THE FUTURE OF CREATIVE WORKSPACES: HOW ORGANIZATIONAL SPACES INFLUENCE CREATIVE WORK

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I, Ozumcan Demir-Caliskan, confirm that the work presented in my thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

ABSTRACT

Creativity has become an essential skill in today's competitive business environment, leading to the expansion of the notion of "creative workspace" beyond traditionally creative industries. Despite growing managerial interest in creating organizational spaces that support creativity and innovation, little is known about how these spaces affect and are affected by creative work. In this dissertation, I examine creativity and its underlying processes of collaboration and learning by foregrounding the effects of work environment.

The first study is a qualitative study in makerspaces – shared workspaces with communal resources – investigating how developing creative projects in a space shared with other independent creators influence creators' experiences and their projects. I theorize the ways in which the copresence of multiple independent creative processes affects the creators' perceptions of themselves and their work, and, consequently, the collective experience in the makerspace. The second study focuses on how organizations use spaces to harness their members' personal interests for creativity, innovation, and learning. Based on a qualitative investigation at two design agencies, I uncover two distinct ways organizations and their members co-create spaces for exploration and play by negotiating their diverging needs and interests. In the final chapter, I review and synthesize research on physical space and creative work and propose an agenda for future research on creative workspaces.

IMPACT STATEMENT

Existing research on creativity often describes the work environment as a backdrop for the creative process. However, the findings from my empirical studies and insights from my literature review suggest that where people do creative work plays an important role in shaping their creative processes and outcomes. The knowledge and insights uncovered in this dissertation contribute to academic research and provide important implications for managers and practitioners seeking to support and manage organizational creativity.

Chapter 2 provides an in-depth exploration of makerspaces, where independent creators work in the same space. This research advances the theory of creative process by uncovering how the intersections of multiple independent creative processes affect individual and collective experiences. The findings reveal that the presence of creators with diverging interests and levels of expertise, in combination with access to a variety of resources to enact ideas, is crucial for establishing an environment where people learn new skills, uncover new ideas, and hone their expertise. This insight is particularly relevant for organizations managing multiple independent creative processes and looking into establishing spaces that support creativity and learning.

In Chapter 3, I explore how organizations can harness their members' personal interests. My findings illuminate two distinct approaches through which organizations can create spaces for employees to bring in and develop ideas stemmed from their personal interests. This study highlights the challenges of pursuing personal interests at work and uncovers ways that organizations and their members negotiate how to navigate these tensions. This research can be of benefit to organizations wishing to

support their employees' creativity and employees wishing to explore their personal interests at work, as it shows that drawing clear boundaries around work can have the effect of turning the rest of the organization into a space for exploration and creativity. The findings and learnings from this study were shared with the participating organizations, and I received encouraging comments about how this research helped them reflect on and refine their processes of managing creativity and innovation. Moreover, this research contributes to the academic research on organizational creativity by theorizing how organizations can turn an individual resource into a collective one by calibrating their members' sense of psychological ownership over their ideas.

Finally, Chapter 4 of this dissertation contributes to our scholarly understanding of the relationship between physical space and creative work by synthesizing this fragmented area of research and developing recommendations for future research. Organizing the insights from existing studies in a way that differentiates between different forms of creative work could provide useful guidance for the planners and designers of physical work environments.

In sum, this dissertation provides a deeper understanding of how organizational spaces could affect creative work.

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This is probably the only section of my dissertation that my family and friends will actually read. The key message is I love you all and I could not have done this without your support. You can keep reading, or we can go celebrate.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

As work becomes increasingly dynamic and complex, creativity – the ability to develop something novel and useful –has become one of the key skills necessary for achieving organizational success (Amabile, 1996; George, 2007; World Economic Forum, 2020). Early organizational research on creativity focused primarily on how individual differences, such as motivation, creative thinking skills, and domain-related skills, affect creative processes and outcomes (Amabile, 1996). However, scholars have increasingly called for more attention to be given to the work environment where creative activities take place (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Amabile & Pratt, 2016). In response to these calls, creativity scholars have primarily focused on the social work environment, investigating the effects of support, freedom, and autonomy on creativity (Amabile et al., 1996; Mathisen & Einarsen, 2004; Isaksen, 2022). In recent decades, however, organizational space has been recognized as an important part of the work environment that influences how people behave and interact (Elsbach & Pratt, 2007; Khazanchi, Sprinkle, Masterson, & Tong, 2018; Stephenson, Kuismin, Putnam, & Sivunen, 2020).

Today, organizations are increasingly interested in creating spaces that facilitate creativity and innovation. A common approach to establishing a creative workspace has been incorporating unusual and fun elements, such as comfortable sofas, foosball tables, and adult-size playgrounds, as symbols of the organization's dedication to freedom, out-of-the-box thinking, and imagination (De Paoli, Sauer, & Ropo, 2019). The underlying assumption of this approach is that the physical environment can support creativity by communicating and reinforcing a creative organizational culture (Tesluk,

Farr, & Klein, 1997). Another common approach to establishing spaces for creativity has been to create spaces that are physically and socially separated from the regular work environment, such as innovation labs (Lewis & Moultrie, 2005), makerspaces (de Vaujany & Aroles, 2019), and open creativity labs (Schmidt & Brinks, 2017). Scholars have argued that these spaces can encourage experimentation and generation of new ideas due to their distance from traditional ways of doing things and insulation from managerial oversight (Hendry & Seidl, 2003; Furnari, 2014; Bucher & Langley, 2016).

These approaches, however, "render the [creative] work itself invisible" (Alexandersson & Kalonaityte, 2018), overemphasizing the aesthetic and symbolic experience of organizational spaces. Given the growing managerial interest in supporting creativity and innovation through organizational spaces, the time is ripe to investigate how organizational spaces affect and are affected by creative work. Creative work involves a series of processes by individuals or groups, including identifying a new problem, preparing for idea generation, generating ideas, evaluating generated ideas against criteria, and implementing the selected ideas with the intent of developing something novel and useful (Amabile, 1996; Amabile & Pratt, 2016; Harrison, Rouse, Fisher, & Amabile, 2022). Creative workers often move back and forth between these stages with the input and help from other people until they generate a creative outcome and then repeat the same process for other problems over the course of their careers (Perry-Smith & Mannucci, 2017; Ananth & Harvey, 2023).

Given the complex nature of creative work, which involves multiple stages and multiple actors, the relationship between organizational space and creative work is likely to be a complex one that requires a deeper scholarly understanding. How does sharing

a space with other creative workers affect one's creative process? What happens when employees are given a legitimate space to explore their personal ideas? How does physical space affect different forms of creative work? In this dissertation, I explore these questions by foregrounding the role of organizational space in shaping creative work.

This dissertation comprises two empirical studies and a literature review, presented in three main chapters. Chapter 2 is a qualitative investigation of the experience of developing creative projects in a space shared with other independent creators. We conducted a qualitative study in two makerspaces – shared workshops providing communal resources for designing and producing artifacts – and collected data for more than 450 projects. The findings reveal that these spaces facilitate creativity and learning *through* distraction and suggest that the intersections of multiple creators and projects generated a "creative current". While previous research has focused on how non-work-related elements in the organizational space can help organizations create and communicate a creative and innovative culture, this study highlights that multiple, collocated yet independent, creative processes can generate an environment for creativity and learning by influencing one another and shaping how people see themselves and their work within this space.

Chapter 3 presents a qualitative study on how organizational space can be used to harness employees' personal interests for organizational creativity and learning. Our findings reveal that exploring personal ideas at work has a dual nature that blurs the distinction between work completed for the organization and personal endeavors. This dual nature implies that even when organizations provide safe and legitimate spaces to

explore personal interests, employees still feel the need to negotiate the relative novelty of their proposed exploration, the openness of their process, and the ending of their exploration. The grounded model developed through this study offers new insights into the complexities of organizing for creativity and innovation. The findings indicate that providing dedicated spaces for creativity and exploration is not the only way to encourage and support employees in generating new ideas and learning new skills. Instead, organizations can separate routine work from exploratory creative work by bounding work practices, allowing creative ideas to permeate the entire organization more organically.

In Chapter 4, I review and synthesize literature on physical space and creative work. I consolidate the review findings into a comprehensive framework that delineates the needs of different forms of creative work (deep, collaborative, and serendipitous) and physical space elements that can support those needs. This chapter concludes the dissertation by outlining an agenda for future research on organizational space and creativity, inviting scholars to pay closer attention to processes of creative work and emerging technologies and work trends when theorizing the relationship between physical space and creative work.

Taken together, these three studies serve the overarching purpose of illuminating the relationship between organizational space and creativity by making the creative work “visible”. The findings of this dissertation suggest that the way organizational spaces are established, in combination with how they are used during creative work by the organizational members, can help individuals and organizations to develop new ideas, learn new skills, and build relationships. Theoretically, these findings contribute to

our understanding of organizational creativity and provide new insights for the future of creative workspaces. Practically, the findings of this dissertation provide a roadmap for organizations seeking to establish spaces that support their employees' creativity.

2. MANAGING THE CREATIVE CURRENT: HOW MAKERSPACES FACILITATE LEARNING AND CREATIVITY THROUGH DISTRACTION

Designing and producing novel and useful products is no longer limited by the bounds of traditional organizations. The emergence of flexible employment relationships (Spreitzer, Cameron, & Garrett, 2017) and new design and production technologies, such as 3D printing and computer-aided design (CAD) tools, enable people to navigate the idea journey from idea generation to production independently (Browder, Aldrich, & Bradley, 2019; Lifshitz-Assaf, Lebovitz, & Zalmanson, 2021). While creating outside the boundaries of an organization gives creators autonomy, lack of access to key resources and isolation from others might stifle their creativity and learning (Garrett, Spreitzer, & Bacevice, 2017; Blagoev, Costas, & Kärreman, 2019).

Makerspaces—shared spaces that provide communal resources to design and produce artifacts—have emerged with the promise of supporting independent creators by providing access to the tools, knowledge, and support needed to realize ideas (Anderson, 2012). Since the early 2000s, the number of makerspaces has grown substantially; as of 2020, there were over 2400 officially reported community-operated makerspaces worldwide (Hackerspaces, 2020) and many more makerspaces in universities (Bill & Fayard, 2017), schools (Dougherty, 2012), libraries (Burke, 2014), and organizations (Rieken et al., 2020). Success stories of people learning new skills, finding collaborators, and starting up businesses in makerspaces have led practitioners, policy makers, and scholars to speculate that these spaces could “democratize innovation” and be a catalyst for “the next industrial revolution” (Von Hippel, 2005; Anderson, 2012; Markillie, 2012; Hatch, 2014).

As makerspaces have grown in popularity, they have also attracted attention from management scholars (e.g., Browder et al., 2019; Gorbatai, Dioun, &Lashley, 2021; Lifshitz-Assaf et al., 2021). On the one hand, scholars have highlighted the potential for makerspaces to be “knowledge creation and sharing spaces” (Browder et al, 2019, p. 459). It is argued that these spaces can promote learning and creativity (Caccamo, 2020) by creating an environment for “chance and randomness” (Halbinger, 2018, p. 2035). Organizational research affirms that informal interactions with diverse groups of people in shared spaces beyond the boundaries of traditional organizations can foster new ideas (Furnari, 2014; Cohen, Bingham, & Hallen, 2019). On the other hand, working in a shared space with so many different tools, projects, and creators can also make makerspaces difficult places to work (de Vaujany & Aroles, 2019). Interacting with others in close physical proximity may expose people to too many stimuli and thus may lead them to experience shared workspaces as distracting (Oldham & Brass, 1979; Leroy, Schmidt, & Madjar, 2020). Thus, it is critical to understand the processes through which makerspaces might, if at all, realize their promise of facilitating creativity and learning.

To understand how working in makerspaces influences independent creators and their projects, we carried out a qualitative study of project work in two makerspaces using data from over 75 hours of participant observation, 40 semi-structured interviews encompassing 191 projects, and an archival search of 52 member profiles and 250 additional projects documented on the online forum with over 2000 individual messages. We found that makerspaces facilitate creativity and learning *through* distraction. Specifically, our analysis reveals that when designing and producing

artifacts in makerspaces, the presence of other makers, tools, and projects pulled people's attention in new and unexpected directions. We call this inspiring yet potentially distracting experience the *creative current* and identified three distinct orientations that makers adopted toward it (anchoring, navigating, drifting). The orientation makers adopted for a given project affected how others responded to them and their projects and consequently where their attention was pulled. Because each orientation has distinct implications for the creator, the focal project, and the collective experience in the makerspace, we theorize that the combination of all three orientations sustains the creative current and increases the potential for individual and collective creativity and learning. These insights contribute to organizational research by building theory on processes within makerspaces (Browder et al., 2019) and how actors balance inspiration and distraction in shared spaces during creative work (Furnari, 2014; Hallen, Cohen, & Bingham, 2020; Lifshitz-Assaf et al., 2021).

THEORETICAL BACKGROUND

To situate our findings within extant theory on creating in the presence of other creators, we turn to two separate but relevant streams of research on (a) organizational spaces and (b) creative processes.

The Stimulating Effects of Creating in the Presence of Others

Some scholars argue that creating in the presence of others stimulates creativity and learning for three primary reasons. First, creating in the presence of others increases the chances of being exposed to diverse knowledge and perspectives. For example, discussing ideas with others helps people to reframe the original problem, re-evaluate what they already know, and recognize alternative solutions that they

otherwise were unaware of (Hargadon & Sutton, 1997; Hargadon & Bechky, 2006; Harvey, 2014). Supporting this idea, some studies have found that open common areas allow creative workers—such as video game engineers (Cohendet & Simon, 2016), and toy and product designers (Elsbach & Stigliani, 2019)—to have impromptu brainstorming and problem-solving conversations that lead to improvements in their creative work. Sharing spaces with other creators facilitates chance encounters and, thus, increases the likelihood of such informal interactions (Alexandersson & Kalonaityte, 2018; Elsbach & Stigliani, 2019).

Second, the presence of others facilitates exploration by inspiring curiosity and tacit learning (Bresman, 2013; Bridwell-Mitchell, 2016; Lee, 2019). For instance, in Harrison and Rouse's (2014) study of the coordination of creative work in modern dance, choreographers and dancers indicated that "they need others around for [their] curiosity to flourish" (p. 1269). The knowledge and skills needed for exploration are often tacit and difficult to articulate (Collins, 2010). Therefore, scholars have argued that the best way to acquire tacit knowledge is to observe others in action (Nonaka & von Krogh, 2009; Stigliani & Ravasi, 2018). For example, Lee (2019) found that the spatial proximity of peers leads to more exploration because people can transfer diverse knowledge and skills more effectively when collocated.

Finally, the presence of others provides help and support needed to manage the challenges of the idea journey. Creators benefit from timely feedback (Harrison & Rouse, 2015; Grimes, 2018; Hoever, Zhou, & van Knippenberg, 2018) and help (Hargadon & Bechky, 2006; Fisher, Pillemer, & Amabile, 2018) to improve their ideas and turn them into tangible outcomes. Prior studies have shown that physical space

plays an important role in facilitating such interactions. For instance, Fisher, Pillemer, and Amabile (2018) found that project space and artifacts conveyed valuable information about the project's status and the team's need for help. Similarly, Stigliani and Ravasi (2012) found that project rooms facilitated the exchange of feedback between designers because all the project-related artifacts were collected in these spaces as they worked on the project.

The Distracting Effects of Creating in the Presence of Others

In contrast, other scholars have argued that creating in the presence of others might inhibit creativity and learning. Shared spaces, while providing transparency and physical closeness, may lead to excessive stimulation and distract people from attending to the project at hand (Khazanchi et al., 2018). Scholars argued that when work requires attentional focus, people benefit from the privacy that physical separation provides (Elsbach & Pratt, 2007). Sharing spaces with others, however, exposes people to alternative outlets for attention, such as background noise and others' activities (Oldham & Brass, 1979; Coradi, Heinzen, & Boutellier, 2015; Leroy et al., 2020).

Another reason shared spaces can hinder experimentation and learning is that, paradoxically, people are less willing to have informal, meaningful conversations in these spaces (Bernstein, 2012). As Becker et al. (1983) put it, "[Informal] interaction is facilitated not by unlimited opportunities for interpersonal contact, but by the opportunity for privacy" (p. 723). Supporting this idea, an ethnographic study of office common areas (e.g., watercoolers, photocopier rooms) revealed that a balance of openness and privacy is needed for people to have meaningful interactions with others (Fayard & Weeks, 2007). Similarly, Irving, Ayoko, and Ashkanasy (2020) found that employees

often avoid collaboration in spaces specifically designed to promote serendipitous encounters by adopting strategies to minimize the chance of them occurring. Thus, researchers have argued that physical proximity does not guarantee serendipitous encounters and exchanges between people (Dale, 2005; Irving et al., 2020).

Finally, creating in the presence of others may promote conformity rather than creativity (Uzzi & Spiro, 2005). In diverse organizational settings, people generally prefer to interact with others who hold similar views and information. People with the same characteristics are gradually socialized into sharing similar perspectives, norms, and information through repeated interaction (Skilton & Dooley, 2010). This limits opportunities for interactions with diverse others, reducing the chances of radical creativity emerging through social interactions (Madjar, Greenberg, & Chen, 2011).

Creating in Makerspaces

We define makerspaces as shared spaces that provide a wide variety of communal resources for people to design and produce varied artifacts. In makerspaces, independent creators work in the presence of other creators without necessarily working toward a common outcome. As makerspaces have been growing in number and popularity, management scholars have begun to use them as a context to understand various organizational phenomena. For instance, scholars have studied maker events to understand how identity and emotion affect the legitimatization of a new field (Gorbatai et al., 2021), hackathons at makerspaces to theorize accelerated innovation (Lifshitz-Assaf et al., 2021), and tours of makerspaces to investigate how people develop an embodied experience of a new space (de Vaujany et al., 2019). While these studies suggest that makerspaces are an increasingly important context for organizational

scholars to attend to, an important question remains unanswered: How do people actually use makerspaces to gain their theorized benefits?

Extant research on organizational spaces and creative processes shows that creating in the presence of others is a complex process that offers the potential for both inspiration and distraction. However, there are two important issues with existing research that suggest the need for a new theory and for richer conceptual understanding of how makerspaces may "impact the approach individuals and groups take in the development of new products outside traditional, large corporations" (Browder et al., 2019, p. 473).

First, organizational research has focused on the development of a single creative project or idea (Amabile & Pratt, 2016; Perry-Smith & Mannucci, 2017), providing limited insights into how multiple independent projects developing in the same space might influence one another. Makerspaces, however, feature parallel projects from multiple creators. While proponents of makerspaces believe that exposure to others' projects may spark learning and new ideas (Von Hippel, 2005; Anderson, 2012; Hatch, 2014), how one project might influence another concurrent one in the same space remains an overlooked, but potentially important, issue. Multiple creators working on independent yet parallel projects is an increasingly prevalent practice in traditional organizations, as well. For example, Cohendet and Simon (2016, p. 618) described their research setting—a video game company—as a project-led organization "with a portfolio of approximately 15 to 20 projects in parallel" where "each project is independent, and the project manager literally acts as a semiautonomous entrepreneur." Many other types of organizations feature such project-based

autonomous organizing (Hobday, 2000; Cacciatori, Tamoschus and Grabher, 2012), such as professional service firms and academic departments. Despite its prevalence, the dynamics of multiple creators working on independent projects in the same space are not well integrated into existing theory on creative processes or shared spaces.

Second, most research has focused on traditional organizational settings, in which workers share organizational or project-level goals. In other words, the kinds of interactions studied in the organizational literature, such as group brainstorming (Sutton & Hargadon, 1996), helping (Hargadon & Bechky, 2006; Fisher et al., 2018) and feedback (Harrison & Rouse, 2015), are driven in part by common goals and group- or organization-level interdependence. In makerspaces, however, creators pursue projects independently and lack any formal interdependent goal. Members of these spaces also often have different backgrounds, interests, and goals (Gorbatai et al., 2021). The opportunity to socialize with a like-minded yet diverse group of people is believed to support learning and creativity (Furnari, 2014; Browder et al., 2019). Recent studies on makerspaces suggest that the presence of other people can be even more important than having access to tools and materials (Hynes & Hynes, 2018). For example, makers reported that socializing and learning were the top two reasons they joined makerspaces, with making ranking third (Sleigh, Stewart, & Stokes, 2015). However, varying levels of power, knowledge, skills, and interest may lead people to have different experiences despite physically being in the same space (Taylor & Spicer, 2007). Therefore, to understand and theorize how makerspaces are used and experienced (Stephenson et al., 2020), it is necessary to consider the multiplicity of the space's users.

Given these issues, we thus ask the research question: How do independent creators working in shared spaces manage the possible tensions between the potential for inspiration and distraction from other parallel creators and projects? We address this question in an inductive, qualitative study of makerspaces.

METHODS

Research Setting

As there is little formal theory on makerspaces, "rich, detailed, and evocative data are needed" to understand and theorize the previously unexplored processes in these spaces (Edmondson & McManus, 2007, p. 1162). We designed a qualitative study to develop a theory of how people work in makerspaces (also called hackerspaces, fablabs, co-making spaces, or innovation labs), which vary in size, operation strategy (community-run vs. professionally managed), and portfolio of tools and equipment (Hatch, 2014; Sleigh et al., 2015; Dougherty & Conrad, 2016; de Vaujany et al., 2019) but have three primary characteristics.

First, makerspaces are shared spaces that provide a wide variety of communal resources for members. The resources are typically large, costly tools and equipment that might be challenging for independent makers to acquire (e.g., table saws, 3D printers, pottery wheels, metal working equipment), introductory training demonstrating how to use them (Dougherty & Conrad, 2016), and examples and descriptions of prior projects (Browder et al., 2019). Second, in providing a wide variety of resources, makerspaces attract both professionals (e.g., entrepreneurs, artists, designers) and hobbyists with diverse backgrounds and interests who will undertake projects in different domains (e.g., woodworking, electronics, fabric, 3D printing) (Browder et al.,

2019; Gorbatai et al., 2021). Activities undertaken at makerspaces range doing from do-it-yourself projects, such as refurbished furniture and lino prints, to producing high-tech prototypes, such as prosthetic hands and robots. Third, shared space facilitates transparency in the making process, such that community members can observe different kinds of tools in action across multiple projects (de Vaujany & Aroles, 2019).

We identified potential locations to conduct our research through industry reports and online repositories that list local makerspaces. As part of our "preparatory work" to gain access (Feldman, Bell, & Berger, 2004), the first author attended introductory tours of four makerspaces, where the director or an experienced member explained how the space works, introduced the available tools, and showed a selection of projects completed there. After each visit, we conducted an informal interview with the director of the makerspace and available members. Interviews with five makerspace directors were purposely broad in scope, covering the history of the space, profiles of the members, the facilities, and the maker movement in general. During this period, the first author also attended several maker events including maker festivals and exhibitions to familiarize herself with the context.

We focused our data collection on two makerspaces: one open to the public (*PubMake*) and another one located inside a large university (*UniMake*). The first author became a member of both makerspaces and had access to their facilities and resources. Table 2.1 provides comparative information regarding our research sites.

[Insert Table 2.1 here]

Our data collection and data analysis proceeded together and involved multiple rounds of iteration (Golden-Biddle & Locke, 2006). For the sake of clarity, however, we describe our data collection and data analysis processes separately.

Data Collection

We aimed to gather information about how people work in makerspaces, with a particular focus on the interaction between makers, projects, and tools as they create artifacts in a shared space. We relied on multiple data sources, including participant observations, semi-structured interviews, and archival documents to construct a more complete process story (Lincoln & Guba, 1985). Table 2.2 summarizes the data sources.

[Insert Table 2.2 here]

Participant observation. In addition to the 10 hours of observation done during our exploratory visits, we conducted a total of 65 hours of participant observation in UniMake (30 hours) and PubMake (35 hours) to see and experience the making process in makerspaces. The first author participated in activities as any member of the makerspace would. That included attending tool training sessions, workshops, and members' meetings, participating in community events, and completing several projects such as printing cards, laser cutting coasters, engraving a wood panel, sewing an eye mask, and turning a clay pot. Her participation in makerspaces as an active member provided a rich understanding of how these spaces work and what making activities entail.

Moreover, participant observation provided opportunities to interact with makers using various areas of the makerspaces. When in the field, the first author also had

impromptu conversations with other makers about their projects, which helped to clarify what we observed. After each visit, the observations and the content of these informal conversations were captured in the form of field notes (Emerson, Fretz, & Shaw, 2011) and shared with the second author in weekly meetings.

Interviews. In addition to the informal interviews that regularly occurred in the field, we conducted 35 semi-structured interviews with the members of UniMake (8) and PubMake (27). Of the interviews, 35 percent were with creative workers (e.g., artists, craftworkers, entrepreneurs), 48 percent were with hobbyists, and the remaining 17 percent were with makers who started as hobbyists and became entrepreneurs over their time at the makerspace. The interviews lasted from 30 minutes to over 2 hours with an average duration of 1 hour. All interviews were audio-recorded and transcribed.

Whenever possible, interviews were conducted in the makerspaces, so that informants could show their work environment and projects in the making. Doing so also helped us observe their relationships with other makers. For example, some of the interviews were interrupted by another maker asking for help or borrowing a tool from the informant. Similarly, some informants greeted their friends, asked about their projects, or made comments on another maker's choice of materials and tools during the interviews. When appropriate, we followed up on such conversations to understand our informant's involvement with the given project.

Initially, we focused interviews on why informants joined the makerspace, what projects they were working on, and how they were engaging with the community. Consistent with an interpretive, inductive approach to research (Locke, 2001), our interview protocol changed over time. As our research evolved, we began asking more

detailed questions about informants' making processes to understand behaviors before, during, and after a particular project. As our data collection and analysis unfolded, we used theoretical sampling (Corbin & Straus, 2015) to identify informants who could fill in potential gaps in our emerging theory. For example, when the importance of relative expertise became apparent, we interviewed makers who were visibly experienced in a domain (e.g., volunteer technicians, workshop organizers) as well as new members who joined the makerspace with little or no prior experience in a given domain.

Archival documents. As we developed our theoretical model, we used archival data sources to supplement our analysis. Initially, these documents helped us familiarize ourselves with the settings by providing information about the mission, organizational structure, and member profiles of these makerspaces. Moreover, by following their social media and web pages, we were able to keep track of the past, current, and upcoming events at these makerspaces and plan our visits accordingly.

Later, we used archival data to refine our emergent theory. UniMake published eight annual reports (1376 pages) including 52 member profiles during our data collection. These profiles included detailed summaries of members' backgrounds and projects completed at the makerspace, accompanied by direct quotes from makers describing their experience at UniMake and what they liked most about working there. PubMake had an online discussion forum where members shared their projects, received feedback and advice from the community, and asked for help from others. Whenever available, we tracked our informants' member profiles and online posts to support and triangulate evidence from observations and interviews.

In addition, PubMake's project-related online discussions were especially useful in fleshing out our emergent theory (250 projects documented with over 2000 individual messages). Such systematic documentation of the projects and corresponding interactions between members allowed us to uncover otherwise hidden processes. For example, on one project thread, a maker provided detailed documentation of his 3D printing project with an open-source 3D model. Months later, another maker used that model to replicate the project and shared his version on the same thread thanking the other maker. These archival data sources thus provided us with opportunities to observe and theorize both the short- and long-term consequences of project work at makerspaces.

Data Analysis

We began our analysis while data collection was ongoing. We met regularly to review field notes, interview transcripts, and memos and to discuss emerging insights. These conversations helped us leverage the benefits of insider-outsider perspectives (Bartunek & Louis, 1996) and minimize the risk of the first author "going native" (Gioia, Corley, & Hamilton, 2013). Given the first author's prior experience with product design and her immersion in the field, she was able to offer insights into the processes from the makers' side. The second author, who was not familiar with makerspaces before the study, was able to question taken-for-granted issues and pinpoint practices that were meaningful for theory building.

During these conversations, we realized that projects play a central role in all the interactions and experiences in makerspaces. In early fieldnotes, the first author noted: "They [members of the makerspace] really care about ongoing projects. Most

conversations revolve around the question, “What are you working on?” I feel like I should immediately start making something to be part of these interactions.” Insights like this focused our data analysis on ongoing project work.

Step 1. Organizing data for coding. We carefully read interview transcripts, fieldnotes, and archival data to identify all the projects our informants worked on during their time at the makerspace. By triangulating our interviews with other data sources, we identified 191 projects across 35 informants, with each informant having data for a minimum of two and a maximum of 12 projects (see Table 2.3). Archival sources provided data on 250 additional projects documented on PubMake’s online discussion forum. Organizing data into projects allowed us to manage large volumes of data and define our analytic focus (Langley & Ravasi, 2019; Locke, Feldman, & Golden-Biddle, 2020).

[Insert Table 2.3 here]

Step 2. Coding the practices and interactions. Next, we turned to open coding to identify the processes associated with project work (Locke, 2001). Remaining close to our informants’ language, we noted the practices and interactions involved in the process of designing and producing a physical artifact. For instance, we coded different ways that makers used tools and materials while working on their projects as “using own resources”, “using communal resources”, and “borrowing resources”.

To our surprise, our informants often reported engaging in activities that they had not planned to do as they worked on a particular project. Statements like “I ended up helping [another maker] instead [of working on my own project]”, “I ended up being a lathe inductor”, “[the community] changed the way I was going to make”, and “I changed

my mind and made it using concrete instead" showed that their initial plans changed over time. However, we noticed that how their plans changed differed across projects. With this recognition, we reengaged with our data with an eye to theorizing the key processes behind these differences.

Step 3. Comparative coding across projects. As we focused our analysis on searching for differences and commonalities across project processes, we organized the previously generated codes using a temporal bracketing strategy (Langley, 1999). We analyzed each project by reviewing all the practices and interactions that happened before, during, and after the making of a particular artifact. We moved from open coding to axial coding as we compared and contrasted data from different projects to develop concepts (Corbin & Strauss, 2015).

In this stage of the analysis, we constructed project summaries to refine emerging concepts. Project summaries, as an analytic artifact, provided us with new ways of seeing our data and facilitated the process of constant comparison (Locke et al., 2020). Project summaries were constructed using previously coded data on how informants decided to do a particular project, how they gathered the necessary skills and resources, how they made the physical object, and how they engaged with other makers during and after the making process.

Step 4. Building a theoretical model. Through multiple rounds of coding and analysis, we identified three different ways that project work unfolds in makerspaces. These orientations differed in how people engaged with available resources and other makers, how others reacted to their work in turn, and consequently where their attention was pulled to. Our "conceptual leap" was to use a metaphor of an ocean current to

theorize this process (Klag & Langley, 2013). In the final stage of our analyses, we combined the emerging constructs in a theoretical model (Figure 2.1). We considered and produced alternative conceptual frameworks and visual representations (Langley & Ravasi, 2019) before we assembled the one that best fit the dynamics we observed.

[Insert Figure 2.1 here]

FINDINGS

Makerspaces we observed lived up to their reputation as both inspiring and potentially distracting workplaces. As an excerpt from our fieldnotes recounts, this was evident even in our earliest visits:

> It was 7:30 P.M. when I arrived at the makerspace for the open evening. A maker with a laser-cut name tag welcomed me. I started looking around, trying to make sense of all the messiness. On my right, there was a woman sewing an apron. Next to her, at the electronics bench, there were two men having a deep discussion on which sensor would work best for the mini robot. Meanwhile, I could hear the sound of a 3D printer in the background, wondering what was being made. Then, the tour started. We walked into another room where two makers were trying different dyes for screen printing while talking to a jewelry designer laser cutting a necklace. Then, we walked into the wood workshop full to the brim with tools and scrap wood. As we walked in, a man raised his head from the wooden box he was making and smiled at us. As we came back to the main room, our host offered us tea and biscuits from the kitchen and reminded us that £20 per month is nothing compared to what we could get in exchange. *(Excerpted from field notes, the first visit to PubMake)*

Our observations revealed that exposure to a broad range of tools and materials, people with diverse skills and interests, and projects spanning various areas and techniques pulled makers' attention in new and unexpected directions.

We use a metaphor of an ocean current and refer to the pull makers experienced to attend to new activities, ideas, or opportunities as the *creative current.* As an informant told us:

> I don't think that the experience can be labelled as one [experience]. It can be distracting, sometimes it can be very stimulating, [and] other times it can actually

> be extremely helpful because you might realize that something can be done in a much more effective way. [U5]

Similarly, other informants described what they experienced at the makerspace as “a buzz of ideas” [U7], “a creative energy” [U6], and “a collective ADHD” [P25]. It was consistent among informants that the creative current had a multi-faceted nature—that it was “stimulating,” “distracting,” and “helpful.” Our analysis of the project work at makerspaces revealed that while available tools and materials, active members, and projects were idiosyncratic to each makerspace, the distinct ways in which makers engaged with those elements during a project systematically shaped the different directions that the creative current pulled their attention in.

We identified three distinct orientations toward the creative current that makers adopted for a given project: *anchoring, navigating,* and *drifting.* We found that makers’ orientation could vary from project to project, rather than being a stable characteristic of a maker (see Table 2.3). Each orientation had different consequences for the focal maker and their work. Moreover, these different orientations complemented one another in shaping the experiences of other members, building and maintaining the makerspace, and sustaining the creative current itself.

When anchoring—like vessels that anchor to prevent being pulled too far away from a particular location—makers intentionally resist the creative current during their project work to avoid being pulled too far away from the project at hand. Their self-sufficiency in making is perceived as a sign of expertise and attracts others’ admiration and curiosity, which then pulls the anchoring makers toward activities that require them to share their knowledge and skills. Consequently, anchoring expands the resource pool and brings people together around certain domains.

When navigating—like vessels that adjust their location in relation to the wind and current to reach an intended location—makers use the creative current to figure out how to realize their project ideas. As others inspire them to explore new ways of making, navigating makers end up reimagining their projects and changing the way they materialize their ideas. As a result, navigating uncovers different uses of existing resources and bridges makers across making domains.

When drifting—like vessels that are carried away by the current without exerting much control over the direction—makers let the creative current take them where it will even before having a concrete idea for a project. Through guidance and help from others, they often end up initiating unforeseen projects that imitate or closely build on others' prior work. Thus, drifting surfaces resources and builds relationships. Table 2.4 provides an overview of the three orientations and Figure 2.1 illustrates their relationship.

[Insert Table 2.4 here]

Anchoring

When anchoring, makers have a specific idea about what to make and use makerspaces to access critical tools to execute their ideas. During the process of making, they refrain from exploring other tools and materials and getting input from other makers. Instead, they focus on the project at hand, relying on their own knowledge and abilities. Their relatively closed process signals forethought and effort toward a clearly defined project and, in turn, attracts other makers' attention. Having others showing interest in their work leads these makers to divert their attention into activities during which they are expected to use their expertise in doing a particular

project. Below we use the story of Wes [P2], who got pulled into organizing a luthier [stringed instrument makers] group in the makerspace as he attempted to make a guitar, to illustrate the anchoring orientation. Table 2.5 provides more illustrative cases of anchoring.

[Insert Table 2.5 here]

Anchoring makers shield themselves from the creative current. Anchoring makers seek to minimize their exposure to stimuli that could lead them to deviate from their ongoing project. The first part of Wes's guitar-making journey illustrates how he intentionally sought to shield himself from the creative current:

> [Summary of Wes [P2]'s guitar-making project - Part 1] Wes joined the makerspace after realizing that he would not be able to make a guitar using the tools he had at home. His main motivation for joining the makerspace was having access to the band saw that would allow him to cut a guitar body as precisely as he hoped. He bought high-quality wood without consulting anyone, put on headphones when working in the makerspace to tune out distractions, and "made some attempt to use" the band saw by himself, with which he had little experience. Expectedly, his first attempt to make a guitar failed. He told us: "After the failed one, I said to myself: 'I am actually going to write all of the things that I need to do step by step.' And it took me a couple of months to get that list. When I came to make the second one, I just followed that list." In his next attempt, Wes relied heavily on his detailed plan composed of over 200 steps. This time he "knew exactly what [he was] doing." When in the makerspace, he directly walked into the wood workshop, laid out the full-scale template he drew as a reference, and took every measurement with great care to make sure that his guitar had "very few visible mistakes." To further improve his craftsmanship, he bought specialist fretting tools and radius gauges so that he could make precise guitar necks.

For those adopting an anchoring orientation, the makerspace was used primarily to have access to critical tools (in Wes's case, the band saw). For other tools and materials, they often relied on their own resources rather than making do with the ones provided by the makerspace, which were often not specifically intended for the project at hand. For Wes, this meant ordering higher-quality wood than was available in the

wood workshop. In other examples of anchoring (see Table 2.5), makers similarly brought higher-quality resources and tools into the makerspace, such as specialized cloth and zippers (U6 Climbing Bag) or jewelry saws and drills (P6 Coin Jewelry). Bringing in and using their own tools and materials limited these makers' exposure to similar resources available at the makerspace.

We observed that to limit their engagement with other makers, anchoring makers distanced themselves by finding quiet spots to work, wearing headphones, or avoiding eye contact. As in Wes's case, they often refrained from asking others questions, such as which wood to buy or how to cut a guitar body, to avoid being, as an informant put it, "an ask-hole" who "constantly asks stupid questions or questions that you can find answers to with a simple search" [P1]. Instead, when adopting an anchoring orientation, makers sought to figure out how to do a project independently, often physically isolating themselves from other makers. For example, P27 (see 8-bit Computer project in Table 5) had limited experience with electronics when he decided to make an 8-bit computer from scratch. Instead of asking for guidance from other makers, he relied on books and online sources to teach himself how to work with electronics and he found a quiet spot to work in when in the makerspace.

Their efforts to be self-sufficient often resulted in the production and use of detailed planning artifacts, such as drawings, sketches, CAD models, and templates. Wes was not alone in his practice of making a step-by-step plan and drawing a full-scale template. Many anchoring makers agonized over the details of their plans, dragging their sketches from one workstation to another during their project work, and producing jigs and templates to speed up production and increase precision. Using

plans and tangible resources helped anchoring makers stay focused on their current project without succumbing to potential distractions.

Other makers respond with admiration and curiosity. The second part of our summary of Wes's journey illustrates how his clear focus on his project attracted other makers' admiration and curiosity:

> [Summary of Wes [P2]'s guitar-making project - Part 2] We observed that as Wes's project began to take the shape of a guitar, others started making attempts to engage with Wes. They were curious because they often saw Wes taking his specialist tools out of his backpack, laying them on the bench, and constantly checking his to-do list and full-scale plan. Wes told us: "It was a couple of weeks or a month [after I started making the second guitar]. Some people asked, 'What are you making?' [and I said,] 'I am making a guitar.' They said: 'It is so cool, we want to do that!'"

Other makers in the makerspace often perceive the anchoring makers' attempts to shield themselves from the creative current as signs of competence. It is important to note that these makers were not necessarily "real" masters who had years of experience working with a tool or making a particular object. The community assessed their competence relative to the others in the makerspace. As both makerspaces already provided many advanced and difficult-to-obtain tools and materials, bringing in additional specialized tools was interpreted as being particularly committed to and knowledgeable about their current project.

Other makers first watched anchoring makers in action from a distance, trying to understand what they were making. As illustrated in Wes's case, these curious glances were followed by inquiries about the projects. These conversations often started with a simple question of "What are you making?" and were followed by more detailed questions about the tools, materials, and techniques used for the project. At that point, they often came closer to the anchoring maker, touched or pointed to the particular

parts of the project, and asked: “How did you make this?”, “How does this work?”, and “Where did you get this material?” After better understanding the project, they verbalized their admiration by commenting on the quality of the craftsmanship and communicated their desire to learn the techniques involved.

We observed similar processes in PubMake’s online forum. When the anchoring makers shared the finished outcome, other makers not only showed admiration by liking the post and commenting “Nice work!” but also started asking questions about the making process as specific as, “Did you vibrate the cast [when pouring the concrete] at all?”, “For your enclosure design are you using Illustrator/Inkscape or exporting from a CAD program?”, and “How did you get the legs [of the bench] to be the same height?”. These interactions often moved from online to the physical space as people asked to meet with the anchoring makers to learn how to do a particular project or use a particular technique.

Anchoring makers are pulled to share their know-how. Other makers’ admiration and curiosity pulled anchoring makers toward sharing their project-related knowledge more systematically. The last part of Wes’s journey illustrates how he ended up organizing a micro-community of stringed instrument makers (luthiers) at the makerspace:

> [Summary of Wes [P2]’s guitar-making project - Part 3] In response to the makers interested in learning how to make guitars, Wes said: “I’ll show you. It is not that I am an expert on guitars but probably know more than you do about it because I made two.” Then, he shared his idea of starting a luthiers’ group on the online forum to gauge interest: “The group would meet regularly in the makerspace to share ideas and techniques and help out with each other’s designs and builds.” Moreover, pointing out the challenges of having access to the specialist luthier tools, he offered to bring his for others to use. The community welcomed his idea with enthusiasm. The thread he started received more than 100 messages over the course of four months. He told us: “So, I

> started a little luthiers' group. And we met a few times, and I shared some stuff about how to build guitars, I guess. It was really nice. […] It felt like I was actually then contributing to the community rather than just absorbing."

Both for the enjoyment of "contributing to the community" and to deal with the volume of inquiries, when adopting an anchoring orientation, makers were motivated to share what they learned. In both makerspaces, many anchoring makers volunteered to be "technicians" responsible for maintaining the tools they frequently used for their projects and teaching people how to use them safely (see the case of U6 in Table 2.5). Moreover, in response to other makers' curiosity about learning the techniques they used, anchoring makers often organized one-off workshops (e.g., coin-cutting workshop, 3D-modelling workshop, model-finishing workshop) to share their know-how and skills. In both makerspaces, we observed that there was at least one workshop a month organized by the anchoring members.

If there was growing interest in a particular project, tool, or domain, anchoring makers helped organize people into micro-communities so that they could regularly exchange knowledge and skills. Similar to Wes's luthier group, there were knitting circle meetings during lunch breaks at UniMake, electronics nights every Thursday, and hand tool meetups on the first Sunday of every month at PubMake. During these meetups, the anchoring makers facilitated the learning environment by welcoming newcomers, demonstrating particular techniques, and introducing new tools and materials (see cases P6 and P27 in Table 2.5).

Finally, to further encourage and enable others to initiate projects in their domain of interest, anchoring makers often shared project-specific resources, such as planning artifacts and specialist tools and materials. For example, P16 (see Mechanical Task Switcher project in Table 2.5) posted detailed documentation of his project on the online

forum, including the source codes and laser-cutting templates that would allow anyone to initiate a similar project. Our analysis of the online forum posts revealed that anchoring makers tended to share this detailed documentation in response to others' curiosity. For instance, a maker shared a step-by-step description of a bookbinding process with the note, "Lots of people have asked me to write this up, so here it is." Another one wrote: "I built a table recently in the space and thought I should probably share some images here since a few people were watching me make it over the past few weeks!" These posts included the motivation for the project, the list of the materials and tools used, a description of the process (including setbacks and workarounds), and the process photos.

When anchoring, despite trying hard not to have their attention pulled in different directions, makers were recognized as local experts who knew more about a particular tool, technique, or project compared to others in the makerspace and were thus expected to share their know-how. Surprisingly, however, anchoring makers did not mind the distraction and rather enjoyed the attention they received. For example, an informant who volunteered to be a woodworking technician reflected on his experience: "I wouldn't take quite as much enjoyment in [making captive rings on a lathe] if there weren't another person to appreciate it." Another maker echoed his point: "Another part [of sharing your knowledge] is to feel accomplished about that. 'Look what I have done.' It is the adult version of 'Look, mum!'." As these examples illustrate, anchoring, despite not directly changing the way makers make, changes how the focal makers are seen and see themselves in relation to the rest of the community.

Navigating

When anchoring, makers resist the creative current, albeit still being pulled in a new role in the makerspace. By contrast, when navigating, makers intentionally use the creative current by asking for input on their projects in the making. Because their actions signal openness about their process, other makers get involved by sharing ideas, introducing new techniques, and pointing out other possibilities. Inspired by the creative current, makers end up reimagining their original ideas, which often means integrating new components and changing the way they planned to materialize the project. Below we introduce the navigating orientation through the story of Kelly [P13], who ended up turning his interactive game project into a playful musical instrument. Table 2.6 provides more illustrative cases for the navigating path.

[Insert Table 2.6 here]

Navigating makers use the creative current as an input. Navigating makers already had an ongoing project when they engaged with other makers, projects, and resources. As they worked on the project at hand, they also explored the opportunities that the makerspaces offered. The first part of Kelly's journey illustrates how he opened up his process for others' input:

> [Summary of Kelly [P13]'s musical game project – Part 1] Kelly was a professional game designer whose creations were well recognized by the game design community. He joined the makerspace to have access to the laser cutter, but he also acknowledged the importance of the community: "There were a lot of people knowledgeable about the things I don't know about." To get the most out of that knowledge, he consistently invited other makers (including the first author) to play with his prototypes and give him advice and ideas. For example, when he built a hardware LED light controller made from door stoppers, he showed it around: "I built the controller first without having any idea about what it actually should do or what game it should be, if it is a game or whatever it would do. I know it is interactive, so you can touch it and wobble it and there is a display. So where can I go from there?" His openness about his project was also reflected in how he spent his time in the makerspace. Every time the first author visited the

> makerspace, she found him sitting with at least one other maker at the table in the common area, chatting about his projects.

When anchoring, makers limit their interaction with others to focus on their projects; in contrast, when navigating, makers use their in-progress projects to start conversations with other makers. When Kelly showed the controller with cables still hanging from it, others knew he was open to input. Similarly, we observed that P28 (see Light-up Monster Figure project in Table 2.6) often left his in-the-making monster figure on the common table for the resin to set or dye to dry. Whenever someone showed an interest, he started talking about the project and asked for feedback. Showing a clearly unfinished project communicates makers' desires for input rather than appreciation, but, at the same time, the presence of an object in the making prevents others from directing them into a completely new project.

These conversations often started with navigating makers pointing to their projects and asking, "What do you think?" In most cases, they did so by approaching other makers in the makerspace. In other cases, they used the online forum to seek help and feedback. For instance, P18 (see Musical Kites project in Table 2.6) shared work-in-progress photos of his kite project on the online forum and shared his confusion about how to communicate with the kites wirelessly. Navigating makers do not hesitate to point out challenges, admitting their lack of knowledge of parts of the project or soliciting ideas. As an informant put it: "You are not afraid to ask [questions] or someone is not afraid to tell you when you are wrong." They typically asked project-specific questions: "What is the right material to use?", "How can I glue this to that?", and "How can I make a box for this?"

Other makers respond with 'thinkering together'. Once other makers recognize the desire for input, they point the navigating maker toward new possibilities by getting temporarily involved in their process. The second part of Kelly's journey shows how others reacted to his openness about the making process:

> [Summary of Kelly [P13]'s musical game project – Part 2] When Kelly showed the controller he had been working on to others, they responded to it in different ways. Some suggested using a wood base to make it sturdier, and others told him to produce his own springs instead of using store-bought door stoppers. He recalled one particular exchange that changed the course of his project: "The interesting thing is that a lot of people have different ideas about what it should do, and it feeds from their backgrounds as well. A lot of people from music backgrounds told me, 'Oh, this could be like an instrument. It can be a musical instrument of a sequencer where you build songs.' And I know nothing about music. So, I was like… interesting. I didn't even think about this." Later, one of the makers with a music background showed Kelly the sequencer she made and explained how it worked.

As illustrated above, other makers respond to the navigating makers' openness not only by suggesting ideas but also "*thinkering* together". *Thinkering* is an in-vivo term used by the maker community to refer to thinking while tinkering, such that makers typically work with tools and materials while discussing ideas or solving problems. *Thinkering* together begins with the other maker asking the navigating maker questions like "Why don't you use this material?" or "Why don't you do it like this instead?" For instance, in Kelly's case the other maker asked, "Have you consider turning it into a musical instrument?" In U7's case (see Art/Research Installation project in Table 2.6), the other maker suggested using concrete to make sturdier legs. An informant described such interactions: "They will throw lots of ideas at you about what you might be doing. And then sometimes that kind of inspires you to think, 'Actually, that is a thing I could do.'" [P24].

Upon asking a provocative question, the other maker often physically sits down with the navigating maker to experiment together. During this process, two or more makers try to solve a problem, or simply play with the project while talking about ideas. The materials, tools, and techniques used during *thinkering* are not limited to the ones navigating members were already familiar with. Instead, other makers introduce new opportunities by lending tools and materials, pointing to alternative ways of thinking, and showing how to approach the process. For example, P28 was not considering adding electronic components to his monster figure until another member showed him how to control lights using the tools and components available at the makerspace. The other maker's involvement opened a new possibility of combining the model-making with electronics, something that P28 had not considered before. In the following section, we unpack how navigating makers end up reimagining the project at hand.

Navigating makers are pulled toward reimagining their projects. When they engaged with other makers, projects, and resources, navigating makers already had a project in the making but others' involvement pulled their attention toward exploring new possibilities:

> [Summary of Kelly [P13]'s musical game project - Part 3] After playing with the other maker's sequencer, Kelly began to consider integrating musical elements into his game design by reimagining the controller he had been working on. He said: "So, I am collaborating with musicians to see if I can make these things [musical games] happen. [I'll] see what their ideas are and how I can build this into my designs." When we asked whether he had been considering making a musical game, he replied: "I think this entirely comes out of showing the creations to others. That can only happen in social spaces like here."

While anchoring makers manage to finalize their projects as planned, navigating makers reimagine their projects. The focal maker's idiosyncratic needs and desires guide the unusual fusion achieved. The process of reimagining sometimes, as in Kelly's case,

results in the integration of new ideas (e.g., adding musical elements to a game project), which significantly alters the course of the project. Another example is how P25 (see Air Pollution Sensor project in Table 6) reimagined his bulky air pollution sensor design to create a portable version after several makers pointed to its potential as a wearable device. At other times, navigating makers use tools, materials, and techniques they had not previously known to materialize their ideas. For example, U7 ended up using concrete for the legs of her installation project despite having no prior experience with the materials or techniques.

By reimagining the core idea or reconsidering the way they planned to materialize it, navigating makers make new connections, overcome technical challenges, and achieve results that they could not achieve on their own. Therefore, navigating makers told us that they did not mind their attention being pulled in a new direction. As an informant put it: “I would never have finished this thing if I’d started to make it the way I had originally intended to” [P20]. During this process, navigating makers develop new skills, such as how to use a particular tool or material and how to apply a particular technique. But even more importantly, interactions with other members make the navigating makers see their own projects from different perspectives, broadening their range of possibilities.

Drifting

When drifting, makers go with the flow of the creative current by exposing themselves to available tools and materials and by showing curiosity about other makers’ ideas, skills, and ongoing projects. Their curiosity leads other makers to guide them by sharing know-how and resources. Consequently, drifting makers learn to

initiate projects that are new to them, though they may not be new to others. Below we use the story of Terri [P12]—who started making an electronic drumkit that required programming a micro-processor despite lacking prior knowledge and skills in programming—to illustrate drifting (see Table 2.7 for additional examples).

[Insert Table 2.7 here]

Drifting makers follow the creative current. Compared to the other two orientations, drifting makers are more open about how they engage with other makers, projects, and resources. Instead of trying to focus their attention on a particular project, they allow their attention to be pulled in new directions even before having a concrete idea for a project. The summary below illustrates how drifting makers engage with other resources, people, and projects:

> [Summary of Terri [P12]'s electronic drum kit project - Part 1] When she first joined the makerspace, Terri did woodworking projects, such as making stools and tables. At the same time, she attended available tool training sessions, including laser cutting, woodturning, and metalwork, as she wanted to "learn all sorts of things". She also enjoyed chatting with the other makers in the common area when she needed a break. One day, Terri was chatting with Jack about playing drums. Being a drummer herself, Terri mentioned that she wanted to be able to practice anytime and anywhere but the portable electronic drum kits were quite expensive. Jack asked: "Why don't you make one yourself?" Then he showed her a video of someone using sensors and cans to imitate drum sounds. By the end of their conversation, Terri was considering making an electronic drum kit despite having no experience with electronics.

When drifting, makers let the creative current take them where it would. This involved trying new tools and materials, signing up for training, interacting with other makers, and playing with others' projects "just because there was an opportunity". An informant told us about the importance of pursuing opportunities: "One of the things you need to do [at a makerspace] is to be alert for exciting opportunities" [U5]. For instance, Terri attended many tool training sessions and spent time with other makers. Doing so exposed her to

new opportunities. Similarly, U2 (see Video Synthesizer project in Table 2.7) signed up for a synthesizer building workshop despite having no intention of making a synthesizer herself. When drifting, makers often follow their curiosity and desire to learn new skills.

Moreover, unlike anchoring makers (who avoid asking questions) and navigating makers (who ask project-specific questions), drifting makers casually interact with others, talking broadly about life, ideas, and projects. Terri commented on her chats with Jack: “Chatting with [Jack]… We are very open. There are not many filters. We can basically be talking about everything. […] That helps channelling the creativity because one doesn’t block anything within.” Terri’s description is consistent with our observations. When in the field, we observed that most coffee break chats were not limited to making and ongoing projects, but instead included topics like personal lives, technological developments, games, and books. Referring to their openness, an informant described drifting makers as “people who are just genuinely curious” and “have a very open ‘Why wouldn’t I ask?’ [approach]” [U8].

Such exposure often transforms drifting makers’ conceptions of what is even possible to make. In Terri’s case, talking with Jack changed her notion of electronic drum kits from an object of desire to a potential project. In other cases, makers learned about materials that they had never heard of, discovered the capabilities of a particular tool that they did not know about, and saw projects that they had not even considered possible. For example, P20 (see Shaving Brush project in Table 2.8) did not know he could make a shaving brush at the makerspace until he signed up for the lathe induction and learned about the capabilities of the tool. But discovering that something is possible

to make is not enough for these makers to initiate a project—they still need others' guidance.

Other makers respond by guiding. Upon recognizing drifting makers' curiosity, other makers guide them through the process of making by sharing their know-how and resources. The second part of Terri's journey summarizes how Jack helped her start making an electronic drum kit:

> [Summary of Terri [P12]'s electronic drum kit project - Part 2] Terri told us about what happened after her chat with Jack: "First, I was like: 'Oh, it is a cool idea!', then in two days, I was like: 'I can make it!'" What made her feel like she could make it was Jack's guidance. Terri explained: "I spoke with Jack about [my intention to make the electronic drum kit]. Jack said he had everything I would need for that. He just brought the sensors, gave them to me." As Terri did not know anything about electronics, having sensors was not enough to get her started: "I understand the basic concept [of how sensors work], but I don't understand what Arduino [a micro-processor] is and how to use that. He taught me all the things [incl. coding, wiring, soldering] I needed to know."

What Jack did for Terri was more than introducing the possibility of making an electronic drum kit. He brought his own sensors and gave them to Terri. As he realized that Terri did not know how to use the sensors, Jack taught her how to do the programming by demonstrating each step as he programmed one sensor. Similarly, in U3's case (see Coil Pottery project in Table 2.7), the other maker demonstrated how to make a coil pot step by step and asked U3 to follow her by using the materials provided by the makerspace. This process resembles the "*thinkering* together" stage of the navigating path. However, when navigating, the focal maker has a peer-like relationship with the other makers as they experiment together with neither of them "knowing the answers at the beginning". When drifting, the focal maker acts as a pupil or apprentice who tries to learn from a more experienced maker. This is evident in Terri's choice of words. While Kelly said, "I collaborated with musicians", Terri said, "[Jack] taught me".

Another maker commented on how others helped him get started in a new domain: “Here, people really, really want to help you. They will probably just do it for you, almost.” [P5]. This quote illustrates how other makers adopt a hands-on role in response to drifting makers’ curiosity. For instance, when P14 (see Slate Coasters Set project in Table 7) showed interest in trying slate, the other maker not only gave her slate but also showed her the specific setting for engraving slate on the laser cutter. Further, he offered to cut it for her as the cutting process required specialist tools. Practices included sharing planning artifacts—including plans, templates, source codes, and models—giving tools and materials to get them started and making with, and occasionally for, the focal maker.

Drifting makers are pulled to start new kinds of projects. When drifting, makers did not have a clear idea of what they would work on in the future. Through the guidance of others, they developed the confidence to initiate a project that they had not thought to do before:

> [Summary of Terri [P12]’s electronic drum kit project - Part 3] By the time we interviewed Terri, she had already started making the electronic drum kit and learned a lot about electronics. Still, she relied heavily on Jack’s guidance: “I think I will do it alone in cooperation with Jack. We are going to sit down, and I am going to say, ‘Oh, I am doing this and now how to do this and what is this?’ I think he is going to help me out.” Jack’s presence not only gave Terri the confidence to initiate a new project but also the support she needed to keep going.

The creative current pulled the attention of the drifting makers to a new project. Drifting projects, despite being novel from the focal makers’ perspectives, tended to be derivative of prior work in the makerspace with minor adjustments based on the available material and what could be done with it that suited the drifting makers’ desires. For example, when interested in trying out coil pottery, U3 used the clay available at the

makerspace and used the other maker's pot design as a template. Similarly, P20 used leftover wood to practice turning the shaving brush handle. Drifting makers did not hesitate to go through materials left over from prior work in the makerspace or claim offered materials, despite often not having a clear idea of what to do with them. Other makers' guidance and support helped initiate a new project.

Our informants highlighted a lack of confidence as an important barrier that could hold them back from initiating new projects. Drifting makers developed the confidence they needed through their close interaction with other makers. For instance, P20 commented on how he ended up making a shaving brush: "They [other makers] give you a place to start and perhaps it's also the confidence to start something." Another maker echoed the same point: "They [other makers] were really supportive and helped me know how I can do new things and they gave me courage to do the projects I haven't done before or that I wouldn't have otherwise thought to do" [P14]. Undertaking projects with the guidance of other makers gives drifting makers a basic understanding of how to use a particular tool, material, or technique, but makers often fail to develop deep expertise during the drifting process. A maker reflected on his drifting projects by saying: "I am not deep enough with the technique to be able to do that successfully. But if I want to do it in the future, at least I would know where to start" [P3]. Drifting equips makers with beginner skills in multiple domains as opposed to deepening their expertise in a given domain.

Orientations and the Creative Current

As shown above, anchoring, navigating, and drifting each have distinct consequences for the project and the focal maker. Our study revealed that these three

orientations also have different effects on how resources and people are organized in the makerspace, and thus influence how the creative current is experienced by others. We theorize that the complementary effects of the three orientations influence how makers collectively experience makerspaces as sources of creativity and learning.

Anchoring expands the resource pool and brings interest groups together. Anchoring expands the resource pool at the makerspace as anchoring makers share their specialist tools, planning artifacts, and knowledge with other members. Anchoring makers typically bring in their own specialist tools and materials that are often not provided by the makerspace or are higher quality than those available. Moreover, they produce planning artifacts—such as sketches, 3D models, and diagrams—which they make available in response to others' curiosity. They either donate or lend their tools, materials, and prototyping resources, such as jigs and models, so that others can initiate projects in the same domain. Moreover, they organize formal or informal teaching sessions to show people how to use these new resources. For example, an experienced print maker brought his own heat press to the makerspace to make papers. As others expressed interest, he decided to donate it to the makerspace and organize a session to show how to make papers from scratch. His donation accompanied by a teaching session expanded the pool of tools that were available to members of the makerspace, as people gained access to a tool that they had not had before and learned how to operate it.

Anchoring also changes how people are organized in the makerspace. When anchoring, makers typically gather people around a particular tool, material, or technique by organizing training sessions and workshops. As more makers become

interested in a domain, they leverage collective interest into raising funds to upgrade the tools at the makerspace and access advanced learning opportunities, such as hiring a professional maker to give a demonstration. For instance, at PubMake, anchoring makers working in the electronics area first organized a weekly meetup to bring makers interested in electronics together. As their micro-community grew, they joined forces to buy an automatic soldering machine to reduce the time spent on soldering electronic boards. Anchoring thus brings people interested in similar making domains together and thereby further expands the resource pool.

Navigating uncovers new uses of existing resources and builds bridges across making domains. Navigating changes how people perceive the existing resources in makerspaces by uncovering how tools and materials provided by makerspaces can be used differently or in combination. For instance, Kelly recalled seeing another navigating maker engraving cylinders she made on a lathe using a laser cutter: “What can you do with a laser cutter? Here, I learned you can actually engrave cylinders or round devices. Before, what I saw was only flat things. This kind of opening new possibilities is definitely a way to feed my creative process” [P13]. Navigating makers’ openness combined with the eclectic nature of the resulting projects points to new uses and combinations of existing tools and materials. Because the particular combinations of materials, techniques and ideas are idiosyncratic, makers seldom try to replicate navigating projects. Instead, they draw inspiration to fuel their own making process.

Navigating also builds bridges across different making domains by openly sharing works in progress and asking for feedback. For instance, an informant who was

making a guitar using mainly the woodworking tools told us that he decided to explore electronics after seeing Kelly's efforts to add musical elements to his light games. He first saw Kelly's work when displayed in the common area. Later, he spent time working on this guitar next to Kelly. He said: "I've been around [Kelly] quite often as he works on this stuff. […] Seeing his [Kelly's] prototypes made me interested in [making a guitar with color-changing lights controlled by sound]. Before that, I'd never tried anything about programming" [P26]. As evidenced in this example, navigating blurs the boundaries between different domains and encourages makers to explore the intersections.

Drifting surfaces resources and builds relationships. Drifting surfaces resources—including knowledge, tools and materials, and prototyping artifacts—for the members of the makerspace by communicating their curiosity. Drifting makers' curiosity and admiration encourage others (often anchoring makers) to offer workshops that others can join. Similarly, drifting makers typically rely on project-specific tools and planning artifacts produced by other makers. Asking for a particular tool, template, model, or source code makes a particular project more accessible and doable for members of the makerspace. For example, an informant recalled how she decided to donate her pyrography pen to the makerspace: "When I told Jim, he said he wanted to use it too. So somehow, I saw that people were interested in that. I was going to use it here, so why not leave it here [at the makerspace], so that other people can also use it" [P12]. Without Jim's and others' interest in using the pyrography pen, P12 would not have donated it to the makerspace, and others would not have had the opportunity to try it there. Finally, drifting makers' make-do approach with available tools and materials

led other makers to make more conscious decisions about their leftover materials and tools. In both of the observed makerspaces, makers had a practice of leaving pieces of wood, plexiglass, and plywood in dedicated scrap boxes instead of throwing them away.

Drifting also builds deeper relationships between makers. When drifting, makers do not avoid potentially distracting interactions with others like anchoring makers or seek project-focused interactions like navigating makers. Instead, they openly engage with other makers, asking questions about projects and tools as well as having casual conversations. Therefore, as an informant put it, drifting acts as “the glue of that world”. Moreover, drifting allows makers to build closer relationships with others who teach them how to use a tool or do a project.

DISCUSSION

By exploring how people manage inspiration and distraction while working in the presence of other creators, this study adds to our understanding of the relationship between organizational space and creative work. We found that makerspaces, as shared workspaces where creative work is highly visible, indeed facilitate creativity and learning but do so *through* distraction. The presence of the creative current pulls people’s attention in new and unexpected directions by creating new assemblages of resources and people and, in doing so, transforms the creator, the project, and the collective experience. Although it is more salient and transparently observable in makerspaces due to the physical nature of the making projects, we expect that creative current may manifest itself in many modern work environments where people simultaneously work on independent projects in a shared space using a shared set of resources, such as design firms, R&D units, or even academic departments. Creative

current is therefore an important mechanism that enables individual and collective creativity and learning. These insights about the process of interacting with the creative current in makerspaces contribute to theory on contemporary workspaces and individual and collective creativity and learning in organizations.

Implications for Contemporary Workspaces

We contribute to the growing body of work on contemporary workspaces. With increasing demands for autonomy, contemporary workspaces have emerged as an alternative to traditional workspaces. So far, scholars have painted an optimistic picture focusing on how these spaces help independent workers to avoid the perils of working in isolation (Garrett et al., 2017; Blagoev et al., 2019), viewing other members of these spaces as a source of emotional and practical support. Our observations offer a more nuanced understanding by theorizing how working in the presence of other people can also be quite demanding and pull focal individuals' attention in different directions. By theorizing different ways through which creators' project work is influenced by the presence of others, this study offers a possible reconciliation to an ongoing debate on whether shared spaces support exploration and knowledge exchange or distract people from the task at hand (Oldham & Brass, 1979; Elsbach & Stigliani, 2019; Lee, 2019; Irving et al., 2020). The concept of creative current suggests that these spaces can support creativity, learning, and social interaction through distraction. Our study begins to shed light on how working in the presence of other creators pulls the individual toward learning new skills, attempting more creative projects, and strengthening relationships with other members of the community by theorizing how different actions

might attract different reactions from the community (Leroy, Schmidt, and Madjar, 2020).

Our study suggests that the co-presence of members with divergent levels of knowledge and skills enables collective learning and creativity in shared spaces. Prior research emphasizes that newcomers bring diverse knowledge, skills, and perspectives to organizations (Choi & Thompson, 2005; Perretti & Negro, 2007). Our findings uncover a crucial but largely overlooked role of novices: that they actively extract knowledge and resources from experienced members of the community and make them public for other members to benefit from. This suggests that when creating spaces for creativity and learning, organizations would benefit from the presence of not only knowledgeable experts but also curious novices. This does not necessarily mean that makerspaces require complete beginners; one can be a novice in one field (e.g., electronics) despite being proficient in another (e.g., woodworking).

The combined influence of anchoring, navigating, and drifting on the creative current has important implications for organizations. With the “if you build it, they will come” mentality, organizations often build spaces filled with the latest tools and equipment. Our study, however, suggests that this approach may fail unless these spaces support people with different orientations to produce a variety of projects. Instead of focusing solely on obtaining tools and equipment, organizations should consider mechanisms to attract people with diverging levels of expertise and creativity and let them work on their projects in the presence of others.

Implications for Creating in the Presence of Other Creators

We suggest two ways that existing models of individual creativity may be extended to include shared spaces and parallel projects. First, our findings suggest that an individual's idea journey shapes and is shaped by other creators' simultaneously unfolding processes. Conceptualizing other creators as sources of new perspectives, help, and feedback (Hargadon & Bechky, 2006; Harrison & Rouse, 2015; Fisher et al., 2018) for a single project overlooks an important reality: other creators often pursue other projects. By introducing the concept of the creative current, we theorize how seemingly independent processes might intersect with one another. For instance, one creator's production of a physical artifact, which is typically seen as the end of the idea journey, may feed into the early stages of another creator's process by acting as a source of inspiration. Similarly, the curiosity of a creator might change the way another project is documented and shared. This suggests that understanding an individual idea journey cannot be based solely on what happens within the scope of a single project. Instead, we suggest that models of individual creativity might be extended by shifting attention from a single project to an intersection of multiple synchronous yet independent projects.

Second, we found that creating in the presence of other creators leads people to see their projects and themselves in a different light. Scholars have suggested that finding the task meaningful and feeling competent to tackle it contributes to the engagement, persistence, and performance of the creator during the creative process (Amabile & Pratt, 2016). Our findings showed that both the meaningfulness of the task and the creator's sense of competence are socially constructed. We found that meaningfulness is not necessarily an inherent characteristic of the creative task.

Instead, people attach meaning to their work as they see others valuing it. Similarly, a sense of competence is not always a reflection of the experience or skills one has. For example, we found that people became “local experts” despite not having much experience as they felt relatively more competent compared to other makers in the makerspace. Likewise, some experienced makers did not adopt the expert role because there were already other makers who were perceived to be more competent than them. Our data thus suggest that social spaces, such as workplaces, influence how people perceive the meaning of the task and their skills and abilities to tackle it. Future work should continue to explore the processes that shape these constructs.

Boundary Conditions and Transferability

In this study, we investigated project work in makerspaces. The fact that makerspaces attract members with disparate interests, needs, and priorities provides opportunities to capture different response patterns. Moreover, the physical nature of the projects undertaken at makerspaces makes individuals’ processes transparently observable. Still, it is important to discuss how our findings and theorizing transfer and compare to other work contexts (Lincoln & Guba, 1985).

Our informants included independent creative workers, entrepreneurs, and hobbyists who worked in the same space in the absence of a single employer. Therefore, our insights are most likely to apply to contemporary workspaces hosting independent workers, such as co-working spaces (Garrett et al., 2017), entrepreneurship incubators (Seidel, Packalen, & O’Mahony, 2016), accelerators (Cohen et al., 2019), and artist collectives (Grandadam, Cohendet, & Simon, 2013). Due to the high visibility of the creative work in makerspaces, individuals can easily and

spontaneously react to and be involved in others' processes. In other spaces, however, projects might be less physical and thus less visible (e.g., building a start-up, writing a novel). How independent processes intersect in the absence of high visibility presents an additional area of inquiry.

While we believe that our insights are most useful for contemporary workspaces, they also have implications for project-based organizations (Hobday, 2000). Our context has important similarities with knowledge and creative workers in more traditional organizations, such as architecture firms (Ewenstein & Whyte, 2009), design studios (Hargadon & Sutton, 1997; Stigliani & Ravasi, 2012; Fisher et al., 2018), and consulting firms (Hargadon & Bechky, 2006), where the work is organized into various independent projects. The insight that a single creative process influences and is in turn influenced by other ongoing creative processes provides important implications for studying project-based organizations. Although researchers have begun to consider socio-material practices that invite people from other project teams into an ongoing creative process (e.g., sharing images, sketches, and prototypes, Ewenstein & Whyte, 2009; Stigliani & Ravasi, 2012), limited attention has been paid to the practices that keep others at a “safe” distance (c.f., de Vaujany & Aroles, 2019). Although it may sound at odds with organizational expectations of giving help to and receiving help from other project teams, this study reveals that individuals, especially when they are competent enough to execute ideas, may intentionally keep others away from their projects, which ironically attracts others’ admiration and curiosity and motivates the individual to share their knowledge. Future research may use the concept of the creative current to

examine how parallel project work might organically influence each other depending on how the project teams approach their work.

CONCLUSION

As independent creative workers continue to seek inspiration and interaction outside of traditional organizations, organizational scholars have begun to update their theories and assumptions to keep pace. Working in shared spaces comes with the benefits of a broader pool of resources, the opportunity for knowledge exchange, and easy access to support. How demanding and distracting the experience could be, however, is often overlooked. This study uncovers different ways through which individuals respond to opportunities and distractions as they work on their projects in the presence of other creators. In highlighting how these different orientations complement one another, we offer a glimpse into how the intersection of seemingly independent processes in a shared space can support creativity and learning through distraction.

3. CO-CREATING NEGOTIATED PLAYGROUNDS: HOW ORGANIZATIONS HARNESS MEMBERS' PERSONAL INTERESTS

Exploring new domains and developing new ideas are essential for organizations to innovate, learn, and gain competitive advantage (Amabile & Pratt, 2016; Anderson, Potočnik, & Zhou, 2014; George, 2007). However, "getting new things done" using existing organizational skills, knowledge, and structures is far from easy (Obstfeld, 2012; March, 1991; Mainemelis, 2010). Members of organizations, on the other hand, possess diverse knowledge, passions, skills, and curiosities —which we describe as a set of personal interests —that often extend beyond what they do at work (Rothbard, 2001; Madjar, Oldham, & Pratt, 2002; Harrison & Wagner, 2016; Koppman, 2016). These personal interests can therefore serve as an important source of new ideas and practices for organizations that desire creativity, learning, and innovation (Hargadon & Sutton, 1997; Sutton & Hargadon, 1996). Yet, research suggests that many ideas and projects that could contribute to organizational creativity and learning go unrecognized, unsupported, and lost because organizational members often choose to explore their personal interests informally, hidden from managerial view (Criscuolo, Salter, & Ter Wal, 2014; Mainemelis, 2010). Therefore, an important question is how to support and harness employees' personal interests in the course of organizing for creative, innovative work.

One solution for organizing creative work is to create space for employees to openly and legitimately explore their personal interests at work. For example, 3M encourages employees to spend up to 15% of their work time on "innovat[ing] ideas that excite them" (3M, 2021) while Google implemented a '20% time' rule aimed at

empowering employees “to be more creative and innovative” regardless of the success of the outcomes (Page & Brin, 2004). That approach has been credited as the source of many projects that led to innovative ideas and products, including Post-it ®, Gmail, and Kevlar (Mainemelis & Ronson, 2006; Mainemelis & Dionysiou, 2015). Previous research on organizational spaces has demonstrated that spaces apart from daily work can facilitate collaborative action to change existing organizational practices and routines (Howard-Grenville, Golden-Biddle, Irwin, & Mao, 2011; Bucher & Langley, 2016). While it is assumed that employees would be intrinsically motivated to explore new ideas and practices when given the opportunity (Edmondson, 1999; Furnari, 2014; Amabile & Pratt, 2016), it remains unclear whether they would incorporate their personal interests, which have potential to introduce even more novel knowledge, skills, and ideas to the organization.

Harnessing personal interests at work has a dual nature. That is, the exploration of personal interests is neither clearly work completed for the organization nor is it clearly a personal endeavor. Yet, at the same time, it is both. This dual nature of the activity suggests that organizations and their members may have diverging interests and needs. For employees, exploring personal interests is typically something they would do in their personal life to experience enjoyment and fulfilment. Thus, they need both autonomy and support at work to be able to identify and explore ideas that they find personally interesting and meaningful. For organizations, however, harnessing their members’ personal interests means gaining access to new knowledge, skills, and ideas. To achieve this, they need to make sure that employees’ exploration of personal interests is accessible and valuable to the rest of the organizational members. This

suggests that harnessing personal interests at work, even when employees are provided with legitimate and safe spaces, is not a straightforward process. Rather, it requires the organization and its members to balance their diverging interests and needs.

The dual nature of exploring personal interests at work means that it may be challenging for employees. While past research has assumed that allowing creators to pursue their personal interests is intrinsically motivating (Amabile & Pratt, 2016), it also requires them to expose a personal part of themselves to their colleagues and open their ideas up to feedback and potential criticism, which might significantly change their personal ideas (Mainemelis & Sakellariou, 2022). This could be difficult and uncomfortable due to the feelings of psychological ownership over their personal ideas (Pierce, Kostova, & Dirks, 2001). Indeed, retaining control and autonomy over their creative process is one reason employees often choose to explore their personal ideas and interests covertly (Criscuolo et al., 2014; Mainemelis, 2010).

Even when an organization manages to cultivate an environment where members are supported to explore new ideas based on their personal interests, the dual nature of pursuing personal interests at work suggests that it might be challenging for organizations to harness members' personal interests to have well-developed projects and ideas that can be integrated into existing organizational routines and practices (Mainemelis, 2010; Bucher & Langley, 2016; Criscuolo et al., 2014). It is particularly challenging to integrate the knowledge, ideas, and practices developed when employees explore personal interests at work because those have their roots in employees' personal lives rather than in the boundaries of the organization (Lifshitz-

Assaf, 2018). Prior research also suggests that decision-makers in organizations hesitate to support employees' exploration efforts when they cannot see how these efforts may lead to concrete outcomes, failing to accurately predict their potential future value to the organization (Mueller, Melwani, & Goncalo, 2012). Thus, although employees take personal risks to pursue their interests at work, many resulting ideas and projects may fail to realize their potential to contribute to organizational learning and creativity for being either underdeveloped or not well-integrated.

In this study, we therefore ask how organizations support their members in exploring intrinsically motivated personal interests at work, and how organizations harness the creativity and learning generated through these efforts. To investigate these processes, we carried out a qualitative study in two design organizations, both of which aim to encourage people to explore personal interests at work. We used data from interviews, observations of meetings and presentations, and project documentation to unpack the complete process from when people brought their personal interests to work to when they stopped working on them.

Our analysis revealed that organizations and their members cocreated spaces where they negotiated their diverging interests and needs around harnessing personal interests. We call these spaces negotiated playgrounds, referring to their playful yet, still, work-like nature. First, to invite and support members' exploration of their personal interests, organizations established organizational spaces dedicated to exploration of new knowledge and ideas that are physically, temporally, and symbolically separate from routine work. Yet, the ways organizations separated playful exploration work from routine work varied: one organization established a closed playground by bounding play

activities, while the other organization established an open playground by setting clear boundaries around work activities, which had the effect of turning the rest of the workplace into a space for exploration and play. Surprisingly, however, employees did not experience playgrounds purely as places to play with their personal interests. Instead, they negotiated play in the playground as they figured out which personal interests to bring to the organization, how to explore them, and how to conclude their time at the playground.

In the closed playground, the way people negotiated play further strengthened their individual psychological ownership over their ideas and led to stand-alone projects. These projects were well-developed and ready to be used as a showcase of organization's capabilities to attract new clients. Yet, because they were often developed by a single employee, it was relatively more difficult to integrate the ideas and learnings generated into the rest of the organization. In the open playground, the way people negotiated play made them loosen their individual psychological ownership and instead develop a sense of collective psychological ownership over a topic of interest. Exploring personal interests at work collectively led to clusters of small explorations done by several members of the organization, well-integrated into the existing organizational routines and practices yet not necessarily as developed as the projects completed in the closed playground.

Our grounded model of harnessing personal interests at the workplace advances our understanding of how to organize for creativity and learning by unpacking processes through which organizations and employees co-create organizational spaces for play and exploration. Our study offers contributions to research on creativity, psychological

ownership, and organizational spaces. First, it provides new insights into the complexities of pursuing personal interests at work. Whereas research has assumed that creators will grasp the opportunity to follow intrinsically motivated paths at work (e.g., Amabile & Pratt, 2016), our work reveals the tensions such opportunities can trigger in organizational settings. Second, our study shows how organizations can foster collective psychological ownership to overcome the challenges of idea ownership during creative and innovative work (e.g., Brown & Baer, 2012). Finally, our work extends research on organizational spaces by illustrating that organizations can create spaces for exploration and creativity, not only by establishing separate spaces for explorative work, but also by bounding work practices.

THEORETICAL BACKGROUND

Organizational Members' Personal Interests as a Source of New Ideas and Knowledge

Organizations desiring creativity and innovation rely on their members' talents, skills, and knowledge to generate ideas and implement solutions (Drazin, Glynn & Kazanjian, 1999; Seidel & O'Mahony, 2014). Especially in knowledge and creative industries, organizations value employees with high creative potential (Malakate, Andriopoulus, & Gotsi, 2007). Interestingly, both anecdotal evidence and research findings suggest that having diverse personal interests outside of work, such as playing accordion in alternative bands, making films on the side, or restoring old pinball machines, is seen as an indicator of one's creative potential (Schmidt & Rosenberg, 2014; Koppman, 2016). Koppman's (2016) study of advertising professionals shows that when hiring creative workers, evaluators pay attention to what people do in their

personal time and take interest in multiple cultural pursuits that are not directly related to their job as a signal of potential creative skill. For example, a creative director said one of the first questions to ask a candidate would be, “What do you like to do in your own time? What are your hobbies?” because it tells a lot about “their own intellectual curiosity” (Koppman, 2016, p. 302). Similarly, an agency vice president looked for candidates who were “creative sponges for the world around them” because “that’s what makes them interesting people” (Koppman, 2016, p.303).

Existing research suggests that having diverse interests outside of work is a way to connect with managers and colleagues, either through matching interests (Rivera, 2012; Childress & Nault, 2019) or matching forms of cultural consumption (Koppman, 2016), and thus makes them more attractive candidates for creative jobs. However, the fact that people voluntarily spend significant amounts of time, money, and effort into learning more about, developing skills for, and generating ideas in domains that they are personally interested in suggests that organizational members’ personal interests could be an important resource of new ideas and knowledge for organizations.

Research hints that diversity in organizational members’ unique talents, skills, and ideas from their past experiences and personal interests can increase variance in ideas generated (Hargadon & Bechky, 2006; Harvey, 2014). For example, a leading design consultancy firm, IDEO, draws on its designers’ personal interests outside of work, such as collecting toys, making model airplanes, sculpting, and climbing, as sources of inspiration to develop innovative solutions (Hargadon & Sutton, 1997). Sutton and Hargadon (1996, p.700) noted that “It is especially "cool" to suggest ideas from hobbies like remote control airplanes or sailing.” during brainstorming sessions.

Moreover, scholars have found that people will be most creative when they are intrinsically motivated to work on the task, which is more likely when they develop solutions based on their personal interests (Amabile, 1996). Yet, it is important to note that these studies describe instances when creative workers bring their personal interests to work in response to a specific problem or task presented to them (Unsworth, 2001).

Seeing personal interests solely as sources of diverse input into a creative process aiming at solving a specific problem overlooks an important potential value of harnessing personal interests at work: the exploration of new domains and problems that fall outside the scope of existing projects. A growing body of research on bootlegging, creative deviance, and proactive creativity suggests that individuals' personal initiatives to explore problems that they find interesting and meaningful could benefit organizational creativity and innovation through the exploration of new and valuable opportunities (Unsworth, 2001; Mainemelis, 2010; Criscuolo et al., 2014; Mainemelis & Sakellariou, 2022). This research, however, builds on the assumption that organizational rules and structures may constrain the flexibility and creativity needed to conduct such explorations and experimentations (Benner & Tushman, 2003; Lavie, Stettner, & Tushman, 2010). Thus, existing empirical work focuses, almost exclusively, on how employees work around existing rules and structures to pursue personal interests at work. For example, scholars have investigated how employees take the initiative to work on ideas covertly with no formal support from organizations (i.e., bootlegging) (Criscuolo et al., 2014) or despite receiving a managerial order to stop working on those ideas (i.e., creative deviance) (Mainemelis, 2010).

Organizational scholars, however, have argued that organizations that desire creativity and innovation should invite a degree of "playfulness" by intentionally relaxing organizational control (Miner, 1994; March, 2020). Allowing "search activities that cannot be justified in terms of their expected return for the organization", such as "pet projects of playful engineers", could help organizations discover new problems to solve (Levinthal & March, 1981, p.309). Indeed, some organizations, like Google and 3M, follow this managerial advice and give their employees autonomy, time, and resources to explore their personal interests. For example, Sky Map, an astronomy application that turns a phone into a star chart, was developed by a team of enthusiastic amateur astronomers at Google in their 20% time (Schmidt & Rosenberg, 2014). Similarly, the first electronic stethoscope with Bluetooth technology is credited to the explorations some employees did using their "15% time" at 3M (Govindarajan & Srinivas, 2013). Despite those success stories and practitioner-oriented articles that illustrate the potential value the personal interests of their members could bring to organizations (e.g., Howe, Jachimowicz, & Menges, 2022; Westwood, 2015; Anca & Aragon, 2014), there is little theoretical understanding of how organizations can harness the personal interests of their members. We therefore ask how organizations encourage and support their members in exploring their personal interests at work, and how organizations can benefit from learning and creativity gained by those organizational members who do so.

The Tensions of Harnessing Personal Interests at Work

In this paper we explore how organizations can harness their members' personal interests at work. While bootlegging and creative deviance activities are done through informal channels and are often hidden from senior management, some organizations

explicitly invite and encourage organizational members to bring their personal interests to work and turn them into something valuable for the organization through the support of organizational resources. It is argued that giving legitimate spaces for the exploration of personal interests should be a win-win for organizations and individuals alike – while employees benefit from using work time and resources to explore areas that they personally find interesting and meaningful, organizations capitalize on the unique knowledge and insights of employees by harnessing their intrinsic motivation to explore new opportunities (Anca & Aragon, 2014).

Yet, there are also hints that these benefits may not be so straightforward to achieve. For example, scholars have speculated that the legitimacy and openness might "reduce the allure of these hidden creative efforts" (Criscuolo et al., 2014, p. 1302). Similarly, a recent empirical study conducted in a creative communications campaign found that even in the presence of organizational support, people might still choose to do parts of their explorative work in the informal channels to bypass organizational barriers and protect their sense of autonomy (Mainemelis & Sakellariou, 2022). Specifically, turning something inherently personal and meaningful for individual members into something of value for the whole organization may raise tensions for the organization and its members.

First, when inviting and encouraging their members to pursue ideas that they find interesting and meaningful at work, organizations are faced with the challenge of balancing *novelty* and *familiarity*. Personal interests are, by definition, based on the unique passions or skills of individuals, which may or may not be related to the work domain. Therefore, bringing those interests to work would likely to introduce new ideas,

practices, or knowledge to the organization. While the diversity of their members' personal knowledge and interests is an important resource for organizations to explore new opportunities, the relative novelty of these perspectives makes them challenging to harness. Research has uncovered that despite desiring novel ideas and perspectives, organizations often experience a bias against novelty, and tend to favor familiar ideas over novel ones (Mueller, Melwani, Loewenstein, & Deal, 2018). Further, when ideas are still in the early stages of development, which is the case when most personal interests, curiosities, and ideas first brought into an organization, it is more difficult to predict their usefulness and potential value (Simonton, 2003). This suggests that people may face rejection and resistance when their unique perspective is too novel for the organization and, as a result, may hesitate to bring or openly pursue ideas that are intrinsically motivating to them at work (Mainemelis, 2010).

Second, the process of turning a personal interest into a collective organizational resource requires organizations to balance two contradictory needs: individuals' need for *autonomy* and organizations' need for *openness*. On the one hand, individuals would benefit from substantial autonomy to be able to pursue their intrinsic motivation and curiosity to deeply explore ideas that they find meaningful and motivating (Amabile, 1996; Ryan & Deci, 2000). Research has shown that having control over what to work on and how to work enables people to be more creative in their thinking (Amabile et al., 1996; Unsworth & Clegg, 2010). On the other hand, organizations that provide legitimate grounds to explore personal interests at work, expect their members to do such explorations openly so that other members can also learn and benefit from the process. The open nature of the exploration process, however, contradicts with

individuals' need for control and autonomy. While the presence of others would likely to contribute to the idea journey by providing new perspectives, help, and support (Perry-Smith, & Mannucci, 2017; Hargadon & Bechky, 2006), including others into their personal exploration may not be easy for people. Opening their ideas up to be potentially criticized and changed by other members of the organization may threaten the original creator's sense of control and psychological ownership (Rouse, 2013; Elsbach & Flynn, 2013). Research suggests that people are less willing to change, let go of, or adapt ideas when they experience ideas as extensions of their identity (Baer & Brown, 2012; Grimes, 2018), which is more likely for ideas that spring from their personal interests. Thus, working on personal interests at work may create negative feelings for employees if they are required to cede some degree of control; but organizations may also struggle to benefit from those explorations if employees refuse to involve other organizational members into their process.

Third, harnessing personal interests at work may have divergent meanings for organizations and their members: pursuing personal interests is *an end in itself* for individuals and *a means to an end* for organizations. Their intrinsic motivation to thoroughly explore their interests makes individuals to see this activity as autotelic, meaning that they "do [it] for its own sake because to experience it is the main goal" (Csikzentmihalyi, 1997, p.117). The intrinsic motivation of creativity states that when people are primarily motivated by their interest in and enjoyment of their work, they are more likely to put effort into the process and persist (Amabile, 1996; Amabile & Pratt, 2016). Yet, in the absence of an external goal and a clear endpoint, organizational members are likely to continue their pursuit as long as they enjoy the process without

worrying about the potential outcomes (Mainemelis & Ronson, 2006). This is likely to pose a risk for organizations because, ultimately, they hope to foster organizational learning and creativity by giving their members space to explore personal interests. Although March (2020) suggests that this is a risk that organizations should take in order to discover new and valuable opportunities, nothing valuable may come up from individuals' "irrational" and "foolish" explorations of alternative ideas. Consequently, employees and organizations alike may be uncertain when those explorations are complete, creating tension about when to end the process and if any outcomes may result.

When organizations explicitly support and encourage employees to pursue their personal interests at work, it is experienced different than bootlegging, creative deviance, and proactive creativity because employees are given legitimate space. Yet, the dual nature of this activity, that is being both personal and work-like, suggests that organizations and their members may need to balance their diverging interests and needs. Thus, it remains unclear how organizations can harness their members' personal interest. Given the growing number of organizations looking into opportunities to tap into this promising source of new ideas, it is a timely and important question.

METHODS

In this study, we focus on two design organizations that support employees to explore personal interests at work to generate novel theory from data. We rely on inductive methodologies, as they are well suited for theorizing novel and poorly understood phenomena, such as harnessing employees' personal interests at work (Edmondson & McManus, 2007).

Research Setting

In selecting the case sites, we were guided by theoretical sampling. We selected Meraki and Paizo (pseudonyms) because both organizations explicitly encourage their members to bring in and pursue personal interests alongside ongoing client work. More importantly, in both organizations, employees have been active in initiating new projects, developing new ideas, and exploring new skills based on their personal ideas. Exploration of personal interests and related practices, such as outcomes of these efforts, the time spent on these projects, and project meetings, had specific names and were introduced to their employees as part of their onboarding experience. When they joined the company, all employees were told that their personal interests were welcomed to the organization, and they would have the autonomy to explore knowledge and ideas based on their personal interests using company resources. Both organizations had these initiatives for over five years and many explorations and projects were completed over the years.

Two shared characteristics of these organizations make them ideal settings to explore our research question. First, both organizations had a family-like culture where the relationships between colleagues were described to be based on friendship, care, and mutual trust. Feeling as a member of, as an informant put it, “a tight-knit family” made employees experience these organizations as safe spaces to bring their authentic selves, experiment with new ideas, and make mistakes (Edmondson, 1999). As a result, employees were actually pursuing their personal interests, instead of being cynical about the organizations’ intent to support their intrinsic motivation (e.g., Fleming, 2005).

Second, both organizations operated in the design field, where most employees were equipped with skills and knowledge to visualize and communicate their ideas (Stigliani & Ravasi, 2012). Consequently, the processes of exploring personal interests often included the production of prototypes, drawings, and presentations, which makes their practices easily observable and accessible to outsiders. During our field study, observing how these artifacts evolved over time helped us get a better understanding of when and how people involved others into their processes, and how, in turn, their ideas evolved.

Data Collection

In both organizations, we were provided access to all events, such as presentations and meetings, and archival sources related to the explorations of personal interests and were able to talk with all members of the organization, including founders, designers, engineers, and project managers, at the time of the data collection. This level of access allowed us to capture the processes related to harnessing personal interests thoroughly. We were guided by common recommendations of ethnographic fieldwork for data collection (Van Maanen, 1979). We combined data from interviews with organizational members, observation of meetings and presentations related to these explorations, informal conversations, and archival sources, including project documentation and organization websites (see Table 3.1).

[Insert Table 3.1]

Interviews. To get a sense of how organizations support employees to explore personal interests and how these efforts are perceived by employees, we conducted 36 interviews in total with 26 informants. Initially, we conducted interviews with all the

employees at Meraki (14) and Paizo (12). We asked senior management why they chose to support organizational members' exploration of personal interests at work and how they designed legitimate spaces for these explorations. The rest of the organizational members described their understanding of the organizational support and whether and how they explored a personal interest. As our purpose was to understand the process of harnessing personal interests at work, we asked them to walk us through the process of exploring an idea based on their personal interest. We also touched on topics such as organizational learning and culture. Doing so allowed us to familiarize ourselves with the context and identify other sources that would inform our theorizing. For example, when we asked about formal and informal channels of learning, an informant directed us to an online repository where those projects were documented.

We then conducted 10 more interviews at Meraki to get more detailed information and concrete examples about how people navigated this process. In these interviews, we asked participants to create a visual timeline of an idea that based on their personal interests they recently developed. Participants described how, where, and with whom they worked, from the moment they decided to bring it to work to the point they stopped working on it. These focused interviews allowed us to unpack the various processes involved in the pursuit of a personal interest at work. Interviews lasted one hour each on average and were all recorded with permission and transcribed.

Observation. Another important source of data to understand these processes and projects was observation. We conducted around 110 hours of observation: 90 hours at Meraki and 20 hours at Paizo. The first author conducted the interviews with Meraki team at their studio and spent two full working weeks with them, participating in

social events, such as team lunches, coffee breaks, and team meetings where work-in-progress projects are presented to receive feedback and help. During our time in the field, we had informal conversations with participants, ranging from brief exchanges to one-to-one catch-up meetings. We captured the content of these conversations in extensive field notes we produced. Later, we attended 23 additional team meetings where employees shared their personal ideas or ongoing exploration projects with the team. At this point, due to the Covid-19 restrictions, Meraki had switched to work from home and all interactions among the team, including 20 of these meetings, took place online. These meetings were video recorded, and all recordings were shared with us. When possible, we talked with the presenter before or after the meeting to understand how they feel about sharing their ideas with others. Observing these interactions in their natural context allowed us to understand how exploration projects evolve as others get involved into the process.

Our data collection at Paizo coincided with Covid-19 restrictions that dictated all members to work remotely. As a result, their annual Hack Days event, during which all employees are given two-full days off from client work to explore and develop ideas based on their personal interests, took place fully online. We attended the two-day-long virtual Hack Days and had regular check-ins with people as they worked on their ideas. After the Hack Days, employees presented their projects to the rest of the team. We took detailed notes on how people presented their ideas and how others reacted. In addition to Hack Days and final presentations, we observed two internal sharing sessions where employees presented their explorations. These observations provided

us with data capturing how employees initiated, pursued, shared, and concluded projects based on their personal interests over time.

Archival Data. We used archival data to supplement and triangulate informants' accounts and better understand how employees explore personal interests at work in both organizations. Informants shared documents related to personal interest projects, including presentation decks, project-specific webpages, project documentation, press articles, and other internal documents. These documents provided information about how informants choose to document, share, and conclude their explorations. Moreover, organizations' websites and internal documents, such as job postings, helped us familiarize ourselves with our research setting and enrich our understanding of the type of work these organizations were doing, the approach they had towards supporting employees in bringing personal interests, and how they presented themselves.

Data Analysis

Consistent with the prescriptions for grounded theory, our data collection and analysis across cases partly overlapped (Golden-Biddle & Locke, 2006). As we engaged in the preliminary analysis of the data collected from Meraki, we gained access to Paizo and started collecting data. Once we concluded our data collection, we engaged in a more systematic data analysis across the two cases.

Step 1. Creating overviews of the strategies for supporting' employees in bringing personal interests to work. We began our analysis by creating overviews of the organizational strategies for supporting the exploration of personal interests at work. Our summaries included information on the history of these support programs, the scope of the support as defined by the organizations and perceived by the employees,

the resources available for employees to pursue their personal projects, the numbers and types of projects done, and the people involved. We largely relied on interviews with founders and participating employees and supplemented our analysis with the archival records. Comparing these overviews helped us identify the similarities and differences in the two organizations' approaches to manage organizational creativity and learning.

Step 2. Coding the practices and experiences and comparative coding across cases. Next, we open-coded interview transcripts and field notes to produce a grounded analysis of the processes of pursuing personal interests at work. Initially, we coded segments of textual data using in vivo terms and descriptive labels (Locke, 2001). For example, we coded passages that described not spending too much time and effort on the idea early on using the in vivo term "starting small". Then, we used axial coding to compare and contrast these first-order codes across informants and organizations, trying to uncover any variance in how the process unfolded in different situations.

To organize the first-order codes into broader second-order concepts, we produced analytical memos recording observed similarities and differences and emerging themes. During this process, we often returned to the literature. For instance, in one of the earlier memos, we noted that the practices of "starting small", "not being precious about ideas", and "creating interactive prototypes" had a similar effect on employees' sense of ownership, that is loosening their individual psychological ownership and developing a collective sense of ownership. This observation led us to travel back and forth between coding and psychological ownership literature. We met

regularly to discuss these emerging insights and initial data structures. Over the course of these meetings, we realized that the processes of harnessing personal interests at work involved certain tensions for employees in both organizations, yet how they managed these tensions differed.

Step 3. Building a grounded theoretical model and member checks.

Following the realization that the different ways that organizations established spaces for explorative work influenced how employees managed tensions of pursuing personal interests at work, we produced a tentative model capturing the two different processes across two organizations. To further solidify our understanding of each process, we went back to interview transcripts and fieldnotes to find cases that would challenge our model. We produced alternative theoretical models until our representation fit the evidence.

After drawing provisional conclusions about the data, we presented our conclusions to the members of the studied organizations separately for their review. We first presented our emerging model and then invited their comments and suggestions. Doing so helped us ensure that the categories and processes we identified fit their experience. Members of both organizations reacted to our analysis with enthusiasm rather than “bland agreement”, further validating our emergent interpretation (Charmaz, 2014, p.210).

FINDINGS

Our analysis revealed that co-creating organizational spaces dedicated to exploration and play, which we call *negotiated playgrounds,* helped organizations and their members to navigate the tensions raised from turning something inherently

personal and meaningful for employees into something of value for the organization. We identified two distinct ways that organizations created spaces for personal exploration at work (open vs. closed playgrounds). The way employees negotiated play within them affected their sense of ownership over their ideas and, in doing so, affected the completeness and integration of resulting projects. The first section of the findings describes two different approaches to establishing playgrounds for personal exploration at work. Then, we explain how employees negotiated the relative novelty of their exploration, the openness of their process, and the ending of their exploration in open and closed playgrounds. The last section presents the organizational consequences of the two distinct negotiated play practices. Figure 3.1 illustrates the relationships we observed.

[Insert Figure 3.1 here]

Establishing a Playground for Explorations Based on Personal Interests at Work

Both Meraki and Paizo created organizational spaces, separate from routine work, to encourage employees to explore their intrinsically motivated ideas and interests at work. It was clearly communicated to employees that they were given a space where they could “do anything”, “follow their passion”, and “take creative risks”. We label these spaces playgrounds because, unlike routine work, the activities done in these spaces resembled play in a sense that people were intrinsically motivated to explore new knowledge and ideas without focusing on the outcomes. Thus, we use the term “play”, an in-vivo term used by our informants to describe the activities related to explorations based on personal interests, and “work” to describe activities related to client projects.

Establishing a playground included a set of intentional decisions and practices, as the founder of Meraki noted: “None of that happens by accident. You have to design a culture that has to work that way. So, everything from the layout of the studios, the furniture that we have, the equipment that we use, all of these decisions add up to make [personal exploration] possible.” [M4]. Specifically, we found that both organizations relied on physical, temporal, and symbolic boundaries to separate explorations based on personal interests from routine work. Physical boundaries are about where certain tasks and activities are planned to be done at the workplace. Temporal boundaries include how employees’ time at work is planned and allocated to certain tasks and activities. Symbolic boundaries are about communicating the norms and expectations around what personal explorations are and could be. Yet, the way the two organizations established their playgrounds differed. Paizo created a closed playground by setting clear boundaries around play. Meraki, on the other hand, bounded work activities, making work a focused and isolated activity. That had the effect of turning the rest of the workplace into an open playground. The two distinct ways of establishing a playground emerged during the analysis process and were not considered during sample selection.

Establishing a closed playground by bounding play. Paizo created a closed playground by physically, temporally, and symbolically bounding play activities to separate them from the rest of the workplace. In terms of *physical boundaries*, Paizo had physical and digital spaces dedicated to personal exploration. For example, a corner of the studio included a desk full of physical and digital prototyping tools, including sensors, microcontrollers, and mobile devices “to encourage the team to explore”. When people were at that desk, it was clear that they were working on their

own ideas, not client work. Being able to see a physical space dedicated to play reminded people that they could bring their personal interests to work, as one informant from Paizo described: “When you see it every single day that we do not only have the option to spend time working on [personal interests at work], but we also have a dedicated space in the office, you are reminded that you can claim to do something, if you like.” [P6]. Similarly, projects resulting from personal explorations were well documented at Paizo, but always kept separate from work documents. For instance, the first page of Paizo’s website was the showcase of completed client work. Projects that sprung from employees’ personal interests were listed in a separate section with links to external web pages. Almost all projects had their own webpage, including detailed information about the process and the outcome.

There were also clear *temporal boundaries* around exploration activities at Paizo. Organizational members were informed in advance about when and for how long they could work on their personal interests, with time allocated to the projects ranging from a few days up to three weeks, often coinciding with the “downtime” when a client project was completed and the new one was yet to begin. These times were always documented on the project planning software and blocked on people’s calendars like time spent on client projects did. Although employees had the autonomy to ask for time to explore their interests, it had to be pre-planned and put into the system. Upon receiving a calendar invite to explore their personal interests, people were excused from ongoing client projects. Instead, they immersed themselves into their own exploration. At the end of the allocated time, they turned back to their routine work. In addition to these ad-hoc exploration times, Paizo had an annual “Hack Days” – an annual event

during which all members of the organization stopped working on client projects to explore anything they wanted for two full working days.

Finally, Paizo used *symbolic boundaries* to demarcate play activities. This was reflected in the language used to describe exploration activities at work. Both the management team and the other members of the organization see those activities as “a good break” from routine work. It was a break in the sense that the expectation to consistently deliver “quality” and “excellence” was suspended in order to “push the boundaries” and “explore new tools”. Our informants at Paizo described these activities as “refreshing”, “liberating”, and “a mind switch” because they were encouraged to explore new ideas, technologies, and topics that they would not normally work with during a client project. However, it was clear that the break was temporary, as an informant put it: “[Personal exploration] is only between projects. There is project work. Stop. Two weeks of [personal exploration]. Then, you are back into the project.” [P6]. Adopting a “break” approach towards exploration activities created symbolic boundaries that defined a safe space, clearly separated from work, for play.

Using physical, temporal, and symbolic boundaries to bound play created a closed playground. Having a closed playground at work gave people freedom and autonomy to pursue their personal interests without being limited or distracted by the other activities in the workplace. When in the closed playground, people were temporarily isolated from the rest of the organization to explore a personal interest of their own. Although occasionally, other organizational members were invited to the closed playground to help with a particular part of the exploration, play was largely an individual activity.

Establishing an open playground by bounding work. Surprisingly, we found that, instead of bounding play, Meraki created boundaries around work activities while setting play activities free by inviting and encouraging people to work on their personal interests more openly. By doing so, they established an open playground where personal explorations were embedded in the workplace yet, still intentionally separated from work.

Our observations at Meraki revealed that there were clear *physical boundaries* around work activities, whereas play activities were ubiquitous. Meraki had an open-plan office with two separate meeting rooms. When working on client projects, employees used meeting rooms to do focused work, give internal presentations, organize critique sessions, and host clients. Notes and prototypes related to client work often resided in one of the two meeting rooms. On several occasions, we observed people in the open studio packing up their laptops and heading to a meeting room to discuss a client project. In contrast, people worked on, discussed, and presented their personal explorations anywhere – at their desks, in the kitchen, in the common areas – except for the meeting rooms in the studio. When in the studio, it was almost impossible not to see an artifact or hear a conversation related to an ongoing exploration. The prototypes created as part of personal explorations were displayed in the common areas and the whiteboards were filled with drawings, notes, and articles about people's personal interests and associated explorations. Personal explorations were so ubiquitous that they were even visible to outsiders. For instance, one of our informants recalled a plumber who came to fix the sink commenting on his prototype displayed on the wall, responding: "Oh, it is great that your company is listening to you!" Similarly,

Meraki's website included anything but reflections on personal explorations written in a blog format. Past client projects, however, were documented separately, hidden from the general public.

In terms of *temporal boundaries,* Meraki had clear guidelines on when to work on client projects, while employees had autonomy over when to explore their personal interests. For example, each client project had a pre-planned timeline with clear deadlines that employees were expected to follow. The norm at Meraki was strict adherence to the client project deadlines. The time spent on the client projects was tracked using project management tools, and employees were encouraged not to exceed the boundaries of regular working hours, as an informant noted: "It is not a badge of honor if you stay until 8 PM. It is a badge of honor that you leave at 5 PM and take care of your family." [M2]. Personal exploration, on the other hand, did not have a pre-planned timeline. Instead, people were told to make their own judgment of when it is appropriate to bring and work on their personal interests. For example, an informant commented on how embedded personal explorations were in their workday: "Whenever anybody has a little bit of free time, they will naturally go to something that intrigues them and dig deeper and turn it into all sorts of [explorations]." [M1]. Despite being an important part of employees' schedule, the time spent on personal explorations was not tracked the way the time spent on client projects was.

The way members of Meraki described play and work activities created symbolic boundaries around work projects while blending play into daily practices. Instead of seeing personal explorations as a break from routine work, as the members of Paizo did, they conceptualized play activities as an ongoing "mission", "a noble quest", and "a

journey". This was reflected in their choice of words to refer to personal explorations. For example, we were surprised to discover that the term "project" was intentionally avoided when referring to personal explorations. Indeed, several informants picked up on the first author's choice of words when asking questions about bringing personal interests to work. During one of the early interviews, she asked, "Can you bring any project?", and a senior manager at Meraki replied, "It is interesting that you just used the "project" word because I don't really think these are projects that people bring. I think they bring curiosities, and they bring themes." [M8]. To them, a project was something that had "a clear beginning and an end", as in client projects, whereas exploration is done with a greater purpose of developing a knowledge base and thus could not be constrained within the boundaries of a closed playground.

Using physical, temporal, and symbolic boundaries to bound work had the effect of turning the rest of the workplace into an open playground. Having an open playground suggested that when not working on a client project, all members of the organization, whether they were actively exploring a personal interest or not, were involved in play activities. The open nature of the playground, that is people were not isolated to play with their personal interests at work, limited the autonomy of the owner of the personal interest and the privacy of the exploration process but also gave people access to different perspectives.

Negotiating Play

Although both organizations established spaces where their members could openly and freely explore their personal interests, people did not simply accept and play with their interests within these playgrounds. These spaces were perceived as liminal

spaces between work and personal life that provided an opportunity to bring personal interests to work but exploring a personal interest at work still required an ongoing negotiation between members' personal interests and the values and norms of the organization. Because these playgrounds were located in the work context, employees felt like they were no longer pursuing a personal interest only for the sake of pursuing it, as they expected their endeavor to somehow contribute to the organization. At the same time, they did not feel like their exploration belonged fully to the world of work, as it continued to provide an outlet for their personal fulfilment. For example, an informant from Paizo said: "It is not 100% play per se. It is play in the sense that you can bring in your ideas and your interests that motivate you. But at the end, the output is ideally something that multiple people in the team can benefit from." [P1]. A designer from Meraki echoed: "[Personal explorations] are definitely personal projects but then the knowledge hopefully feeds into the studio."

Thus, even when provided with a legitimate space to pursue their personal interests at work, employees faced three tensions based on diverging personal and organizational interests and needs, which they navigated by *negotiating play*. The first step of negotiating play is *negotiating the relative novelty* of the personal exploration. Employees had to decide what personal interests and ideas to explore, wanting to identify the ones that they were intrinsically motivated towards yet were also relevant and acceptable to the organization. Some interests, as informants reported, were "too personal" or "too irrelevant" to pursue in the work context and thus might be too novel for their colleagues to relate to and benefit from. Other interests felt it was "too work-like" and less enjoyable to pursue in play time. A founder of Paizo commented: "So,

they might pick a project that they've already worked on, they might pick a data set that we have already used. And if it's too close to other work that we've already done, they feel like [it is] like other projects where they are told what they should do instead of feeling truly in power and in control." [P12]. Thus, in deciding what interests to explore in the playground, employees tried to identify interests that were novel enough to introduce new ideas and practices that they would be "passionate" and "excited" to explore at work but at the same time familiar enough for their colleagues to benefit from.

Once they decided what interests to bring to work, employees *negotiated the openness of their process,* trying to balance their vulnerability and desire for autonomy with the benefits of access to input from their colleagues. Our informants appreciated the value others could bring to their personal exploration through feedback, help, and new perspectives because, according to them, working on their own was "less fun", "less exciting" and would make them "stuck in [their] own thoughts". One informant summarized: "You don't have to [share your work with others], no one has to do it. There is no client. It's your own project to do what you want but it's good to get that feedback of what people respond to. […] Those conversations give you ideas for the next thing to do." [M9]. Sharing personal explorations and inviting others to the exploration process were not only seen as ways to improve a given idea, but doing so was also considered beneficial for the organization to collectively learn new skills and knowledge. Yet at the same time, employees felt vulnerable opening their personal ideas to potential criticism and change. When we asked about their experience of sharing their work with others, they said that they felt "nervous", "awkward", and "scared", as an informant said: "I am more nervous presenting some of that stuff to the

studio than I am presenting anything to a client, which is kind of weird because I'm much more comfortable with the people here." [M7]. When pursuing their personal interests in the playground, employees negotiated a balance between letting go of control by involving others in their process and maintaining control by keeping others at a distance.

Finally, when it was time to conclude their play episode, employees *negotiated the ending* of their exploration. Personal exploration, unlike client projects, did not have clear endpoints in the form of deliverables or outputs, thus employees had to negotiate how to balance their desire to keep working on their ideas with, as an informant put it, "the need for closure". "Exploring something without really knowing where to end up" heightened employees' emotional experience while working on these ideas. Employees often described their experience of working on an open-ended project as enjoyable because they were freed from the expectations to meet a specific goal, as a designer at Meraki expressed: "I think it is more playful because it's your curiosity driving the whole thing rather than client's demand. So, whether you end up with something interesting or not almost doesn't matter." [M6]. However, since they had other work responsibilities, employees had to stop working on their personal exploration at some point. In the absence of a clear goal or an endpoint, they found it challenging to conclude their endeavor in a fulfilling way. An informant shared his experience: "If you do self-initiated work, it's never enough, it's never done because there is no client that has a deadline." [P12]. Therefore, the last step of negotiating play is negotiating the ending of the personal exploration in a way that is fulfilling for the employee and valuable for the organization.

Employees used distinct practices to negotiate the relative novelty of their exploration, the openness of their process, and the ending of their exploration in open and closed playgrounds. These practices are summarized in Table 3.2. In the following sections, we provide a detailed elaboration of how people negotiated play in closed and open playgrounds with Table 3.3 and Table 3.4 presenting illustrative examples of these practices.

[Insert Table 3.2 here]

Practices for Negotiating Play in the Closed Playground

[Insert Table 3.3 here]

Negotiating the relative novelty: Personalizing the familiar. Employees strived to find interests and ideas that were relevant to the organization and interesting for their colleagues. However, when in the closed playground, it was difficult to identify personal interests that may spark an interest in others because employees were temporarily isolated from their colleagues. To overcome this challenge, they *personalized the familiar* by adding their personal touch to the topics and themes that were already familiar to the organization. This practice involved filtering out interests perceived to be uninteresting to their colleagues, building on existing themes, and personalizing content.

The isolation of the closed playground limited employees' access to their colleagues during the play time, which made it challenging to assess whether their colleagues would be interested in their topic of choice. Because they were unable to test their ideas with others, some employees assumed that their personal interests that

were not directly related to work would not be interesting enough and decided not to bring those to work at all. A designer at Paizo shared:

> I was thinking about [doing a presentation about fashion] but then I was [thinking] that's probably not of interest to them. I've studied fashion design and I still do a lot of courses like textile design. I was thinking if I should present – maybe one day – some of that part of my work because it is something that I love. But then, I don't know if the others are really interested in that. I don't know. I don't think that the majority is super interested in fashion, but I don't know… maybe. [P8]

In the absence of clear cues from their colleagues, employees relied on their own judgement of whether their interest was a good fit to explore in the playground or not. Often, in order not to risk bringing something too novel and too irrelevant to work, employees preferred pursuing those interests only in their personal life, not at work.

Another way to navigate the tension around the relative novelty was using previous client and exploration projects as anchors and initiating exploration projects around the themes of those previous projects. During the time of the data collection, there were two active themes: data visualization and reimagining work processes, both of which were closely related to day-to-day work at Paizo. Employees initiated personal explorations within one of these two domains either organically or because they were nudged by the managers. One of the founders of Paizo reflected on this process:

> I mean, in theory, yes, we tell them that they can do anything. […] The other thing is they see what has been done so far in the [playground]. […] It is perceived like these are the guidelines, like to this extreme to that extreme. [People think] somewhere in here I can play but I cannot go outside. This is sort of the written down culture versus the lived culture. Written down [culture] might be [that] you are completely free, but the lived culture is [that] we usually do something similar to [the previous ones]. (P12)

By choosing a domain that the organization and colleagues were already interested in, employees were relieved from the pressure of championing their idea and claiming its relevance – both of which would have been difficult in the closed playground.

Yet, this approach risked their time in the playground being too close to work and lacking the element of fun and excitement. To prevent that, employees began investing themselves in the exploration by personalizing the content to align with their existing passions in their personal lives, within the boundaries of the existing themes. For example, a designer explained his process of creating an infographic website for exoplanets in the closed playground:

> I had like three weeks of free time, and I said to [the managing director] that I would like to do a data story, you know visualizing a data set because it is fun and also, we could learn a few techniques like scrolling telling [a data visualization technique for online story telling]. […] It is a web page about exoplanets. Completely something I'm interested in, and I just use these data sets. It was about the habitability of exoplanets. It was structured like an article where we explain what an exoplanet is and what defines habitability. And there were charts. It was fun! [P5]

When we followed up about how he chose the topic, he replied: "So, the topic… Okay, just because I am interested in astrophysics. Basically, that's the only reason. It's like completely not related to the work I usually do." He was not alone in doing a data visualization project on a topic that he had prior knowledge of or interest in. Another designer who was playing music in his personal life created an interactive data visualization of cover songs during his time in the playground. He said:

> I was interested in music in general and making music as well. […] I [also] did something similar in the sense that I used physical properties to visualize data [as my final project of my bachelor]. I had it on the back of my head for a few years. So, in that sense, I would say it's really driven by my curiosity and my interest in this sort of visualization technique and topics." [P7].

These examples illustrate how personalizing what was already familiar to the organization helped employees in closed playgrounds ensure that their personal explorations were relevant to the organization but still enjoyable to pursue for

themselves. In doing so, employees started with an organizational goal and then begun investing themselves into the project.

Negotiating the openness of the process: Selectively inviting input. As the work done in the closed playground was separated from the rest of the organization, employees did not have regular and open access to input from their colleagues. Instead, our informants reported often working on their personal explorations alone, relying mostly on their own knowledge and skills. However, they still occasionally needed help or feedback. To satisfy their need for input while protecting their control over the process, they only selectively invited input from their colleagues by approaching the "right" people and sharing refined artifacts.

Although they mostly worked by themselves in the closed playground, employees occasionally needed technical help, advice on how to use a tool, or where to find a piece of information. Then, they approached only to the people who could provide the specific help and guidance needed at that point in time. For instance, the designer who did a data story on femicide in India had conducted all the research and designed all the infographics when she reached out to a developer in the team. She said she needed someone else to "bring this to the next level and create a website" because she did not have the technical knowledge and skills to implement her ideas. Similarly, the engineer who wrote the code for the infographic website for exoplanets approached the design lead to get feedback on the design of the website, which was an area that he needed support and input.

Employees typically waited until they had refined artifacts, such as working prototypes, detailed drawings, or websites, apps, and products, to share their

exploration with the rest of the organization. When asked when a good time would be to share his personal exploration with others, an informant replied: “I would say it’s best to share it as early as possible. But we never do it because we always wait [for] it to be perfect before sharing it, which is silly, of course.” [P5]. Indeed, we observed that informants prepared fully-fledged presentations or brought ready-to-test, high-fidelity prototypes. This approach had two important consequences. First, investing time and effort into perfecting it in the closed playground meant that employees invested themselves into the project and held the deepest knowledge about it, which had the effect of tightening their sense of ownership over the project. Second, because the results of a personal exploration were only shared with other members of the organization when it was in its advanced stages, the input and feedback received often did not significantly change the course of the project, as a designer explained: “[When you share your exploration project], it’s mostly feedback on what could be optimized, but with the understanding that it’s kind of finished.” [P9]. This approach meant that in the closed playground, employees remained the main driver of their ideas and remained in control over the process, while others had limited and controlled involvement.

Negotiating the ending: Seeking closure. Despite not having a defined endpoint, employees in the closed playground had limited time to work on their personal explorations. Thus, they sought closure to be able to conclude their projects in a way that they desired even when they had limited time and resources to do so. Seeking closure included finding ways to demonstrate their effort and prolonging their play time to achieve more refined outcomes.

Since they were temporarily isolated from the rest of the organization, it was important for employees to conclude their work in a way that demonstrated the effort and time they put into it. They spent significant portions of their play time visualizing and documenting their process and outcomes. Our observations revealed that informants relied on the same practices they used for documenting client work, such as creating case study reports, writing blog posts, and creating presentation decks. These documents included, as an informant explained, "how [they] approached it, what went into it in terms of thoughts and ideas, and what the outcome was and how [to] use it." [P6]. An informant explained how documentation was used as a way to demonstrate the quality of the work: "I think for us, what counts is doing high-quality work and paying attention to all the details and being a reliable design studio. I think that is visually represented with the way we document our [exploration] projects." [P10]. Some took extra steps to showcase their exploration projects to external audiences by presenting at conferences and participating in exhibitions. Receiving recognition for their personal interests and effort in exploring them not only inside their own organization but also from external people was a fulfilling way to conclude their pursuit.

Yet, because there were clear temporal boundaries around play time, it was not always easy to achieve the quality they strived within those boundaries. Thus, employees often prolonged their play time even when it meant working on these ideas after work hours or over the weekends. For example, an informant explained how he invested in his personal time to further develop the project:

> I enjoyed [working on my personal explorations]. Like, I mean there was like one or two instances where I really had like a one- or two-weeks' time to work on it. And that was nice, but also in a way, not enough. And so, at some point, I

> worked a lot on it in my free time. Also, you know, like in the evening you kind of have an idea. You want to try it out and then you kind of continue working. [P6]

When we asked why they kept working on these projects in their personal time, some referred to the enjoyment they got out of the process:

> That is true that if it is your own project, you invest more [time] than what is contractually defined. Maybe you want to make a good impression or want something [to be] successful or just you have fun. [When] you are so into the project that you are doing that, it also becomes a hobby, at some point it becomes a pleasure to work on it. [P4]

Over investing their personal resources helped employees in the closed playground conclude their projects in a meaningful and fulfilling way for them.

Our analysis revealed that negotiating play in the closed playground strengthened employees' sense of ownership over their ideas. This was reflected in the language they used when referring to these projects. For instance, an informant said: "It is a lot of *my* time and *my* interests. How can I say this? You know, if I didn't do it, then it wouldn't happen. Yeah, in that sense, I feel like it's *my* page." [P5]. Another echoed: "It's *my* project. I feel like [it is] very much something that I have ownership, but it's also [Paizo]. So, it's like me within [Paizo]. [P4]. They felt more ownership over these projects because they developed an intimate knowing of the topic by personalizing a familiar topic or theme, retained control over their process by selectively inviting input, and deeply invested themselves by seeking closure that would give a sense of fulfilment and achievement.

Practices for Negotiating Play in the Open Playground

[Insert Table 3.4 here]

Negotiating the relative novelty: Familiarizing the personal. Employees in the open playground also felt pulled towards projects with both organizational and

personal relevance. Unlike the ones in the closed playground, however, employees were in daily, even constant, contact with their colleagues when in they were in the open playground. Such close interaction allowed employees to test a wide range of personal interests without relying on past themes to guide their choices. They therefore brought personal interests to the workplace without knowing whether they would be interesting or relevant to the others in the organization, as a manager at Meraki describes: “It tends to be just an individual within the team who says: ‘Actually, I’m interested in that. I’m going to bring that into [work] from the outside world.’” [M8]. Yet, we found that employees tried to generate interest around their personal interests – *familiarized the personal* – by testing ideas with peers, creating evocative conversations, and raising awareness about the topic of interest.

The open playground allowed employees to gauge the interest of their colleagues before committing to a topic, theme, or idea. As an informant put it “the only criterion is ‘Is this interesting to us?’ There is no ‘We have to do this.’ So, it becomes quite free and gets judged by [its] interestingness.”. [M7] Employees assessed the “interestingness” of their idea by testing it with peers. The same informant explained his approach to deciding what to explore in the open playground:

> What I normally do… I just grab somebody else. Yeah, I just talk to somebody else, I talk to [a colleague], I talk to [another colleague], show what I’m thinking about and then just see if two other people get interested. [M7]

Unlike the ones in the closed playground who filtered out interests based on their own assumptions, the ones in the open playground relied on their colleagues’ reactions. Employees often tested their ideas for explorations with one or two colleagues that they felt closest to. When their conversation turned into impromptu brainstorming, they could tell their idea had the potential to be interesting and relevant to the organization. If their

colleagues were interested, they initiated an exploration. If not, they moved on to the next idea because “if you don't get anyone excited, you're just on your own. Then you can just do it in your own life.” [M7]

In other cases, employees tried to actively generate interest among their colleagues by creating evocative conversations. Our informants pointed to those conversations as starting points of most of the exploration work, as a manager described: “I think [what initiates a personal exploration] is always or in most cases a conversation with people rather than an epiphany.” [M11]. One day over lunch, this informant, who has been interested in gender issues, shared: “The internet is built mostly by men. […] Maybe you can choose how you consume the Internet. Maybe you can say, I want to look at content just written by women.” Her description of a hypothetical scenario generated a lively discussion around gender bias, which later turned into a number of explorations. People often created those evocative conversations by asking “what if” questions and introducing hypothetical scenarios. Doing so evoked people’s emotions and led them to imagine alternative realities that can be explored in the open playground.

Another way of familiarizing their personal interest was by raising awareness about a topic or idea by demonstrating its importance, meaningfulness, or timeliness. They shared academic and news articles, compiled provocative information in slide decks, and prepared mini lectures to make their personal interest more relatable and interesting for others. For instance, a designer at Meraki gave a presentation on the environmental impacts of digital products to the whole team before conducting a series of exploration projects on this topic. He explained:

> I became interested in digital products and climate change. So, I started researching on my own, reading about it. And then I did a presentation here [at Meraki]. It was like one of those things if I just said it, it would not really mean anything. Because it is just like 'Oh, yeah, I guess it does have real-world implications' and that is it. But I wanted it to be more of a kind of provocation. So, I thought I would make a little deck out of the stuff I've read, found, or thought, and then present it. And then see what other people think about it. I wasn't really sure what the reaction would be to be honest, whether it was stupid or not. So, I presented it, and we had a big conversation about it. [M10]

Presenting his interest in environmental issues backed with loads of provocative data, ignited others interest in the topic, as another designer described: "I think we were all just blown away by how relevant it was, how important it was, and how little we knew about it. […] He has given us the understanding around it that we just didn't have before." [M11]. Following this presentation, he began to receive individual requests to chat more about the topic. He said: "I started having chats with people individually. Quite organically… Like making a cup of tea and then someone would be like 'Oh that was really interesting! Yesterday when you said X." These casual interactions following his presentation showed him that others became interested in the topic, and thus he could initiate a personal exploration around it at work. During our interview, he reflected on this process by saying "I didn't expect everyone to be as interested in it as I was." This example shows how familiarizing their colleagues with their topic of interest, which may have seemed too novel and irrelevant at the beginning, helped employees negotiate what to explore within the open playground. By familiarizing the personal, they took their personal interests and began to open them up to a wider organizational audience.

Negotiating the openness of the process: Facilitating co-creation. Unlike the closed playground, the open playground made the process of personal exploration transparent and accessible to others. This meant that other members of the

organization got involved into the process early on and throughout the project, often leading people to change the course of their exploration. Our informants reported that they facilitated co-creation by welcoming informal interactions and sharing transient artifacts.

Employees welcomed informal interactions with others as they explored their personal interests in the open playground. Instead of keeping their exploration hidden or relying on formal sharing sessions, employees kept their process open and visible to others so that they regularly received comments and suggestions that led them to rethink their approach. As one informant explained: “It is very open so anyone can just say ‘Oh, that sounds super interesting. Can I just help you out with something?’ It is not like a protected thing.” [M7]. Indeed, we observed that our informants had informal conversations about their ongoing explorations in the studio, at lunch, or during coffee breaks. For example, a designer explained: “A lot of the time people will just come and look at my computer. Then people gather around, and you get informal feedback there.” [M9]. When we asked the same informant how his exploration changed based on those interactions, he explained: “When you show people stuff, they are like ‘Oh, I want to see what happens if you do X, Y, and Z.’ So, it is always clear [what is] the next step from the discussion because people are demanding it or requesting it.” [M9]. As a result, others in the organization contributed to people’s personal explorations starting from early stages and in ways that built on the idea and generated new directions and outcomes.

Another important factor for facilitating co-creation was sharing transient artifacts, as opposed to refined ones. Our analysis revealed that the provisional nature of the

transient artifacts – low-fidelity prototypes, drawings, and data sheets created as a way of communicating emerging ideas to others – made employees feel less vulnerable and facilitated collective exploration. Employees avoided spending too much time and effort developing their ideas on their own before sharing with others. Our informants reported avoiding "pretty presentations" and instead, sharing "the smallest thing that [they] can do". Often, they shared editable documents, live demos, or simply drew on the whiteboard. Knowing that these artifacts were meant to be changed, others felt more comfortable sharing their ideas, comments, and suggestions that could challenge the way people planned to explore their personal interests. An informant explained:

> Being open to input and not being precious that it is like your thing [is important]. You haven't gone away and then spent hours doing this thing and then come back and said: '[Colleague], what do you think about this thing?' Then, he would feel bad saying, 'Actually you need this, this, and this. But when you do [draw your ideas] on the whiteboard, you can just scrap everything. […] We do it quite often. We just stand and draw on to the whiteboard together. Which seems quite performative but actually is quite helpful. I think when you are just drawing things naturally in front of someone, that opens this conversation. People just feel able to input, or change something, or question something because it is not as permanent. You can just rub it out and redo it. [M10]

Creating artifacts that could easily be transformed helped employees overcome the discomfort of sharing their ideas and co-create with their colleagues. This suggests that in the open playground, employees who initiated the exploration loosened their control and sense of ownership over their ideas, while the involvement of others into the exploration process widened the base of knowledge developed from the exploration.

Negotiating the ending: Keeping interests alive. When in the open playground, employees explored their interests and ideas together with their colleagues through co-creation. Unlike the employees in the closed playground who found fulfilment in completing their projects on their own, these employees found fulfilment in

keeping their personal interests alive in the studio. They inspired others to continue exploring these interests by shifting their focus from outcome to learning and asking new questions.

Without clear boundaries around play activities, employees did not feel pressured to deliver something within a specific time frame. Instead, they valued what they, as a studio, learned from this experience. When asked how they knew they were done, several of our informants replied: “I don’t think they are ever done.”. It was because they were not trying to reach a certain point. A designer who actively explore his personal interests at work described the process with a hiking metaphor:

> So, the [personal explorations] are setting off exploring something without really knowing where you would end up. We talked about going up this mountain while trying to find paths up. And people are going to take different paths: someone walking, coming back, and taking the boat. But we are just wandering. We are not just looking for anything. We don’t have to get to a certain point. [M5]

As this quote illustrates, valuing learning over the outcome gave employees a sense of fulfilment. The grand organizational purpose of developing knowledge motivated people to explore their personal interests at work, even when they did not lead to concrete outcomes, such as products, apps, or websites.

For them, success was inspiring others. Thus, they hoped their exploration to open new and interesting areas to explore for others in the organization. When someone shared learnings from the exploration, they collectively asked new questions. An informant explained this process: “Now that we have done it, what does this mean? What does it feel like? So, we would ask the question, make something, and reflect on it. That would then form a new question which would help us make something else, so we continue.” [M9]. Indeed, we observed that during the meetings where they discussed personal explorations, employees used phrases like “This is a way of cutting the data,

there might be other ways. [M14] and “Wouldn’t it be cool if you can extract the whole table?” [M6] to encourage others to pick up from where they left off.

It is important to note that this approach resulted in a series of mini explorations around an employee’s personal interest. Yet, they were not obsessed over remaining the main driver of the exploration. We observed many instances when another team member took the lead to continue exploring a different aspect of someone else’s personal interest. Seeing their personal interests “spark an idea in someone else” made these employees feel a sense of accomplishment. As they concluded their explorations in this way, their comments reflected that a sense of collective ownership had developed:

> Here, I feel like we have a collective ownership of ideas. It is not like I would just do that. Say if I had an idea and presented it. [The question would be] ‘Well, what do *we* do with this? Where should *we* take this next? Now like ‘What are you going to do with that [M5]? What’s your next idea?’ It is more like ‘What should *we* do? Where can this go within the company?’ [M5]

Enabling others to get to know the topic by sharing their know-how, sharing control over their process by inviting others to co-create, and letting others invest themselves in the process made these employees develop collective psychological ownership over personal exploration in the open playground.

The Effects of Negotiated Play Practices on Completeness and Integration of New Ideas

As illustrated by the quotes in the prior sections, the different setups of the playgrounds (open vs. closed) and, respectively, how employees negotiated play in those spaces affected the completeness of the projects and integration of new ideas and practices. Both outcomes are of critical importance to organizations that strive to support creativity and learning by supporting employees to explore their personal

interests. While under-developed ideas can be difficult to turn into short-term value, failure to integrate new ideas can negatively affect the long-term learning and development. Our analysis revealed that negotiating how to pursue their personal interests in open or closed playgrounds led employees calibrate their sense of ownership over their ideas accordingly. Employees in the closed playground strengthened their individual psychological ownership, and those in the open playground developed a sense of collective psychological ownership. In this section, we illustrate how employees' sense of ownership over personal explorations affected the completeness and integration of new ideas.

Effects of negotiating play in the closed playground. Since pursuing personal interests in the closed playground led employees to develop stronger individual psychological ownership over their ideas, they put more time and effort into turning them into well-developed projects. As a result, the ideas developed in the closed playground were in a more complete state. Moreover, these projects were already in a format that could be easily shared with external audiences (e.g., websites, digital products, applications) requiring little effort to communicate the relevance and importance of these projects. For example, Paizo's website featured elaborate data stories on exoplanets and musical covers, which were projects completed in the closed playground. These two projects showcased two different sets of capabilities around data visualization: creating a scrolling telling website and creating interactive datasets. Thus, these projects were used as showcases of the organization's and its members' capabilities and interests, as the founder of Paizo put it: "Self-initiated projects, of course, sort of built these showcases and *directly* demonstrated our capabilities and

demonstrated the type of work that we would like to do to others." [P12]. Indeed, several clients had approached Paizo after seeing these projects on their website. The completeness of these projects helped organization have short-term benefits from each project, such as gaining visibility and attracting new clients.

However, despite resulting in well-developed projects, employees' strong sense of ownership hindered the integration of learnings and ideas into the rest of the organization. Because employees were temporarily isolated from their colleagues and invested themselves into the process, they retained control over, got credit for, and gained primary knowledge about the projects. The clear separation of the closed playground from the rest of the workplace activities meant that those projects were not part of daily conversations, as an informant explained: "We have Monday meetings where we talk about what everybody is working on and I think nobody has ever talked about [their personal exploration], as if there is no [playground]." [P2]. Consequently, it was challenging for the organization to embed the learning and know-how from these projects into their regular work. For instance, a designer reflected on this challenge:

> I think a lot of the learnings are probably very personal and tied to the person [who worked on the exploration project]. […] When I work on a [personal exploration], naturally I try out new things and try a new tool to do a certain thing. So, I definitely learn. Then the question is how we actually make that beneficial to everyone in a way. [P7].

As evident in these quotes, while the organization benefited from the well-developed stand-alone projects, the way these projects were developed made it challenging to build a collective knowledge base that can be utilized during client projects over time. Most of our informants reported that they wished the personal exploration processes and associated know-how were more integrated into their daily work so that they could expand the organizational knowledge and push their comfort zone.

Effects of negotiating play in the open playground. In the open playground, employees were not isolated from others while exploring their personal interests. On the contrary, they co-created ideas with their colleagues. This meant that employees developed a sense of collective psychological ownership over these projects. Thus, integrating learnings from each exploration into the organizational know-how was easier for employees in the open playground compared to the ones in the closed playground. A section of Meraki's Monday catch-up meetings was dedicated to the ongoing personal explorations. After a brief update on the exploration, they had a team discussion to collectively make sense of the exploration and how they could extract learnings for that to be used in client projects and beyond. We observed that the terms and themes that emerged from personal explorations became widely used across the organization, even during client projects, as an informant said: "The idea [developed during a personal exploration] keeps popping up in different spaces." [M7]. Such integration allowed the organization to create a rich knowledge base over the years. The founder of Meraki emphasized how this approach helped them achieve their long-term vision:

> We are doing it just so that we can learn. So that we can get to this point now where we built an incredible body of knowledge. […] I think that's really useful and really valuable and it's going to be applicable in the future. So, it was a really long-term vision. [M4]

Developing a knowledge base over the years helped them attract new clients and projects. Yet, unlike Paizo, it was not a straightforward process where clients approached them after seeing showcase exploration projects. Because employees had already developed their ideas with others, they did not feel the need to document or finalize their exploration process. Often, sharing their transient artifacts over lunch

breaks or at informal meetings was enough for them. An informant commented on that issue:

> We don't have a data base, or repository of some sort that very easily and very quickly [could make] people get to grips with all the amazing learning that we've had. […] I think after you share, it stays in people's minds, in everybody's minds, but [still] in people's minds. [M1]

The lower level of completeness made it challenging to share and explain these explorations and learnings with the newcomers to the organization and the external audience. Since personal explorations often did not produce easily shareable outputs, and mostly resided in "people's minds", it required extra effort from managers to showcase the knowledge and capabilities generated. As a manager reflected, "Can they find [Meraki]? I guess at the moment, no. We have found other people; we have found people who have been working on that stuff, but they haven't found us." [M8]. Although they attracted attention from potential clients and collaborators by talking about those explorations, at the time of the data collection, most informants pointed to capturing, documenting, and sharing their ideas and learnings developed through personal explorations as potential areas of improvement.

DISCUSSION

Personal interests of employees can be an important resource for organizational creativity and learning. Prior research has suggested that employees are likely to bring their personal knowledge, skills, and curiosities to work to address existing work-related challenges (Hargadon & Sutton, 1997; Sutton & Hargadon, 1996). Exploring new ideas and projects that spring from personal interests, however, has been theorized to be a risky activity and often found to take place in secret, out of managerial view (Criscuolo et al., 2014; Mainemelis, 2010). On the other hand, there has been an increase in the

number organizations that give employees a legitimate space and autonomy to explore ideas that they personally find interesting and meaningful. Extant research, while hinting at the opportunities and challenges of harnessing employees' personal interests at work, leaves unclear whether, and if so, how organizations can do so.

Using an inductive study of two design organizations, we addressed this question and uncovered the *model of negotiated play* (see Figure 3.1) to explain the process of turning employees' personal interests and ideas into organizational value. Our study shows that the challenges of exploring personal, and as a result, relatively more novel, ideas at work differ from those of exploring new ideas and practices related to work. Thus, even when they were given safe and legitimate spaces to play with their personal interests, our informants still felt the need to negotiate how to do so. By uncovering different ways that employees navigate the dual nature of pursuing personal interests at work, our work provides new insights into the complexities of organizing for creativity and innovation. Taken together, our emergent model and theory offer contributions to research on creativity, psychological ownership, and organizational spaces.

Finding a Balance Between Novelty and Familiarity

Scholars have long recognized that organizations, despite desiring novel ideas, have a bias towards familiar ones (Mueller et al., 2012; Mueller et al., 2018). Prior research suggests that organizations' and teams' desire to reduce uncertainty made them reject novel ideas (Mumford et al., 2001; Rietzschel, Nijstad, & Stroebe, 2010). Even though it is a significant barrier to organizational creativity, learning, and innovation, little attention has been paid to how people navigate the bias against novelty (Harvey & Mueller, 2021). Overcoming this bias is of particular importance for

organizations and their members that desire to harness personal interests as a source of new knowledge and ideas. Our findings revealed that even when they were given a space to explore the project of their choice based on their personal interests, employees sought a balance between novelty and familiarity.

Our findings show that access, or lack thereof, to colleagues with whom people can test their ideas determines how people find that balance. When temporarily isolated from their colleagues to explore new ideas, as the ones in the closed playground were in our study, employees avoid pursuing radically new topics and ideas and instead build on what is already familiar to the organization. Whereas prior literature views decision makers and senior management as the main reason why novel ideas go unrecognized, unsupported, and are rejected (Benner & Tushman, 2003; Mainemelis, 2010), we find that employees also filter out ideas that they think would not fit to the organization when they cannot test their ideas' interestingness. Thus, many ideas that could potentially contribute to the organization remain outside the bounds of the organization. Building on familiar topics and ideas, with relatively more novel ones being filtered out, often results in incremental creativity. This insight points to an even more serious hurdle to organizational creativity and innovation. Hence, our work suggests that organizations that wish to support radical innovation and the development of novel ideas should give employees chances to test their ideas with their colleagues in safe spaces (see Butcher & Langley, 2016 for a similar concept).

When employees have access to their colleagues as they explore new ideas, as the ones in the open playground had in our study, they try to get others interested before they start. This suggests that others can play an important role at the very

beginning of the idea journey by giving the creators courage, motivation, and legitimacy to start. Our study contributes to and extends models of the creative process (Amabile & Pratt, 2016; Perry-Smith & Mannucci, 2017) by highlighting people's need to promote and test their area of interest prior to idea development. This need is especially salient when people do not respond to a task presented to them and instead proactively identify a problem to explore (Unsworth, 2001). This insight challenges the view that championing an idea is a later-stage activity "aimed at obtaining approval to push the idea forward" (Perry-Smith & Mannucci, 2017, p.58). Our findings reveal that employees can champion their area of interest to create awareness, familiarity, and interest, which creates a safe and welcoming space to develop new ideas. Thus, we suggest that one strategy for overcoming the bias against novelty is familiarizing the organization with the novel idea or topic by promoting its importance and relevance even before the idea generation.

Regulating Psychological Ownership through Use of Artifacts

The benefits of involving other people in the creative process have been well-recognized by creativity scholars. Prior research suggests that others could bring diverse ideas and perspectives and provide help and support (Perry-Smith & Mannucci, 2017; Fisher et al., 2018; Hargadon & Bechky, 2006). Consistent with recent research on psychological ownership in creative work, our study suggests that it is more challenging to involve others in the creative process when the idea is particularly personal and meaningful for the creator (Baer & Brown, 2012; Brown & Baer, 2015; Grimes, 2018; Berg & Yu, 2021). We contribute to and extend this line of work by highlighting how the nature of the produced artifacts can help creators invite others or

keep them at a distance by regulating their sense of psychological ownership over their ideas.

We discover that delaying the sharing of ideas until they have been developed into refined artifacts causes creators to devote more of themselves into their ideas, resulting in a stronger sense of psychological ownership. As a result, creators become less open to adopting suggestions, and others become less willing to involve in the collective creative process. On the other hand, creating transient artifacts that can be shared frequently throughout the creative process invites others to participate more actively in idea enactment and helps creators in overcoming feelings of vulnerability. Because they spend less time and effort into perfecting their ideas into well-developed artifacts, creators loosen their individual psychological ownership. Instead, the transient nature of the artifacts invites others to collectively enact ideas early in the creative process and thus fosters a sense of collective psychological ownership.

While prior literature highlights the importance of artifacts in supporting coordination, knowledge exchange, and collective idea generation (Stigliani & Ravasi, 2012; Metiu & Rothbard, 2013; Nicolini, Mengis, & Swan, 2012; Bechky, 2003), our findings uncover a different role of artifacts in creative collaboration: regulating one's sense of psychological ownership over their ideas. Our work thus highlights the importance of studying the creation of artifacts as a way of understanding creators' relationship to their creative process and outcomes. We suggest that organizations can overcome employees' hesitation in getting feedback, involving others, and sharing ownership by shaping the sharing culture in a way that encourages people to share in-progress work and low-fidelity prototypes throughout the creative process.

Embracing Open-endedness by Redefining Meaning

Our findings suggest that concluding the open-ended task of exploring a self-initiated project is challenging for people. We find that in the absence of clear endpoints and deliverables, people find their own way of crafting meaningful and fulfilling endings. When temporarily separated from colleagues, employees try to conclude their process in a way that demonstrates the time and effort put into it. Whereas when employees co-create with their colleagues, they worry less about the outcome and instead value inspiring others to keep the topic of interest alive in the workplace. This suggests that what constitutes a meaningful and fulfilling ending of a creative process can vary depending on how and with whom people create.

Our emphasis on knowledge creation and integration outcomes of the creative process distinguishes our work from the majority of organizational creativity research that foregrounds creative outcomes, such as products, services, and systems. Despite receiving little scholarly attention, the by-products of the creative process play an important role for organizations because they can – directly or indirectly – influence organizational learning and creativity. Given the recent shift from outcome-focused view of creativity to viewing creativity as creative work (Harrison et al., 2022), it is timely and important to focus on the organizational consequences of going through a creative process rather than focusing solely on the outcomes of the creative process. We hope that our study inspires further research to pay attention to the *how* of exploring new ideas.

Co-creating Spaces for Exploration and Play

Scholars have suggested that organizations that desire creativity and learning should create spaces dedicated to exploration and play where organizational rules, structures, and expectations are temporarily suspended (Lavie et al., 2010; March, 2020). Both organizations we studied set up such spaces, yet the way they did so differed. One organization, physically, temporally, and symbolically bounded exploration activities (i.e., created a closed playground), as suggested in prior research, to give employees a safe space to develop new ideas and practices. This finding confirms previous observations that spaces isolated from existing rules and practices help people let go of preconceived expectations and explore new ways of doing things (Lee, Mazmanian, & Perlow, 2020; Bucher & Langley, 2016; Cartel, Boxembaum, & Aggeri, 2019; Furnari, 2014).

Surprisingly, however, our findings reveal that bounding exploration activities is not the only way to establish spaces for exploration and play. We were surprised to find that the other organization created boundaries around work instead to establish a space for exploration and play (i.e., creating an open playground). We find that defining what is clearly work have the effect of turning the rest of the workplace into an open space where employees can explore new ideas. The initial setup of the organizational space, whether it is an open or closed playground, determines who is in and out, which in turn influences how employees experience these spaces and what they do in them.

We contribute to and extend the growing body of work on organizational spaces by uncovering an alternative way of establishing a space for exploration. The bounding work approach suggests that exploration does not have to be an isolated activity that is done separately from the rest of the organization. Instead, it suggests that exploration

can be a collective activity well-integrated into organizational practices when routine work is clearly defined and isolated. Future studies may look at various scenarios and organizations to see which approach supports organizational creativity and learning the best in particular situations. For example, future research might explore if the bounding work approach is viable for emerging organizational forms, including location-independent organizations and flexible work arrangements, where personal life and work are inherently more blended than it was in our setting. Similarly, the size of the organization might make one approach more effective than the other.

While it is critical to establish spaces for exploration and play, we found that it is not enough to harness employees' personal interests. Our model highlights that a space for the exploration of personal interests cannot simply be established by the organization but, instead, is co-created by the organization and its members as they negotiate how to balance their diverging needs and interests. The term *negotiated playground* thus suggests that while the playground is established by the organization, how to explore their personal interests in it is negotiated by the employees. Hence, our work suggests that while organizations need to create safe spaces for risk-taking, experimentation, and play, if they desire to harness employees' personal interests, they may also need to allow employees to transform and recreate those spaces. By focusing on the lived experiences of these spaces (Lefebvre, 1991), we answer calls for studying organizational spaces in conjunction with the activities and practices happening inside them as opposed to studying them as containers of activities and practices (Stephenson et al., 2020). We hope that our study inspires further research attention to explore the active role occupants of organizational spaces play in shaping them.

Boundaries and Limitations of the Model

In this study, we focused on theorizing how organizations harness their members' personal interests. To achieve that, we sampled organizations that were successful in supporting employees to bring in and explore personal interests. Both Meraki and Paizo were pleased with the outcomes and were determined to keep supporting the exploration of personal interests for a long time. Hence, our model explains how people negotiate the way they explore personal interests at work. Although findings hint at the challenges of harnessing personal interests at work that, unless navigated successfully, might cause the failure in these strategies, we did not observe that. As crucial as it was for our research design to understand how employees pursue their interests, it is equally important to understand why they would choose not to do so. Researchers might study unsuccessful strategies and programs to uncover why organizations fail at turning their members' personal interests into organizational value.

Both organizations we studied operate in the field of design. While our sample included employees working in finance and operation, the portion of engineers and designers dominated our sample. That meant that for most of our informants generating new ideas and going through the creative process was a routine practice. These individuals were particularly appropriate for observing negotiated play practices because they were equipped with skills to communicate their ideas visually and clearly. However, their familiarity with the creative process might also make them more comfortable with ambiguity than employees in other sectors might be. It is important to understand how employees with less experience with creative processes navigate the

process of exploring their personal interests at work because most organizations aim to support employees across various divisions. Future research could expand the sample to test the tensions and negotiation practices we uncovered in this study.

Insights from this study are also grounded in small-size companies where all employees know each other and interact on a daily basis. We believe this makes the practices that might otherwise be less pronounced, more visible. However, the organizations that support employee-led exploration vary in their size, ranging from small companies with a dozen employees to large companies with thousands of employees. For example, in larger companies, it might be more challenging to establish an open playground and instead of co-creating with all the colleagues, employees might choose to create small communities within the organization. In the future, scholars might look for opportunities to build on the negotiated play model surfaced in this study by examining how the size of the company affects the observed relationships.

CONCLUSION

Turning a personal interest into organizational value is challenging for both employees and organizations. Our study introduces the negotiated play model to explain how employees and organizations balance their diverging needs and interests and in doing so create an experience that is meaningful and fulfilling for both.

4. MAKING SPACE FOR CREATIVE WORK: A REVIEW AND PROPOSED RESEARCH AGENDA

Today, organizations that strive to be creative and innovative are increasingly investing in the design of physical spaces that inspire and support creative work. Companies have adopted various approaches to establish a "creative workspace," including installing giant playgrounds, getting rid of traditional offices to create open work areas, and introducing unconventional architectural elements like curved walls (Lewis & Moultrie, 2005; Schmidt & Rosenberg, 2014). This growing managerial interest has resulted in an abundance of practical resources aimed at assisting organizations in creating creativity-enhancing workspaces, such as design guidelines (Thoring, Mueller, Desmet, & Badke-Schaub, 2018), "how-to" books (Stewart, 2004; Doorley & Witthoft, 2012), and stories of "best practices" (Kelley, 2001; Catmull, 2014). In this context, research investigating the relationship between physical space and creativity has flourished, with scholars exploring how spatial design of workspaces can support or hinder creative work (Kristensen, 2004; Kallio, Kallio, & Blomberg, 2015).

While recent calls for material (Hicks & Beaudry, 2010; Boxenbaum, Jones, Meyer, & Svejenova, 2018) and spatial turns (van Marrewijk & Yanow, 2010) in organizational research have sparked interest in exploring the effects of work objects and physical work settings on work experiences, behaviors, and interactions with others (Elsbach & Pratt, 2007; Johns, 2006; Ayoko & Ashkanasy, 2021), studies on physical space and creative work remain at the margins of organizational research. This research is scattered across various fields, including architecture, facilities management, environmental psychology, and ergonomics, making it difficult for

management scholars to form a clear understanding of existing knowledge in this area. Therefore, the purpose of this review is to synthesize existing research on physical space and creative work to enhance our understanding of this otherwise fragmented area and identify opportunities for future studies on creative workspaces.

To accomplish this goal, I adopt narrative approach to reviewing and "attempt to draw out the contributions of a range of studies towards a cumulative understanding" of creative workspaces (Taylor & Spicer, 2007, p.326). First, I used the combination of the terms creative, creativity, space, workspace, and physical space to search for articles published on this topic. In sampling literature, I focused on papers in which creativity, creative work, or creative process were the central phenomenon. Once I identify articles that clearly focus on the relationship between creative work and physical space, I also used a reference list checking technique, in which I scanned the references of those articles to find additional studies that were not included in my sample.

This article is organized in three sections. First, I provide an organizing framework outlining three different forms of creative work: deep, collaborative, and serendipitous. I synthesize the main needs of these creative work types and physical space elements that found to support those needs by presenting examples from existing research. Second, I discuss how organizations can establish creative workspaces that support multiple forms of creative work by empowering the users of these spaces to transform them. In the final section, I present an agenda for future studies and outline implications of new work trends and technologies on physical workspaces and creativity.

PHYSICAL SPACES TO SUPPORT DIFFERENT FORMS OF CREATIVE WORK

There has been a growing interest in exploring the relationship between physical space and creativity since Amabile first noted that “physical environments that are engineered to be cognitively and perceptually stimulating can enhance creativity” (1996; p.249). Understanding the relationship between physical spaces and creativity is crucial because contradictory findings from empirical studies suggest that the complex and novel nature of creative work may require different physical spaces and spatial arrangements than those that are optimal for more traditional work tasks. For example, Bernstein (2012) conducted a field experiment in a mobile phone manufacturing company and concluded that open spatial layout resulted in reduced privacy and had a detrimental effect on employees’ learning and experimentation. In contrast, Kallio and colleagues (2015) found that the open-plan office design of a newspaper company was beneficial for the creativity of the editorial staff, as it symbolized equality and collectiveness. Similarly, while messy office spaces may be perceived as a signal of unprofessionalism and low status in corporate settings (Elsbach, 2004), they are considered as an essential aspect of creative work and signal their owners’ creative potential in creative industries (Jacucci & Wagner, 2007; Thoring, Gonçalves, Mueller, Desmet, & Badke-Schaub, 2021).

Existing literature reviews on physical environment and creativity, however, provide extensive lists of factors and physical arrangements that may potentially affect creativity without specifying the conditions under which these could lead to desired effects (Thoring et al., 2020; Dul & Ceylan, 2014; McCoy & Evans, 2002). Although there are some factors that are consistently found to be creativity-enhancing, such as access to natural elements, space for relaxation, and combination of shared and private

spaces, or creativity-inhibiting, such as high levels of noise, insufficient office size, and inflexible work arrangements (McCoy & Evans, 2002; Dul & Ceylan, 2014; Meinel, Maier, Voigt, & Wagner, 2017), there is no organizing framework that brings clarity to when and for whom these factors can be helpful or detrimental.

This is an important oversight because physical environment should be designed based on the intent and envisioned use cases (Moultrie et al., 2007) and creativity enhancing physical spaces should accommodate different forms of creative work. Therefore, in the next sections, I first define different forms of creative work using an organizing framework that differentiates whether the creative work is done individually or collectively and whether the creative work is planned or unplanned.

Organizing Framework

Creative work is defined as "a process in which ideas are generated, elaborated, evaluated, stored, discarded, or implemented into a product by individuals or groups with the intent of developing something novel and useful" (Harrison et al., 2022, p.1; Rouse & Harrison, 2022). As this definition suggests, creative work is not a unitary construct and may encompass forms that fundamentally different from each other. I use two dimensions to define different forms of creative work and identify their different needs in terms of physical space.

The first dimension is whether the creative work is done individually or collectively. In the recent years, creativity scholars have begun to see creativity as a social process as opposed to a product of a lone genius (Perry-Smith & Shalley, 2003; Perry-Smith & Mannucci, 2017). Focusing on collective creative work, scholars have studied the creative processes of dyads (e.g., Rouse, 2020), project teams (e.g.,

Hargadon & Bechky, 2006; Fisher et al., 2018), and communities (e.g., Reilly, 2017). Some parts of the creative process, however, require individual work. For example, incubation phase of the creative process is largely seen as a "personal or private affair" (Wallas, 1926; Kristensen, 2004). Similarly, once the group selects an idea to develop further, it is often individuals who develop and visualize parts of the idea (Stigliani & Ravasi, 2012).

The second dimension used to identify different forms of creative work is whether the creative work is planned or unplanned. Creativity scholars have posited that creative process includes distinct stages during which individuals or groups engage in planned activities to address a defined problem (Amabile & Pratt, 2016; Perry-Smith & Mannucci, 2017). The examples of planned creative activities include idea generation during a brainstorming session (Sutton & Hargadon, 1996; Hargadon & Bechky, 2006), or idea evaluation during team meetings (Harvey & Kou, 2013). However, scholars have also noted that creative ideas can come from unexpected places when people engage in unplanned activities (De Paoli et al., 2019). Randomly encountering a source of inspiration (Austin, Devin, & Sullivan, 2012) and having serendipitous conversations with colleagues (Elsbach & Stigliani, 2019) can lead to novel and useful ideas.

Using these two dimensions, I identify three different forms of creative work for the purpose of organizing literature on physical space and creativity. First, I call planned creative work done by individuals as *deep creative work* and identified the main need for this form of creative work as focus on the task. Second, planned creative work done collectively is called *collaborative creative work.* The main need for collaborative creative work is capturing and coordinating different perspectives. Third, I call

unplanned creative work as *serendipitous creative work.* The reason why I did not differentiate between individual and collective forms of unplanned creative work is that the distinction between individual and collective forms is not as clear-cut as it is for planned creative work. The processes of generating novel and useful ideas from unexpected sources are more fluid and less structured and sources of inspiration can come from individual or group interactions. The main need for serendipitous creative work is exposure to divergent cognitive stimuli.

As shown in Table 4.1, I then synthesized what elements of the physical space support different forms of creative work. I organize the physical space elements under three categories: physical structure, physical stimuli, and symbolic artifacts (Davis, 1984). Physical structure refers to the structural arrangements of architectural elements, such as walls, doors, and rooms, and furnishings, such as desks and chairs. Location, size, and arrangement of workspaces (e.g., open vs. closed offices) are examples of physical structure. Physical stimuli are elements of the physical space that evokes organizational members' attention. The presence or absence of material objects and ambient conditions, such as lighting, noise, and temperature, are part of physical stimuli in the workspace. Symbolic artifacts, independent from their instrumental function, are elements of the physical space that guide organizational members' interpretation of the workspace. Personal artifacts, decorative objects, and fun and playful elements that shape how people perceive their workspace are examples of symbolic artifacts.

In the following sections, I describe each creative work type by highlighting its main need and synthesize findings from literature to explain how that need can be supported by physical structure, physical stimuli, and symbolic artifacts.

[Insert Table 4.1 here]

Deep Creative Work

In his memoir, Stephen King (2000) described the importance of solitude during the creative process, stating “write with the door closed, rewrite with the door open.” Creative process often requires periods of individual work, where individuals need to be alone to ideate, reflect, and execute their ideas (Bisadi, Mozaffar, & Hosseini, 2012; Suckley & Nicholson, 2018). For example, previous research on brainstorming suggests that groups generate fewer and less creative ideas than individuals working alone (Diehl & Strobe, 1991; Paulus & Nijstad, 2003). As group interactions are found to interfere with the cognitive processes of idea generation, scholars have proposed that having individual idea generation sessions preceding group idea generation would help generating more creative ideas (Nijstad, Stroebe, & Lodewijkx, 2002; Markman, 2017). Specifically, open-ended and complex tasks benefit from planned individual creative work as individuals can deeply engage with the task without being distracted by the presence of other people (Shalley, 1995).

Inspired by the concept of “deep work, defined as the “ability to focus without distraction on a cognitively demanding task” (Newport, 2016), I call this form of creative work, *deep creative work.* Examples of deep creative work includes research, writing, and sketching. Since this work requires an individual’s cognitive engagement, the main need is to focus on the task.

Physical structure: Physical separation and privacy. When engaging with deep creative work, individuals benefit from being physically separated from others. Moreover, having control over who can see or hear them, in other words, having visual

and acoustic privacy, helps individuals focus on the task and explore new ideas in a safe space (Suckley & Nicholson, 2018). Physical separation and privacy are particularly important when deep creative work involves generation of novel ideas because receiving harsh criticism and feedback too early may lead to premature abandonment of potentially creative ideas (Perry-Smith & Mannucci, 2017). Moreover, presence of others may trigger feelings of social comparison which steals time and energy from the creative task, as a creative worker in an open workspace designed to support creativity explained: “In the beginning, it was almost unbearable; I spent so much time and energy looking at what my colleagues were doing.” (Thanem & Varlender, 2019, p. 307). Evidence from existing research suggests that individuals need to be alone with their creativity to be able to generate, develop, and execute novel ideas (Bisadi et al., 2012).

One way to provide physical separation and privacy needed for deep creative work is assigning private office spaces to individuals (Khazanchi et al., 2018). For example, Shalley (1995) conducted multiple studies comparing the level of creativity of individuals working alone in private rooms and individuals working at a conference table with others. The results from these studies suggest that when working alone in private rooms individuals display higher levels of creativity because they could allocate their attention fully to the task at hand.

When the existing arrangement of the architectural elements does not allow individuals to have physical separation and privacy, individuals make their own arrangements to separate themselves from others during deep creative work. For instance, when working in a shared open-plan office, creative workers occasionally felt

the need to leave their workstation and use a meeting room to think and sketch (Martens, 2011). Similarly, Elsbach observed that toy designers turned their cubicles in open-plan offices into “private work caves” by attaching cardboards to the top and sides of their workstation when they engage in deep creative work working on their unassigned creative projects (Elsbach & Stigliani, 2019). In this example, transforming their work environment not only helped toy designers focus on their task but also helped them experiment with new ideas freely, away from the gaze of managers and colleagues.

Physical stimuli: Isolation from distracting stimuli and exposure to relevant information. Some physical stimuli in the workspace, such as noise, foot traffic, and visual clutter, may act as distractions and impede individuals’ ability to engage in deep creative work. Research has shown that environmental distractions inhibit individuals’ creativity by interrupting their concentration on the creative activity (Stokols, Clitheroe, & Zmuidzinas, 2002). For example, when a business school building was redesigned to promote creativity, collaboration, and engagement through use of open and shared workspaces, researchers found themselves into a situation where they were constantly exposed to distracting physical stimuli (Berti, Simpson, & Clegg, 2018). A junior academic commented: “The space does not allow you to work like an academic needs to work. There are lots of conversations and interruptions happening.” (p.177). Similarly, a study conducted with digital artists has shown that open work arrangements created too much noise and visual distractions that artists had to look for ways to gain their disturbed focus back, as described by an interviewee: “At the moment, whenever I have a problem that I need to solve, I need to go to somewhere quiet where I can think, which

usually is the bathroom." (Hoff & Oberg, 2015, p.1896). The findings from extant research suggest that physical spaces for deep creative work should support individuals' need for focus by limiting exposure to distracting stimuli.

However, not all physical stimuli in the workspace are distracting. Having access to information relevant to the creative task at hand is critical for the incubation stage where individuals make new connections between the ideas and information collected during the course of the project (Kristensen, 2004). For instance, based on their ethnographic investigation of product designers' work practices, Stigliani and Ravasi (2012) found that individual designers continue to work in project rooms even outside of group meetings, because these were the rooms where all project-related artifacts resided. An informant from this study explained: "[Working in a project room] is more like how to almost immerse yourself with everything that that project is about and nothing else. So, it helps you focus more into that." (p.1243). These insights suggest that deep creative work would benefit from isolation from distracting physical stimuli such as noise and visual clutter, and immersion to project-related stimuli, such as sketches, notes, and photographs.

Symbolic artifacts: Reminders of personal history. Research on creativity suggests that when individuals see themselves as making progress in meaningful work, they are more likely to persist in their creative endeavor in the face of challenges (Amabile & Pratt, 2016). As explained above, deep creative work requires deep engagement with a creative task, which is a process that inevitably includes a set of failures and setbacks. Therefore, for individual creators, it is important to have symbolic

artifacts that act as physical reminders of who they are as a creative, what they achieved so far, and what their goal is.

One way to include these symbolic artifacts in one's workspace is by personalizing the work environment by decorating or physically modifying the space. While past research on workspace personalization found that employees personalize their work environment to communicate information about themselves to others (Elsbach, 2003; 2004), a recent study found that people also personalize their physical space as symbolic reminders of self, desired future self, and goals (Byron & Laurence, 2015). For example, one of the informants said she decorated her workspace in a way that conveys the message that "Oh, this must be one of the creative people that works here." (p.309) and another one explained that he has been keeping a Coldplay poster in his office as a reminder of "the kind of design [he] eventually want[s] to do." (p.313).

The review of the literature also shows that individual creators value being connected to their personal history as they continue to engage with deep creative work. Workspaces help individuals' meet this need, which Ashforth and colleagues call the motive for self-continuity (Ashforth, Ceza, & Meister, 2020), by providing links to "past selves". Keeping unrealized ideas from the past, samples of previous work, and evidence of personal achievements at their workspace can help them ground themselves and keep producing creative work (Ananth & Harvey, 2023). For example, an architect explained why she keep all her sketchbooks from university: "because they are kind of like a visual documentation of where you were at one point and where you are now." (Ananth & Harvey, 2023, p. 24). Similarly, an employee who recently moved to a non-territorial office noted that what he missed the most was "having prototypes

from past projects" because they "remind [him] of [his] history [t]here." (Elsbach, 2003, p.636). Access to personal history through physical artifacts made the progress made in the creative journey visible and, in doing so, motivate individuals to keep engaging in deep creative work.

In sum, the synthesis of research on physical space and creative work reveals that deep creative work would benefit from physical structures that provide physical separation and privacy, the balance of the need for isolation from distracting physical stimuli with exposure to project-related artifacts, and the presence of symbolic artifacts that make individuals' identity, goals, and progress visible.

Collaborative Creative Work

Planned collective work is an essential part of the creative process, as it allows groups to leverage diverse perspectives and skills to generate new insights and novel combinations of ideas (Hargadon & Bechky, 2006; Sutton & Hargadon, 1996). I call this form of creative work as *collaborative creative work.* While deep creative work can be effective for engaging deeply with a problem or an idea, collaborative creative work can foster creativity and innovation by encouraging individuals to build on each other's ideas, challenge assumptions, and explore new perspectives (Harvey, 2014). Examples of collaborative creative work include project meetings (Stigliani & Ravasi, 2012; Harvey & Kou, 2013), brainstorming sessions (Sutton & Hargadon, 1996; Fisher et al., 2018), and group rehearsals (Harrison & Rouse, 2014). Since individuals with diverse knowledge, skills, and ideas involve in this form of creative work, the main need is to capture and coordinate diverse perspectives.

Physical structure: Acoustic privacy and visibility of workstation. My review of the literature revealed an interesting tension in terms of how physical structures may facilitate collaborative creative work: balancing the need for privacy with the benefits of visibility. On the one hand, when doing collaborative creative work, team members need to exchange knowledge and generate ideas freely without worrying about what other members of the organizations may think about their emerging ideas. This is often achieved by having enclosed spaces dedicated to the team for the duration of the project (e.g., project rooms (Stigliani & Ravasi, 2012) and project spaces (Fisher et al., 2018)). This view is supported by prior research on purpose-built creative spaces such as innovation labs (e.g., Moultrie et al., 2007), makerspaces (e.g., de Vaujany & Aroles, 2019), and open creativity labs (Schmidt & Brinks, 2017). Scholars have argued that dislocation from day-to-day work helps people "leave traditional animosities at the door", facilitates team collaboration, and enhances' people's creativity (Lewis & Moultrie, 2005; Magadley & Birdi, 2009).

On the other hand, collaborative creative work, despite being mainly led by a dedicated team, still benefits from other people's help and input (Perry-Smith & Mannucci, 2017). One danger of being in an enclosed project space or a purpose-built creative space is being fully isolated from the rest of the organization. Making workstations visible is found to mitigate this danger and help creative teams access help, input, and support needed during the creative process (Haner, 2005; Coradi et al., 2015). For example, based on their investigation of helping behavior in a design studio, Fisher and colleagues (2018) found that leaders were able to keep track of the project's

development and identify the team's need for help by observing their workstation and project related artifacts.

This suggests that when creating spaces to support collaborative creative work, it is important to balance the need for privacy with the benefits of visibility. Empirical studies have found that enclosing spaces for creative teams with structural elements that provide acoustic privacy and visibility, such as glass walls, help achieve this balance (Coradi et al., 2015; Hoff & Oberg, 2015; Bouncken & Aslam, 2021).

Physical stimuli: Tools and materials for externalizing knowledge and ideas. Externalizing knowledge and ideas by producing physical objects is essential for both individual and collective creative processes (Stigliani & Ravasi, 2012). However, the need for capturing and coordinating diverse perspectives makes enacting ideas even more critical for creative teams (Harvey, 2014). The presence of material objects and visual stimuli in the workspace can help creative teams externalize their knowledge and ideas in two ways. First, access to tools and materials for visualization and model making helps team members turn their intangible ideas tangible, visible, and available for further development (Moultrie et al., 2007). Prior studies have found that groups that have access to a "making space", a room with prototyping tools and various materials, were able to experiment and exchange ideas by building things (Thoring et al., 2018; Martens, 2011). Specifically, access to unusual and novel materials to materialize ideas, such as Lego bricks, is found to make the idea generation process more enjoyable, active, and inspiring for creative teams (Zenk et al., 2021). "Thinking through making" (Ingold, 2013), "getting physical with idea of work" (De Paoli & Ropo, 2017), and having

“a conversation with materials” (Schon, 1983) help teams capture diverse perspectives and collectively make sense of emerging ideas (Stigliani & Ravasi, 2012; Harvey, 2014).

Second, having artifacts produced as part of the creative process displayed in the work environment supports collaborative creative work. Scholars have described project rooms as a “repository of tangible evidence collected during the life of the project” (Elsbach & Stigliani, 2019) and argued that seeing prototypes and sketches of work-in-progress supports team processes by allowing people to communicate across boundaries, develop and sustain mutual focus of attention, and coordinate their action (Bechky, 2003; Carlile, 2002; Nicolini, Mengis, & Swan, 2012; Metiu & Rothbard, 2013). Thus, physical spaces that provide opportunities to display visual stimuli, such as prototypes and sketches, facilitate collaborative creative work. For example, Elsbach and Bechky (2007) found that the presence of display shelves and rolling white boards improved team collaboration as they allowed the team to store and display their ideas and prototypes. Similarly, Doorley and Witthoft (2012) noted that, unlike horizontal elements that promote individual work (e.g., desks, tabletops), vertical elements (e.g., whiteboards, walls, and panels) support teamwork by providing opportunities to display works-in-progress.

Symbolic artifacts: Symbols of collective ownership. Collaborative creative work requires team members to build on each other’s ideas. Recent research suggests that developing a collective ownership of their work benefits the performance of creative teams as team members are more likely to dedicate themselves to advance the team’s creative output when they perceive the idea or product as “ours” (Pierce & Jussila, 2010; 2011; Gray, Knight, & Baer, 2019). Symbolic artifacts in the workspace help

creative teams develop a sense of collective ownership by triggering team identification. Seeing prototypes from past projects, for instance, not only help creative teams identify new ideas (Sutton & Hargadon, 1996; Bechky, 2003) but also promote a collective sense of place attachment (Elsbach & Bechky, 2007). Similarly, McCoy (2000) found that highly collaborative and creative teams displayed artifacts that were evidence of team activities in their workspace. Seeing physical evidence of what they did together outside of the professional domain, such as playing sports, was perceived as a symbol of what they can achieve professionally.

Creating the workspace itself collectively is another way for creative teams to develop a sense of collective ownership of their work, as Doorley and Witthoft (2012, p.31) put it, “creating a space collaboratively is the best recipe for creating a collaborative space.” For instance, the workspace of product designers was found to evolve from being an empty meeting room to being a project room as designers kept producing physical prototypes, hanging Post-its on the walls, and displaying mood boards and photographs during the course of the project (Stigliani & Ravasi, 2012).

To summarize, physical structures that balance the need for privacy with the benefit of visibility, tools and materials that allow materialization and display of knowledge and ideas, and symbols of collective ownership support collaborative creative work by providing opportunities to meet the overarching need of capturing and coordinating diverse perspectives.

Serendipitous Creative Work

Creative process involves moments when creators unexpectedly encounter people, experiences, or information that are not directly related to the task at hand but

spark new ideas and connections. Chance encountering a colleague (Elsbach & Stigliani, 2019), a new material (Leclair, 2022), or an unexpected piece of information (Darbellay, Moody, Sedooka, & Steffen, 2014) are examples of unplanned moments that can help individual creators and creative teams identify new problems to solve, uncover ideas that were previously unexplored, and create solutions to the problems at hand (Hargadon & Bechky, 2006; Austin, Devin, & Sullivan, 2012). Since it requires creative workers to actively recognize, be open to, and act on unexpected sources of new ideas, I consider it as a form of creative work. Unlike deep creative work and collaborative creative work, however, this form of creative work is unplanned, thus I call it *serendipitous creative work.* The main need serendipitous creative work is exposure to divergent cognitive stimuli.

Physical structure: Proximity of diverse knowledge sources and liminal shared spaces. The way physical workspace is structured affects with whom people interact on a day-to-day basis (Lee, 2019; Khazanchi et al., 2018). Studies on space and organizational communication have found that people are more likely to communicate with colleagues that are in their physical proximity (Allen, 1977). Recognizing this tendency, some organizations like Google have taken steps to "engineer serendipity" by carefully designing their spatial plan in a way that people can encounter diverse knowledge sources (Lindsay, 2013). My review of the literature suggests that physical structure can support serendipitous creative work by bringing people with different knowledge and skills closer and by creating spaces for informal interaction.

Scholars have found that one way to facilitate serendipitous creative work is bringing people with diverse knowledge and skills closer (Agrawal, Kapur, & McHale, 2008; Khazanchi et al., 2018). For example, based on a study of an e-commerce company that recently relocated, Lee (2019) observed that moving closer to the peers with different knowledge and skills increased individuals' level of exploration because they were now able to learn from these peers. Similarly, a longitudinal case study of a newspaper showed how moving from a facility where different divisions were physically separated by a "maze-like" structure into a new building where all functions share a mutual open space facilitated employees' creativity by making encounters easier and more likely (Kallio et al., 2015). When located closely, people are more willing to share information about their ongoing work and involve in interactions that lead to new ideas (Agrawal et al., 2008; Elsbach & Stigliani, 2019).

Yet, it is not always possible to place workstations of people with diverse knowledge and skills in close proximity. Research suggests that liminal shared spaces, such as stairways, toilets, coffee rooms, and photocopier rooms, play an equally important role in facilitating serendipitous encounters (Fayard & Weeks, 2007; Shortt, 2015). Findings from existing studies reveal that spaces adjacent to commonly used tools, such as copy machine, water cooler, or coffee machine, organically bring people together (Yekanialibeiglou et al., 2021; Doorley & Witthoft, 2012). For example, at Pixar, the building had only one entrance and all shared spaces, including restrooms, mailroom, game area, and eating area, were located at the center of the atrium so that people inevitably encountered each other all day long (Catmull, 2015). This shows that physical structures play an important role in facilitating serendipitous creative work,

because in the absence of an obligation to interact, people may choose to keep interacting with their existing contacts and miss on the opportunity to establish new collaborations (Irving et al., 2020).

Physical stimuli: unexpected stimuli, spaces for relaxation. The review of the literature suggests that having unexpected stimuli in the workspace supports serendipitous creative work by increasing people's mental awareness and enabling them to make novel combinations (Lee, 2016). Echoing Weick's call for "junk-laden laboratory", scholars have argued that having random props in the work environment supports serendipitous creativity (Lewis & Moultrie, 2005). Due to its reliance on divergent cognitive stimuli, serendipitous creative work thrives in workspaces that are messy, cluttered, and unorderly (Jacucci & Wagner, 2007). For example, an ethnographic investigation of a fashion design studio revealed that the presence of "fabrics, pliers, the washing machine, threads, shirts, rolls, kraft-paper, needles, and half-sewn garments" in the studio "allows for (or even invites) the unexpected" (Leclair, 2022). As Leclair observed, fashion designers discovered new opportunities and ideas simply by accidentally stumbling upon a fabric lying in the studio. The more unrelated the stimuli to the task at hand, the more novel the creative insights. For example, a case study of a team working on new services for electronic vehicles revealed that seeing photos unrelated to the initial topic, such as someone playing a piano or dancing, triggered more novel concept generation (Brun et al., 2019).

Another source of unexpected stimuli can be old projects. Some scholars argue that there are no new ideas, and all ideas are reconfiguration of old ones (Hargadon & Sutton, 1997; Hargadon & Bechky, 2006). Thus, access to prototypes, sketches, and

documents of what has been done previously inspire people to borrow elements from existing solutions and create new ideas (Sutton & Hargadon, 1996; Ravasi, Rindova, & Stigliani, 2019). Design of the physical space can make these artifacts visible and accessible by providing opportunities for display (Elsbach & Bechky, 2007). For example, Nike's Kitchen, which is "a creative thinking space for sneaker designs", had one wall that showcases "models of every Air Jordan shoe ever produced" accompanied by their initial sketches (Epstein et al., 2013).

While the presence of unexpected stimuli in the workspace prepares the mind to make novel combinations, it is equally important to have time and space to process the diverse input and develop creative insights. Scholars have argued that creative insights are more likely to occur in spaces for relaxation, where people can disconnect from the work responsibilities and conventions (Martens, 2011; Meinel et al., 2017). This insight makes the case for use of green spaces, natural elements, and home-like furniture in the workspace (Lee, 2016; Alexandersson, & Kalonaityte, 2018; De Paoli et al., 2019). Surprisingly, however, recent studies have revealed that people hesitate to use spaces dedicated to relaxation during the work hours because they feel that using these spaces would be perceived as them being slacking off (Yekanialibeiglou et al., 2021). This suggests that organizations can look into more subtle ways to provide opportunities for relaxation, reflection and contemplation. For example, Batey and colleagues (2021) found that being in a room with a poster depicting a nature scene can lead to elevated stimulation and thus increase the level of creativity.

Symbolic artifacts: Symbols of playful organizational culture. Serendipitous creative work requires organizational members to be in a creative mental state even

outside of their time on planned creative activities. Physical symbols of an organizational culture that supports creativity and innovation are found to inspire people's creative thinking (Lee, 2016). Visual analyses of the images of ostensibly creative workspaces have revealed that organizations often use playful and unconventional elements to demonstrate their dedication to freedom, out-of-the-box thinking, and experimentation to present and prospective employees (Kallio et al., 2015; Maier et al., 2022). For example, scholars have observed that the spaces designed to promote creativity and innovation used unconventional shapes of windows, walls, and stairs as a sign of breaking free from traditional ways of doing things (Lewis & Moultrie, 2005; Lee. 2016). Similarly, organizations intend to create relaxed and informal environments that encourages spontaneous interactions and exploration by using comfortable furniture and décor that would normally be found in residential settings in their work environment (Alexandersson & Kalonaityte, 2018).

Moreover, empirical evidence also suggests that including playful elements in the workspace can encourage people to have informal and spontaneous interactions which may lead to new collaborations and knowledge exchange (Lee, 2016). For example, the presence of games that require at least two people to play (e.g., foosball, billiard, table tennis) convey the message that it is acceptable and even encouraged to do non-work-related activities together (Alexandersson & Kalonaityte, 2018). A recent diary study found that when their workspace facilitated informal interactions, employees displayed more creative behaviors in their daily work and in the subsequent days (Chi, Liao, & Chien, 2021).

Altogether, serendipitous creative work benefits from physical environments that bring people with diverse knowledge and skills closer and provide liminal shared spaces for informal and spontaneous interactions. Moreover, exposure to unexpected stimuli followed by an opportunity to relax and contemplate help people make novel recombination of ideas. Finally, the presence of physical artifacts that symbolize the organization's commitment to and support of creativity and innovation encourage people to engage in serendipitous creative work.

SUPPORTING MULTIPLE FORMS OF CREATIVE WORK

By organizing findings from existing literature on physical space and creativity, I show how different elements of the physical space can support different forms of creative work. However, it is important to note that the process of generating and implementing novel and useful ideas includes multiple – if not all – forms of creative work outlined above. This suggests that creating a workspace that is crafted to support a single form of creative work would likely to fail to facilitate creativity and innovation. Indeed, scholars have shown that workspace designers tend to prioritize collaborative creative work, resulting in lack of spaces for deep creative work, where individuals reflect, generate ideas, and focus on their work (De Paoli et al., 2019). For example, Sailer (2011) studied the relocation and refurbishment process of a UK media company and found that designers of the new building put too much emphasis on collaborative work and failed to create spaces for working alone. Similarly, a study of a renowned design thinking school showed that the physical space was primarily designed for teamwork, causing difficulties for students to engage in individual work on the campus and forcing them to work from home instead (Thoring et al., 2018). These examples

demonstrate that having a bias towards supporting one form of creative work, which is, in most cases, collaborative creative work, ignores the complexity of organizational creativity.

Seeing the physical organizational spaces for creative work as a product of designers, architects, and office administrators, however, ignores the fact that people have agency to change the environment they work in to fit their emerging needs. Recently, organizational scholars have moved away from seeing organizational spaces as "fixed, dead, and immobile containers" and adopted a more process-oriented perspective that sees space as an experience (Taylor & Spicer, 2007; Stephenson et al., 2021). Kornberger and Clegg (2004) go one step further and call the inhabitants of spaces as "illegal architects" because they are the ones who (ab)use and (re)define space according to the context and situation. Yet my review of the literature on physical space and creative work revealed that there is a paucity of process research investigating how creators can transform their workspace.

There are, however, hints in existing research and design guidelines that creating a workspace that allows its inhabitants to adapt it to their needs would support different forms of creative work. Scholars and practitioners have pointed to roughness and flexibility of the space as two important characteristics that enable and empower its users to transform it (McCoy & Evans, 2002; Doorley & Witthoft, 2012). Roughness refers to the perceived unfinishedness of the physical space. Scholars have found that natural materials, visible construction elements, and rough furniture improvised from various objects invite people to experiment and change their work environment (McCoy & Evans, 2002; Thoring et al., 2019). For example, a creative leader of an architecture

company said the space should not be finished because “it serves as a blank canvas” (Martens, 2011, p.74). Flexibility refers to the ability of the space to be modified to serve different purposes at different times (Oksanen & Stahle, 2013; Hoff & Oberg, 2015). Multi-purpose artifacts, movable furniture, and adjustable elements make a space flexible and open to user adjustments (Elsbach & Bechky, 2007; Doorley & Witthoft, 2012).

These insights suggest that instead of designing separate spaces for different forms of creative work, organizations can design workspaces in a way to give employees opportunities to transform their work environment as they engage with different forms of creative work. Figure 4.1 illustrates the relationships involved in creating a creative workspace captured in this review. While the physical structure, physical stimuli, and symbolic artifacts establish the physical space for creative work, roughness and flexibility of the space allow users to manipulate the space to fit their specific needs.

[Insert Figure 4.1 here]

A RESEARCH AGENDA FOR CREATIVE WORKSPACES

In this paper, my main goal has been to review and synthesize previous research on physical space and creative work to bring clarity to scholarly and managerial understanding of this topic. Specifically, I presented an organizing framework that shows that different forms of creative work, namely deep, collaborative, and serendipitous, have different needs in terms of physical space. In this section, I outline a research agenda that identifies critical gaps in current knowledge and highlights new research opportunities and needs stemming from the emergence of new work trends,

communication and collaboration technologies, and changing work environments. By doing so, I aim to inspire future studies to explore the nuanced relationship between workspace and creative work and point to areas of consideration to design more effective workspaces that support creativity and innovation.

Capturing the Process of Creative Work

My review of the literature revealed that most of the empirical research on physical space and creative work relies on surveys (e.g., Stokols et al., 2002), visual analysis (e.g., Alexandersson, & Kalonaityte, 2018; De Paoli et al., 2019), or descriptive case studies (e.g., Haner, 2005; Thoring et al., 2018) that aim to identify factors facilitating or hindering creative work. Organizational scholars, on the other hand, often uncovered the role of physical space and materiality when investigating other processes, such as help (Fisher et al, 2018) and sensemaking (Stigliani & Ravasi, 2012). This suggests that there are gaps in our current understanding of the influence of physical space on creativity.

I believe asking process-oriented questions and developing process theories (Langley, 1999) focusing on the relationship between physical space and creativity would advance the scholarship on this topic. This is well aligned with the recent shift in the field of organizational research on creativity. Creativity scholars have shifted their attention from studying individual and contextual factors that support or hinder creativity to studying the “dynamics of creative work” foregrounding the underlying processes and relationships (Harrison et al., 2022). In adopting a process perspective, researchers might examine how users interact with physical space to support their different needs during the creative process. For instance, findings from empirical studies reveal that

organizational spaces should provide a balance between spaces for concentration and collaboration (Sailer, 2011; Hoff & Oberg, 2015; Suckley & Nicholson, 2018). But how and when do people change their workspace during a creative process? For example, researchers can pay closer attention to the timing and order of different forms of creative work outlined in this review to theorize how people transform or adapt their work environment over the course of a creative project.

Another question, which has not been considered so far, is how the creative process itself transforms the space. Creative work leaves visible traces behind, such as drawings, prototypes, and reorganization of furniture. These physical markers continue to exist independent from their creators (Elsbach, 2004) and thus just by looking at the workspace people can get insights about the progress of the creative project (Fisher et al., 2018) and the creative identity of the user. Future studies could look more closely at how the physical space evolves with creative work. For example, scholars may conduct longitudinal studies of artists' studios and creative workspaces to see how engaging in creative work in these space over time influence creative process and the way people present themselves as a creators.

Finally, scholars have recognized that the same space can be experienced differently by different users (Taylor & Spicer, 2007; Yakhlef & Rietveld, 2020). This is an important insight for researchers investigating the influence of physical space on creative work. Given the rise of coworking spaces, makerspaces, and artist collectives that provide a work environment for creative workers with divergent knowledge, skills, and interests, it is necessary to examine differences in their experience of and interaction with the space. Moreover, further research is required to understand how

outsiders, such as visitors, potential employees, or managers, perceive the creative work environments (deVaujany et al., 2019; Maier et al., 2022).

Understanding the Changing Nature of Workspaces

Taylor and Spicer (2007, p.328) once argued that “organizing and managing appear to be activities that are extremely difficult to displace”. Scholars, however, have pointed to the growing number of employees working remotely and called for research to explore creativity in virtual teams (Martins & Shalley, 2011; Gilson et al., 2015). This call is even more relevant and urgent today, given that a majority of the creative and knowledge workers continue to work – at least partially – remotely after being forced to work from home during the COVID-19 pandemic (Barrero, Bloom, & Davis, 2021).

I argue that the emergence and wide adoption of remote work does not render physical spaces irrelevant to organizations, far from it. First, remote work introduces alternative ways to inhabit the workspace as remote workers continue to use cutting-edge technologies, such as telepresence robots, to “be there” (Lee & Takayama, 2011). Second, as Ashforth and colleagues (2020) have rightly pointed out, even when employees work remotely, they are still located in a physical space, be it a home office or a coworking space. From a more practitioner-oriented perspective, this change in nature of workspaces creates sets of challenges and opportunities for organizations in terms of using physical space to support their members’ creativity. Thus, there is considerable room for new research.

Alternative forms of presence in the physical workspace. My review reveals that one of the major assumptions of the research on physical space and creativity is that users of the physical workspaces have in-person presence. Recently, however,

hybrid organizational design has become increasingly common and physical organizational spaces have begun to be inhabited by both onsite and offsite employees, albeit in different forms. In the past, remote work meant being absent in the physical workspace. Indeed, researchers have found that telecommuters worried about missing out on spontaneous workspace interactions and felt the need to be seen at work (Elsbach & Bechky, 2007). Similarly, onsite workers reported feeling lonely when their colleagues work remotely as there were no longer colleagues to go out to lunch or have hallway conversations with (Rockmann & Pratt, 2015).

Today, remote workers have access to technologies like mobile robotic telepresence that gives them a greater sense of presence in the physical workspace. Using a remotely controlled mobile base with an attached tablet for videoconferencing, remote workers can navigate in the space and interact with onsite colleagues (Kristofersson et al., 2011). A recent study found that physical embodiment alone –in the form of telepresence robots – was not enough to give remote workers a sense of presence. They felt present when they participated in local action and were treated as present by their onsite colleagues (Boudouraki et al., 2023). Presence of embodied remote workers in the physical workspace creates interesting dynamics for creative work. Questions that empirical studies could focus include: What aspects of the physical space facilitate participation of remote workers into creative activities? Whether, and if so, how do telepresence robots transform the physical space to generate, store, organize, and communicate ideas? Do different forms of presence in the workspace (in-person and telepresence) require different physical space elements to support collaboration and serendipitous encounters?

As hybrid work is expected to be a common practice for organizations and technologies like telepresence robots are becoming more and more accessible in the organizational context, it is important for organizational researchers to develop a deeper understanding of the implications of alternative forms of presence for creative work.

Remote workspaces and creative work. Although telepresence robots are becoming increasingly popular, still most of the remote workers rely on other communication technologies, such as video/audio conferencing tools and remote collaboration tools. Organizations have limited control over where these employees work, which makes it even more critical to rethink the relationship between physical space and creative work. For example, previous research has shown that design of the physical space is an effective tool to communicate the organization's commitment to creativity and innovation (Maier et al., 2022). In the absence of a physical workspace, how do organizations present themselves to be a creative and innovative organization?

More specifically, how can organizations support different forms of creative work when they have little control over where employees work from? I have attempted to disentangle the effects of physical structure, physical stimuli, and symbolic artifacts on deep, collaborative, and serendipitous work. In doing so, I aim to extract the underlying function of certain physical space elements from specific examples. Research investigating remote creative work may continue to look at how optimal conditions for different forms of creative work can be created by individuals or supported by organizations in remote work settings. For instance, how do creative workers isolate themselves from distracting stimuli or surround themselves with reminders of their personal history during deep creative work if they work from coworking spaces with

limited privacy and opportunities to personalize (Elsbach, 2003; Bhave, Teo, & Dalal, 2020). How do creative teams develop a sense of collective ownership without sharing a physical space? Would it still support collaborative creative work to display symbolic artifacts, e.g., photos taken during team activities, at individual workstations? And even more importantly, would people be willing to decorate their home with work-related artifacts? How do remote creative workers incorporate serendipitous encounters to their workflow when there is no watercooler to stumble upon a colleague?

By asking these questions, I hope to inspire researchers to look more closely at the reasons why certain elements of the physical environment support different forms of creative work. In this way future research, for instance, may uncover ways for remote workers to manipulate their own physical workspace to focus on task at hand during deep creative work without having to physically separate themselves from others. Such explorations are likely to provide valuable insights for managers and workspace designers to better manage spaces for creativity, even when these spaces are outside of the bounds of organizations.

TABLES

Table 2.1: Research Settings

	PubMake	UniMake
Membership model	Open to the public with a monthly membership fee.	Open to all members of the university for free.
Operation	Built and managed by the members. Experienced members volunteer to educate others and take care of the tools.	Managed by a team of directors. Each area has at least one experienced technician. Experienced members volunteer to educate others and take care of the tools.
Physical space	Shared workshop Common table Kitchen Social area	Shared workshop Common table Material library
Available resources	Sewing, woodworking, metalworking, laser cutting, 3D printing, screen printing, electronics Compulsory tool training sessions Ad-hoc workshops organized by volunteer members	Sewing, ceramics, woodworking, metalworking, laser cutting, 3D printing Compulsory tool training sessions Planned workshops run by professional artists Ad-hoc training sessions organized by volunteer members
Community of makers	Hobbyists, professional designers, and entrepreneurs.	Members of the university, including researchers, architectural students, artists, and hobbyists.
Collection of projects	Shared on an online forum and at meetups/casual interactions Displayed at events and festivals	Shared on social media and at meetups/casual interactions Displayed at events and festivals

Table 2.2: Data Sources and Use

Data Source		
Exploratory data collection: 5 interviews and 10 hours of observation	5 interviews with the founders/directors of the makerspaces to understand the history, culture, and operation of these spaces 4 introductory tours of makerspaces where directors or volunteer members of the makerspaces introduced the facilities 2 public maker events where makers exhibited their projects and organized workshops and hands-on demonstrations	
	PubMake	**UniMake**
Interviews: 35 in-depth semi-structured interviews with makers	27 interviews with members of the makerspace	8 interviews with members of the makerspace
Observation: 65 hours of participant observation	*Tool training and workshops (12 hours).* Attending compulsory space induction and 3D printing, laser cutting, woodworking, and screen-printing training. *Making sessions (13 hours).* Making lino-printed cards, wood engravings, and an eye mask. *Members' meetings, social events and informal interactions with makers (10 hours).* Attending monthly meetings and parties, volunteering at community events, and having informal conversations with makers.	*Tool training and workshops (10 hours).* Attending compulsory space induction and 3D printing, laser cutting, sewing, and potter's wheel training. *Making sessions (8 hours).* Making laser-cut coasters and a clay pot. *Members' meetings, social events and informal interactions with makers (12 hours).* Attending parties, volunteering at community events, and having informal conversations with makers.
Archival data: Reports, websites, discussion forums, and other documents	Project-related discussions on the online discussion forum documenting 250 separate projects with over 2000 individual messages Makerspace website	8 annual reports (1376 pages) including 52 member profiles Makerspace website

Table 2.3: Informants and Projects

	Informants	Maker type	Projects											
			1	2	3	4	5	6	7	8	9	10	11	12
PUBMAKE	P1	Hobbyist→ Entrepreneur	⚓	⚓	⚓									
	P2	Hobbyist	⚓	⚓	⚓	⚓								
	P3	Hobbyist	⛵	⚓	✳	✳	⚓	⚓	⛵					
	P4	Hobbyist	⚓	✳	⛵	⚓	✳							
	P5	Hobbyist→ Entrepreneur	✳	✳										
	P6	Professional	⚓	⚓	✳	⚓	⚓	⚓	⛵	⛵	✳	⚓	⛵	⚓
	P7	Hobbyist	⚓	✳	⚓	⛵	⛵	✳						
	P8	Hobbyist→ Entrepreneur	✳	✳										
	P9	Professional	⚓	⛵	✳	⛵	⛵							
	P10	Professional	⚓	✳	✳	⚓	⚓	⛵	⛵	⚓				
	P11	Hobbyist	⚓	⚓	⚓	⚓	⚓	✳						
	P12	Hobbyist→ Entrepreneur	⚓	⛵	✳	✳	✳	⚓	⛵	⚓	⛵	⛵		
	P13	Professional	⚓	⚓	✳									
	P14	Hobbyist	✳	⛵	✳	⛵	⚓	⚓	⛵	⚓	✳	⛵		
	P15	Professional	⛵	⛵	⚓	✳	⚓	✳	✳	⚓				
	P16	Hobbyist	⚓	✳										
	P17	Hobbyist	✳	✳										
	P18	Professional	⛵	⚓	✳	⛵	✳	⚓						
	P19	Hobbyist	⚓	⚓	⚓	✳	⚓							
	P20	Hobbyist	⚓	⚓	⛵	✳	✳	⚓	⛵	⛵	✳			
	P21	Hobbyist→ Entrepreneur	✳	⚓	⚓	⚓								
	P22	Hobbyist→ Entrepreneur	⚓	⚓	✳	✳	⚓	✳	✳					
	P23	Professional	⚓	⚓	✳									
	P24	Professional	⚓	✳										
	P25	Hobbyist	⚓	✳	⚓	⛵	⛵	⚓	⚓	⚓				
	P26	Hobbyist	✳	⛵	⛵	⛵	✳							
	P27	Hobbyist	✳	⚓	✳	⛵	⚓	✳	⚓					
UNIMAKE	U1	Hobbyist	⚓	✳										
	U2	Professional	⚓	⚓	⚓	⛵	✳	✳	⛵	⛵	⛵			
	U3	Hobbyist	⚓	⚓	✳	⛵	⚓	⚓	⚓	⚓	⛵			
	U4	Professional	✳	⛵										
	U5	Hobbyist	⚓	✳	⚓	⛵	✳							
	U6	Hobbyist	⚓	✳	⛵	⚓	⚓							
	U7	Professional	✳	⚓	⚓									
	U8	Professional	✳	⚓	⚓	✳								

⚓:Anchoring ✳:Navigating ⛵:Drifting

Table 2.4: Summary of the Three Paths

	Orientation toward the creative current	Others' responses to the focal creator	Direction being pulled towards	Impact on the collective experience
Anchoring	**Shielding from the creative current.** Using one's own tools and materials; producing planning artifacts; avoiding interaction with others outside the area of focus	**Expressing admiration and curiosity.** Verbalizing appreciation of the outcome; showing interest in learning how the project came into being; asking questions about the process	**Sharing know-how.** Organizing meetups, workshops, and informal teaching sessions; volunteering to take care of equipment; documenting the process of making	**Expanding the resource pool and bringing interest groups together.** Donating specialist tools; lending tools and materials to others; making planning artifacts available for others; teaching people new skills and techniques; organizing meetups; creating micro-communities
Navigating	**Using the creative current as an input.** Showing work-in-progress projects around; sharing challenges; asking for feedback and advice after starting a project	**'Thinkering together.'** Introducing new possibilities; showing alternative techniques; lending tools and materials; experimenting together	**Reimagining the original idea.** Integrating new ideas into the original one; learning new techniques; using new tools and techniques	**Uncovering new uses of existing resources and building bridges across making domains.** Demonstrating new ways of using available tools and materials; socializing across micro-communities; inspiring experimentation
Drifting	**Following the creative current.** Taking learning opportunities; playing with others' projects; admitting to being a novice; asking for help and guidance before starting a project	**Guiding.** Sharing templates, source codes, 3D models; making with the focal maker; sharing tools and materials; unpacking the process of making	**Starting new kinds of projects.** Initiating an unexpected project; developing confidence; discovering new possibilities	**Surfacing resources and building relationships.** Pulling expertise out of people by demonstrating interest in learning; using scrap materials; asking for templates and guidelines

Table 2.5: Anchoring: Illustrative Evidence

Name of the project *Description of the project* **[Informant]** (Sources of data -- O: Observation; I: Interviews; A: Archival sources)	
Coin jewelry *Hand-cutting coins into desired shapes to be turned into necklaces, earrings, and rings* **[P6]** (O+I+A)	
Orientation toward the creative current	**Shielding from the creative current.** P6 had been making coin jewelry professionally for a few months when he joined the makerspace. He already had his specialist tools, including a jeweler's saw and mini drill. When working on his coin projects at the makerspace, he set up his workstation and transferred the previously designed patterns onto coins using his own tools.
Others' responses to the focal creator	**Expressing admiration and curiosity.** At that time, there were no others making coin jewelry. Thus, several people showed interest in his work. One day, he was working meticulously on his coin necklace. He leaned towards the coin to see the details. His focused work caught another maker's attention. He first watched him from a distance and then approached him to ask what he was working on. After learning about the technique, he said: "I'd love to do that." P6: "I'll show you!" P6 commented on such instances: "It is easier to share enthusiasm about what you are doing with another person than it is to find it within yourself."
Direction being pulled towards	**Sharing knowledge.** In response to such interest, P6 offered to organize a coin cutting workshop for the Maker Festival. It was followed by another workshop at the makerspace. He announced it on the online forum: "There was a great response from the workshop at the Maker Festival last Saturday and a lot of interest from other members with prior preoccupations, and so here is an offer of a workshop this weekend." He provided all the required equipment for people. After these workshops, more people started making coin jewelry and kept asking P6 questions about the process.
Impact on the collective experience	**Expanding the resource pool and bringing interest groups together.** He left his specialist tools and pattern templates at the makerspace so that other people could keep making coin jewelry. He shared his know-how by organizing workshops and helping people as they continued to make coin jewelry after the workshop.
8-bit computer *Building a programmable 8-bit computer from scratch on breadboards using electronic components* **[P27]** (I+A)	
Orientation toward the creative current	**Shielding from the creative current.** Before joining the makerspace, P27 didn't have much experience with electronics. He told us how he decided to make an 8-bit computer from scratch: "I think I just picked up the items and started playing with it. Downloaded a guide and taught myself. Yeah, I guess I've been always self-sufficient in learning new things and internet enables that." Instead of asking for help, he figured things out through books and online resources. When working on this project, the makerspace was no more than a space to do focused work. Except for the soldering machine, he brought all the tools and materials himself as they were "quite specific for the project."
Others' responses to the focal creator	**Expressing admiration and curiosity.** People saw him carefully reading his guide and trying to put pieces of the computer together. He recalled a new member approached him while working on the project: "I've got someone interested in electronics. I think he was a new member. [He said] 'Oh, I want to learn electronics.'"

Direction being pulled towards	**Sharing knowledge.** Upon receiving interest from the new maker, he decided to share his experience with others. He said: “I decided to spend time with this person. I shared the book I was reading and showed some basic stuff. And now he bought himself a book and is now doing a project himself. He kickstarted. I always enjoyed sharing my interest with people.” As he continued to receive questions about how to get started in electronics, he posted his idea of organizing a meetup on the online forum: “Let’s learn electronics together! A few people have asked for a more structured way to expand their electronics knowledge. […] I thought it would be nice to meet once a month to build and experiment together.”
Impact on the collective experience	**Expanding the resource pool and bringing interest groups together.** Despite not being as experienced as some other makers in the makerspace, he mastered how to learn electronics from scratch. Thus, he helped others to do the same. While the makerspace already had a weekly meetup for people interested in electronics, he organized a new one dedicated to beginners willing to get started. He also shared the resources that helped him during his journey, e.g., books, videos.
Mechanical task switcher *Designing and producing an interactive desktop object to track the time spent on various tasks* **[P16]** (I+O+A)	
Orientation toward the creative current	**Shielding from the creative current.** He came up with the idea of making a mechanical task switcher to keep track of how he spends his time at work. Before each making session, he had a clear plan of what he wanted to accomplish: “I am always planning things in drawings, sketches, and spreadsheets. I try to figure out details as much as I can beforehand.” When working on his project, he only used the tools he needed: “I don’t know how to use anything else yet. I will pick up other tools if I need to.” He also avoided distractions by limiting his interactions with others: “Generally, I haven’t spent enough time talking with people to see what they are doing at the minute.”
Others’ responses to the focal creator	**Expressing admiration and curiosity.** One day, as he was working in the corner of the common table, another maker approached him and asked, pointing to the almost finished task switcher: “What will it do?” P16 said: “It’s basically a time clock for work.” The other maker pulled a chair next to P16 and said: “Go on! I am intrigued.” P16 explained the motivation behind the project and how it works.
Direction being pulled towards	**Sharing knowledge.** Once finished, he shared detailed documentation of the process of making it on the online forum “just in case other people find it useful.” His documentation included the motivation behind the project, the list of the materials and tools he had used, different techniques he had tried, an explanation of the decisions he made, and a demonstration of how the final product works. He also made his codes and laser templates available on an open-source platform.
Impact on the collective experience	**Expanding the resource pool and bringing interest groups together.** By sharing his know-how and planning artifacts, he turned his project into an accessible resource for others.
Climbing bag *Designing and sewing a fabric bag with separate pockets for climbing equipment* **[U6]** (I+O+A)	
Orientation toward the creative current	**Shielding from the creative current.** When working on the climbing bag project, she was exclusively spending time in the area where the sewing machines were located. For each session, she set up her workplace meticulously: “Usually, I have all my stuff with me already and then I find a nice quiet space. […] I lay out everything that I have and then I kind of just get going. I mean they have the basic like scissors and thread and needles and things like that, but I bring my own cloth and zippers and things like that. I am usually quite focused. I'm usually in my headphones. I don't really talk to anyone. When I'm doing something, I've been told I look quite scary.”

Others' responses to the focal creator	**Expressing admiration and curiosity.** When she took breaks, people passing by stopped and asked what she was doing. They tended to ask about her choice of needles or fabric.
Direction being pulled towards	**Sharing knowledge.** Soon, U6 found herself taking care of the sewing area, e.g., reorganizing needles and threads, and helping others with their sewing projects. She said: "I still have a long way to go. [But] I can teach you. I mean I know how to solve your sewing-machine-related problems if you need help." Indeed, we observed her helping others change a broken needle, change the thread, and try a particular stitch. Due to such actions at the makerspace, she won the annual "Contribution award."
Impact on the collective experience	**Expanding the resource pool and bringing interest groups together.** Her actions helped others get started with and keep doing sewing projects at the makerspace. The resources remained in good condition for others to use thanks to her efforts to keep them in order.

Table 2.6: Navigating: Illustrative Evidence

Name of the project *Description of the project* **[Informant]** (Sources of data -- O: Observation; I: Interviews; A: Archival sources)	
Light-up monster figure *Making a realistic monster figure out of plaster and adding programmable LED lights* **[P28*]** (O+A) ** Informant not listed on Table 3 as the data came from informal chats, observation, and archival sources.*	
Orientation toward the creative current	**Using the creative current as an input.** During our observation period, P28 was one of the members we kept seeing during our visits. His half-made projects were mostly on the common table as he wandered around talking to other makers. He enjoyed showing his work around and asking for feedback and suggestions. When in the makerspace, he approached others with his monster figure in hand. He also used the online forum to share photos of this in-the-making project with a note: "A peek at what I've been making recently."
Others' responses to the focal creator	**'Thinkering together.'** One day he showed his monster sculpt project to another maker who was working in the electronics area. The maker asked: "Hey, why don't you add some lights to your figures?" P28 told us that he had never thought of adding lights to his figures before because he had no knowledge of electronics. But the other maker did not stop at making a suggestion. He showed P28 how to control light with a basic code and told him all the components he would need were already available at the makerspace.
Direction being pulled towards	**Reimagining the original idea.** After being introduced to the world of electronics, P28 decided to add programmable lights to the eyes of the monster. As he continued to experiment with coding, he used the online forum to seek help: "I'm currently putting together my new monster and will need a little assistance on the coding side." He ended up making a light-up monster figure. P28 told us: "The design looks even cooler with light!"
Impact on the collective experience	**Uncovering new uses of existing resources and building bridges across making domains.** As P28 bridged two areas – model making and electronics – through his project, others were inspired to do the same. Another maker working in electronics told us that he decided to experiment with plaster to make casings for his electronics project, referring to P28's project as a source of inspiration.
Musical kite *Making laser-cut kites and integrating electronic components to control music through their movement* **[P18]** (I+A)	
Orientation toward the creative current	**Using the creative current as an input.** P18 made a laser-cut kite and was looking for ways to make it interactive. To do so, he had to find a way to communicate with the kite wirelessly. He shared his idea on the online forum and asked how he could approach the problem: "I'd like to share/ask what it might be to build an internet of kites."
Others' responses to the focal creator	**'Thinkering together.'** In response to his post, P4 left a lengthy comment sharing an alternative idea that P18 could consider: "One thing that popped into my head when reading this is a little fleet of small-ish kites, each with some RGB LEDs sewn into them." P18 replied: "Using light to communicate between local kites is a very interesting idea." And then shared what he had tried so far. P4 responded by sharing his suggestions and invited him to the electronics night. Later, they met at the makerspace. P4 told us about their interaction at the makerspace: "We talked about it. I said: 'Here is my controller, you might want to use it.' I had more than one, so I lent him one. He played with it and decided it was amazing before ordering one." The following week, P18 came to the makerspace for the electronics night and asked P4: "I have got [the controller] now. Can you help me to set it up?" P4 recalled: "I was doing my own thing but that was much more interesting, so I just kind of got involved. It wasn't like an organized teaching session or anything. This is like 'I have this thing, let's

	make it work.' We kind of both went through that process together." Then P4 shared tutorials P18 used to learn more about the controller.
Direction being pulled towards	**Reimagining the original idea.** After figuring out how to use the controller P4 suggested, P18 realized the same controller could also be used to control music. Then, he decided to use his kite design to control the music.
Impact on the collective experience	**Uncovering new uses of existing resources and building bridges across making domains.** As P4 put it, what P18 did was "a cross-disciplinary thing" integrating electronics, software, laser cutting, and sewing. Moreover, he produced a project demonstrating how a controller commonly used to control lights can be used to control music.

Air pollution sensor *Making a sensor to measure real-time air pollution and designing a wearable/portable version* **[P25]** (I+A)	
Orientation toward the creative current	**Using the creative current as an input.** P25 was a regular attendee at the electronics nights. During these meetups, he worked on his air pollution sensor and chatted with others about it. As he made some progress, he shared the work in progress on the online forum with a note: "I am making an air quality monitoring box. It's far enough now that I decided to do a writeup on some of it, and I'd love to get your suggestions on both the project and style of writeups." He told us: "Before I started discussing it with the members of the [makerspace], I was making it pretty much only for myself."
Others' responses to the focal creator	**'Thinkering together.'** People were excited to see P25's project, but most pointed to an aspect that P16 had not considered before: portability. He said: "Then I realized that most people would probably like to see something that's like either wearable or something they can clip onto their bag that would monitor air quality as they walked along the street."
Direction being pulled towards	**Reimagining the original idea.** Conversations with other makers made P16 reconsider how he approached the project. He said: "I was pretty much content myself with how the air quality monitor had been working for me but now that I know that there would be quite a few people who would want something like the air quality monitor, that sort of made me slightly realign the priorities, what I want to do. And that's why I'm working on putting it in a case. […] I will first finish a slightly more portable product prototype of the air quality monitor thing. So, that's that particular bit of makerspace creativity cross-pollination."
Impact on the collective experience	**Uncovering new uses of existing resources and building bridges across making domains.** A few months after P25 posted his project, another maker posted about her interest in making an air pollution sensor. In response, P25 showed her the sensors he used to make it as small as possible.

Art/research installation *Designing an art installation to research how people perceive color through virtual reality and making a wooden structure to support the experience* **[U7]** (O+I+A)	
Orientation toward the creative current	**Using the creative current as an input.** U7 joined the makerspace with the idea of making an installation for her virtual reality research project, but she did not have a clear idea of which materials to use and how to make the structure. As she discussed her ideas with others, she learned that there was an opportunity to reclaim wood from an old theater. As she decided to take the opportunity, she regularly asked for advice and feedback as she tried to work with a material that she was not familiar with. As her project developed, she organized a demo session for the members of the makerspace so that people could try the installation and give her feedback.
Others' responses to the focal creator	**'Thinkering together.'** She was looking for a way to hold it onto the ground without fixing it permanently. Another maker suggested she use concrete and walked her through the process of making concrete legs. She said: "I was always a bit afraid of concrete because it sounds like something you need to like be very skilled in or whatever. I didn't know what I

	was thinking. And then [the other maker] just showed it. [I thought] 'Oh it's not that hard actually.'" As she told us about this process, her narrative changed from "I" to "we": "*I* had to find something to hold it on to ground it because *I* wanted to be able to move and I couldn't really fix it to the ground. So, in the end *we* made like little concrete feet that sort of could hold the wooden beams in place."
Direction being pulled towards	**Reimagining the original idea.** Talking about her project led her to discover materials she had not considered using before: teak and concrete. She developed new skills as she tweaked the design of the installation. She said: "I never built an installation like that. I've never worked with concrete. I've never. So, that's the basic example. So, you have this idea, but you've never done it – yet! – but you just discuss it and then they teach you the techniques, how to do it and then you learn."
Impact on the collective experience	**Uncovering new uses of existing resources and building bridges across making domains.** Her project demonstrates how wood and concrete can be integrated into a single project.

Table 2.7: Drifting: Illustrative Evidence

Name of the project *Description of the project* **[Informant]** (Sources of data -- O: Observation; I: Interviews; A: Archival sources)	
Shaving Brush *Wooden-handled shaving brush turned on a wood lathe* **[P20]** (O+I+A)	
Orientation toward the creative current	**Following the creative current.** He got the lathe induction after seeing a member making a bowl. He told us: "I watched someone making a bowl and I thought that's pretty cool, you know I'd like to be able to do that and it doesn't look that hard. So, then I signed up for the induction." Next, he tried to make do with the materials he found at the makerspace: "The next time I was at the maker space, I just picked up a piece of wood that was just lying around and just started turning it. […] I wasn't trying to make anything. I was just trying to get accustomed to the steps, setting up the tool, using the tool and developing the skill."
Others' responses to the focal creator	**Guiding.** As he played with the lathe and discovered the capabilities of the tool, he realized that the body of a shaving brush can be made using a lathe. Volunteer wood technicians (i.e., experienced makers) guided him throughout the process by telling him which steps to follow: "We owe a lot of thanks to the wood techs who are there and can ask a question [or] answer a question if you get stuck. I couldn't figure out how to find the center of the piece of wood. [She showed] 'You just do it like this.' [I thought] 'Oh can you do it like that?'"
Direction being pulled towards	**Starting new kinds of projects.** Getting inducted on the lathe and being guided by experienced makers led him to initiate a project that he did not even know could be done using a lathe. He told us how being in the makerspace gave him the confidence to initiate that project: "They give you a place to start and perhaps it's also the confidence to start something. […] What you need a lot of the time is someone who has been there and done it before telling you 'Yes, you can do this.' […] You say 'Well, where do I start?' [They say] 'You start by doing this.'"
Impact on the collective experience	**Surfacing resources and building relationships.** The interest from P20 and others to learn how to use the lathe led the experienced maker to organize a teaching session. Moreover, during the process of making the shaving brush, P20 used scrap wood left behind by other makers.
Slate coaster set *Carving and laser cutting a set of slate coasters* **[P14]** (I+A)	
Orientation toward the creative current	**Following the creative current.** When in the makerspace, P14 saw a maker using the laser cutter. She approached him to see what he was cutting. The material he was using was something she had never used before: slate. She told us how she decided to try a new material: "I saw someone laser cutting slate. I got really excited when I saw it, it was really good. Seeing that I was like, 'Okay, I am going to get some slates right now.'" She told the maker about her intention to try slate and asked where she could find the material.
Others' responses to the focal creator	**Guiding.** She explained what happened next: "Even before I searched for it [where to find slate], [the other maker] told me, 'Don't buy them, my brother is a roofer and he will get you some.' And he got me some slates." He then showed her the specific settings she would need to engrave the slate. Once she did the engravings, the same member offered to cut it for her as cutting slate required a specialist tool that she did not have access to.
Direction being pulled towards	**Starting new kinds of projects.** P14 was not expecting to get her hands on this new material so quickly. When she got the slates, she was not sure what to do with them: "So, then I had these slates, and I was thinking I know I want to laser engrave them, but I don't

	know what I want to do with them." Another maker showed her geometric animal patterns that she could engrave. Then, she made a set of coasters with animal patterns and a box for them out of "plexiglass lying around the [maker]space". She thanked both makers "for the slate" and "for helping find inspiration" on the online forum.
Impact on the collective experience	**Surfacing resources and building relationships.** In response to P14's inquiry about where to find slate and how to use it, the other maker not only gave some to P14 but also donated some tiles to the makerspace so that others could also try a new material. Moreover, he shared his experience with engraving slate on the online forum, including the particular settings he used and the trial pieces he had engraved with various settings. Thus, P14's process of making a slate coaster set uncovered slate as a potential resource for other members.
Coil pottery *Making a pot using coiling technique* **[U3]** (I)	
Orientation toward the creative current	**Following the creative current.** One day, U3 noticed that another maker was making coil pottery, a technique he had "never heard of before." Intrigued, he approached the maker and asked "Oh my God! What is that?" As soon as he learned it was a technique potters use to shape clay, he told her that he would like to learn how to make pots like that. He said: "She was doing something I'd never seen before. [It was a] new skill, so I needed to learn how to do it. So, I just joined her."
Others' responses to the focal creator	**Guiding.** She showed U3 how to make a coil pot, as she made one for herself. U3 said: "She just did it and she showed me, and I did it with her." During the process, U3 asked questions and she answered by demonstrating the piece she was working on. U3 used the tools and clay available at the makerspace.
Direction being pulled towards	**Starting new kinds of projects.** As a result, U3 ended up making a coil pot despite not having intended to do so. He said: "I was sort of maybe in between projects or whatever and she had something to do. So, I just wanted to learn it. Then she showed me how and I made a really terrible one (laughs)."
Impact on the collective experience	**Surfacing resources and building relationships.** U3 made the other maker share her know-how in coil pottery by showing interest in learning the technique. Moreover, he used the tools and materials provided by the makerspace.
Video synthesizer *Making a synthesizer for compiling short video clips* **[U2]** (I+A)	
Orientation toward the creative current	**Following the creative current.** U2 met another maker and learned that he was planning to organize a workshop on how to make synthesizers. She convinced a couple of friends and signed up for the workshop.
Others' responses to the focal creator	**Guiding.** U2 told us about the workshop: "We went and built synthesizers which is brilliant. And he was very very patient with us. Because we had no idea how to think about circuitry or anything like that. That was quite good." He provided all the materials and tools they would need to make a mini synthesizer.
Direction being pulled towards	**Starting new kinds of projects.** After learning how to make a synthesizer, U2 ended up making a video synthesizer. She said: "It kind of spiraled into my own work. […] So, I built a video synthesizer. I basically did this website where I uploaded the maximum number of videos I could possibly upload and then you would toggle audio on/off and then you can mix and match [videos]." During the process of making the website, she got help from others with coding. Being introduced to a new technology inspired her to initiate a new project and gave her the confidence to do so.

Impact on the collective experience	**Surfacing resources and building relationships.** As people demonstrated interest in learning, the knowledge of making a synthesizer became available in the makerspace through a workshop.

Table 3.1: Data Sources

	Meraki	**Paizo**
Interviews (36 semi-structured interviews in total)	Interviews (14) with all members of the organization, including founders, designers, engineers, and project managers Focused interviews (10) with members who were actively pursuing a personal exploration at the time of data collection	Interviews (12) with all members of the organization, including founders, designers, engineers, and project managers
Observation (110 hours in total)	Fieldnotes from internal sharing sessions (23 meetings) Informal conversations with the members of the organization, ranging from brief exchanges to one-to-one catch-up meetings	Fieldnotes from the Annual Hackday (2 day long) and internal sharing sessions (2 meetings)
Archival Data	Company website, project-related documentation for exploration projects, internal presentations	Company website, project-related documentation for exploration projects, internal presentations

Table 3.2: Negotiating Play in the Open and Closed Playgrounds

	Negotiating the relative novelty	**Negotiating the openness of the process**	**Negotiating the ending**
Closed Playground	**Personalizing the familiar**	**Selectively inviting input**	**Seeking closure**
	Filtering out Building on existing themes Personalizing the content	Approaching to the “right person” Sharing refined artifacts	Demonstrating the effort Prolonging play
Open Playground	**Familiarizing the personal**	**Facilitating co-creation**	**Keeping interests alive**
	Testing ideas with peers Creating evocative conversations Raising awareness about the topic	Welcoming informal interactions Sharing transient artifacts	Shifting focus from outcomes to learning Asking new questions

10 Table 3.3: Illustrative Examples of the Negotiating Play Practices in the Closed Playground

Negotiating the relative novelty	Personalizing the familiar	Filtering out	There were things are in relation to food or wine, which I am also kind of passionate about. But I didn't see much potential for a data set or a visualization that I could use. So, I was like, 'Okay, this doesn't make sense for me at this point to go with this direction of this concept of this content.'[P7]
		Building on existing themes	It's not actually whatever you want. You know it's like the hack days, you do whatever you want. But actually, everybody does something very closely related to what they do every day. [P5] All these ideas that I have, have to do with my day-to-day work. So, when I work on a project, I may have an idea how to improve the process or how to make my life easier as a software engineer built myself tools that helped me do my work. And these are the type of projects that I do in my free time. [P3]
		Personalizing the content	The brief [for the play time] was to do like a data viz project that was a significant in some way for people and that it could be published and might be interesting to look at. And then I started to dive into this genocide or femicide in India. It interests me a lot. I have been always watching videos, searching for more information [on issues related to women]. In the end, I decided [to work on] this because it was something I was researching and ended up being very interested in knowing what's behind all of this." [P4] I'm very much interested in data visualization and obviously maps. So, I kind of brought [my interest in maps] into the work. I tried to bring my personal interest at every point of my work, you know, I think it's pretty well aligned. [P6]

Negotiating the openness of the process	Selectively inviting input	Approaching the “right person”	I don't announce it widely, I don't go to the company's Slack channel and announce, ‘I built this Let's try to use it.’ But we, the developers, the engineers in the company, have a weekly [meeting where we] get together and talk about the projects and what we do. And I presented [my exploration], [saying] ‘Hey, I did this. If you like it, you can use it.’ [P3] I got help from design and project management because there was also a lot of coordination. […] I was very happy to get some help there because the technical stuff, I felt more or less comfortable to work by myself. But yeah, at an individual level, I struggle a bit with talking to people that I don't know and writing all these emails and coordination, so I would just avoid it until it's too late. [P9]
		Sharing refined artifacts	We mostly discuss about visual artifacts, rather than code or anything in these sessions. So, it's seldomly the case that we show actual code and talk through that or anything. Generally, mainly on the virtual artifact that we talked about. And so, it's mostly on that level that you get feedback. [P7] Of course, when it's done, then that's definitely a good time to do [a presentation] that you can show the outcomes, the learnings. You can inspire other team members [by] showing new technologies, new options. [P11]

Negotiating the ending	Seeking closure	Demonstrating the effort	Most of the self-initiated projects, they just come with a well-documented process that allows other people to see how this has led to where it is. Even if it might stop at a non-finished time, it's probably still well documented. [P12] We publish this [website of the personal exploration] and I also got the chance to present it at the university here. Yeah, so to show the process in a presentation to students. [P4]
		Prolonging play time	I think, [personal exploration], since it's kind of a more scheduled thing, it's normally during work hours. Normally, but naturally you're more likely to invest more time on your own. If it's on a passion project, right? So, even then, maybe I'm more likely to spend like an additional hour on the weekend or maybe at night to kind of refine something. [P7] It's also fun for me, it's like my passion and I don't mind having to think about my side projects and all these ideas that I have even outside of the of the company time. [P3]

Table 3.4: Illustrative Examples of the Negotiating Play Practices in the Open Playground

Negotiating the relative novelty	Familiarizing the personal	Testing ideas with peers	Once you've found something interesting you, you think 'oh that's weird or I'd like to know what other people think.' It's just quite organic. [M9] One thing I love about [Meraki] is you can grab people to talk to all the time. I started doing this thing now […] I'll just grab someone to say Hey [Colleague]! Can I talk you through this thing to see if it makes sense to you as well or do you think that's bullshit. [M6]
		Creating evocative conversations	Well [it starts with] someone just over the lunch talking about somethings. For example, [a colleague] saw a video of an ex Venezuelan president talking about money and how when we pay for something we're not paying with the money, we're paying with the time it took us to make that money. So, [he said] we are trading bits of our life in jobs to buy things. And then very quickly someone helped that idea of making a browser plugin that would convert any money values to time values. [M5] I sat down with [a colleague] and we were thinking 'What if you have a daily meter for carbon footprint allowance and you need to make the decision if this picture is worth it for you to use it up or not. How would that change your behavior?'[M2]
		Raising awareness about the topic	I am going to give a very quick [presentation] about an AI module called GPT3 that couple of us have been discussing on slack. It is kind of getting a lot of interesting hype around the internet. I'll quickly go through my presentation, and we can have a chat about its implications and whether we think it is a kind of crap. [M9] It is going to be a weird one. I am not sure about this. [...] Not sure what it is relevant for but thinking about it is useful for me. The reason why I thought this was interesting is

			because I guess what we do sometimes feels a lot like therapy. [continues sharing the properties of the therapeutic relationship making parallels to design work] [M13]
Negotiating the openness of the process	Facilitating co-creation	Welcoming informal interactions	It's not even in the calendar, people just go like 'Look, I want to share something with you over lunch here because that's the time we kind of get together'. [You share] the same way how you would tell your partner at home about something. The same way how you would describe to your parents. So, it doesn't feel like there is the theatre of a presentation or anything. But I think it's just very [Meraki] way as well. (Laughs) We are just like this. [M3] This doesn't have to be a [formal presentation]. This can even be like 'Oh, I ask you to come look at my computer. You're not working on with me but just look at this thing and tell me what you think.' Now you're kind of involved and you've given me a thought maybe a way forward. […] So, it's kind of like getting out there without a formal share. So, it is a lot more informal. [M9]
		Sharing transient artifacts	[During client projects people have the mindset of] I'll have an artifact to show at the end. Whether that artifact is a presentation, or it is a built product, this is an artifact. And I guess [personal exploration] kind of doesn't have the same artifacts we do have [for] work projects. Yeah, yeah, there is stuff created. But I guess we'd always perceive a lot of that stuff as being tentative, transient. I guess we have a lot of transient artifacts and [during a personal exploration] the focus is more about 'what I have learned' rather than 'I have built that artifact.' [M8] [At the beginning of the sharing session] That is something I've been building last week. I am going to show you a live demo of this. It is a chrome extension. [Towards the end of the sharing session]

			You can get the extension, as well as the presentation with live demos in the boxes. […] It's on GitHub, I'll send it around to everyone. [M6] I'll upload this document so; everyone would have time to play with it themselves. [M14]
Negotiating the ending	Keeping interests alive	Shifting focus from outcome to learning	Well, in that case the outcome was the learning itself so sometimes the outcome is just the learning. It's not necessarily that you have achieved something as well. [M6] The magic was actually the journey, the magic wasn't like that the last thing. [M4]
		Asking new questions	[Personal explorations] normally open up ideas. Ideas probably expand further than what you were thinking. I might have been concentrating on this slice, where I think a good idea is. And then we bring it to the studio, it can mean different things to different people, and you actually see the scope of it is wider. And maybe you didn't look at it this angle and maybe there is this emotional level that you completely missed. [M5] It's open ended in the same way that you have closed-ended questions and open-ended questions. We ask open-ended questions within the [personal exploration]. So, there are work streams and we don't really use that term. But the way I perceive things are that we have work streams within the [the formal employee-led innovation program] which are where we're exploring different themes. [M8]

Table 4.1: Organizing Framework

	Individual	***Collective***
Planned	***<u>Deep Creative Work</u>*** **Main need:** Focus on the task **Physical structure:** Physical separation, visual and acoustic privacy **Physical stimuli:** Isolation from distracting stimuli, exposure to relevant information **Symbolic artifacts:** Reminders of personal history	***<u>Collaborative Creative Work</u>*** **Main need:** Capturing and coordinating diverse perspectives **Physical structure:** Acoustic privacy, visibility of workstation **Physical stimuli:** Tools and materials for externalizing knowledge and ideas **Symbolic artifacts:** Symbols of collective ownership
Unplanned	***<u>Serendipitous Creative Work</u>*** **Main need:** Exposure to divergent cognitive stimuli **Physical structure:** Proximity of diverse knowledge sources, liminal shared spaces **Physical stimuli:** Exposure to unexpected stimuli, spaces for relaxation **Symbolic artifacts:** Symbols of playful organizational culture	

FIGURES

Figure 2.1: Three Processes of Creating in the Presence of Other Creators

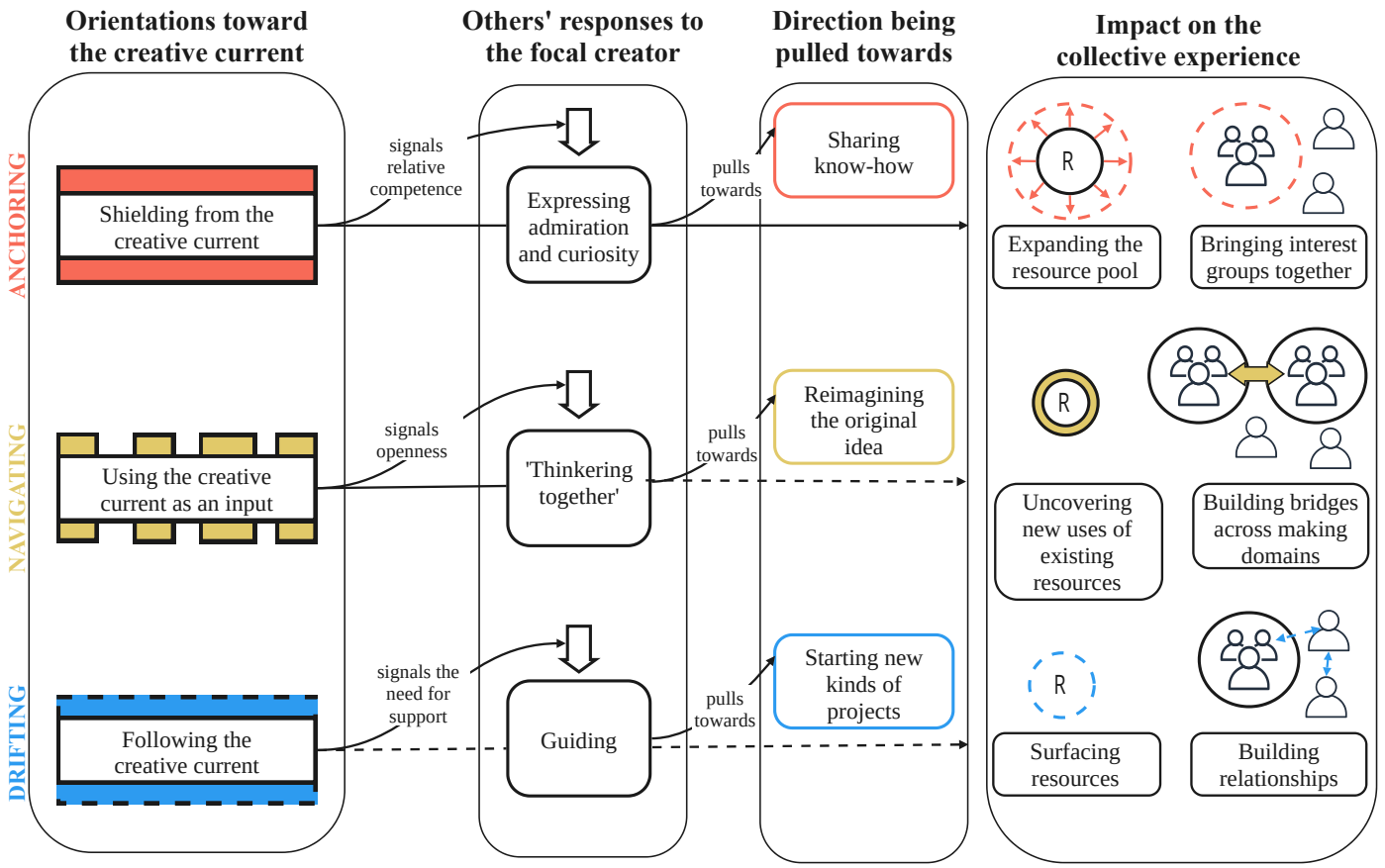


Figure 3.1: A Model of Negotiating Play at Work

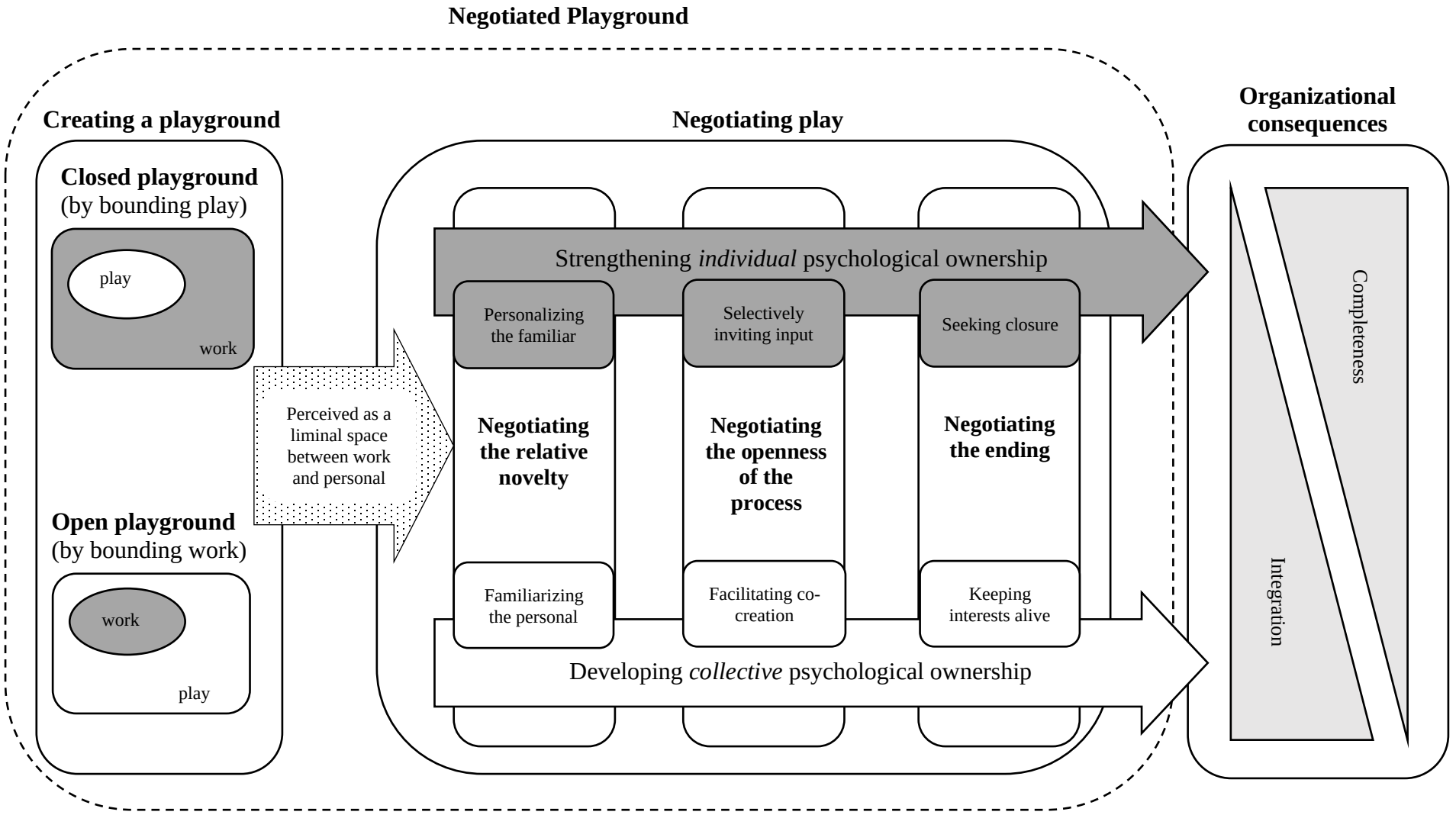
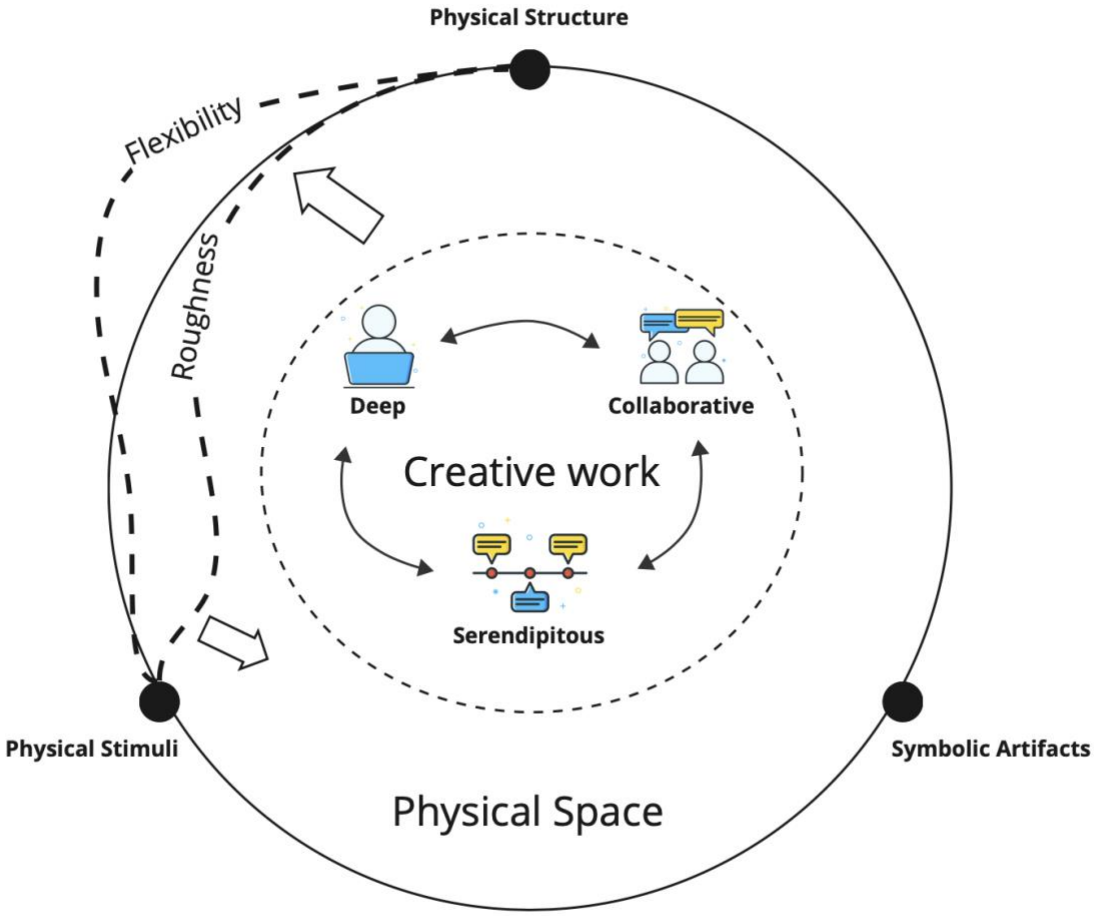


Figure 4.1: Creating a Creative Workspace



REFERENCES

3M. (2021). 3M's 15% culture. Retrieved from https://www.3m.co.uk/3M/en_GB/careers/culture/15-percent-culture/

Agrawal, A., Kapur, D., & McHale, J. (2008). How do spatial and social proximity influence knowledge flows? Evidence from patent data. *Journal of urban economics*, *64*(2), 258-269.

Alexandersson, A., & Kalonaityte, V. (2018). Playing to dissent: The aesthetics and politics of playful office design. Organization Studies, 39(2-3), 297–317.

Allen, T. J. (1977). Managing the flow of technology: Technology transfer and the dissemination of technological information within the R & D organization. Cambridge, Mass., MIT Press.

Amabile, T. M. (1996). *Creativity in context: Update to the social psychology of creativity*. Westview press.

Amabile, T. M., & Pratt, M. G. (2016). The dynamic componential model of creativity and innovation in organizations: Making progress, making meaning. *Research in Organizational Behavior*, 36, 157-183.

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39(5), 1154-1184.

Ananth, P., & Harvey, S. (2022). Ideas in the space between: Stockpiling and processes for managing ideas in developing a creative portfolio. *Administrative Science Quarterly*, 00018392231154909.

Anca, C., & Aragon, S. (2014). Let your employees bring their interests to work. *Harvard Business Review*. Retrieved from https://hbr.org/2014/08/let-your-employees-bring-their-interests-to-work

Anderson, C. (2012). *Makers: The new industrial revolution*. Crown Business.

Anderson, N., Potočnik, K., & Zhou, J. (2014). Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, 40(5), 1297-1333.

Ashforth, B. E., Ceza, B. B., & Meister, A. (2020). My place: How workers become identified with their workplaces and why it matters. *Academy of Management Review*.

Austin, R. D., Devin, L., & Sullivan, E. E. (2012). Accidental innovation: Supporting valuable unpredictability in the creative process. *Organization Science*, *23*(5), 1505-1522.

Ayoko, O. B., & Ashkanasy, N. M. (2021). Guest Editorial: The physical environment of organizational behavior (OB). *Journal of Managerial Psychology*, *36*(4), 301-309.

Baer, M., & Brown, G. (2012). Blind in one eye: How psychological ownership of ideas affects the types of suggestions people adopt. *Organizational Behavior and Human Decision Processes*, *118*(1), 60-71.

Baer, M., & Brown, G. (2012). Blind in one eye: How psychological ownership of ideas affects the types of suggestions people adopt. *Organizational behavior and human decision processes*, *118*(1), 60-71.

Barrero, J. M., Bloom, N., & Davis, S. J. (2021). *Why working from home will stick* (No. w28731). National Bureau of Economic Research.

Bartunek, J. M., & Louis, M. R. (1996). *Insider/Outsider Team Research*. Sage Publications, Inc.

Batey, M., Hughes, D. J., Crick, L., & Toader, A. (2021). Designing creative spaces: an experimental examination of the effect of a nature poster on divergent thinking. *Ergonomics*, *64*(1), 139–146. https://doi.org/10.1080/00140139.2020.1811398

Bechky, B. A. (2003). Sharing meaning across occupational communities: The transformation of understanding on a production floor. *Organization Science*, 14(3), 312-330.

Becker, F. D., Gield, B., Gaylin, K., & Sayer, S. (1983). Office design in a community college: Effect on work and communication patterns. *Environment and Behavior*, 15(6), 699–726.

Benner, M. J., & Tushman, M. L. (2003). Exploitation, exploration, and process management: The productivity dilemma revisited. *Academy of Management Review*, 28(2), 238-256.

Berg, J. M., & Yu, A. (2021). Getting the picture too late: Handoffs and the effectiveness of idea implementation in creative work. *Academy of Management Journal*, *64*(4), 1191-1212.

Bernstein, E. S. (2012). The transparency paradox: A role for privacy in organizational learning and operational control. Administrative Science Quarterly, 57(2), 181–216.

Berti, M., Simpson, A. V., & Clegg, S. R. (2018). Making a place out of space: The social imaginaries and realities of a Business School as a designed

space. *Management Learning*, *49*(2), 168–186. https://doi.org/10.1177/1350507617737453

Bhave, D. P., Teo, L. H., & Dalal, R. S. (2020). Privacy at work: A review and a research agenda for a contested terrain. *Journal of Management*, *46*(1), 127–164. https://doi.org/10.1177/0149206319878254

Bill, V., & Fayard, A. L. (2017, June). Building an entrepreneurial and innovative culture in a university makerspace. Paper presented at the ASEE Annual Conference and Exposition, Columbus, OH.

Bisadi, M., Mozaffar, F., & Hosseini, S. B. (2012). Future research centers: The place of creativity and innovation. *Procedia - Social and Behavioral Sciences*, *68*, 232–243. https://doi.org/10.1016/j.sbspro.2012.12.223

Blagoev, B., Costas, J., & Kärreman, D. (2019). "We are all herd animals": Community and organizationality in coworking spaces. *Organization*, 26(6), 894–916.

Boudouraki, A., Fischer, J. E., Reeves, S., & Rintel, S. (2022). Being in on the action in mobile robotic telepresence: Rethinking presence in hybrid participation.

Bouncken, R. B., & Aslam, M. M. (2021). Bringing the design perspective to coworking-spaces: Constitutive entanglement of actors and artifacts. *European Management Journal*, https://doi.org/10.1016/j.emj.2021.10.008

Boxenbaum, E., Jones, C., Meyer, R. E., & Svejenova, S. (2018). Towards an articulation of the material and visual turn in organization studies. *Organization Studies*, *39*(5-6), 597-616.

Bresman, H. (2013). Changing routines: A process model of vicarious group learning in pharmaceutical R&D. *Academy of Management Journal*, 56(1), 35–61.

Bridwell-Mitchell, E. N. (2016). Collaborative institutional agency: How peer learning in communities of practice enables and inhibits micro-institutional change. *Organization Studies*, 37(2), 161–192.

Browder, R. E., Aldrich, H. E., & Bradley, S. W. (2019). The emergence of the maker movement: Implications for entrepreneurship research. *Journal of Business Venturing*, 34(3), 459–476.

Brown, G., & Baer, M. (2015). Protecting the turf: The effect of territorial marking on others' creativity. *Journal of Applied Psychology*, *100*(6), 1785.

Brun, J., Le Masson, P., & Weil, B. (2019). Out of the picture? How incompatible knowledge and distant visual stimuli may foster idea generation. *Creativity and Innovation Management*, *28*(3), 368–388. https://doi.org/10.1111/caim.12311

Bucher, S., & Langley, A. (2016). The interplay of reflective and experimental spaces in interrupting and reorienting routine dynamics. *Organization Science*, 27(3), 594-613.

Burke, J. J. (2014). Makerspaces: A practical guide for librarians (Vol. 8). Rowman & Littlefield.

Byron, K. & Laurence, G. A. (2015). Diplomas, photos, & tchotchkes as symbolic self-representations: Understanding employees' individual use of symbols. *Academy of Management Journal*, *58*(1), 298–323.

Caccamo, M. (2020). Leveraging innovation spaces to foster collaborative innovation. *Creativity and Innovation Management*, 29(2), 178–191.

Cacciatori, E., Tamoschus, D., & Grabher, G. (2012). Knowledge transfer across projects: Codification in creative, high-tech and engineering industries. *Management Learning*, 43(3), 309–331.

Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization science*, *13*(4), 442-455.

Cartel, M., Boxenbaum, E., & Aggeri, F. (2019). Just for fun! How experimental spaces stimulate innovation in institutionalized fields. *Organization Studies*, 40(1), 65-92.

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

Charmaz, K. (2014). *Constructing grounded theory*. Sage.

Chi, N. W., Liao, H. H., & Chien, W. L. (2021). Having a creative day: A daily diary study of the interplay between daily activating moods and physical work environment on daily creativity. *Journal of Creative Behavior*, *55*(3), 752–768. https://doi.org/10.1002/jocb.488

Childress, C., & Nault, J. F. (2019). Encultured biases: The role of products in pathways to inequality. *American Sociological Review*, *84*(1), 115-141.

Choi, H.-S., & Thompson, L. (2005). Old wine in a new bottle: Impact of membership change on group creativity. *Organizational Behavior and Human Decision Processes*, 98(2), 121–132.

Cohen, S. L., Bingham, C. B., & Hallen, B. L. (2019). The role of accelerator designs in mitigating bounded rationality in new ventures. *Administrative Science Quarterly*, 64(4), 810–854.

Cohendet, P. S., & Simon, L. O. (2016). Always playable: Recombining routines for creative efficiency at Ubisoft Montreal's video game studio. *Organization Science*, 27(3), 614–632.

Collins, H. (2010). *Tacit and Explicit Knowledge*. University of Chicago Press.

Coradi, A., Heinzen, M., & Boutellier, R. (2015). Designing workspaces for cross-functional knowledge-sharing in R&D: The "co-location pilot" of Novartis. *Journal of Knowledge Management*, 19(2), 236–256.

Corbin, J., & Strauss, A. (2015). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications, Inc.

Criscuolo, P., Salter, A., & Ter Wal, A. L. (2014). Going underground: Bootlegging and individual innovative performance. *Organization Science*, 25(5), 1287-1305.

Csikzentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life*. New York: Basic.

Dale, K. (2005). Building a social materiality: Spatial and embodied politics in organizational control. *Organization*, 12(5), 649–678.

Darbellay, F., Moody, Z., Sedooka, A., & Steffen, G. (2014). Interdisciplinary research boosted by serendipity. *Creativity Research Journal*, *26*(1), 1-10.

De Paoli, D., & Ropo, A. (2017). Creative workspaces – a fad or making real impact? *Journal of Corporate Real Estate*, *19*(3), 157–167. https://doi.org/10.1108/JCRE-09-2016-0029

De Paoli, D., Sauer, E., & Ropo, A. (2019). The spatial context of organizations: A critique of "creative workspaces." *Journal of Management and Organization*, *25*(2), 331–352. https://doi.org/10.1017/jmo.2017.46

de Vaujany, F.-X., & Aroles, J. (2019). Nothing happened, something happened: Silence in a makerspace. *Management Learning*, 50(2), 208–225.

de Vaujany, F.-X., Dandoy, A., Grandazzi, A., & Faure, S. (2019). Experiencing a new place as an atmosphere: A focus on tours of collaborative spaces. Scandinavian Journal of Management, 35(4), 101030.

Diehl, M., & Stroebe, W. (1991). Productivity loss in idea-generating groups: Tracking down the blocking effect. *Journal of Personality and Social Psychology*, 61(3), 392–403. https://doi.org/10.1037/0022-3514.61.3.392

Doorley, S., & Witthoft, S. (2012). *Make space: How to set the stage for creative collaboration*. John Wiley & Sons.

Dougherty, D. (2012, April 4). Makerspaces in education and DARPA. O'Reilly Media. Retrieved from https://makezine.com/2012/04/04/makerspaces-in-education-and-darpa/

Dougherty, D., & Conrad, A. (2016). *Free to make: How the maker movement is changing our schools, our jobs, and our minds*. North Atlantic Books.

Drazin, R., Glynn, M. A., & Kazanjian, R. K. (1999). Multilevel theorizing about creativity in organizations: A sensemaking perspective. *Academy of Management Review*, 24(2), 286-307.

Dul, J., & Ceylan, C. (2014). The impact of a creativity-supporting work environment on a firm's product innovation performance. *Journal of Product Innovation Management*, *31*(6), 1254–1267. https://doi.org/10.1111/jpim.12149

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, *44*(2), 350-383.

Edmondson, A. C., & McManus, S. E. (2007). Methodological fit in management field research. *Academy of Management Review*, *32*(4), 1246-1264.

Elsbach, K. D. (2003). Relating physical environment to self-categorizations: Identity threat and affirmation in a non-territorial office space. *Administrative Science Quarterly*, *48*(4). https://doi.org/10.2307/3556639

Elsbach, K. D. (2004). Interpreting workplace identities: The role of office décor. *Journal of Organizational Behavior*, *25*(1), 99–128. https://doi.org/10.1002/job.233

Elsbach, K. D., & Bechky, B. A. (2007). It's more than a desk: Working smarter through leveraged office design. *California Management Review*.

Elsbach, K. D., & Flynn, F. J. (2013). Creative collaboration and the self-concept: A study of toy designers. *Journal of Management Studies*, *50*(4), 515-544.

Elsbach, K. D., & Flynn, F. J. (2013). Creative collaboration and the self-concept: A study of toy designers. *Journal of Management Studies*, *50*(4), 515-544.

Elsbach, K. D., & Pratt, M. G. (2007). The physical environment in organizations. *Academy of Management Annals*, 1, 181–224. https://doi.org/10.1080/078559813

Elsbach, K. D., & Stigliani, I. (2019). The physical work environment and creativity: How creative workspaces support and encourage design thinking. In O. B. Ayoko & N. M. Ashkanasy (Eds.), *Organizational Behaviour and the Physical Environment* (pp. 13–36). Routledge.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing Ethnographic Fieldnotes*. University of Chicago Press.

Epstein, R., Kaminaka, K., Phan, V., & Uda, R. (2013). How is creativity best managed? Some empirical and theoretical guidelines. *Creativity and Innovation Management*, *22*(4), 359–374. https://doi.org/10.1111/caim.12042

Ewenstein, B., & Whyte, J. (2009). Knowledge practices in design: The role of visual representations as 'epistemic objects'. *Organizational Studies*, 30, 7–30.

Fayard, A.-L., & Weeks, J. (2007). Photocopiers and water-coolers: The affordances of informal interaction. *Organization Studies*, 28, 605–634.

Feldman, M. S., Bell, J., & Berger, M. T. (2004). *Gaining access: A practical and theoretical guide for qualitative researchers*. Altamira Press.

Fisher, C. M., Pillemer, J., & Amabile, T. M. (2018). Deep help in complex project work: Guiding and path-clearing across difficult terrain. *Academy of Management Journal*, *61*(4), 1524-1553.

Fleming, P. (2005). Workers' playtime? Boundaries and cynicism in a "culture of fun" program. *The Journal of Applied Behavioral Science*, *41*(3), 285-303.

Furnari, S. (2014). Interstitial spaces: Microinteraction settings and the genesis of new practices between institutional fields. *Academy of Management Review*, *39*(4), 439-462.

Garrett, L. E., Spreitzer, G. M., & Bacevice, P. A. (2017). Co-constructing a sense of community at work: The emergence of community in coworking spaces. *Organization Studies*, 38, 821–842.

George, J. M. (2007). 9 Creativity in organizations. *Academy of Management Annals*, 1(1), 439- 477.

Gilson, L. L., Maynard, M. T., Jones Young, N. C., Vartiainen, M., & Hakonen, M. (2015). Virtual Teams Research: 10 Years, 10 Themes, and 10 Opportunities. *Journal of Management*, *41*(5), 1313–1337. https://doi.org/10.1177/0149206314559946

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. *Organizational Research Methods*, 16, 15–31.

Golden-Biddle, K., & Locke, K. (2006). *Composing qualitative research*. Sage Publications.

Gorbatai, A., Dioun, C., & Lashley, K. (2021). Making space for emotions: Empathy, contagion, and legitimacy's double-edged sword. *Organization Science*, 32, 42–63.

Govindarajan, V, & Srinivas, S. (2013, Aug. 6). The Innovation Mindset in Action: 3M Corporation. *Harvard Business Review*. Retrieved from https:// hbr.org/2013/08/the- innovation-mindset-in-acti-3

Grandadam, D., Cohendet, P., & Simon, L. (2013). Places, spaces and the dynamics of creativity: The video game industry in Montreal. *Regional Studies*, 47, 1701–1714.

Gray, S. M., Knight, A. P., & Baer, M. (2020). On the emergence of collective psychological ownership in new creative teams. *Organization Science*, *31*(1), 141-164.

Grimes, M. G. (2018). The pivot: How founders respond to feedback through idea and identity work. *Academy of Management Journal*, *61*(5), 1692-1717.

Hackerspaces. (2020). List of hacker spaces. Retrieved from https://wiki.hackerspaces.org/List_of_Hacker_Spaces

Halbinger, M. A. (2018). The role of makerspaces in supporting consumer innovation and diffusion: An empirical analysis. *Research Policy*, 47, 2028–2036.

Hallen, B. L., Cohen, S. L., & Bingham, C. B. (2020). Do accelerators work? If so, how? *Organization Science*, 31, 378–414.

Haner, U. E. (2005). Spaces for creativity and innovation in two established organizations. *Creativity and Innovation Management*, *14*(3), 288–298. https://doi.org/10.1111/j.1476-8691.2005.00347.x

Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. *Organization Science*, 17(4), 484- 500.

Hargadon, A., & Sutton, R. I. (1997). Technology brokering and innovation in a product development firm. *Administrative science quarterly*, 716-749.

Harrison, S. H., & Rouse, E. D. (2014). Let's dance! Elastic coordination in creative group work: A qualitative study of modern dancers. *Academy of Management Journal*, 57, 1256–1283.

Harrison, S. H., & Rouse, E. D. (2015). An inductive study of feedback interactions over the course of creative projects. *Academy of Management Journal*, 58, 375–404.

Harrison, S. H., & Wagner, D. T. (2016). Spilling outside the box: The effects of individuals' creative behaviors at work on time spent with their spouses at home. *Academy of Management Journal*, *59*(3), 841-859.

Harrison, S. H., Rouse, E. D., Fisher, C. M., & Amabile, T. M. (2022). The turn toward creative work. *Academy of Management Collections*, *1*(1), 1-15.
Harrison, S. H., Rouse, E. D., Fisher, C. M., & Amabile, T. M. (2022). The turn toward creative work. *Academy of Management Collections*, *1*(1), 1-15.
Harvey, S. (2014). Creative synthesis: Exploring the process of extraordinary group creativity. *Academy of Management Review*, *39*(3), 324-343.

Harvey, S., & Kou, C. Y. (2013). Collective engagement in creative tasks: The role of evaluation in the creative process in groups. *Administrative science quarterly*, *58*(3), 346-386.

Harvey, S., & Mueller, J. S. (2021). Staying alive: Toward a diverging consensus model of overcoming a bias against novelty in groups. *Organization Science*, *32*(2), 293-314.

Hatch, M. (2014). *The maker movement manifesto: Rules for innovation in the new world of crafters, hackers, and tinkerers*. New York: McGraw-Hill Education.

Hendry J, Seidl D (2003) The structure and significance of strategic episodes: Social systems theory and the routine practices of strategic change. Journal of *Management Studies*. 40(1):175–196.

Hicks, D. & Beaudry, M. C. 2010. *The Oxford handbook of material culture studies:* OUP Oxford.

Hobday, M. (2000). The project-based organization: An ideal form for managing complex products and systems? *Research Policy*, 29, 871–893.

Hoever, I. J., Zhou, J., & van Knippenberg, D. (2018). Different strokes for different teams: The contingent effects of positive and negative feedback on the creativity

of informationally homogeneous and diverse teams. *Academy of Management Journal*, 61, 2159–2181.

Hoff, E. V., & Öberg, N. K. (2015). The role of the physical work environment for creative employees – a case study of digital artists. *International Journal of Human Resource Management*, *26*(14), 1889–1906. https://doi.org/10.1080/09585192.2014.971842

Howard-Grenville, J., Golden-Biddle, K., Irwin, J., & Mao, J. (2011). Liminality as cultural process for cultural change. *Organization Science*, *22*(2), 522-539.

Howe, L. C., Jachimowicz, J. M., & Menges, J. I., To retain employees, support their passions outside work. *Harvard Business Review.* Retrieved from https://hbr.org/2022/03/to-retain-employees-support-their-passions-outside-work

Hynes, M. M., & Hynes, W. J. (2018). If you build it, will they come? Student preferences for Makerspace environments in higher education. International *Journal of Technology and Design Education,* 28, 867–883.

Ingold, T. (2013). *Making: Anthropology, archaeology, art and architecture*. Routledge.

Irving, G. L., Ayoko, O. B., & Ashkanasy, N. M. (2020). Collaboration, physical proximity and serendipitous encounters: Avoiding collaboration in a collaborative building. *Organization Studies*, 41, 1123–1146.

Isaksen, S. G. (2022). Assessing the Work Environment for Creativity and Innovation: Building on Mathisen and Einarsen's Review (2004). *Creativity Research Journal*, *00*(00), 1–27. https://doi.org/10.1080/10400419.2022.2112837

Jacucci, G., & Wagner, I. (2007). Performative roles of materiality for collective creativity. *Creativity and Cognition 2007, CC2007 - Seeding Creativity: Tools, Media, and Environments*, 73–82. https://doi.org/10.1145/1254960.1254971

Johns, G. (2006). The essential impact of context on organizational behavior. *Academy of Management Review*, *31*(2), 386-408. https://doi.org/10.5465/AMR.2006.20208687

Kallio, T. J., Kallio, K. M., & Blomberg, A. J. (2015). Physical space, culture and organisational creativity – A longitudinal study. *Facilities*, *33*(5–6), 389–411. https://doi.org/10.1108/F-09-2013-0074

Kelley, T. (2001). *The art of innovation: Lessons in creativity from IDEO, America's leading design firm* (Vol. 10).

Khazanchi, S., Sprinkle, T. A., Masterson, S. S., & Tong, N. (2018). A spatial model of work relationships: The relationship-building and relationship-straining effects of workspace design. *Academy of Management Review*, 43, 590–609.

King, S. (2000). *On writing: A memoir of the craft*. Simon and Schuster.

Klag, M., & Langley, A. (2013). Approaching the conceptual leap in qualitative research. *International Journal of Management Reviews*, 15, 149–166.

Koppman, S. (2016). Different like me: Why cultural omnivores get creative jobs. *Administrative Science Quarterly*, 61(2), 291-331.

Kornberger, M., & Clegg, S. R. (2004). Bringing space back in: Organizing the generative building. *Organization Studies*, 25(7), 1095–1114. https://doi.org/10.1177/0170840604046312

Kristensen, T. (2004). The Physical Context of Creativity. *Creativity and Innovation Management*, *13*(2), 96–98. https://doi.org/10.4324/9780203493007-32

Kristoffersson, A., Coradeschi, S., Loutfi, A., & Severinson-Eklundh, K. (2011). An exploratory study of health professionals' attitudes about robotic telepresence technology. *Journal of Technology in Human Services*, *29*(4), 263-283.

Langley, A. (1999). Strategies for theorizing from process data. Academy of *Management Review*, 24, 691–710.

Langley, A., & Ravasi, D. (2019). Visual artifacts as tools for analysis and theorizing. In T. B. Zilber, J. M. Amis, & J. Mair (Eds.), The Production of Managerial Knowledge and Organizational Theory: New Approaches to Writing, Producing and Consuming Theory (Research in the Sociology of Organizations, Vol. 59, pp. 173–199). Emerald Publishing Limited.

Lavie, D., Stettner, U., & Tushman, M. L. (2010). Exploration and exploitation within and across organizations. *Academy of Management Annals*, *4*(1), 109-155.

Leclair, M. (2022). The atmospherics of creativity: Affective and spatial materiality in a designer's studio. *Organization Studies*. https://doi.org/10.1177/01708406221080141

Lee, M. K., & Takayama, L. (2011, May). " Now, i have a body" uses and social norms for mobile remote presence in the workplace. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 33-42).

Lee, M. Y., Mazmanian, M., & Perlow, L. (2020). Fostering positive relational dynamics: The power of spaces and interaction scripts. *Academy of Management Journal*, *63*(1), 96-123.

Lee, S. (2019). Learning-by-moving: Can reconfiguring spatial proximity between organizational members promote individual-level exploration? *Organization Science*, 30, 467–488.

Lee, Y. S. (2016). Creative workplace characteristics and innovative start-up companies. Facilities, 34(7–8), 413–432. https://doi.org/10.1108/F-06-2014-0054

Lefebvre, H. (1991). *The production of space*. Oxford: Blackwell.

Leroy, S., Schmidt, A. M., & Madjar, N. (2020). Interruptions and task transitions: Understanding their characteristics, processes, and consequences. *Academy of Management Annals*, 14, 661–694.

Levinthal, D., & March, J. G. (1981). A model of adaptive organizational search. *Journal of economic behavior & organization*, 2(4), 307-333.

Lewis, M., & Moultrie, J. (2005). The Organizational Innovation Laboratory. *Creativity and Innovation Management*, *14*(1), 73–83. https://doi.org/10.1111/j.1467-8691.2005.00327.x

Lifshitz-Assaf, H. (2018). Dismantling knowledge boundaries at NASA: The critical role of professional identity in open innovation. *Administrative Science Quarterly*, *63*(4), 746-782.

Lifshitz-Assaf, H., Lebovitz, S., & Zalmanson, L. (2021). Minimal and adaptive coordination: How hackathons' projects accelerate innovation without killing it. *Academy of Management Journal*, 64, 684–715.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic Inquiry. Sage Publications, Inc.

Lindsay, G. (2013) Engineering serendipity. *The New York Times*.

Locke, K. (2001). *Grounded theory in management research*. Sage.

Locke, K., Feldman, M., & Golden-Biddle, K. (2020). Coding practices and iterativity: Beyond templates for analyzing qualitative data. *Organizational Research Methods*, 25, 262–284.

Madjar, N., Greenberg, E., & Chen, Z. (2011). Factors for radical creativity, incremental creativity, and routine, noncreative performance. *Journal of Applied Psychology*, 96, 730–743.

Madjar, N., Oldham, G. R., & Pratt, M. G. (2002). There's no place like home? The contributions of work and nonwork creativity support to employees' creative performance. *Academy of Management Journal*, *45*(4), 757-767.

Magadley, W., & Birdi, K. (2009). Innovation labs: An examination into the use of physical spaces to enhance organizational creativity. *Creativity and Innovation Management*, *18*(4), 315–325. https://doi.org/10.1111/j.1467-8691.2009.00540.x

Maier, L., Baccarella, C. V., Wagner, T. F., Meinel, M., Eismann, T., & Voigt, K. I. (2022). Saw the office, want the job: The effect of creative workspace design on organizational attractiveness. *Journal of Environmental Psychology*, *80*(February 2021), 101773. https://doi.org/10.1016/j.jenvp.2022.101773

Mainemelis, C. (2010). Stealing fire: Creative deviance in the evolution of new ideas. *Academy of Management Review*, 35(4), 558-578.

Mainemelis, C., & Dionysiou, D. D. (2015). Play, flow, and timelessness. *The Oxford handbook of creativity, innovation, and entrepreneurship*, 121-140.

Mainemelis, C., & Ronson, S. (2006). Ideas are born in fields of play: Towards a theory of play and creativity in organizational settings. *Research in organizational behavior*, *27*, 81- 131.

Mainemelis, C., & Sakellariou, E. (2022). Creativity and the arts of disguise: switching between formal and informal channels in the evolution of creative projects. *Organization Science*.

Malakate, A., Andriopoulos, C., & Gotsi, M. (2007). Assessing job candidates' creativity: Propositions and future research directions. *Creativity and Innovation Management*, 16(3), 307-316.

March, J. (2020). The technology of foolishness. In Shaping Entrepreneurship Research (pp. 120-130). Routledge.

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization science*, *2*(1), 71-87.

Markillie, P. (2012, April 21). A third industrial revolution. The Economist. https://www.economist.com/special-report/2012/04/21/a-third-industrial-revolution

Markman, A. (2017). Your Team is brainstorming all wrong. Harvard Business Review. https://hbr.org/2017/05/your-team-is-brainstorming-all-wrong

Martens, Y. (2011). Creative workplace: Instrumental and symbolic support for creativity. *Facilities*, *29*(1), 63–79. https://doi.org/10.1108/02632771111101331

Martins, L. L., & Shalley, C. E. (2011). Creativity in virtual work: Effects of demographic differences. *Small group research*, *42*(5), 536-561.

Mathisen, G. E., & Einarsen, S. (2004). A Review of Instruments Assessing Creative and Innovative Environments Within Organizations. *Creativity Research Journal*, *16*(1), 119–140. https://doi.org/10.1207/s15326934crj1601_12

McCoy, J. M. (2000). The creative work environment: The relationship of the physical environment and creative teamwork at a state agency – a case study [Doctoral Dissertation]

McCoy, J. M., & Evans, G. W. (2002). The potential role of the physical environment in fostering creativity. *Creativity Research Journal*, *14*(3–4), 409–426. https://doi.org/10.1207/S15326934CRJ1434_11

Meinel, M., Maier, L., Voigt, K.-I., & Wagner, T. F. (2017). Designing Creativity-Enhancing Workspaces: A Critical Look at Empirical Evidence. *Journal of Technology and Innovation Management*, *1*(1), 1–12.

Metiu, A., & Rothbard, N. P. (2013). Task bubbles, artifacts, shared emotion, and mutual focus of attention: A comparative study of the microprocesses of group engagement. *Organization Science*, 24(2), 455-475.

Miner, A. S. (1994). Seeking adaptive advantage: Evolutionary theory and managerial action. In J. A. C. Baum & J. V. Singh (Eds.), *Evolutionary dynamics of organizations* (pp. *76*-89).

Moultrie, J., Nilsson, M., Dissel, M., Haner, U. E., Janssen, S., & Van der Lugt, R. (2007). Innovation Spaces: Towards a Framework for Understanding the Role of the Physical Environment in Innovation. *Creativity and Innovation Management*, *16*(1), 53–65. https://doi.org/10.1111/j.1467-8691.2007.00419.x

Mueller, J. S., Melwani, S., & Goncalo, J. A. (2012). The bias against creativity: Why people desire but reject creative ideas. *Psychological Science*, 23(1), 13-17.

Mueller, J., Melwani, S., Loewenstein, J., & Deal, J. J. (2018). Reframing the decision-makers' dilemma: Towards a social context model of creative idea recognition. *Academy of Management Journal*, 61(1), 94-110.

Mumford, M. D., Feldman, J. M., Hein, M. B., & Nagao, D. J. (2001). Tradeoffs between ideas and structure: Individual versus group performance in creative problem solving. *The Journal of Creative Behavior*, *35*(1), 1-23.

Newport, C. (2016). *Deep work: Rules for focused success in a distracted world*. Hachette UK.

Nicolini, D., Mengis, J., & Swan, J. (2012). Understanding the role of objects in cross-disciplinary collaboration. *Organization Science*, *23*(3), 612-629.

Nijstad, B. A., Stroebe, W., & Lodewijkx, H. F. (2002). Cognitive stimulation and interference in groups: Exposure effects in an idea generation task. *Journal of experimental social psychology*, *38*(6), 535-544.

Nonaka, I., & von Krogh, G. (2009). Perspective—tacit knowledge and knowledge conversion: Controversy and advancement in organizational knowledge creation theory. *Organization Science*, 20, 635–652.

Obstfeld, D. (2012). Creative projects: A less routine approach toward getting new things done. *Organization Science*, *23*(6), 1571-1592.

Oksanen, K., & Ståhle, P. (2013). Physical environment as a source for innovation: investigating the attributes of innovative space. *Journal of knowledge management*, *17*(6), 815-827.

Oldham, G. R., & Brass, D. J. (1979). Employee reactions to an open-plan office: A naturally occurring quasi-experiment. Administrative Science Quarterly, 24, 267–284.

Page, L., & Brin, S. (2004, April 29). Letter from the founders. The New York Times. https://www.nytimes.com/2004/04/29/business/letter-from-the-founders.html

Paulus, P. B., & Nijstad, B. A. (Eds.). (2003). *Group creativity: Innovation through collaboration*. Oxford University Press.

Perretti, F., & Negro, G. (2007). Mixing genres and matching people: A study in innovation and team composition in Hollywood. *Journal of Organizational Behavior*, 28, 563–586.

Perry-Smith, J. E., & Mannucci, P. V. (2017). From creativity to innovation: The social network drivers of the four phases of the idea journey. *Academy of Management Review*, *42*(1), 53-79.

Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *Academy of management review*, *28*(1), 89-106.

Pierce, J. L., & Jussila, I. (2010). Collective psychological ownership within the work and organizational context: Construct introduction and elaboration. *Journal of Organizational Behavior*, *31*(6), 810-834.

Pierce, J. L., & Jussila, I. (2011). *Psychological ownership and the organizational context: Theory, research evidence, and application*. Edward Elgar Publishing.

Pierce, J. L., Kostova, T., & Dirks, K. T. (2001). Toward a theory of psychological ownership in organizations. *Academy of Management Review*, 26(2), 298-310.

Reilly, P. (2018). No laughter among thieves: Authenticity and the enforcement of community norms in stand-up comedy. *American Sociological Review*, *83*(5), 933-958.

Rieken, F., Boehm, T., Heinzen, M., & Meboldt, M. (2020). Corporate makerspaces as innovation driver in companies: a literature review-based framework. *Journal of Manufacturing Technology Management*, 31, 91–123.

Rietzschel, E. F., Nijstad, B. A., & Stroebe, W. (2010). The selection of creative ideas after individual idea generation: Choosing between creativity and impact. *British journal of psychology*, *101*(1), 47-68.

Rietzschel, E.F., B.A. Nijstad, & W. Stroebe. (2010). The selection of creative ideas after individual idea generation: Choosing between creativity and impact. *British Journal of Psychology.* 101(1) 47-68.

Rivera, L. A. (2012). Hiring as cultural matching: The case of elite professional service firms. *American sociological review*, *77*(6), 999-1022.

Rockmann, K. W., & Pratt, M. G. (2015). Contagious offsite work and the lonely office: The unintended consequences of distributed work. *Academy of Management Discoveries*, *1*(2), 150-164.

Rothbard, N. P. (2001). Enriching or depleting? The dynamics of engagement in work and family roles. *Administrative science quarterly*, *46*(4), 655-684.

Rouse, E. (2013). Kill your darlings? Experiencing, maintaining, and changing psychological ownership in creative work (Doctoral dissertation, Boston College). Retrieved from https://dlib.bc.edu/islandora/object/bc-ir:101452

Rouse, E. D. (2020). Where you end and I begin: Understanding intimate co-creation. *Academy of Management Review*, *45*(1), 181-204.

Rouse, E., & Harrison, S. (2022). Choreographing creativity: Exploring creative centralization in project groups. *Academy of Management Discoveries*, *8*(3), 384-413.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, *55*(1), 68.

Sailer, K. (2011). Creativity as social and spatial process. *Facilities*, *29*(1), 6–18. https://doi.org/10.1108/02632771111101296

Schmidt, E., & Rosenberg, J. (2014). *How google works*. Grand Central Publishing.

Schmidt, S., & Brinks, V. (2017). Open creative labs: Spatial settings at the intersection of communities and organizations. *Creativity and Innovation Management*, *26*(3), 291–299. https://doi.org/10.1111/caim.12220

Schon, D. A. (1983). *The reflective practitioner: How professionals think in action*. Routledge.

Seidel, V. P., & O'Mahony, S. (2014). Managing the repertoire: Stories, metaphors, prototypes, and concept coherence in product innovation. *Organization Science*, *25*(3), 691-712.

Seidel, V. P., Packalen, K. A., & O'Mahony, S. (2016). Help me do it on my own: How entrepreneurs manage autonomy and constraint within incubator organizations. In L. E. Cohen, M. D. Burton, & M. Lounsbury (Eds.), The Structuring of Work in

Organizations (Research in the Sociology of Organizations, Vol. 47) (pp. 275–307). Emerald Group Publishing Limited.

Shalley, C. E. (1995). Effects of coaction, expected evaluation, and goal setting on creativity and productivity. *Academy of Management journal*, *38*(2), 483-503.

Shortt, H. (2015). Liminality, space and the importance of 'transitory dwelling places' at work. *Human Relations*, *68*(4), 633–658. https://doi.org/10.1177/0018726714536938

Simonton, D. K. (2003). Scientific creativity as constrained stochastic behavior: the integration of product, person, and process perspectives. *Psychological bulletin*, *129*(4), 475.

Skilton, P. F., & Dooley, K. J. (2010). The effects of repeat collaboration on creative abrasion. *Academy of Management Review*, 35, 118–134.

Sleigh, A., Stewart, H., & Stokes, K. (2015). *Open dataset of uk makerspaces: A user's guide.* Nesta.

Spreitzer, G. M., Cameron, L., & Garrett, L. (2017). Alternative work arrangements: Two images of the new world of work. *Annual Review of Organizational Psychology and Organizational Behavior*, 4, 473–499.

Stephenson, K. A., Kuismin, A., Putnam, L. L., & Sivunen, A. (2020). Process studies of organizational space. *Academy of Management Annals*, *14*(2), 797-827.

Stewart, M. (2004), The other office: Creative workplace design, Birkhäuser, Boston.

Stigliani, I., & Ravasi, D. (2012). Organizing thoughts and connecting brains: Material practices and the transition from individual to group-level prospective sensemaking. *Academy of Management journal*, 55(5), 1232-1259.

Stigliani, I., & Ravasi, D. (2018). The shaping of form: Exploring designers' use of aesthetic knowledge. Organization Studies, 39, 747–784.

Stokols, D., Clitheroe, C., & Zmuidzinas, M. (2002). Qualities of work environments that promote perceived support for creativity. *Creativity Research Journal*, *14*(2), 137–147. https://doi.org/10.1207/S15326934CRJ1402_1

Suckley, L., & Nicholson, J. (2018). Enhancing creativity through workspace design. *The Palgrave Handbook of Creativity at Work*, 245–263. https://doi.org/10.1007/978-3-319-77350-6_12

Sutton, R. I., & Hargadon, A. (1996). Brainstorming groups in context: Effectiveness in a product design firm. *Administrative Science Quarterly*, 685-718.

Taylor, S., & Spicer, A. (2007). Time for space: A narrative review of research on organizational spaces. *International Journal of Management Reviews*, 9, 325–346.

Tesluk, P. E., Farr, J. L., & Klein, S. R. (1997). Influences of organizational culture and climate on individual creativity. *The journal of creative behavior*, *31*(1), 27-41.

Thanem, T., & Värlander, S. W. (2013). Fun-parks or Parkour? The ambiguities and paradox of planning pro-creative office design. In *Handbook of management and creativity* (pp. 298-324). Edward Elgar Publishing.

Thoring, K., Desmet, P., & Badke-Schaub, P. (2018). Creative environments for design education and practice: A typology of creative spaces. *Design Studies*, *56*, 54–83. https://doi.org/10.1016/j.destud.2018.02.001

Thoring, K., Gonçalves, M., Mueller, R. M., Desmet, P., & Badke-Schaub, P. (2021). The Architecture of Creativity: Toward a Causal Theory of Creative Workspace Design. *International Journal of Design*, *15*(2), 17–36

Thoring, K., Mueller, R. M., Desmet, P., & Badke-Schaub, P. (2020). Spatial design factors associated with creative work: A systematic literature review. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing: AIEDAM*, *34*(3), 300–314. https://doi.org/10.1017/S0890060420000232

Unsworth, K. (2001). Unpacking creativity. *Academy of management review*, *26*(2), 289-297.

Unsworth, K. L., & Clegg, C. W. (2010). Why do employees undertake creative action?. *Journal of Occupational and Organizational Psychology*, *83*(1), 77-99.

Uzzi, B., & Spiro, J. (2005). Collaboration and creativity: The small world problem. *American Journal of Sociology*, 111, 447–504.

Van Maanen, J. (1979). Reclaiming qualitative methods for organizational research: A preface. *Administrative science quarterly*, *24*(4), 520-526.

Van Marrewijk, A., & Yanow, D. (2010). Introduction: The spatial turn in organizational studies. In *Organizational spaces*. Edward Elgar Publishing.

Von Hippel, E. (2005). Democratizing Innovation. Cambridge, MA: The MIT Press.

Wallas, G. (1926). *The art of thought*. New York: Harcourt, Brace and Company.

Westwood, R. (2015). The advantage of personal interests in the workplace. Forbes. Retrieved from https://www.forbes.com/sites/ryanwestwood/2015/02/19/the-advantage-of-personal-interests-in-the-workplace/?sh=a7e1a7141bfe

World Economic Forum. (2020). The Future of Jobs Report. Retrieved from https://www3.weforum.org /docs/WEF_Future_of_Jobs_2020.pdf

Yakhlef, A., & Rietveld, E. (2020). Innovative action as skilled affordance-responsiveness: An embodied-mind approach. *Creativity and innovation management*, *29*(1), 99-111.

Yekanialibeiglou, S., Demirkan, H., & Denti, L. (2021). Enhancing creativity in activity-based offices: A critical incident study of knowledge workers. *Creativity and Innovation Management*, *30*(4), 763–782. https://doi.org/10.1111/caim.12464

Zenk, L., Hynek, N., Krawinkler, S. A., Peschl, M. F., & Schreder, G. (2021). Supporting innovation processes using material artefacts: Comparing the use of LEGO bricks and moderation cards as boundary objects. *Creativity and Innovation Management*, *30*(4), 845–859. https://doi.org/10.1111/caim.12459

AUTHOR CONTRIBUTION STATEMENT

The first study in this dissertation (Chapter 2) is based on work done in collaboration with Dr. Colin Fisher. I independently identified and designed the research, collected and analyzed data, and theorized. Dr. Fisher and I then worked together to develop the paper. The second study (Chapter 3) is based on work conducted with Dr. Sarah Harvey. I identified and executed the research program independently, which included designing the study, negotiating access to the research sites, collecting and analyzing data, theorizing, and writing up. I subsequently worked with Dr. Harvey to refine and further develop the research. All aspects of the final essay (Chapter 4) were conducted by me. I identified and scoped the literature review and proposed a future research agenda. The empirical studies reported in this dissertation were approved by UCLs behavioral ethics board: 12739/001.