



**Abstract**

Two behaviors—often seen in conflict—optimize creative thinking for innovation processes: intense focused work and restorative activities. We need to experience these on our own as well as when we are working with others. If we never take breaks, can't focus, or don't work with each other, we miss out on finding new ideas and ultimately fail to execute them.

With the work landscape shifting to an ecosystem of working from anywhere, some of these individual creative behaviors could be done outside of the office. However, group creative work is best done in the same space. The type and cadence of on-site and off-site activities for creativity should be decided by needs and goals. Explore the growing evidence that supports this and how—coupled with Haworth's workplace expertise—space design can cultivate the creativity necessary to spark innovation.

**Keywords**

- Creativity
- Creative process
- Creative rhythm
- Convergent thinking
- Divergent thinking
- Flow
- Focus
- Group flow
- Innovation
- Rest
- Recharge
- Social capital
- Teaming

**Takeaways**

Too often "productive work" is defined by intense focused work (individual and group), over-emphasizing one way of working and leaving little room for contemplation. The creative process requires both—activating and enlisting our entire brain in convergent and divergent thinking. Convergent thinking requires our controlled attention or focus. It is sensitive to external stimuli where unwanted, irrelevant information can sabotage efforts and performance drops. Conversely, divergent creative thinking benefits from novel stimuli and spontaneity.

Workplace design can foster all creative thinking by addressing these specific needs. Space then looks like opportunities for individualized deep work, intense teaming, moments of restoration, and connecting with colleagues. Consideration centers on understanding the level of privacy needed, how structured activities will be, and how much user control over the workspace is required.

We perform focused work best in bursts. Without honoring down-time during the traditional workday to replenish our resources—both by ourselves and relaxing with colleagues—we shortchange the creative process. Preparing the workplace for the whole creative process will likely look different depending on the organizational culture and goals, but it will be well worth the effort for the increased intellectual capital.

## Optimizing the Workplace for Innovation

Within our fast-paced global economy, organizations feel pressure to innovate. Regardless of industry, products, or services, it's humans that come up with new ideas for innovation. If we want people to innovate, we need to understand how they create new ideas. First, let's debunk some myths about creativity and innovation:

1. Creativity is not a “gift.” It is a skill. Skills can be developed and practiced.<sup>1</sup>
2. Creativity is not “right-brained.” The creative process involves the whole brain, so workplaces should support the whole process.<sup>2</sup>
3. Creativity is the accumulation of many small ideas that lead to the big ideas we tend to laud as “innovative.”<sup>3</sup>
4. Conflict between people with diverse and complementary knowledge sets can be constructive for innovation.<sup>4</sup>

If you're doubtful of these, read on. Recent research sheds light on how to design workspaces and workplaces to improve and optimize creative activities—the activities necessary for employees to create the next new ideas that spark innovation.

## Creating and Innovating: How Ideas Come to Market and Grow Knowledge

First things first: Creativity and innovation, as studied, are not synonymous. Researchers understand and study these as two separate concepts that work together. Creativity and innovation, both, are defined by novelty and usefulness—finding a new (novel) idea that is valued by others (usefulness).<sup>5</sup> Creativity is the process of coming up with the new and useful idea, and innovation is the process of making that idea a reality for others to use.<sup>6</sup> So, innovation starts with the discovery of creative ideas that then moves toward production or use of that idea to economically satisfy a specific need or market. If we want to optimize the front end of this process—how the individual and organization create new and useful ideas—we need to understand how new ideas come about.

### From New Ideas to Market

#### ① Ideas

What you know + new knowledge = new ideas.

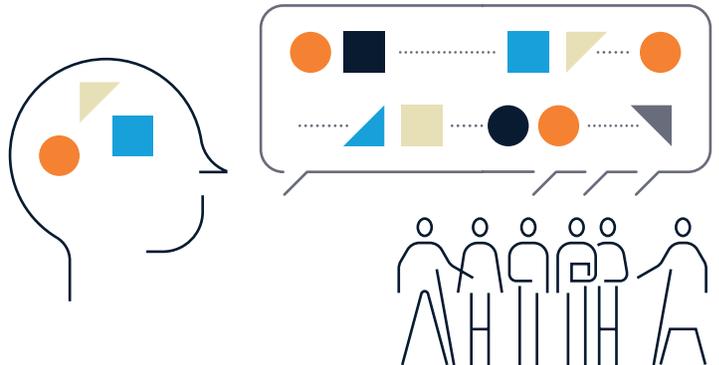


#### ② Sharing

New ideas are shared with others.

#### ③ Evaluation

Together, we determine if new ideas are, in fact, new and useful to a market.



#### ④ Ideas in Practice

If the ideas are new and useful, we make those ideas a reality as new physical products or processes.

#### ⑤ Full Process

Sharing new ideas, products, and processes adds to knowledge; and, the process comes full circle.<sup>7</sup>



1. Sawyer, 2012; Jackson et al., 2012; Chapman et al., 2017.  
2. Jung et al., 2010; Beaty et al., 2014; Beaty et al., 2015;

3. Hennessey and Amabile, 2010; Sawyer, 2012.  
4. DeGraff and DeGraff, 2017.

5. Hennessey and Amabile, 2010; Jung et al., 2010; Benedek et al., 2014.

6. Anderson, Potočnik, and Zhou, 2014.  
7. Csikszentmihalyi, 2014; Sawyer, 2012.

## Developing and Practicing Creativity

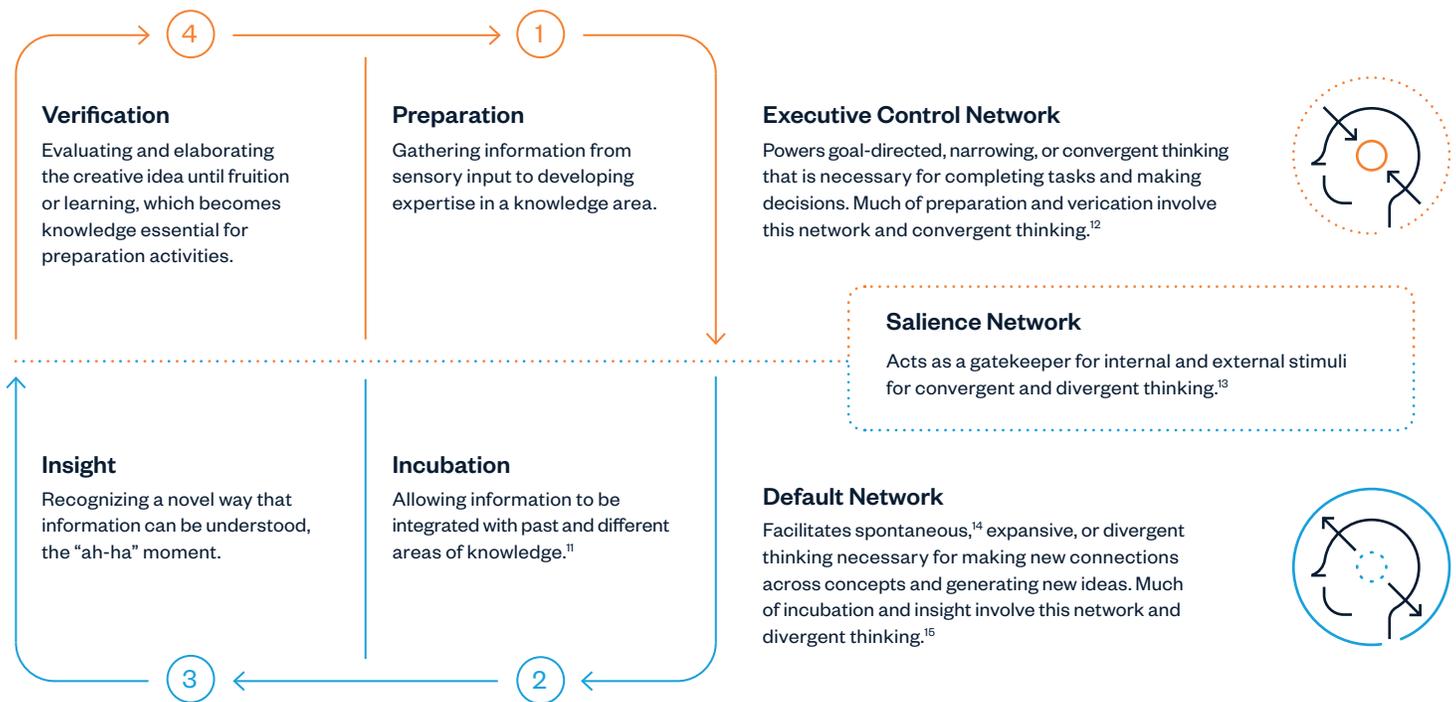
There are four stages of cognition involved in the creative process: preparation, incubation, insight, and verification.<sup>8</sup> Cycling among these stages forms a continuous feedback loop, generating novel ideas and evaluating those ideas until our ideas are fully formed and vetted.<sup>9</sup> Without spending time in all of these cognitive stages, creative ideas don't happen.

Luckily, we come by these fairly naturally—and by developing expertise, following the right work habits, and knowing how to combine ideas and select good ones, we can get better at it.<sup>10</sup>

Unfortunately, too often, our workplaces don't provide what we need for those "right work habits." Starting with creative cognition can help us fix that.

Not surprisingly, our brains function in different ways for different kinds of cognition, and there are three neural networks (constellations of brain areas) most important to creative cognition: the executive control network, the default network, and the salience network. Knowing how these networks work together helps us understand what exactly those right work habits are, and how to design for them in the workplace.

### What Kinds of Thinking are Needed for Creativity?



People with deep knowledge of various areas of interest have more to draw upon for creative ideas. Curiosity and openness to new experiences is closely tied to creative outcomes.<sup>16</sup> Their deep knowledge then provides more material from which to make new connections.<sup>17</sup>

**“Inspiration prefers the prepared mind.”**

Dr. Scott B. Kaufman and Carolyn Gregoire

8. Sawyer, 2012; Kaufman and Gregoire, 2015.  
9. Cunningham et al., 2007; Gabora and Saab, 2011; Zelazo, 2015.

10. Sawyer, 2012.  
11. Tomparry and Davachi, 2017.  
12. Jung et al., 2013.  
13. Menon, 2015.

14. Marron et al., 2020.  
15. Jung et al., 2013.  
16. Kaufman, 2013; Madrid and Patterson, 2016; Kaufman et al., 2016.

17. Gabora and Carbert, 2015.

## Creativity Involves the Whole Brain

Since creative cognition involves the executive control, default, and salience networks, and these networks span across various regions of the brain, creativity involves the whole brain.<sup>18</sup> So how does our workplace impact convergent and divergent thinking? Through the salience network.

### Salience Network: The Gatekeeper

The salience network monitors external and internal stimuli and passes information to the other networks and influences the way they are prioritized.<sup>19</sup> In short, it impacts how we think by telling us what should get our attention. Our salience network is designed to monitor stimuli and—when something new, different, out of place, occurs—lets us know by bringing it into our awareness. It can also be trained to monitor stimuli that matter to our own interests. We have some control over our salience network by directing our attention (a “top-down” process), but other times, it directs our attention for us (a “bottom-up” process). Whether a stimulus is relevant and desired, or not, depends on what you want to do and which cognitive mode you need to be in: convergent or divergent.

### Executive Control Network: The Conductor

Focus (controlling our attention) is important to convergent thinking because, without intentional focus, learning, problem-solving, and evaluating—all important processes for the preparation and verification stages of creating new and useful ideas—are much more difficult. Intentionally focusing engages

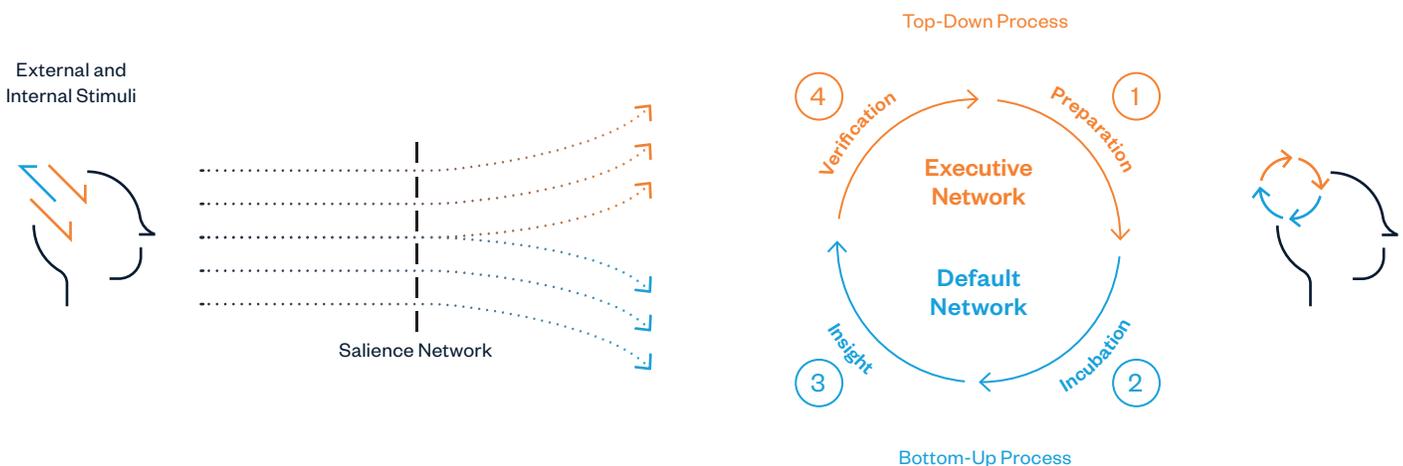
the executive control network in order to help us complete tasks.<sup>20</sup> Unfortunately, we have limited cognitive capacities, and when/if the tasks at hand demand more attention than our capacities can manage, attention to and performance on those tasks tends to decline.<sup>21</sup> But, it can also depend on other factors, such as the difficulty of the tasks, duration of tasks, and perceived costs involved.<sup>22</sup>

Some good news: At the onset of a focus task, our brain starts to “learn” what to pay attention to (what’s relevant) and what to ignore (what’s irrelevant).<sup>23</sup> Our focus can get more efficient the longer we control our attention: Our brain starts to suppress what it doesn’t need to bring into awareness to perform the task.<sup>24</sup> Although, no matter how efficient our focus is, it still functions within limited capacities and can be susceptible to off-task stimuli, such as distractions and interference.<sup>25</sup>

### Default Network: The Tinkerer

Rest replenishes resources and allows for divergent thinking for idea generation: incubation and insight. Research provides evidence that divergent thinking needs little intentional effort,<sup>26</sup> benefits from a range of stimuli,<sup>27</sup> requires less dependency on specific external stimuli (you can be “perceptually decoupled”—or oblivious to your surroundings),<sup>28</sup> and functions best when emotions and engagement are low.<sup>29</sup> Resting and routine activities downgrade the executive control network,<sup>30</sup> allowing the default (or imagination)<sup>31</sup> network to get more active.

## From Stimuli to Thoughts



18. Menon, 2015.  
 19. Menon and Uddin, 2010; Oosterwijk, Touroutoglou, and Lindquist, 2015; Menon, 2015.  
 20. Lavie et al., 2004; McCabe et al., 2010; Christie and Schrater, 2015.  
 21. Randall, Oswald, and Beier, 2014; Buschman and Kastner, 2015.  
 22. Simon et al., 2016; Kool, Shenhav, and Botvinick 2017; Krimsky et al., 2017.  
 23. Kiyonaga, Egner, and Soto, 2012; Buschman and Kastner, 2015.  
 24. Sörqvist, Stenfelt, and Rönnerberg, 2012; Hopf et al., 2006; Menon, 2015.  
 25. Johnson et al., 2019.  
 26. Beaty et al., 2014.  
 27. wiruchnipawan, 2015.  
 28. Baird et al., 2012; Christoff, 2012.  
 29. Harmon-Jones, Price, and Gable, 2012.  
 30. Dietrich, 2003; Dietrich, 2004b; Jung et al., 2010.  
 31. Kaufman, 2014.

It takes what we've learned, integrating it with what we already know<sup>32</sup> in unique ways. How do our brains make connections between varied and unlikely concepts? By being inefficient, says Dr. Rex Jung in *The New York Times*: "...in the regions of the brain related to creativity, there appears to be lots of little side roads with interesting detours, and meandering little byways."<sup>33</sup>

Why is being inefficient important to creative thought? "In a way, the [imagination network] is like a scout, ranging about for prospective futures."<sup>34</sup> Scouting is crucial to connect what we know with what "could be" into a new idea.

*It remains prudent to protect our ability to focus. Without the ability to effectively learn and build our knowledge, we have no foundation from which to draw new ideas. Without the ability to effectively test and refine our ideas, our new ideas won't go anywhere. Without focus work, there is no innovation.*

*On the other hand, by meandering the byways of the imagination network, cognition gets more spontaneous,<sup>35</sup> stumbling upon the desired connection responsible for the "ah-ha!" moment. It often happens when we least expect it. Without time and space to engage imagination, we'll miss out on insights. Without rest, there is no innovation.*

The salience network, then, is the key for how a workplace (and all its external stimuli) impacts the way we think and behave, including our creative work habits. For the convergent and divergent thinking necessary to creativity, we should include design that helps the salience network prioritize creative work habits ranging from focus to rest.

## Designing for Creative Rhythm: Focus, Rest, and In-Between

Because we need both focus and rest to foster the convergent and divergent thinking for the creative process, design considerations for workplaces should include how to manage stimuli for the whole process. Remember, whether a stimulus is relevant and desired or not depends on what you want to do and which cognitive mode you need to be in: convergent or divergent.

### The Challenge for "Top-Down" Attention: Irrelevant Stimuli Sabotaging Focus

The challenge to focusing for convergent thinking begins when unwanted, irrelevant stimuli divert our efforts to focus, even emotions. Highly intense emotions, whether positive or negative, will divert resources from efforts to intentionally

focus.<sup>36</sup> Too much arousal overloads our cognition. For example, in a Haworth Human Performance Lab experiment, when arousal or stress was too high, performance on a time-sensitive, difficult focus task was poor.<sup>37</sup> Top-down attention, indeed, needs a low to moderate amount of arousal for motivation, what we call "interest."<sup>38</sup> Too little interest (boredom), and we won't pay attention enough to perform well. You may have experienced a time when your thoughts drifted off during a meeting. That may be due to not enough arousal. Therefore, a good motivator for focus work is confronting achievable yet, challenging tasks.<sup>39</sup> It's the "sweet spot" in terms of interest, engagement, or arousal. Since managing stimuli that doesn't sabotage efforts to focus can be so challenging on many fronts, we need to protect people's ability to focus for preparation and verification.

### The Advantage of "Bottom-Up" Attention: Stimuli Sparking New Ideas

"Boredom," however, isn't always necessarily a bad thing. When our minds wander, our imagination network can kick in and do some work.<sup>40</sup> Because varied and novel stimuli feed the imagination network, when we're bored it may be a signal that it's time to take a break and soak in the surrounding stimuli ("bottom-up" attention). It could be just the right kind of stimuli, like an unusual object or overheard conversation, that our imagination network can use to make unique and interesting connections across concepts we already know. Variety of stimuli serves a purpose—cueing the resting brain for imaginative thinking.

Oftentimes, when we want to "clear our head," we seek a different space and activity (like a walk outdoors), daydream, or do something routine.<sup>41</sup> When we do this, we're letting our brains noodle on potential ideas.<sup>42</sup> How many ideas have come to light during a routine activity like exercising or commuting to work? Chances are your commute is very routine and you "go through the motions" with just enough awareness to get there—sometimes even arriving at work with little recollection of how exactly you got there. Such a routine task engages your imagination network.<sup>43</sup> While on "automatic pilot" for routine tasks, especially if they involve movement and motor skills,<sup>44</sup> it seems the imagination network can get some tinkering done, oftentimes arriving at that flash of insight. Since our brains can do so much good stuff when we're relaxed, we should encourage restorative behaviors at work for incubation and insight.

32. Tompary and Davachi, 2017.

33. Cohen, 2010.

34. Kaufman, 2014.

35. Knight et al., 1999.

36. Duncan and Barrett, 2007; Harmon-Jones, Gable, and Price,

2012; Alpert and Haber, 1960.

37. Johnson, 2017.

38. Yerkes and Dodson, 1908; Alpert and Haber, 1960; Crum, Salovey, and Achor, 2013.

39. Keller and Bless, 2008.

40. Baird et al., 2012; Smallwood et al., 2012; McMillan, Kaufman, and Singer, 2013.

41. Baird et al., 2012; McMillan, Kaufman, and Singer, 2013.

42. Dietrich, 2003; Dietrich, 2004a; Jung et al., 2010.

43. Lin et al., 2016; Vatanserver, Menon, and Stamatakis, 2017.

44. Matheson and Kennet, 2020.

## Designing spaces for focus, rest, and in-between activities builds creative work habits.

### Creative Rhythm and Peak Performance

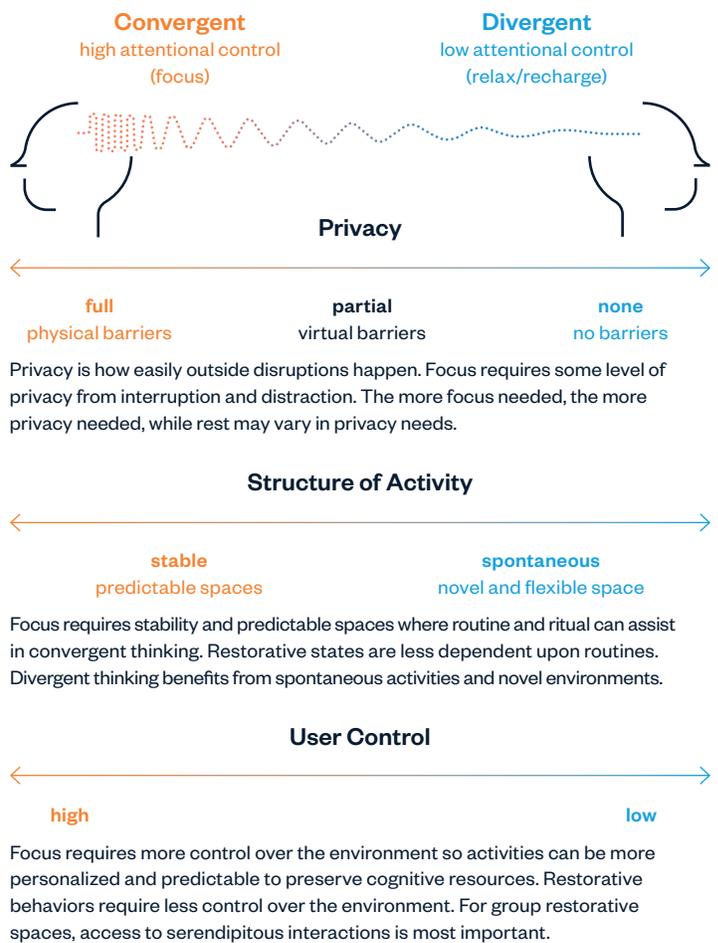
It's clear we must have both focus and rest for creative cognition. How fast we cycle between these modes of thinking and behaving depends on how well we can focus, how much rest we need, what we already know, what we need to know, and where we are in the creative process. The rhythm between focusing and resting can be slower, with longer periods in each state. Sleeping each night is an excellent example of a longer resting period that provides cognitive benefits for divergent thinking.<sup>45</sup> In the workplace, a popular study conducted by DeskTime revealed that the most productive employees (top 10 percent), on average, took a 15-minute break after working for about an hour.<sup>46</sup> Or, the creative rhythm can be quite fast—even to the point that we can't tell which mode we're in. We're absorbing information, generating ideas, and refining them all at once—and it's effortless. Here we have optimal focus with the least amount of effort (or cognitive load), thus freeing up resources otherwise used to control our attention for other kinds of cognition. These kinds of cognition include drawing on past experiences and procedural knowledge<sup>47</sup> (all that preparation you did),<sup>48</sup> moral reasoning, working memory,<sup>49</sup> and spontaneous thought<sup>50</sup> from the imagination/default network<sup>51</sup> for whatever task is being performed. Now, we've got the whole brain involved, and it seems that convergent and divergent thoughts happen simultaneously,<sup>52</sup> here, the executive control and default networks are cooperating instead of competing.<sup>53</sup> We are in the "in-between" space between intense focus and rest. Researchers are starting to pull apart the conditions for this kind of creative performance.<sup>54</sup> But for now, there's some evidence that just the right amount of "buzz" or activity<sup>55</sup> combined with the intention to do some mind wandering<sup>56</sup> can help facilitate the ability to maintain enough focus and actively enlist the imagination.<sup>57</sup> Welcome to peak performance, a.k.a. "flow." In this state, we also lose a sense of time; hours pass like they are minutes. However, if efforts to focus are sabotaged up front (or you are exhausted or the challenge is either too much or too little), you can forget about reaching peak performance.

## Smart Design for Workplace Creativity

Considering what science says about ways to support convergent and divergent thinking, and pooling our workplace design and strategy expertise at Haworth, we've developed the following model for better understanding workplace creativity and innovation. In this model, we see, on one side, the need to protect focus work; on the other side, the need to encourage down-time, and the in-between for the creative rhythm.

For creativity and innovation to flourish, employers should protect employees' ability to focus and encourage restorative behaviors in the workplace. Design considerations should address privacy, structure of activity, and user control, with a variety of spaces and the freedom to choose appropriate spaces.

### Designing Workplaces for Creativity: Focus, Creation, and Rest



45. Ellenbogen et al., 2007; Vartanian et al., 2014; Tompary and Davachi, 2017.  
46. Gifford, 2014.  
47. Beaty et al., 2020.

48. Beilock et al., 2002.  
49. Fukuda and Vogel, 2011; Kiyonaga, Egner, and Soto, 2012.  
50. Sawyer, 2012; Oosterwijk, Touroutoglou, and Lindquist, 2015.

51. Menon, 2015; Beaty et al., 2016.  
52. Jung et al., 2013; Beaty et al., 2017.  
53. Smallwood et al., 2012; Hughes et al., 2013; Beaty et al., 2017.  
54. Beaty et al., 2016.

55. Mehta, Zhu, and Cheema, 2012.  
56. Golchert et al., 2016.  
57. Vannucci, Pelagatti, and Marchetti, 2017.

## The Accumulation of Creative Ideas

So far, we’ve only been discussing how individuals come up with new ideas. If we only work alone and all we ever do is for ourselves, we miss out on the rest of the creative and innovative process that happens during and with knowledge sharing. We need others to build on our creative ideas and verify that they are useful for innovation to happen. So, the creative process applies to more than just individual cognition and behaviors; it also applies to group efforts to create and innovate. What fosters creativity alone fosters creativity done together. It’s clear that we need to focus and we need to rest. At times, we need to do these alone and, at other times, we need to do them together. Doing things well together relies on social capital.

Social capital is a resource that exists in the relationships among members of a social network. It is aided through the obligations, expectations, and trust in the network structure, the information shared, and the norms that manage the network.<sup>58</sup> With workplace social capital, the pay-off for organizations is that the same social capital employees use also provides the organization with what it seeks, outcomes from their knowledge sharing such as intellectual capital and innovation.<sup>59</sup>

Social capital is more easily maintained with in-person interactions because people have access to a rich amount of interaction cues – more easily understanding each other.<sup>60</sup>

What are some of the key features of an organization’s social capital that better facilitate creativity? Knowledge sharing, constructive conflict, collisions of ideas, and group flow.

### Knowledge Sharing: Creating and Innovating Together

When people in groups need to be creative, individual cognitive processes of creativity become externalized (this is called distributed cognition).<sup>61</sup> Periods of preparation or group learning require the whole group to focus; periods of incubation that lead to moments of insight can happen when we socialize; periods of vetting those insights for verification require the whole group to focus once again.

Time and space for collaborative efforts with others

Recharging spaces for groups and individuals



Intense group focus work—what most think of as “brainstorming”—and what may look like seemingly “inefficient” processes are quite helpful to creative work habits: Socializing (dining together) or engaging in off-task activities (taking an architectural tour of a city or attending a performance) oftentimes yields unexpected questions, where meaning then develops afterwards while the group makes sense of those new questions in the verification stage.<sup>62</sup> Groups are less successful with innovation if their emphasis on engagement with one another is solely on one creative activity, e.g., brainstorming. Groups need time and space to learn, collectively, to identify the common knowledge across members, and to allow for connections between different pieces of knowledge among its members. Three well-known group processes mirror these needs: organizational learning (preparation),<sup>63</sup> brain writing (individualized incubation and insight),<sup>64</sup> and, of course, brainstorming (group insight and verification).<sup>65</sup> Much more is needed than just brainstorming. Protecting focus, encouraging restorative activities, and having the right tools for knowledge sharing become very important for group designated spaces.

### Benefits of Constructive Conflict

In addition, these kinds of group activities happen best under specific conditions in an organization—conditions related to social capital. 1) when failure is valued; and 2) when diverse perspectives are sought. When people trust that group members and their organization value failure and diverse perspectives,<sup>66</sup> they have the psychological safety<sup>67</sup> to share what they know. One way that a group workspace can facilitate this is to encourage physical movement during group focus activities. Moving within a protected focus space and among each other leads to less territorial behaviors. This can foster trust and more knowledge sharing while in that space, which in turn improves creativity.<sup>68</sup>

### Welcoming the Outside In

Lastly, movement should be encouraged outside the group in two ways: across other internal groups and with people external to the organization. This is when “collisions” or serendipitous interactions are more likely to occur. These spontaneous interactions generate knowledge sharing and learning with colleagues. Fruitful grounds for additional insights, these interactions allow for novel connections by affording more access to a variety of perspectives, knowledge, and expertise, both within and outside an organization.<sup>69</sup>

58. Coleman, 1988.

59. Dalkir, 2005.

60. Rothwell, 2018; Burgoon and Bacue, 2003.

61. Sawyer, 2007.

62. Sawyer, 2007.

63. Sailer, 2014.

64. Heslin, 2009.

65. wiruchnipawan, 2015.

66. Carmeli, Dutton, and Hardin, 2015.

67. Edmondson, 1999; Edmondson, 2004; Edmondson, 2016.

68. Knight and Baer, 2014.

69. Sailer, 2014.

### Group Flow? Yes, It's Possible

Yes, it is possible, but it can be difficult to achieve regularly. Group flow requires several conditions. Members should all:

1. have similar skill levels
2. be able to obtain intense concentration simultaneously
3. perform close or deep listening
4. manage the paradox of individual autonomy/control with flexibility to yield to the group needs
5. possess enough tacit knowledge of how the group best functions<sup>70</sup>

And, interestingly, there is this advice from Keith Sawyer: “Group flow is more likely when a group can draw a boundary, however temporary or virtual, between the group’s activity and everything else. Companies should identify a special location for group flow.”<sup>71</sup>

Innovation is more difficult to achieve without designated spaces for group focus and intense collaborative work like teaming and rest where people can build social capital.

## Designing for the Whole Brain

Understanding the focus, rest, and transition needs of individuals and groups leads to the following design implications for fostering creativity and innovation in the workplace.

### Workspace Focus Needs

Protecting focus work is necessary for preparation and verification. The workspace needs to have full or partial privacy to block external stimuli. Focus activities tend to be highly structured for efficiency, so we also want to make efficient use of the necessary cognitive resources for high-focus activities while in a workspace. Having user control over a workspace also allows for fine-tuning that is specific to the current focus activity. Pictured right, addressing four specific issues can ensure ones’ cognitive needs are being met.

### What Can a Space Do to Help Us Focus?

#### ① Insulate

Protect from distractions, allowing for focusing ease including structural barriers (walls) and virtual barriers (“do not disturb” cues, headphones, distance to minimize disruptions).

#### ② Embed

Provide tools (analog and digital) to support memory recall, meaning, reminding, and a legible workplace that is easy to navigate.

#### ③ Externalize

Provide ways for knowledge sharing to help sense-making, organization, and communicating to others.

#### ④ Access

Connect to information through tools or in person interactions in a context for knowledge sharing that doesn't interrupt focus.

### Workspace Restorative Needs

Fostering restoration for incubation and insight encourages our imagination network’s “scouting” activities. Time and spaces that promote relaxation and desired distractions from focus work are necessary with biophilic elements as key features.<sup>72</sup> These can range from “micro-breaks”—the short pauses in focus when we gaze off into the distance and daydream—to “macro-breaks”—when we move to new spaces seeking individual or group respite and restoration. Depending on the way we prefer to recharge and how much time is needed, these spaces can range in the amount of exposure to external stimuli. The longer we have, the less efficient we need to be, the more spontaneous activities may be. User control over the space is also less critical than during focus work, but people still will need some minimal access to tools for embedding and externalizing (e.g., Wi-Fi) because, when an insight occurs, opportunity to embed is helpful before the insight is lost.

### The Importance of Legibility

If the goal is to protect, preserve, and optimize cognitive resources for creative work, navigating the workplace and workspaces within it should be intuitive and easy—in other words, legible. When space isn’t legible, for example, a floorplan’s simplicity (or complexity) can account for up to half of the difficulty people face navigating the space.<sup>73</sup> How so?

70. Sawyer, 2007.

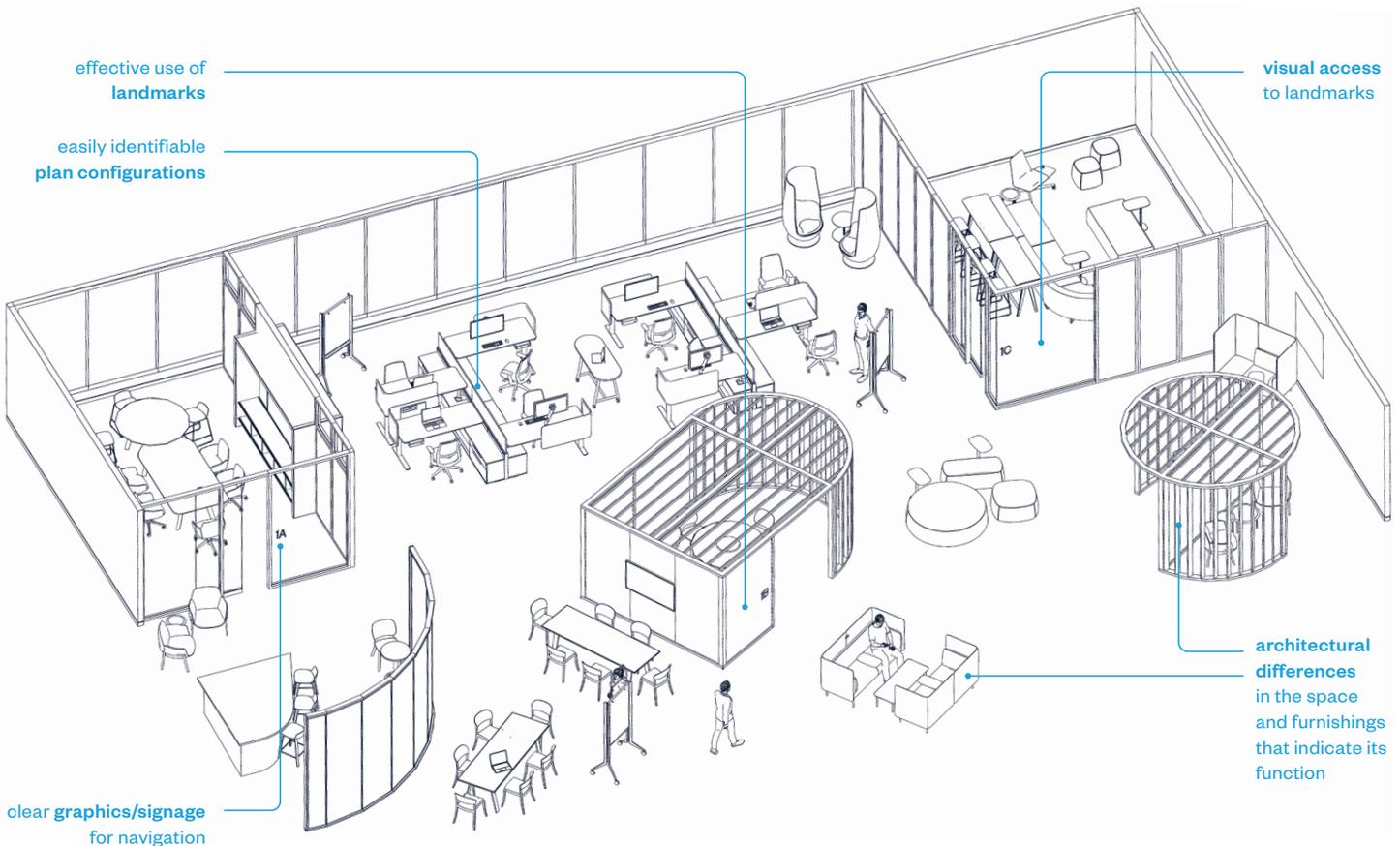
71. Sawyer, 2007.

72. Benfield et al., 2014.

73. Weisman, 1981.

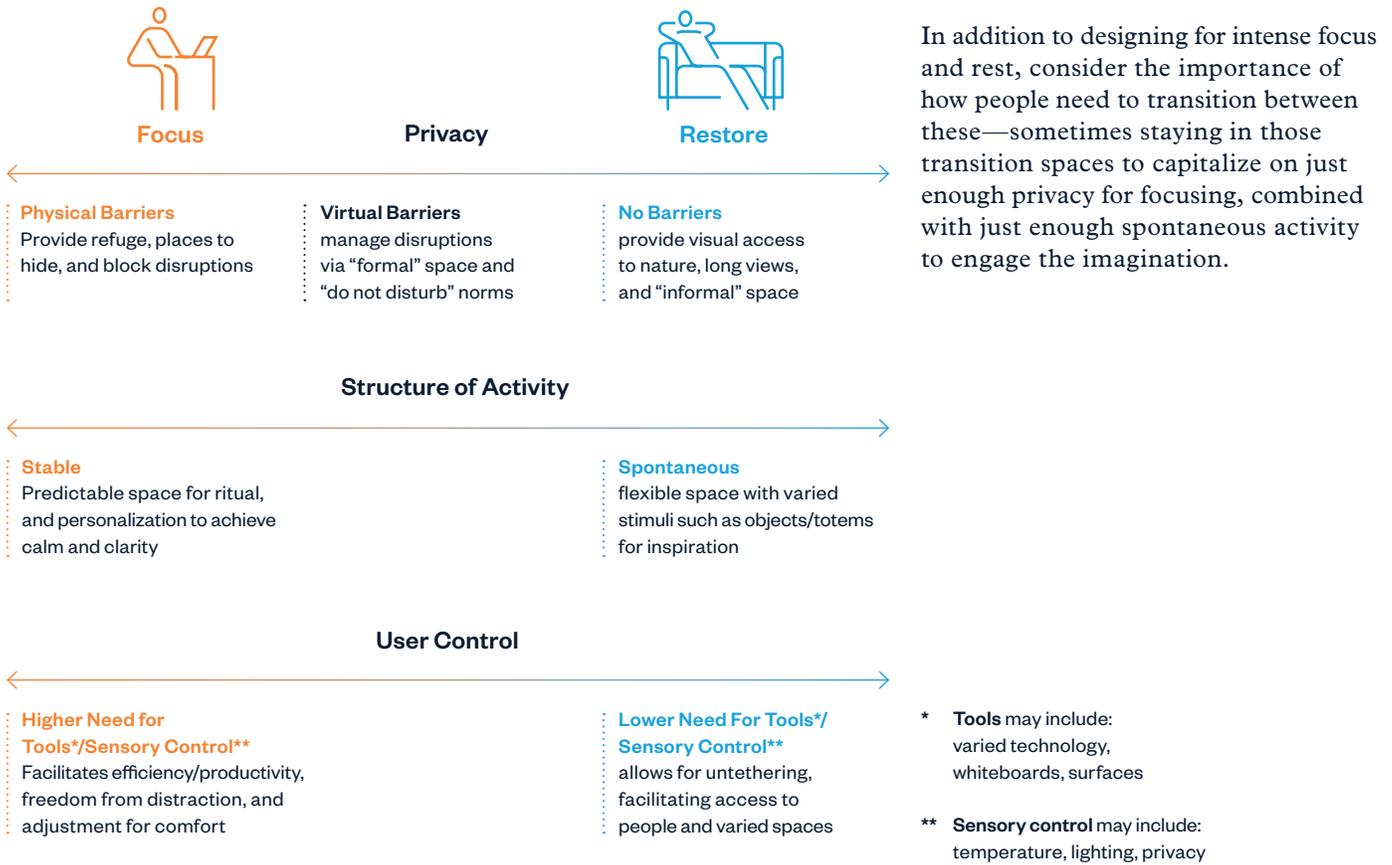
Familiar patterns for plan configurations are more readily detectable, but without specific markers to differentiate location in that plan configuration, difficulty increases for us to know where we are within the patterned space as cognitive resources are expended to orient ourselves. Once oriented and arrived at a desired location, is the intended use of that space obvious? If not, additional cognitive resources are expended to identify the activities that are best suited for that specific space, or the space goes unused. Not only do you have a space utilization problem, but employees have also expended valuable resources better used in the creative process. Thus, the argument for legibility in design.

Legible Workplace Design<sup>74</sup>



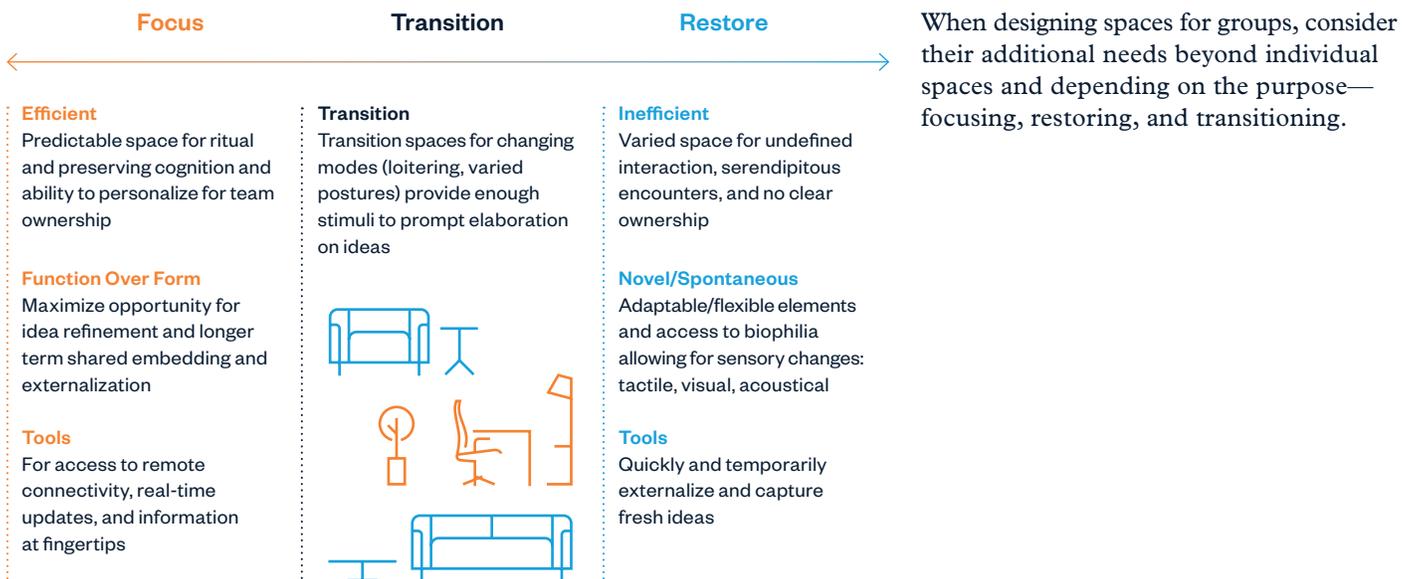
74. O'Neill, 2016.

Designing for Individual Creativity



In addition to designing for intense focus and rest, consider the importance of how people need to transition between these—sometimes staying in those transition spaces to capitalize on just enough privacy for focusing, combined with just enough spontaneous activity to engage the imagination.

Designing for Group Creativity



When designing spaces for groups, consider their additional needs beyond individual spaces and depending on the purpose—focusing, restoring, and transitioning.

## Putting It All Together: Organizational Implications

While the degree of innovation needs may vary across different organizations, all organizations need to innovate. In addition to addressing employees’ needs through smart workplace design for optimal creative performance, organizational culture is equally important. The structural and social norms of organizational culture<sup>75</sup> set the stage for innovation by coordinating creative efforts among its members. Group creativity norms include respectful engagement,<sup>76</sup> diversity in knowledge and perspectives, expecting frequent failures, and skillful management of deadlines understanding that high-pressure timelines can block creativity.<sup>77</sup>

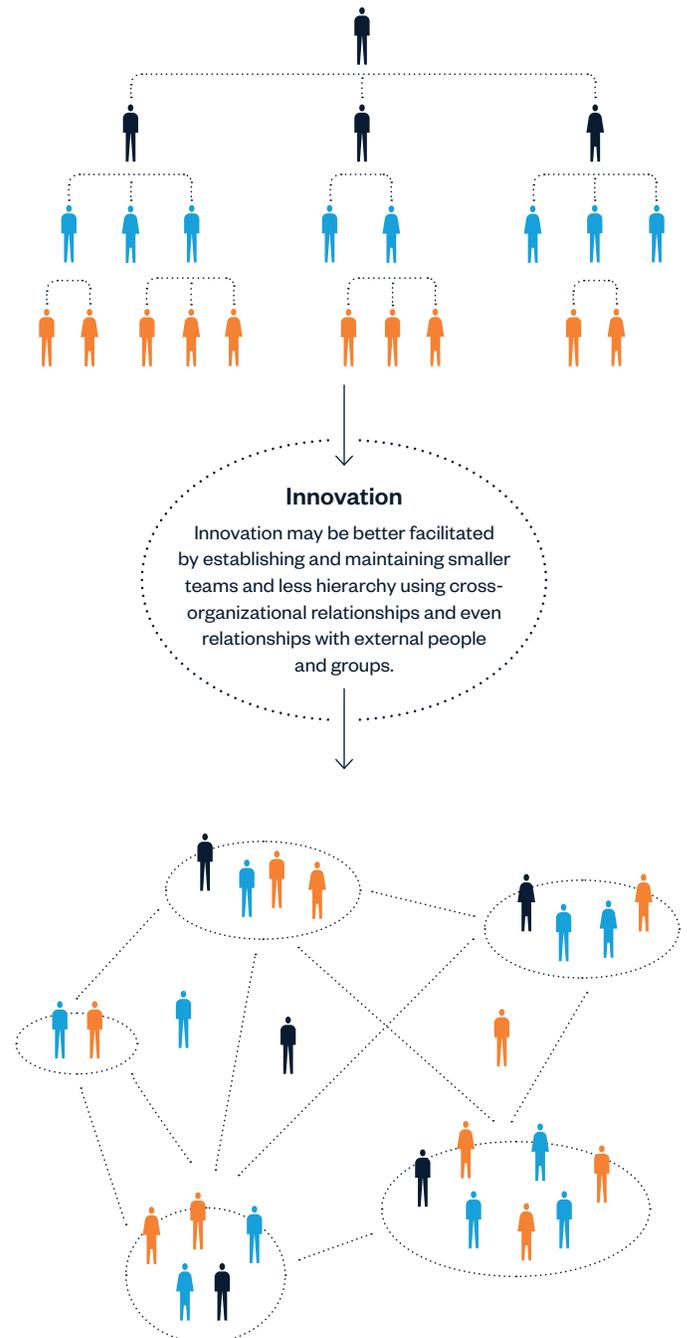
These may be better facilitated in organizations (or parts of an organization) that have less hierarchy. We see some of these qualities arise within incubator, accelerator, and coworking environments<sup>78</sup>—environments that seem to be innovation factories. Based on what we know about individual creativity, group creativity, and innovation, this means establishing and maintaining smaller teams and less hierarchy using cross-organizational relationships and even relationships with external people and groups.

Creating a network structure for people that emphasizes both strong and weak ties allows for the kind of activities and relationships that are hallmarks of creativity: access to diverse knowledge for idea generation (weak ties) and the resources to move those ideas to fruition (strong ties).<sup>79</sup> Team members should be encouraged to span boundaries across an organization to other internal members of other groups as well as with external members<sup>80</sup> at different times of the creative cycle.

An important factor in an organization’s culture is how it is embodied in the built environment.<sup>81</sup> Why? Because an organization’s workplace communicates an organization’s values.<sup>82</sup> Thus, design solutions for a more innovative culture must take into account individual and group creative rhythm needs for the culture type. Even with the ability to work from anywhere, the workplace will remain the place where ideas finally come together and get developed for market.

Furthermore, employees experience happiness when their workplace and workspaces convey that they are valued by their organization and when they can focus on their work.<sup>83</sup> Given the right places, spaces, and tools for the creative rhythm of innovation, people can be free to do what they need to do to best create and innovate. When we are free to create and innovate, good things happen—for all of us.

Within the Competing Value™ framework, creativity and innovation may look different. Collaborate cultures approach innovation through human relationships. Compete cultures focus on rational pursuits of success often at the expense of weaker competition. Control cultures approach innovation in an incremental fashion to improve on existing ideas. Create cultures pursue breakthrough innovations through open systems and experimentation.



75. Hartnell, Ou, and Kinicki, 2011.  
76. Carmeli, Dutton, and Hardin, 2015.  
77. Amabile, Hadley, and Kramer, 2002.

78. Rief et al., 2016.  
79. Perry-Smith and Shalley, 2003; Baer, 2010.

80. Harvey, Peterson, and Anand, 2014.  
81. Miller, Casey, and Konchar, 2014.  
82. Kupritz, 2017.

83. O’Neill, 2017.

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