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The dynamic componential model of creativity and innovation in organizations: Making progress, making meaning☆

Teresa M. Amabile[a,*], Michael G. Pratt[b]

[a] Harvard Business School, United States
[b] Boston College, United States

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ABSTRACT

Leveraging insights gained through a burgeoning research literature over the past 28 years, this paper presents a significant revision of the model of creativity and innovation in organizations published in *Research in Organizational Behavior* in 1988. This update focuses primarily on the individual-level psychological processes implicated in creativity that have been illuminated by recent research, and highlights organizational work environment influences on those processes. We revisit basic assumptions underlying the 1988 model, modify certain components and causal connections, and introduce four new constructs into the model: (1) a sense of progress in creative idea development; (2) the meaningfulness of the work to those carrying it out; (3) affect; and (4) synergistic extrinsic motivation. Throughout, we propose ways in which the components underlying individual and team creativity can both influence and be influenced by organizational factors crucial to innovation.

Contents

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* Corresponding author.
E-mail addresses: tamabile@hbs.edu (T.M. Amabile), prattmg@bc.edu (M.G. Pratt).

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1. Introduction

One of the most difficult things for organizations to do is to critically reexamine something that they have painstakingly built and that has served them well over time—a best-selling product, for example, or a cash-cow service (Christensen, 1997). The same is true for individuals, and scholars are no exception. In 1988, the first author proposed a componential model of creativity and innovation in organizations (Amabile, 1988) that has now been cited nearly 4000 times. Given that measure of the theory's utility, it is tempting to leave well enough alone. Yet, in conversations about developments in the field with the second author and many other colleagues, it became clear that the theory required reexamination and, most likely, revision even in some of its core constructs.

Scholarly attention to creativity and innovation has increased dramatically over the past 28 years; these closely related phenomena have emerged from the shadows of organizational behavior scholarship into the mainstream. Moreover, the field of organizational behavior itself has evolved considerably in this time. Most notably for our purposes, the field has discovered how the meaningfulness of work can influence a wide range of attitudes and behaviors in organizations, and it has experienced something of an affective revolution, with affect appearing as a key construct in many studies and theories. As we will detail, these particular developments have direct implications for any theory of organizational creativity and innovation that aims to be both comprehensive and relevant.

To our knowledge, the 1988 model (hereafter referred to as "the componential model") is the oldest theory of creativity and innovation in organizations, and still the only widely-cited theory to attempt a comprehensive description of both the process of individual creativity and the process of organizational innovation, as well as the ways in which the two are linked through mutual influence. As noted by others, theoretical advances in this realm have been sparse in recent years (Anderson, Nik, & Zhou, 2014). For these reasons, and in a spirit of creative inquiry, we present in this chapter a revision of the theory, including four new or radically modified constructs.

We view creativity and innovation as different parts of essentially the same process, when innovation is understood as organic (arising from activities within the organization) and not as externally-acquired innovative products or services (arising from mergers and acquisitions). Creativity, which we define as *the production of novel and useful ideas by an individual or small group of individuals working together*, is often conceived of as the "fuzzy front end" (Koen et al., 2002) of innovation, which we define as *the successful implementation of creative ideas within an organization*. These definitions, and this view of the relationship between creativity and innovation, are the same as those in the original componential model (p. 126), and they are shared by most scholars of organizational creativity and innovation (e.g., Drazin, Glynn, & Kazajian, 1999; Van de Ven, 1986).

It is important to note two features of these definitions. First, both are grounded in the assumption that creativity and innovation are subjective constructs, socially bound by historical time and place (Amabile, 1982, 1983). What is perceived as novel within a domain surely varies as a function of what already exists in that domain.[1] And perceptions of usefulness likely vary even within a given domain at a given time; indeed, as George (2007) has argued, "What is useful and creates value for one stakeholder group might harm one or more other stakeholder groups (p. 443)." Second, as implied by George's observation, and in contrast to many popular conceptions, these definitions are value-free. A creative idea may be useful for attaining either an evil aim or a morally good aim, and a fully implemented innovation could do harm or good or both. Thus, in order for creative ideas within organizations to promise constructive outcomes (deemed as such by social consensus) once they are successfully implemented, they must be linked to a socially positive system of values, morals, and ethics.

Given that we are micro-OB scholars, grounded in the discipline of organizational psychology, we will focus primarily on the aspects of our model that address individual creativity within organizations. However, our contribution will be a relatively comprehensive – and, we hope, provocative – portrayal of the interlocking systems of individual creativity and organizational innovation. In light of research done in the 28 years since the componential model was introduced, four discoveries in creativity research and beyond have influenced our revision. First, and perhaps most importantly, we view creativity more dynamically: as comprising cycles of creativity (and innovation). As we discuss below, these insights became clear in the first author's work on the progress principle—the discovery that work progress is a major determinant of psychological states that facilitate creative behavior. Second, the progress principle, as well as research by others, has suggested a critical role for meaningful work in the creative process. Third, research by both authors – and by many others – has highlighted the importance of emotions in creativity. Consequently, we add an affective element to the existing attitudinal, cognitive, and behavioral elements of the model. Finally, our understanding of motivation and creativity has changed significantly, calling into question the near-exclusive focus on intrinsic motivation as facilitating the creative process. As a result, we integrate insights into the potential role of extrinsic motivation in our model. Thus, the first three substantive revisions are additions to the model, and the fourth revisits a basic premise.

2. Integrating insights from subsequent theories

The 1988 chapter compared the componential model to theories of organizational creativity and theories of organizational innovation that had come before. To that point, no widely-cited theory had attempted to incorporate individual creativity into a model of organizational innovation. Here, we will present a brief overview of some of the major theoretical statements that followed the 1988 publication, some of which did address both creativity and innovation. In particular, although we believe these subsequent theories are largely compatible with the componential model, each does highlight some important element that we believe should be incorporated into our new dynamic componential model of creativity. Table 1 summarizes these concepts and highlights the important new insights they advance for our thinking on creativity.

In 1990, Staw presented a fresh perspective on the individual creativity portion of the componential model. Drawing on Campbell's (1960) evolutionary model of creativity, Staw (1990) recasts the componential model into a variation-selection framework, whereby idea alternatives are created and solutions chosen. This evolutionary approach to creativity was further developed in great detail by Simonton (1999). Together, at a general level,

[1] Because organizational innovation is generally oriented toward external stakeholders, such as customers, we propose that novelty within a domain is the criterion for organizational creativity, rather than novelty solely within the organization.

Table 1
Key concepts of post-1988 creativity and innovation theories and their relevance to the dynamic componential model.

Author(s)	Key concepts	Insights relevant for revised model
Staw (1990) [see also Simonton (1999)]	Creativity can be viewed as an evolutionary theory including semi-blind variation and selective retention of ideas; the importance of the work, to the individual, is a key element of creating variation	Insight into the dynamism of the process of creativity; insight into the role of work meaningfulness
Woodman et al. (1993)	Multi-level interactionist model of creativity, where creativity results from the complex interaction of person and situation, influenced by events of the past and by the current situation	Importance of external influences (e.g., society) on creativity; insight that team creativity may not simply be the aggregation of individual members' creativity
Hargadon & Bechky (2006)	Model of collective creativity	Insight that team creativity may not simply be the aggregation of individual members' creativity
Drazin et al. (1999)	Sociological model of intra-individual and intra-organizational sensemaking in the creative process over time	Dynamism of creative process

these scholars infuse additional dynamism into the creative process by proposing that multiple iterations through the process are almost inevitable. We introduce additional, similar dynamism into our model by positing that progress, and the presence of a "progress loop," can facilitate repeated iterations through the creative process even in the face of failure. Hence, in evolutionary terms, we show how selection and retention can be ongoing in the creative process.

Beyond variation, selection, and retention, Staw (1990) introduces some additional new concepts in his theorizing that we find particularly useful. For example, he proposes that the novelty of a final solution can be increased by a broader formulation of the initial problem, and he asserts that creative problem solving may involve multiple skill domains, rather than a single domain. Most notably, although not using the specific term, he suggests that the *meaningfulness* of the work to the individual will matter: "Whether one perceives the problem to be important or trivial will, no doubt, affect how the problem is stated and how many alternatives will be generated" (Staw, 1990, p. 293). Work meaningfulness is one of the four major new constructs that we introduce in our revision of the model.

Woodman, Sawyer, and Griffin's (1993) model of organizational creativity highlights the complex interactions between person and situation in producing a creative outcome within an organization, and it incorporates interactions among three levels—the individual, the group, and the organization. This model bears a number of similarities to the 1988 model of organizational creativity and innovation: both are multi-level theories, including individual and organizational characteristics and their interactions; both present input–process–output models, with individual and organizational components influencing the creative process; and, in both, there is an important role for the organizational environment (or contextual influences). However, there are two key differences that we find useful for our theory revision. First, the model of Woodman and colleagues incorporates influences external to the organization – essentially, the economic and social environment in which the organization operates. Other scholars have more recently highlighted the potential importance of multi-level theorizing and, in particular, a consideration of broader contextual influences outside the organization (Zhou & Hoever, 2014). Although we do not name these specific influences in our model, we reconfigure the organizational components of the 1988 model into a broader conceptualization of the "work environment" and note that this work environment is an open system, susceptible to broader socio-cultural forces.

Second, and most importantly, Woodman and colleagues cite research evidence that group creativity depends on, but is not a simple aggregation of, the creativity of the individuals in the group. Similarly, Hargadon and Bechky (2006) present a conceptualization of "collective creativity," arguing that, although some new insights that arise in organizations are truly the products of a single individual's mind, others arise from a momentary collaborative process among multiple individuals that is qualitatively different. The original 1988 componential model made the simplifying assumption that small-group creativity operates essentially like the creativity of a single individual. In the dynamic componential model, we no longer make that assumption. However, although there has been some promising research distinguishing the two, which we highlight toward the end of our paper, we do not feel that research in this area is sufficiently developed to make differential predictions in our revised model. Nonetheless, we acknowledge the potential differences between individual and group creativity and argue that a truly comprehensive model must include a more robust treatment of group creativity.

Finally, Drazin and colleagues took a sociological perspective on creativity in organizations that is quite different from the psychology-based 1988 componential model. Most notably, Drazin and colleagues do not describe components necessary for creativity or present an input-process-output model of creativity. Rather, their conceptualization focuses on intra-individual and intra-organizational sensemaking processes that influence a creative project over a long period of time. It stresses intra-organizational dynamics, by presenting a punctuated process whereby three types of crises (technological—related to functionality of an innovative product; financial—related to cost of an innovation project; and temporal—related to schedule for the project) lead to shifts in shared cognitive frames about a project over time. Although this theory sheds new light on highly complex, large-scale, long-

duration projects in organizations, its aims differ from those of the theory we focus on, which is designed to account for organizational creativity and innovation projects at all degrees of complexity and scope. However, as noted, we do acknowledge that the work environment that influences creative work is an open system, subject to a variety of forces beyond the organization. More generally, we believe that this theory highlights a more dynamic nature of the creative process, and thus we introduce a greater degree of dynamism in our revised model.

In sum, our revised model – the dynamic componential model of creativity and innovation – builds on insights from these post-1988 creativity and innovation theories (see Table 1). However, it is important to note that we do not (and, due to space limitations, cannot) integrate all of the insights from these theories and other research on the topic. Given the sheer volume of research on creativity and innovation that has occurred since 1988, we had to make some difficult choices about what to include and what not to include. In the end, we decided to focus primarily on revising certain aspects of the creativity portion of the componential model, although our revised model will also propose some updating to the innovation portion.

3. Creativity and innovation in organizations

Before discussing the major updates to the model in detail, we first describe its basic components and processes at a high level, mentioning recent work relevant to the core constructs of the model. We briefly point out elements that have stayed the same as the original (1988) model, as well as those that differ in our revised model. We elaborate upon the differences in the main body of our paper.

A simple schematic of the componential model appears in Fig. 1, depicting only the components and the general way in which the individual and the organizational components interact. The original theory rested on two key, closely related assumptions, which also apply to the revised theory we will present. First, the model assumes a high-level isomorphism between what's needed for individual creativity and what's needed for organizational innovation, because both produce something new. For both processes, three components are needed: basic resources or raw materials, a set of processes or skills for combining them in new ways, and a driver. Second, as noted, the model assumes that individual creativity and organizational innovation are inextricably linked. Specifically, the creativity of individuals and teams feeds organic innovation within organizations. Without creative ideas, there is nothing to implement. Indeed, recent empirical evidence shows that employee creativity relates to overall job performance (Gong, Huang, & Farh, 2009), with obvious implications for the innovative performance of the organization. At the same time, features of the organization, including managerial practices, feed (or starve) individual and team creativity. The two systems are highly interdependent. A number of other scholars (e.g., Baer, 2012) have made this assumption since the original theory was published.

Two closely related central constructs undergird the model, each of which had considerable empirical support at the time the original theory was published, and for which more recent empirical evidence will be reviewed later in this chapter. First is the *intrinsic motivation principle of creativity*. People can be intrinsically motivated toward a task, by the interest, enjoyment, satisfaction, and challenge of the work itself, or extrinsically motivated, by pressures such as deadlines or positive motivators such as incentives and recognition, or motivated by both intrinsic and extrinsic factors. The original intrinsic motivation principle stated that people are most creative when they are primarily intrinsically, not extrinsically, motivated. The principle was based on the notion that extrinsic motivation works in opposition to intrinsic motivation, and is never conducive to creativity if it is stronger than intrinsic motivation. We will radically modify this construct in the revised theory.

The second central construct, which survives intact and is elaborated in our revised theory, is that the social environment – the work environment – influences creativity in a number of ways. Within organizations, creativity is affected by the highest levels of leadership, through the strategies they set, the structures and policies they establish, and the values they communicate. Creativity is affected by all levels of management, through managers' everyday practices in dealing with individuals, teams, and their projects. And individual creativity is affected by coworkers' everyday attitudes and behaviors, through dyadic interactions and team dynamics.

3.1. Individual and organizational components

As noted earlier, the model specifies that creativity and innovation each require basic resources or raw materials, a set of processes or skills for combining them in new ways, and a driver (see Fig. 1). Each of the individual components includes both relatively stable elements and elements that are amenable to development and social influences. At the individual level, the driver is *intrinsic motivation to do the task*. The basic raw materials, the basis for any creative performance, are *skills in the task domain*: one's expertise or factual knowledge about the domain, technical skills for doing work and advancing one's knowledge in the domain, and special domain-relevant talents. A recent paper affirmed the importance of domain knowledge and skill to creativity in organizations, with the authors explicitly stating that their results support the original (1988) componential model of creativity (Hirst, Van Knippenberg, & Zhou, 2009). Given the complexity of most problems and opportunities facing contemporary organizations, skills in *multiple* domains may be necessary for the most novel and useful ideas.

At the individual level, the processes or skills for combining these raw materials in new ways are *creativity-relevant processes* (called "skills in creative thinking" in the 1988 chapter, with the term being later modified (Amabile, 1996)). These include cognitive styles, perceptual styles, and thinking skills that are conducive to taking new perspectives on problems, pivoting among different ideas, thinking broadly, and making unusual associations; personality processes, traits, and characteristics that lead the individual to take risks and eschew conformity; and persistent, energetic work styles. Recent research has

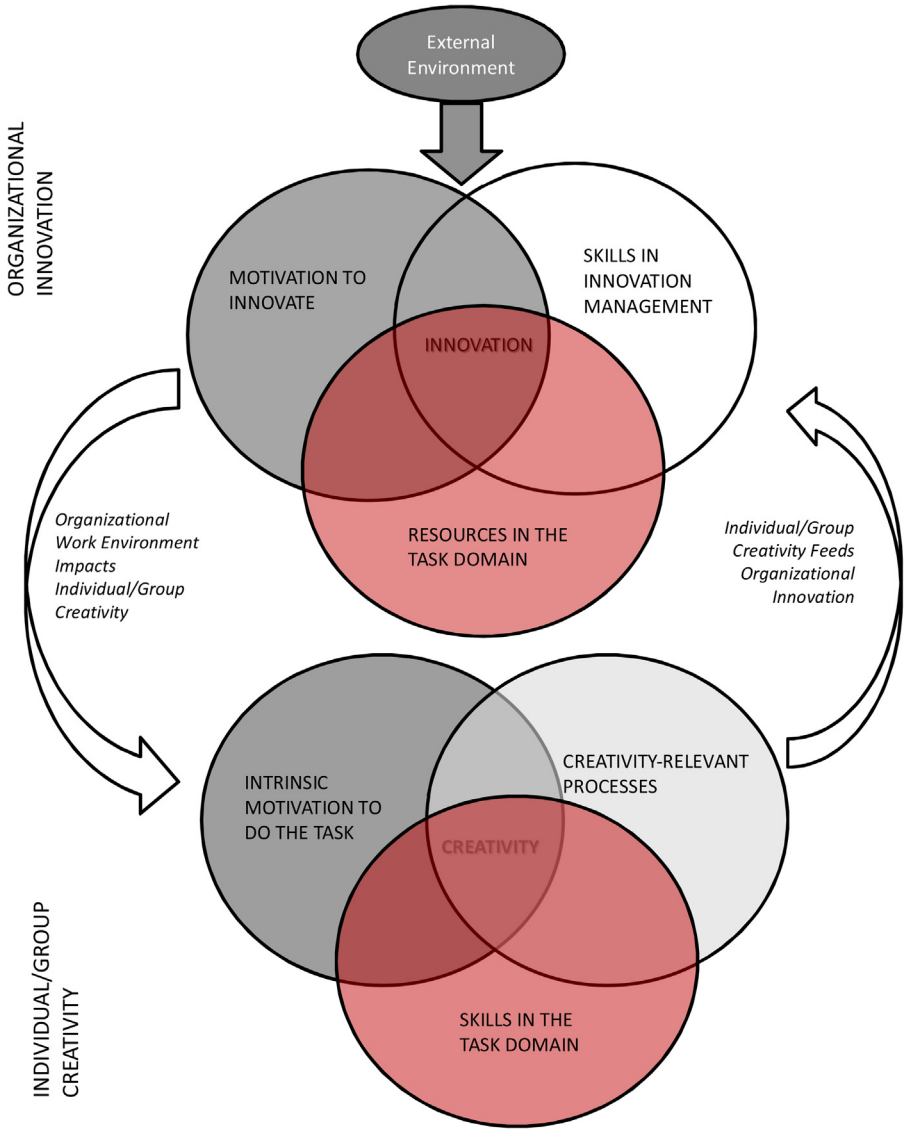

Fig. 1. An abstraction of the components influencing innovation and creativity and how they interact.

revealed additional creativity-relevant processes, each of which has been supported by multiple studies, for example: creative self-efficacy (Gong et al., 2009; Richter, Hirst, van Knippenberg, & Baer, 2012; Tierney & Farmer, 2011) and trust in leaders (Carmeli & Spreitzer, 2009; Harris, Li, Boswell, Zhang, & Xie, 2014).

The three components at the organizational level are analogous to those at the individual level. The driver at the organizational level is the *motivation to innovate*,[2] the basic orientation of the organization toward innovation. Note that, even though this is an organizational-level factor, motivation is manifest primarily in the statements and actions of founders and high-level leaders; it is they, and other organizational members, who display more or less motivation to innovate. The original model posited that the organizational motivation toward innovation was often embedded in an organization's mission statement. Although innovation is nearly ubiquitous in mission statements now (and, for that reason, not indicative of the organization's actual orientation toward innovation), it is important to remember that a true organizational motivation to innovate is marked by a bias toward clear-eyed risk-taking (versus clinging to the status quo), a genuine openness to new ideas, a system for developing creative ideas, and an offensive strategy of leading the organization's industry into the future.

[2] At a very general level, motivation to innovate may be viewed as a manifestation of James March's broader conceptualization of "exploration" which, according to O'Reilly and Tushman (2013) is about an organization's ongoing ability to survive by adapting to competitive environmental pressures via the development of new capabilities (rather than always taking advantage of existing ones—i.e., "exploitation"). Such new capabilities may both stem from, and lead to, innovation.

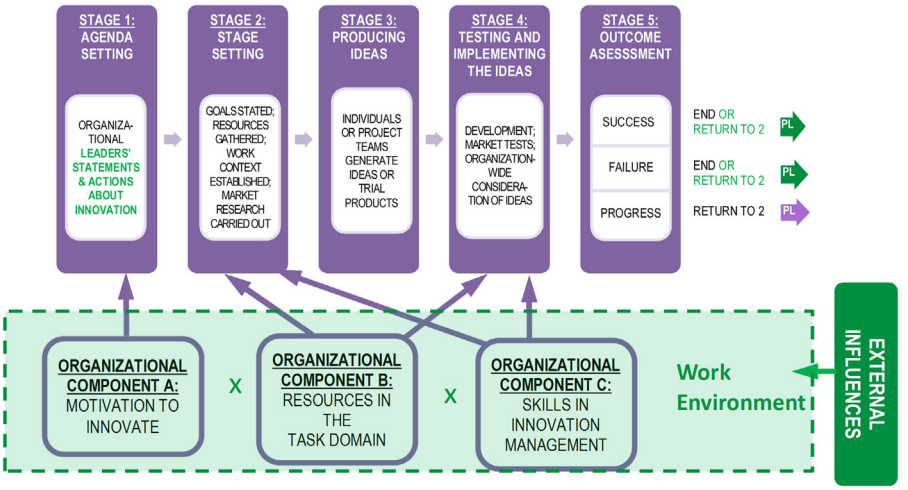

Fig. 2. The dynamic componential model of innovation. (Only primary influences are depicted. Note that purple items represent the original 1988 componential model. Green items represent additions or modifications.) (For interpretation of the references to color in the text, the reader is referred to the web version of this article.)

The basic resources or raw materials at the organizational level are *resources in the task domain*, which include everything the organization has available to aid creative work in a targeted area: people with sufficient expertise, skill, and interest to do the work creatively; financing for projects in the targeted domain, with which necessary tangible materials and services can be obtained; sufficient infrastructure within and external to the organization to support the creative work; and access to necessary information. Importantly, sufficient time to explore creative solutions and implement those solutions effectively is an often-neglected organizational resource (Lawson, 2001; Wang, Choi, Wan, & Dong, 2013).

At the organizational level, the processes or skills for combining these raw materials in new ways are *skills in innovation management*, which include management at the level of the organization as a whole and management at the levels of units, departments, and projects. A great deal of research, extending back many decades, has investigated management practices that influence creativity and innovation. Described in detail in the 1988 chapter, these include: goal-setting that is sufficiently clear to direct work toward the ultimate strategic aims of the organization, but sufficiently loose to allow individuals and teams the autonomy to explore for truly new ideas; work assignments that are matched well to individuals' interests and that provide positive challenge; open communication systems within the organization, to facilitate idea exchange, coordination, and collaboration; frequent, constructive, and supportive feedback on creative efforts; equitable and generous rewards and recognition for good creative efforts (regardless of outcome), as well as for creative successes; an absence of unnecessary layers of hierarchy, complexity, and bureaucracy in the organization; and supportive collaboration across teams, departments, and units.

3.2. The organizational innovation process

The original componential model of creativity and innovation proposed five-stage processes for both individual creativity and organizational innovation, along with influences of the creativity or innovation components at each stage of the relevant process. (Only primary influences were depicted in the original chapter's figures; the same is true here.) We first discuss the innovation process, which is depicted in Fig. 2. In this and all subsequent figures, the items in purple represent parts of the original componential model that are unchanged. Items in green depict either an updating (a relatively minor change) or a revision (a more substantive change) of the original model. There are also some small changes (e.g., making labels more concise or using more updated terminology) that are not highlighted in the figures.

In terms of the organizational components, two changes from the original componential model involve relatively minor updating. First, the three organizational components constitute the "Work Environment" that influences the individual components of the model; although this concept was highlighted prominently in the 1988 chapter, the figure in that chapter did not label it as such. In our updating, the work environment is depicted by a shaded rectangle that includes all three components, and is surrounded by a dashed outline to show that it is an open system—subject to social, economic, cultural and other influences outside of the organization (as suggested by Drazin et al. (1999) and Woodman et al. (1993)). Second, we have also added a box, "External Influences," with an arrow to the work environment to emphasize their relationship.

A third change is more substantive: the addition of "X's" between the organizational components in the work environment. These make visually explicit theorizing from

the componential model that did not appear in the original figure; they show that, in a general sense, the model is a multiplicative one. It is multiplicative in the sense that all organizational components are necessary for innovation (that is, none can be zero) and, generally, the higher the level of each of the components, the greater the likely success of the ultimate innovation. In other words, in the absence of the motivation to innovate, or resources in the task domain, or skills in innovation management, innovation cannot happen. We revisit this assumption of multiplicative components in our discussion of future directions.

Stage 1 of the innovation process involves identifying the goal to be attained or the problem to be solved. For organizational innovation, this *agenda setting* stage of the process can be initiated by a strategic imperative of the organization—a top-level decision to pursue a particular opportunity. It can also be started by something outside the usual strategic planning process—a crisis that arises, for example, or a serendipitous discovery by customers or an individual or group within the organization. What happens at this stage depends primarily on the first organizational component, the motivation to innovate; that motivation is manifest, at this stage, in organizational leaders' behaviors concerning innovation. In the original componential model, this stage was labeled "'mission' statement for the organization." However, for reasons described earlier, we consider contemporary mission statements as weak indicators, at best, of an organization's true values. Thus, we have changed the label to "organizational leaders' statements and actions about innovation."

Stage 2 involves preparing for a successful process. This *stage setting* for organizational innovation involves stating broad goals for the project, gathering resources (including people and market information) deemed necessary to carrying out the project, and establishing the work context for the project—a leadership structure, deadlines, budgets, evaluation metrics, and so on. The effectiveness of this stage of innovation depends on two of the organizational components, resources in the task domain and skills in innovation management.

Stage 3 involves generating possibilities. In the organizational innovation process, this *producing ideas* stage consists solely of the results of the completed creative processes of individuals or small groups working on the project. Consider again our definition of innovation as the successful implementation of creative ideas within an organization. Note that success in the innovation process depends not only on the foundation laid (in Stages 1 and 2) before individuals and teams generate ideas or product prototypes (in Stage 3). It also depends on what is done with those ideas afterwards (Stage 4).

Stage 4 consists of evaluating possibilities. For organizational innovation, this *testing and implementing the ideas* stage involves all relevant areas of the organization in evaluating the ideas presented by individuals or groups, and fully developing one of those ideas. This stage depends on the organizational components of resources in the task domain and skills in innovation management; the latter are required to ensure that good ideas get implemented and poor ideas get killed or sent back for further work. In this update of the model, we have added a direct influence of the motivation to innovate on Stage 4. Research over the past three decades has produced considerable evidence that the progression of novel ideas to full implementation depends, in part, on high-level leaders' orientation toward taking reasonable risks and supporting mechanisms for developing new ideas (see Amabile, 1996).

Stage 5 involves, and is called, *outcome assessment*; it is here that the organization makes decisions based on the results of Stage 4. A key element of the outcome assessment stage is a feedback loop, whereby the assessment could lead back to an earlier stage of the process. In the original model, there were three possible outcomes of the fifth stage of both the creativity and innovation processes: success, failure, or progress (partial success). The original model proposed that, under either success or failure, the process would end. Only when there was progress toward problem solution or goal attainment would the process restart, at any of the earlier stages. Given new research findings, however, the model now includes feedback loops following both success and failure, as well. As we will see, these loops, depicted as green arrows marked "PL" (for "progress loop") in Fig. 2, become one of the most important, dynamic elements in our revised model.

3.3. The individual creative process

Although the 1988 chapter failed to note the obvious conceptual similarities between the processes of individual creativity and organizational innovation, we do so here. Indeed, the two processes are quite analogous, at the highest level of abstraction. This similarity becomes obvious when Fig. 2, which depicts the organizational innovation process, is compared to Fig. 3, which depicts the individual (or small group) creative process.[3] Just as the "X" symbols between the innovation components in Fig. 2 denoted that the innovation components are multiplicative in their influence, the "X" symbols in Fig. 3 denote that the creativity components are multiplicative. Just as the innovation components influence the various stages of innovation, the creativity components influence the stages of creativity. And the stages of the creative process can be described in the same terms as those used for the innovation process.

Stage 1 involves identifying the goal or problem. For individual creativity, this stage is called *task presentation*. An individual's strong intrinsic motivation to solve a particular problem or tackle an intriguing opportunity can kick off the process, or it can be started by an external source, like an assignment from the individual's group or manager. Stage 2 involves preparing for a successful process. In individual creativity, this *preparation* stage is a time for building the knowledge, skills, and specific information necessary to tackle the problem. If the individual's stock of domain-relevant skills is high, this

[3] It is important to note that, although we continue to combine individual and small-group creativity, the latter is not always simply the sum of the former. See the second footnote in Fig. 3.

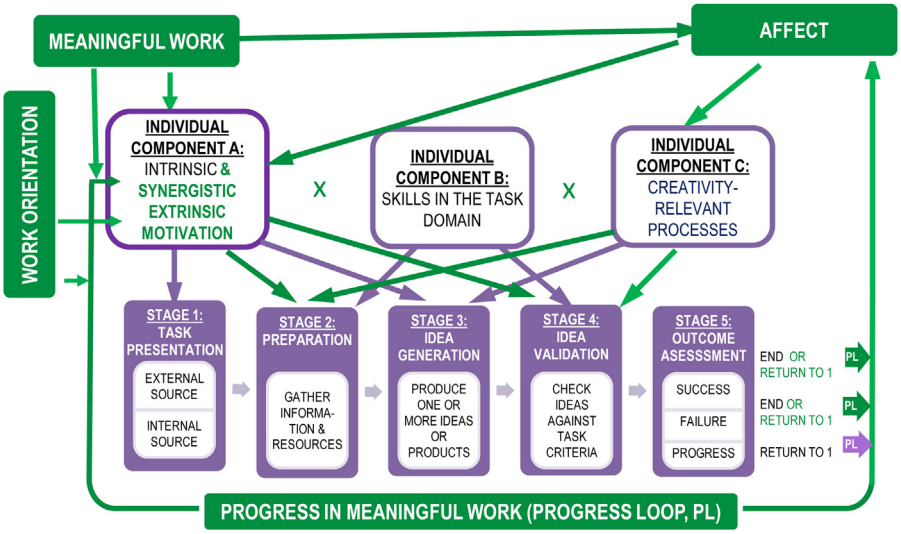

Fig. 3. The dynamic componential model of creativity. (Only primary influences are depicted. Although we list them together, we understand that group creativity may not simply be the aggregation of individual creative efforts. Note that purple items represent the original 1988 componential model. Green items represent additions or modifications.) (For interpretation of the references to color in the text, the reader is referred to the web version of this article.)

stage can be quite brief; if not, it can take a long time. Stage 3 involves generating possibilities. In the individual creative process, this *idea generation* stage involves coming up with one or more possibilities for solving the problem or meeting the goal. Idea generation depends primarily on two individual creativity components, creativity-relevant processes and task motivation. To the extent that the individual has well-developed creativity-relevant processes (skills in creative thinking) and strong intrinsic motivation for the task, the number and novelty of ideas generated should be greater. Stage 4 is where possibilities are evaluated. This *idea validation* stage of individual creativity involves checking ideas against criteria for the task and criteria in the domain more generally, to ensure the usefulness or appropriateness of the novel ideas emerging from the third stage. As such, this stage depends most heavily on the individual's skills in the task domain. Stage 5, as in the innovation process, involves, and is called, *outcome assessment*; at this stage, decisions are made based on the results of the fourth stage. Here, too, as in the organizational innovation process, there is a feedback loop that, as we will describe, is often activated at the end of the fifth stage.

There are three points to highlight about the processes of both creativity and innovation. First, as noted in the original chapter, the processes apply to all degrees of creativity and innovation, from very low to very high. The ultimate degree of creativity or innovation depends on the strength of the components that feed into the relevant process – the three components of individual creativity and the three components of organizational innovation – and the extent to which each stage of the relevant process is fully realized. Second, also as noted in the original chapter, the sequences described in these processes are stylized, idealized. They may be typical, but they are not fixed. Indeed, *many variations of these sequences are possible*, because creativity is often an improvisational process requiring frequent shifts in response to new information and changing conditions (Fisher & Amabile, 2009). The same is true of innovation. Third, as we have proposed, it is not only possible but likely that multiple iterations – or loops – through the entire process will be involved, for both creativity and innovation.[4]

In Fig. 3, the four boxes in green and the green lettering in Component A represent new or radically modified parts of the revised theory, the dynamic componential model of creativity and innovation in organizations. Before elaborating on each of these changes, we present the full revised model, which closely links the processes of organizational innovation and individual creativity just described.

4. The dynamic componential model: an introduction

Building on insights from the other theories of creativity and innovation that we have reviewed, as well as empirical findings in recent creativity research, we offer a new model of creativity and innovation in organizations in Fig. 4. Although this model retains the componential structure of the original model, it adds a number of more dynamic elements, in the form of feedback loops. These loops propose not only how future iterations through the creative process could be initiated, but also mechanisms by which those future iterations could be different from previous ones. The addition of these loops grew out of our major changes to the original componential model, and was the main reason for changing the name of the model. The major changes that we made fall into two high-level categories: new linkages between innovation and creativity, and new critical psychological factors. As noted earlier,

[4] In his 2015 book, Kevin Ashton shows that several canonical stories about a creative idea or invention emerging whole, in a single flash, are pure myths.

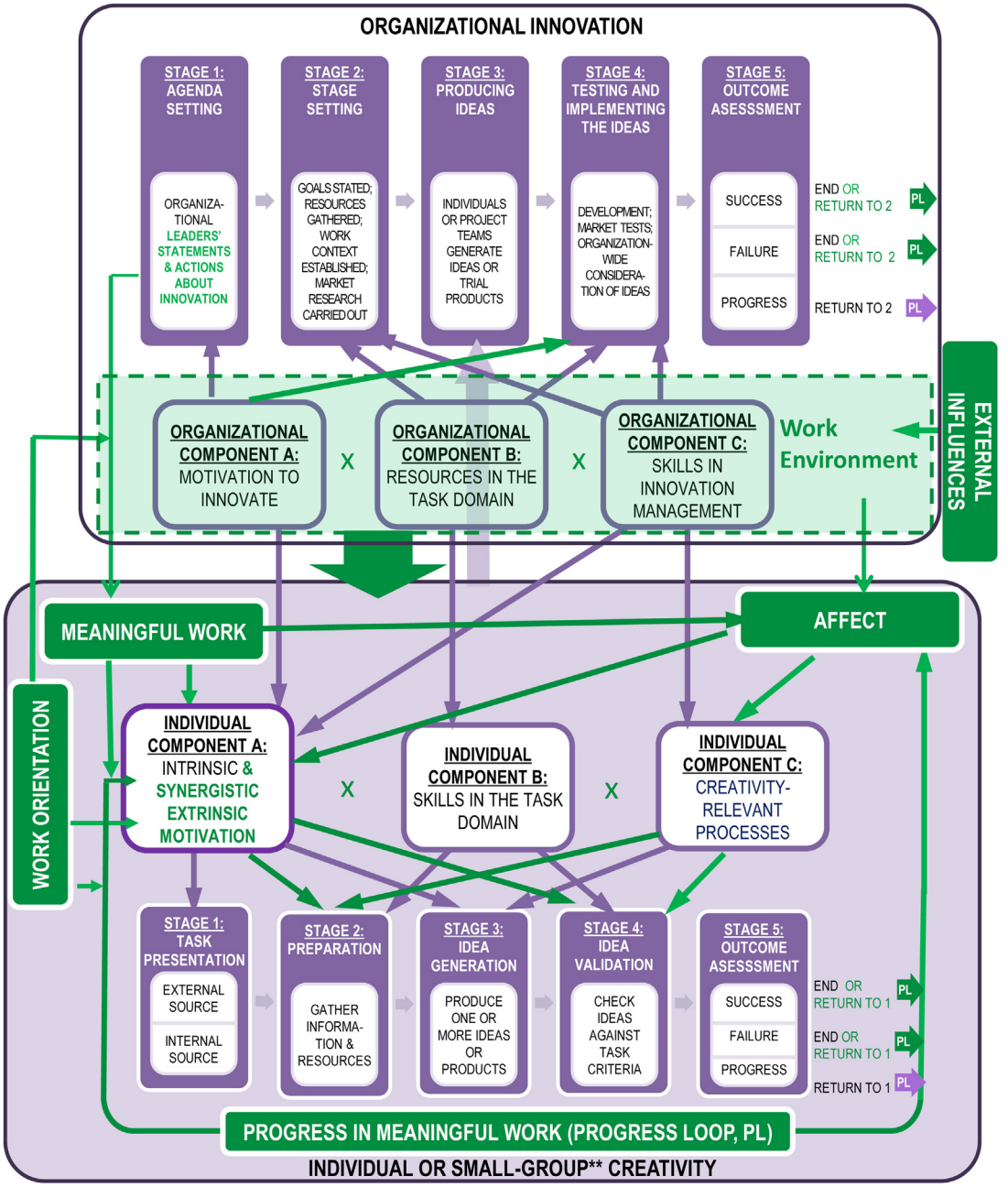

Fig. 4. The dynamic componential model of creativity and innovation. (Only primary influences are depicted. Although we list them together, we understand that group creativity may not simply be the aggregation of individual creative efforts. Note that purple items represent the original 1988 componential model. Green items represent additions or modifications.) (For interpretation of the references to color in the text, the reader is referred to the web version of this article.)

changes are depicted by green boxes, green lettering, and green arrows (including loops) leading to and from elements of the model.

4.1. New linkages

The model depicted in Fig. 4 is a concatenation of the organizational innovation process (Fig. 2) and the individual creative process (Fig. 3) (as was the original componential model), with the addition of a number of key linkages between the two processes. Most of these linkages will be highlighted in subsequent sections, but we note two here. First, as in the original componential model, it is at Stage 3 of the organizational innovation process that the two processes intersect most clearly. (This is depicted by the upward purple arrow in the center of the figure.) Here, the fruits of the entire process of individual (or small group) creativity enter into the innovation process. The

linkage at this point means that, in the idealized sequence depicted in this model, individual creativity does not enter into the organizational innovation process until the third stage. In other words, creativity is not really the "fuzzy front end" of innovation; rather, it is more like the "fuzzy middle part." To be sure, the innovation process does sometimes start with an unexpected discovery by an individual or group within or even outside of the organization. In those cases, the "front end" label does apply.

The second linkage to highlight, though implicit, was not explicitly noted in the original chapter: the components of individual creativity influence the individual creative process, but the organizational components have a dual influence. Not only do they influence the organizational innovation process but, because they constitute the work environment, they also influence the individual creativity components, thus indirectly influencing the entire individual creative process. In Fig. 4, this linkage is depicted, at the highest level, by the new, thick green arrow from the work environment to the entire individual (or small group) creative process (see also Fig. 1).

At a more fine-grained level, the original componential model specified that an individual's motivation to do creative work (Individual Component A) can vary by day or even by hour, depending on new information about the organization's orientation toward innovation (Organizational Component A) and on immediate managerial behavior (Organizational Component C). In the revised model, the individual motivation component is subject to even more influences, rendering that component, in itself, considerably more dynamic. We revisit this idea later in the chapter.

In the original model, the impact of each organizational component was limited to only one or two of the individual components. The thick green arrow in the new model indicates that any of the organizational components can influence any of the individual components. For example, if appropriate training is available (Organizational Component B) and if work is structured appropriately in the organization (Organizational Component C), individuals should be able to increase their skills in the task domain (Individual Component B). As another example, if managers are sufficiently creative themselves and use creativity-enhancing managerial practices (Organizational Component C), individuals will be likely to develop their own creativity-relevant processes (Individual Component C). More importantly, beyond the impact of specific organizational components on specific individual components, the work environment could influence the success of the individual (or group) creative process by, for example, truncating a project before the individual (or group) has had the chance to move from idea generation to idea validation.

4.2. New critical psychological factors

The new or revised boxes and arrows in green in Fig. 4 stem from four critical psychological factors identified in research subsequent to the publication of the original componential model (Amabile, 1988): a progress loop; meaningful work (and a related construct, work orientations); affect; and new insights into motivation. Although the fourth of these, motivation, is one of the essential components of creativity, the others are not. Akin to moderators, they can facilitate or undermine the creative process in important ways. We explain each of the four major additions to the model in the following sections.

5. The progress principle: progress in meaningful work

Just as the original 1988 theory was grounded, in large part, in a multi-study field research program on creativity in organizations, this revised theory is grounded, in large part, on a (very different) multi-study field research program. The first three of the four major modifications we will make to the theory were suggested by the results of this study, and the fourth modification is supported by it. The study, described in detail elsewhere (Amabile, Barsade, Mueller, & Staw, 2005; Amabile & Kramer, 2011; Amabile, Schatzel, Moneta, & Kramer, 2004), followed 238 professionals on 26 teams working on projects requiring creativity in seven different organizations, during the entire course of the project or a specific project phase. The study included data of various types, but the primary data came from daily electronic diaries that participants submitted toward the end of their work day.

The aim of the study was to gain deep insight into the day-by-day experiences of people working on important innovation projects in their companies,[5] by sampling those experiences in close to real time. The diary form, which was completed independently by each participant each day during the project (with a 75% response rate), contained scale-rated items on the individual's subjective experience at work that day (motivation, perceptions of the work environment, and emotions), as well as an open-ended question asking participants to write about one event from the work day that stood out in their mind. We conducted both qualitative and quantitative analyses on the nearly 12,000 diary entries we received.

The most important discovery of this diary study is *the progress principle*: of all the work events that appear repeatedly on days of people's most positive subjective experiences, the single most prominent is making progress in meaningful work. The progress can be individual, team, or organizational, as long as the individual is aware of it. Setbacks and failures, by contrast, are the most prominent work events on days of people's most negative subjective experiences. For the purposes of revising the componential model of creativity and innovation, we will first consider one key aspect of subjective experience that, as

[5] The projects had been nominated by high-level managers as among the most important in the organization, for the purposes of this study.

discussed earlier in this chapter, much previous research has revealed as crucial for creativity: intrinsic motivation.

Three different quantitative treatments of the diary data revealed the progress principle as applied to intrinsic motivation.[6] Given the non-experimental nature of the data, these quantitative analyses alone do not allow causal conclusions. However, when coupled with the qualitative analyses, they do suggest a causal directionality from progress to increased intrinsic motivation (and from setbacks to decreased intrinsic motivation). Theoretical and empirical work by Bandura (1997) supports this conclusion about the impact of progress on motivation, revealing the mechanism by which progress should increase intrinsic motivation: *self-efficacy*, the basic human drive toward seeing oneself as capable of carrying out activities required to achieve desired goals.[7] This suggests that progress does, indeed, have a positive effect on intrinsic motivation. Additional support comes from more recent experimental research (Koo & Fishbach, 2012) showing that motivation increases when individuals have a sense of making faster progress. It is important to note, however, that bidirectional causality is likely operating. As we have already discussed, there is considerable evidence that intrinsic motivation has positive effects on creativity. When the task being performed calls for creativity (as in our model), achieving a creative outcome *is* progress. Thus, intrinsic motivation has positive effects on progress.

This bidirectional causality is termed *the progress loop* (Amabile & Kramer, 2011) and can, theoretically, be responsible for virtuous cycles whereby intrinsic motivation and progress in creative work fuel each other unless and until one is interrupted by an external shock. This insight prompted another important addition to our model. This progress loop, the key new dynamic element in our model, is the central mechanism by which individuals and teams can maintain high levels of creative productivity over long periods of time, even in the face of extremely difficult innovation problems—and, as we will explain below, even in the face of initial failures.

The original componential model anticipated the progress loop. In that model's individual creative process, Stage 5, the outcome of the process, dictated whether the individual stopped or tried again. Specifically, the model proposed a feedback loop from the outcome to intrinsic task motivation: if the individual had made progress (a sense of "getting warmer," (Simon, 1978)), intrinsic motivation would increase, and the individual would return to Stage 1 (task presentation or problem formulation) for another iteration through the process. The discovery of the progress principle provides evidence supporting that proposed mechanism. Other recent research provides additional support. One study (Baer, 2012) suggests that even the expectation that one's creative ideas will lead to positive outcomes, through actual implementation by the organization, leads to increased motivation for creative work. This finding extends the progress principle phenomenon beyond actual progress to expected progress, and beyond individual creativity to organizational innovation.

Indeed, we believe that an analogous mechanism can operate at the organizational level. It is likely that innovation progress at the organizational level can stimulate a progress effect, which can lead to further innovation. At present, extant research says little about the possibility of an organizational innovation progress loop. However, we believe that such a loop is not only possible but may be probable; visible progress in successfully implementing a new product, service, or process is likely to stimulate the organization's motivation to innovate, its provision of resources for further implementing the innovation, and perhaps even its skills in innovation management. (The green "PL" arrows in Figs. 2 and 4 show this organizational progress loop).

Moreover, progress at the organizational level could even stimulate creativity at the level of individuals. However, for this to occur, two conditions are likely required. First, as we will discuss more fully in the following section, meaningful work is centrally important at the individual level. Given this, it is likely that the organization would have to provide some compelling rationale – for example, a compelling strategic imperative in Stage 1 – for conducting innovative work. Second, in order for this imperative or purpose to be motivating for the individual, it would likely have to be internalized in some fashion by the individual; that is, the individual would have to identify with these specific values of the

[6] (1) Extensive qualitative analyses of the open-ended responses in the 12,000 diaries, including chronological responses of each individual across the days, weeks, and months that they were submitting diaries, revealed a clear pattern of enhanced intrinsic motivation toward the work following progress. For these analyses, we considered a reported event to be an instance of progress if the person, team, or organization finished a task, made progress, moved forward, was productive, or achieved an accomplishment in the work; this could include a creative accomplishment. (2) A statistical comparison carried out on all 12,000 diary entries, contrasting subjective experience on days when the diary reported a progress event, days when it reported a setback event, and days when it reported neither, revealed that on days when they made progress, people were more intrinsically motivated. Interestingly, on days with setbacks, not only were people (on average) less intrinsically motivated by interest in the work itself, they were also less extrinsically motivated by recognition. It seems that work setbacks can lead to a general apathy toward doing the work at all. (3) We conducted a simple numerical comparison of the events (all types of events) mentioned on participants' most highly intrinsically motivated days with their least intrinsically motivated days (relative to their own baseline levels of intrinsic motivation). Not surprisingly, a few types of events appeared repeatedly on the best days, and others appeared repeatedly on the worst days. However, of all the events that were mentioned on the most highly intrinsically motivated days, the single most frequently-reported event, by far, was progress in the work; it was mentioned on 64% of these "best days." And of all the events that were mentioned on the days of lowest intrinsic motivation, the single most prominent, by far, was setbacks in the work; setbacks were mentioned on 45% of these "worst days." Moreover, of all opposite pairs of events (for example, receiving and not receiving instrumental support), progress and setbacks showed the greatest contrast between the most and the least intrinsically motivated days.

[7] Although Bandura's major claim is that increases in self-efficacy lead to higher-level performance, he posits that the causality may go in the other direction, as well. It is that more minor point of Bandura's that we believe may explain the mechanism by which progress in the work affects intrinsic motivation. As reported by Vancouver and Kendall (2006), research evidence suggests that—at least in the domain of training – higher-level performance (i.e., progress in task mastery) leads to increased self-efficacy more reliably than the opposite. This supports our view of the progress mechanism in the diary study.

organization—either because he or she personally placed a strong value on the type of innovation targeted by the organization, prior to joining it, or was socialized to do so by the organization (Pratt, 1998).

Recall that, of the three components of individual creativity, intrinsic motivation is most likely to play a prominent role in Stage 1. Thus, we posit that progress (partial success) in the creative process increases intrinsic motivation, which increases the probability that the individual will re-engage with the problem and continue the search for a creative solution. Complete success in Stage 5 should have similar effects, for related problems. Moreover, the probability of a novel solution should be increased in the next iteration, because intrinsic motivation also has a prominent role in Stage 3, idea generation. In addition, as proposed in other statements of the componential theory of creativity (Amabile, 1983, 1996), the increased intrinsic motivation could also lead to increases in the other two creativity components: further learning of skills in the task domain (increasing the probability of a useful solution, by influencing Stages 2 and 4) and stimulation of creativity-relevant processes such as breaking mental set (increasing the probability of a novel solution, by influencing Stage 3).[8] In other words, enhanced intrinsic motivation should directly or indirectly enhance every stage of the creative process, leading to solutions that are both more novel and more useful. The newly-added influences of intrinsic motivation on Stages 2 and 4 are depicted by the green arrows from Individual Component A in Figs. 3 and 4.

Qualitative analyses of the diary data revealed one particular circumstance under which the progress principle can extend even to failure, whereby failure on a creative project can lead to increased intrinsic motivation and re-engagement in the creative process. That circumstance is a high degree of psychological safety (Edmondson, 1999) in the work environment. Psychological safety is a shared sense in the group that it is acceptable to fail and to make mistakes, because those failures and mistakes are treated as opportunities to learn and improve, without derision of the individuals involved. A high degree of psychological safety was rare among the 26 teams followed in the diary study, but it did appear in all four teams followed in one particular company (a chemicals firm). For example, this diary report came from a chemical engineer on one of those teams: "I showed the project manager the results I got and told him that there was a mistake in one of the trials. [. . .] He said that's all right, as long as we know what we did." The team proceeded to have a quick debrief of that trial and discuss the implications for improvements in the next one.

Although such instances were rare in the diary data, we believe they warrant a second modification of the componential theory: at the individual and small group level, complete failure often leads to an end of the creative process, but it can, under high levels of psychological safety, lead to increased intrinsic motivation and learning of domain-relevant skills and, thus, re-engagement in the creative process. This is especially likely when honest, constructive feedback on the failure is readily available. We speculate that this effect of psychological safety could operate at even the level of organizational innovation. Moreover, as we discuss in the next section, we believe that, under certain conditions, work that is perceived as meaningful may also foster progress in the face of failure. For these reasons, Figs. 2 and 4 include green "PL" arrows following failure.

A third way in which the progress principle led to modification of the componential model resulted from further qualitative analyses of the recent field study. The diary data revealed a set of events in the work environment that appeared to directly facilitate or impede progress. Given that progress is essential to maintaining the intrinsic motivation that fuels repeated iterations through the creative process, influences on such progress become important new additions to the model. These "catalysts" (and their opposites, "inhibitors") of progress were discovered through qualitative analyses that sought to identify events that repeatedly preceded or co-occurred with progress (or setbacks) as reported in the diaries. Several of these catalysts and inhibitors had been discovered in the earlier field research program and, thus, appeared in the 1988 chapter that first presented the componential theory. However, others were new discoveries of the diary study. The existing and new elements of the work environment, as revealed by the diary study, appear in Table 2, along with citations to some other recent research that supports the inclusion of these elements in our model.

Each of the work environment elements listed in Table 2, positive and negative, can be moderated by managerial behavior, particularly the behavior of immediate supervisors. The 1988 chapter included a speculation that "managers can establish a creativity oasis for potentially creative individuals within the desert of an organization that is usually hostile to creative enterprises" (p. 161). There was a clear instance of such an oasis in one of the seven companies followed in the diary study. In that high-tech company, high-level managers alternately ignored or harshly critiqued the team in question, stayed vague about ultimate goals, and starved the team of both resources and time. However, the two co-leaders of that team – the local leaders – devoted great effort to getting goals clarified, securing necessary resources, welcoming new ideas, and helping team members while granting them considerable autonomy. As a result, team members' intrinsic motivation stayed high most of the time, with the result that they consistently turned out creative solutions, with high quality, and on time.

In a more general form of the "oasis effect," the diary study also discovered that, on average, local leaders have a stronger impact on the perceived work environment than high-level leaders or the organizational

[8] An idea's novelty is most strongly determined at Stage 3 (and, to some extent, Stage 1—by the way the problem is formulated). The idea's usefulness is most strongly determined at Stage 2 (by the depth and breadth of information drawn upon) and Stage 4 (by the careful checking of generated ideas against criteria for the task).

Table 2
Elements of the work environment for creativity.

Organizational innovation component	Creativity stimulant ("Catalyst")	Creativity obstacle ("Inhibitor")	Other recent supporting research
Motivation to innovate	- Clear organizational goals* - Value placed on innovation - Support for reasoned risk-taking & exploration	- Unclear/shifting organizational goals* - Disinterest in new undertakings - Overemphasis on the status quo	
Resources in the task domain	- Sufficient resources - Sufficient time, but not too much*	- Insufficient resources - Insufficient or over-abundant time*	Binnewies and Wornlein (2011)
Skills in innovation management	- Clear project goals - Autonomy in how to meet project goals - Mechanisms for developing new ideas - Participative decision-making - Frequent, constructive feedback on new ideas - Work assignments matched to skills & interests - Equitable, generous reward & recognition for creative efforts - Collaboration & coordination between groups - Help with the work* - Learning from problems* - Open idea flow*	- Unclear/shifting project goals - Constraint in how to meet project goals - Harsh evaluation of new ideas - Hindrance of the work* - Ignoring or overreacting to problems* - Restricted idea flow*	Binnewies and Wornlein (2011) and Zhang and Bartol (2010)

*Asterisks mark the new elements of the work environment for creativity, which did not appear explicitly in the 1988 chapter presenting the componential model, or have been modified. These elements were identified as progress "catalysts" (creativity stimulants) or progress "inhibitors" (creativity obstacles) in the diary research that led to discovery of the progress principle.

environment overall.[9] Of course, this power of local leaders applies not only to creating a creativity oasis, but also to doing the opposite—creating a negative work environment for creative progress. An intriguing recent paper, using multiphase, multisource, and multilevel data, reported that team leader abusive supervision (at the most local level of leadership) mediates a negative relationship between department leader abusive supervision and team member creativity (Liu, Liao, & Loi, 2012).

In summary, the discovery of the progress principle and phenomena associated with it lead us to three related modifications of the componential theory of organizational creativity and innovation, now present in our dynamic model: first, the inclusion of a feedback loop – the progress loop – from success and from progress (partial success) in Stage 5 of the individual creative process to increased intrinsic motivation and, thus, enhanced engagement in Stages 1 through 4 of the creative process; second, the inclusion of a similar feedback loop originating with failure, under conditions of high psychological safety; and third, the addition of analogous progress loops to the organizational innovation process. Thus, in our view, the progress principle discovery led to the most extensive modification of the model, with ramifications not only for creativity theory, research, and practice, but also for management theory and practice more broadly.

We have focused, in this section, on the power of progress in creative work to affect the process of individual creativity and, thus, organizational innovation. We have described three closely related modifications of the componential model prompted by the discovery of the progress principle. However, there is one crucial element of the progress principle that we have so far only hinted at: in order for the progress principle to operate, the work must be meaningful to the individual; the individual must believe that the work matters, that it contributes to something of value. Although, in the diary study, most participants did feel that their work was meaningful most of the time, because it was among the most important innovation projects being done in the company, there were occasional days on which individual participants felt they were doing meaningless "gopher work," where they saw no point to what they were doing. Under those circumstances, even getting a lot done did not lead to the intrinsic motivation boost that we saw on most days of work progress. In the next section, we explore work meaningfulness in greater depth, discussing not only its role in the progress principle, but also its broader role in organizational creativity and innovation.

6. The broader role of meaningful work in creativity

Although the importance of meaningful work in creativity was largely absent from the original componential model, it has not been completely absent from the

[9] Note that the oasis effect, as we define it, is a local-level phenomenon, protective against a hostile organizational environment (an environment often caused by top management). Thus, the oasis effect differs in important respects from a specific top-management strategy to intentionally isolate experimentation within an organization (e.g., Fang, Lee, & Schilling, 2010).

subsequent literature. As noted in Table 1, Staw (1990) hints that creativity is enhanced when the problem-solver perceives that the problem is important. More recently, research on the progress principle, described in the preceding section, suggests that progress influences people most strongly when the work itself is meaningful. Although direct research on this topic is scant, clues from research on creativity (and innovation) and meaningful work do suggest at least four main linkages: (1) the role of meaningful work in sustaining the creative process via its effect on intrinsic motivation; (2) the role of meaningful work in contributing to and sustaining the progress loop; (3) the mediating role of meaningful work in the relationship between organizational leaders' statements and actions about innovation and the creative process; and (4) the critical role of work orientations in explaining the effects of leaders' innovation-related statements and actions and progress loops. We highlight these linkages in Figs. 3 and 4. (As seen in the figures, we also posit a link between meaningful work and affect. We further explore that link in the next section). Taken together, these various linkages suggest that the main influence of meaningful work on creativity is exerted via motivation. We will unpack these motivational linkages below. Before doing so, it is important to delineate what we mean by "meaningful" work.

Although definitions vary, meaningful work is often viewed as work that is perceived as "positive" and "significant" in some way. (See Pratt and Ashforth (2003) and Rosso, Dekas, and Wrzesniewski (2010) for reviews).[10] Referring to meaningful work as positive, however, does not mean that people always find it pleasurable (Lepisto & Pratt, in press). Indeed, work that involves obligation and sacrifice may be viewed as meaningful (and positive), but not necessarily always "fun" or "enjoyable" (see Bunderson & Thompson, 2009). That said, research suggests that individuals who experience meaningfulness in doing an activity are also likely to experience positive affect while engaged in that activity (Deci & Ryan, 2008).[11] Finally, meaningful work, similar to "novelty" and "usefulness," is in the eye of the beholder. What might be perceived as meaningful work by one individual may not be viewed as meaningful work by another.[12]

Following other scholars, we assert that meaningful work is intrinsically motivating (Hackman & Oldham, 1975; Rosso et al., 2010). Thus, the first way we argue that meaningful work influences the creative process is through intrinsic motivation. This direct effect, illustrated by a green arrow in Figs. 3 and 4, is supported by research showing that perceived meaningfulness can enhance intrinsic motivation which, in turn, facilitates creativity (e.g., Grant & Berry, 2011).[13]

A second way in which meaningful work enhances creativity is by strengthening the progress loop and, thus, increasing persistence in a creative endeavor. Such strengthening can happen in two ways: in the initial progress loop and in subsequent loops. With regard to the former, the notion of "meaningful work" is part of the progress principle. Indeed, the full name of our progress loop in Figs. 3 and 4 is "progress in meaningful work," to denote the key finding from the diary study that it is not simply progress in anything that kicks off the loop, but progress in meaningful work. We have highlighted this moderation effect of meaningful work by including an arrow in Figs. 3 and 4 from Meaningful Work to the progress loop arrow.

A particularly important aspect of the moderating effect that progress in meaningful work has on persistence in creative work in general is the role that meaningful work can have in strengthening the "staying power" of the progress loop in the face of failure. Given that creative work is often fraught with failures and setbacks, it is probable that creative workers might wonder, "Why is this work worth doing?" Answering this question is at the heart of a particular perspective on meaningful work: a justification perspective (Lepisto & Pratt, in press). Drawing on Frankl's (1959) writings as a survivor of a Nazi concentration camp who describes his own labor serving fellow prisoners in that camp as meaningful, Lepisto and Pratt (in press) argue that any work can be viewed as meaningful if one knows "why" one is working. Put another way, meaningfulness is created by the ability to provide a compelling account – a justification – of why one's work is worth doing (Lepisto & Pratt, in press). Individuals who experience setbacks or failure in their creative endeavors can nonetheless find continued meaningfulness in their work by crafting the appropriate justification for their actions. One such justification might be that the pursuit of creativity is worthwhile, whether or not it always leads to successful outcomes. In this way, even failure can be viewed as progress if it allows the individual to learn which path not to take in the longer journey forward. While justifications are not unique to creative work, one can imagine that such accounts can

[10] Meaningfulness differs from work "meaning" in that the former implies positivity, whereas the latter can refer to any interpretation – positive, negative, or neutral – regarding work. For example, to say that my work is "degrading" would suggest that I have made meaning of my work, but such work would not be considered meaningful.

[11] Research in meaningful work often refers to the experience of meaningfulness as eudemonic rather than hedonic (Lepisto & Pratt, in press). Hedonia refers to pleasure and pain whereas eudemonia is about "realizing one's daimon or true nature" (Ryan & Deci, 2001, p. 143; though see Lepisto & Pratt, in press for the varying views of this concept). While distinct, hedonia and eudemonia are often highly correlated.

[12] This characterization differs from classic writing in job design by Hackman and Oldham (1975), who viewed "experienced meaningfulness" as a function of specific and objective characteristics of tasks: skill variety (the number of things one does), task identity (the ability to do whole tasks rather than unrelated subtasks), and task significance (the importance of one's task to the group, organization, society, etc.). Although an in-depth reconciliation of this point is beyond the scope of this paper, we suggest that jobs with certain characteristics likely have a higher probability of being perceived as meaningful.

[13] Some also suggest that creativity in a job can enhance its perceived meaningfulness (Brown et al., 2001). If such findings can be confirmed in other studies, this would suggest a "meaningfulness" loop much like the progress loop. Simply put, meaningful work is intrinsically motivating, which influences creative work. Creative work, in turn, is perceived of as meaningful, which stimulates more intrinsic motivation, and more creative work.

compel creative striving in the face of failures for avant-garde designers, cutting-edge scientists, or anyone who believes that making something novel and useful is a worthwhile end in itself.

A third way in which meaningful work can influence creativity is by mediating the relationship between organizational leaders' statements and actions about innovation and intrinsic motivation. (In Fig. 4, see the arrows from Organizational Innovation Stage 1 to Meaningful Work, and from that to Individual Component A). Put simply, if people do not see innovative or creative work as meaningful, it seems unlikely that leaders' statements and actions about the importance of innovation will be motivating. By contrast, such statements are likely to be highly motivating for those who do find innovative and creative work meaningful. Such statements may even be motivating in the face of failure.[14] Returning to our earlier arguments about persistence in creative activities in the face of failures, it is likely that such persistence will be strengthened to the extent that organizations credibly espouse accounts suggesting that the creative process itself is important, even when creative outputs are not always achieved.

A fourth way that insights about meaningful work can help us better understand creativity in organizations is through the concept of "work orientations." In contrast to external statements from leaders, work orientations are "internalized evaluations about what makes work worth doing" (Pratt, Pradies, & Lepisto, 2013, p. 175). More specifically, work orientations are akin to our own personal "accounts" about how we see our work and, more specifically, what we see as valuable in our work. These accounts accrue through the internalization of societal standards emanating from sources such as family, religious institutions, the media, educational institutions, and other social influences—including organizational leaders (Pratt et al., 2013). Thus, the link between work orientations and creativity becomes clear: creativity is most likely to be viewed as intrinsically motivating if one sees creativity at the heart of "what makes work worth doing."[15] To add specificity to this broad statement, we briefly review different types of work orientations, as well as the indirect evidence we have linking these orientations to creativity, in Table 3. As shown in the table, different work orientations are likely to have differential effects on creativity.

More generally, we believe that work orientations are likely to be associated with creativity in at least three ways. These arguments largely mirror the arguments we have made about meaningful work more broadly. First, because we believe that work orientation influences the creative process primarily through motivation, we include an arrow in Figs. 3 and 4 from work orientations to Individual Component A.[16] Second, we have argued that leaders' statements about innovation will only be motivating if people view doing innovative and creative work as meaningful. We extend this argument here to suggest that whether an employee views organizational leaders' statements about the importance of innovation as being "meaningful" in the first place – and therefore motivating – will depend in large part on how that employee approaches work. (See, in Fig. 4, the arrow from Work Orientation to the arrow from Stage 1 of the organizational innovation process to Meaningful Work). For example, organizational justifications about the intrinsic worth of innovation may not fit well with someone who has a job orientation, but may be viewed more positively if that person has a passion or a craftsmanship orientation (see Table 3).

Third, like meaningful work more generally, work orientations may influence persistence and, thus, the degree to which individuals persevere in the progress loop—though some orientations are likely to be more helpful in that regard than others. Specifically, the arrow from work orientation to the progress loop in Figs. 3 and 4 is meant to convey that re-engaging in creative work after Stage 5 (Outcome Assessment) will likely be more meaningful and, hence, more intrinsically motivating, to some people than to others. To illustrate, as noted, people with a job orientation may not find creative work inherently meaningful or motivating, and thus they may be less likely to persist in a creative endeavor following success, progress or failure—unless there were some extrinsic motivation for doing so. However, someone with a craftsmanship orientation, who is always striving for improvement and higher quality, might find engaging and re-engaging in creative work (following success, failure or progress) meaningful and, thus, intrinsically motivating.[17]

In summary, as illustrated in Figs. 3 and 4, the construct of perceived meaningful work is critical for explaining the intrinsic motivation to initially engage in creative work and then re-engage in it via the progress loop. This construct is also critical for explaining the effectiveness of organizational leaders' innovation-related statements to lift employees' intrinsic motivation. But crucial to our arguments is the notion that creative work (and progress in

[14] Although we make the link from leader statements about innovations to meaningful work, we believe that the work environment – and elements of the organizational culture in particular – can bolster the power of pro-innovation and pro-creativity accounts. Specifically, reward systems (e.g., not punishing people when creative failures occur), role modeling (e.g., having high profile employees who engage in creative behaviors fail and yet continue in their pursuits, having learned from the failure), and stories about the importance of creative failures (e.g., Post-It notes at 3 M) should strengthen the relationship between leader statements and perceptions of meaningful work.

[15] While work orientations may change over time in response to working conditions, they are often considered relatively stable (Wrzesniewski et al., 1997; see also Amabile et al., 1994; Bennett, 1974). Individuals internalize one or more orientations over time. Once internalized, these work orientations become resistant to change (Pratt et al., 2013), which is why we argue for a relatively stable influence on the creative process over time.

[16] Note, however, that different work orientations will likely vary in whether they predispose a person toward intrinsic or extrinsic motivation. To illustrate, people with a job orientation are likely to be more extrinsically motivated and more responsive to extrinsic motivators, all else equal. By contrast, those with a craftsmanship orientation or a prosocial service orientation may be geared toward intrinsic motivation. We discuss influences on, and the influences of, intrinsic and extrinsic motivation more directly in a later section.

Table 3
Work orientations and creativity: indirect evidence.[a]

Work orientation type	Description	Link to creativity: indirect evidence
Job	Viewing work primarily as a means to an end (i.e., "working to live")—including viewing work as a means to making a living and/or supporting a family through wages earned (Wrzesniewski et al., 1997).	Individuals with job orientations often value extrinsic rewards. To the degree that their motivation for extrinsic rewards interferes with their intrinsic motivation at work, creativity may be hindered (Amabile, 1996).
Career	Viewing work primarily as a means of advancement or achievement (Wrzesniewski et al., 1997).	Wrzesniewski et al. (1997, p. 23) argue that career orientations do not fall easily along an intrinsic-extrinsic motivation continuum, though they do suggest that those with a career orientation may be more extrinsically than intrinsically motivated. This suggests that the relationship between creativity and career orientations may skew negatively, but is likely complicated. More directly related to creativity, research has found a positive relationship between autonomy orientation and creativity (Liu, Chen & Yao, 2011). Individuals with a strong autonomy orientation may be similar to those with a career orientation, as they "organize their actions on the basis of personal goals and interests" (Deci & Ryan, 1985, pp. 111–112 as cited in Liu, Chen, & Yao (2011), p. 297). Interestingly, this relationship is mediated by harmonious passion, which suggests a more complex relationship, possibly involving multiple work orientations (i.e., achievement and passion) in predicting creative performance.
Calling/ service	[Calling] "Work that people feel called to do is usually seen as socially valuable – an end in itself – involving activities that may, but need not be, pleasurable." (Wrzesniewski et al., 1997, p. 22). [Service] Viewing work as a means of achieving some higher purpose, such as saving the environment (Pratt et al., 2013).	The positive relationship between prosocial motivation and creativity (Grant and Berry, 2011) suggests an analogous relationship between creativity and a calling or service orientation.
Kinship	Viewing work as a means of creating and enacting filial-type ties with others (Pratt et al., 2013).	Filial-type relationships would be considered strong ties. Research in the "strength-of-weak-ties" perspective, however, suggests that weak ties may be more conducive to creativity (Baer, 2010, p. 592—see also Perry-Smith and Shalley, 2003). Thus, individuals with this orientation – who prefer to enact family-like ties in organizations – may find these relationships a hindrance to creative output.
Craftsmanship	Viewing work as a vehicle for achieving quality (i.e., "anything worth doing is worth doing well"); individuals with this orientation work in order to achieve the highest quality products or services they can (Pratt et al., 2013).	Like individuals with a craftsmanship orientation, those with a learning orientation or high growth need strength strive to learn and improve their performance over time. Learning orientation – "an internal mind-set that motivates an individual to develop his or her competence" (Gong et al., 2009, p. 767) – and growth need strength – the tendency "to value personal development and learning and thus enjoy more stimulating and challenging work" (Shalley, Gilson, & Blum, 2009, p. 491) have both been positively linked to creativity.
Passion	Viewing work as something that makes a person feel good (i.e., "love what you do"); individuals with this orientation are excited about engaging in their work (Lepisto, McArdle, & Pratt, 2016).	Research on intrinsic motivational orientation as a stable trait, which – like the "passion" work orientation – includes elements of work enjoyment, has identified a strong positive relationship between this orientation and creativity (Amabile et al., 1994).

[a] To our knowledge, there has not been any research directly examining the link between work orientations and creativity.

creative work) will be more meaningful, and thus more motivating, to some workers than others. For this reason, it is important to understand employees' work orientations.

7. Affect and creativity

A third major change we make to the componential model is the inclusion of affect (see Figs. 3 and 4). In the past 28 years, there has been something of an affective revolution in organizational behavior, with a seeming explosion of theoretical and empirical articles on both affect (general mood) and emotion (specific emotional reactions) (see Barsade, Brief, & Spataro, 2003). Social psychologists had begun re-focusing on affect and emotion somewhat earlier (Zajonc, 1980), and the question of a possible link between affect and creativity has received considerable empirical attention in psychological laboratories. Isen (1999a, 1999b) was particularly active in this arena and, with her colleagues, published a number of papers investigating that link. Across all of Isen's experiments, the most consistent finding was that induced positive mood leads to higher levels of creativity and dimensions of performance that are related to creativity (like making unusual associations and exploring alternative solutions) (e.g., Carnevale & Isen, 1986; Estrada, Isen, & Young, 1994; Isen & Daubman, 1984; Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985; Isen, Niedenthal, & Cantor, 1992). The relationship between positive affect and creativity has subsequently been found in numerous studies in organizational behavior (e.g., Binnewies & Wornlein, 2011; Kark & Carmeli, 2009; Madjar, Oldham, & Pratt, 2002), including a meta-analysis (Davis, 2009).

Although it was not able to nail down causality given the non-experimental nature of the research, the diary study that we described in the progress principle section supports the general relationship between positive affect and creativity, and adds important nuance to it.[18] In one of many analyses of affect and creativity data from this study, Amabile et al. (2005) found evidence for a positive role of the discrete emotion of joy – in addition to positive mood in general – in creativity. Discrete negative emotions such as anger, fear and sadness were negatively related to creativity. Moreover, lagged analyses revealed that positive affect on a given day predicts creative thought the next day and possibly the day after that, even controlling for affect on the subsequent days. To our knowledge, this is the first field study to find clear evidence of an incubation effect for processes related to creativity. In addition, multiple analyses for various patterns in the day-by-day affect – creativity relationship revealed significant evidence only for a positive linear relationship between positive affect and creativity – at least within the range of affect normally experienced at work.

Echoing the findings on progress and intrinsic motivation, quantitative and qualitative analyses of the diary data suggest that progress in meaningful work leads to, or is at least associated with, positive affect.[19] Qualitative analyses of diaries describing work progress suggest that joy is the most common affective response to the progress. Moreover, in the few diary event descriptions in which an emotion seemed to be intertwined with the creative process, the vast majority of those emotions were positive—usually mild pleasure, but sometimes intense passion. Interestingly, the affective response evoked by progress may be disproportionate to the degree of progress made. Fully 28% of all events rated by the diarist as relatively trivial in terms of impact on the project ("no" impact or "somewhat" of an impact) had a "very" or "extremely" positive or negative impact on the diarist's feelings the day that they happened. In other words, to borrow a term from Weick (1984), the "small wins" of mundane or trivial progress could lead to outsized positive emotional reactions. Unfortunately, this effect held for setback events, as well. "Small losses" in the work could lead to outsized negative reactions. And, as revealed by effect sizes, the negative impact of setbacks on emotion was three to four times stronger than the positive impact of progress—a finding that fits well with the general "bad is stronger than good" phenomenon in psychology (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001).

Beyond the apparent strength of the relationship between progress and affect, the general association between progress in meaningful work and positive affect is significant for another reason. To the extent that meaningful work, itself, is also associated with positive affect (Arnold, Turner, Barling, Kelloway, & McKee, 2007), and to the extent that positive affect influences creativity, the elements of our dynamic model may not only be reinforcing, but mutually reinforcing. Thus, progress in the work feeds positive affect and intrinsic motivation (which, in turn, feed further creative progress—see the progress

[17] Admittedly, the relationship between work orientations and persistence may not be that straightforward. One could alternatively argue that, although someone with a craftsmanship orientation may persevere in the face of failure or progress, it is unclear what might happen in the face of success, or indeed if "success" has any meaning if that person holds a standard of perfection that is unattainable. Similarly, someone with a service orientation who wants to "create beauty in the world" may also persevere in the face of failure, but it is not clear how that person would assess overall progress, or even success, given the scope of that ambition. It is also not clear what types of creative products would result from this progress. For example, one might argue that someone with a craftsmanship orientation might, over time, begin to make only incrementally creative improvements as they home in on what they believe "quality" is. Alternatively, someone with this orientation may never feel their creative products are good enough, and might thus be motivated to make the discontinuous leaps necessary for radical creativity. These and other issues suggest that much additional work needs to be done at the interface of creativity, work orientations, and meaningful work.

[18] Measures of creativity in this study included (a) reports, in the diary event descriptions, of coming up with a new idea or solving a complex problem; (b) team leaders' ratings of the individuals' creative contributions over the previous month; and (c) colleagues' ratings of the individuals' creative contributions over the previous month.

[19] Quantitative analyses revealed that, on the days of best overall mood, the single most prominent positive event, by far, for these individuals working on creative projects, was progress in meaningful work (reported on 76% of such days). Furthermore, on the days of worst overall mood, the single most prominent negative event, by far, was the opposite of progress: having a setback in the work (reported on 67% of such days). For a complete description of this study's analyses and results, see Amabile et al. (2005).

loop in Figs. 3 and 4), and perceptions that the work itself is meaningful likely strengthen these relationships (see the arrows from Meaningful Work to the Progress Loop and to Affect in Figs. 3 and 4). We discuss the implications of this affect-meaningful work-progress dynamic in a subsequent section.

Although the findings of this study, as well as many others, revealed a positive relationship between positive affect and creativity, not all studies have confirmed this relationship. To be sure, Fredrickson (1998, 2001) and Isen (1999a, 1999b) have proposed compelling theoretical arguments explaining that positive affect broadens the scope of cognitions (e.g., allows for more "unusual cognitive associations" (Fredrickson, 2001, p. 308)) and, thus, should be more facilitative of creativity. However, some organizational theorists have proposed reasonable mechanisms by which negative affect should do so (George, 2007; George & Zhou, 2007; Martin, Achee, Ward, & Harlow, 1993). Moreover, a small number of experimental studies have found that negative affect leads to higher levels of creativity. For example, Kaufmann and Vosburg (1997, p. 155) found such an effect; they argued that negative affect may signal that a task is problematic, which stimulates deeper processing and, by consequence, leads to greater creativity. And, in a non-experimental study in an organizational setting, George and Zhou (2002) found that, under certain conditions, negative affect may facilitate employee creativity. Specifically, they found that workers in negative mood states are more likely to be creative when their feelings are very clear to them and they perceive organizational reward and recognition for creativity to be high. Other non-experimental studies in organizations have found positive associations between creativity and negative affect, under certain conditions and for certain types of negative affect (e.g., Bledow, Rosing, & Frese, 2013; George & Zhou, 2007; To, Fisher, Ashkanasy, & Rowe, 2012).

Even in the diary study (Amabile et al., 2005), there was some evidence of a link between negative affect and creativity, with the suggestion that creative behavior could lead to negative affect (rather than the other way around). Qualitative analyses revealed that, in the few instances where participants' diary narratives mentioned how others in the organization had reacted to their new idea, those reactions were almost exclusively negative, leading to negative emotions (sadness or anger) in the participant. Thus, although the direct affective consequence of an individual's creative behavior appears to be positive, negative affect could be an indirect consequence. For this reason, as noted in the previous section, finding creative work meaningful (positive and significant) may be paramount in helping individuals who are experiencing negative outcomes – whether from setbacks or negative feedback – to persist in their creative endeavors.

Further complicating the relationship between affect and creativity, other research has found that emotional ambivalence, or the "association of both strong positive and negative emotions with some target" (Pratt & Doucet, 2000, p. 205), may also influence creativity. In two laboratory experiments, Fong (2006, p. 1027) found a positive relationship between ambivalent emotions and creativity, arguing that conflicting emotions heighten sensitivity and recognition of uncommon associations between concepts. Similarly, George and Zhou (2007) found that, in supportive environments, creativity can be bolstered under high levels of both positive and negative moods. They suggest that, in these situations, moods serve an informational function, "tuning" or preparing people for their creative tasks as they engage both in divergent thinking (stimulated by positive moods) and detail-oriented, analytic thinking (stimulated by negative moods). Although subsequent empirical work on emotional ambivalence and creativity has been scant, recent research has shown that paradoxical frames, which might lead to cognitive-emotional ambivalence (Ashforth, Rogers, Pratt, & Pradies, 2014), could also lead to creativity (Miron-Spektor, Gino, & Argote, 2011). Similarly, the work of Harrison and Rouse (2014) on feedback in creative projects notes that both positive and negative affect often result from feedback interactions between creative workers and feedback providers—interactions that are instrumental in moving the creative process forward. In sum, it may be an understatement to say that the nature of the link between creativity and affect has become a much-debated question.

Despite the lack of clarity in the findings we have reviewed, it is clear that the creative process is suffused with affect; many psychological and organizational behavior studies have shown links between affect and creativity, and there are also probable links between affect and both progress and meaningful work. For this reason, affect belongs in our theory. The original componential model of individual creativity (1983; 1988) did not include affect, except quite tangentially. It described intrinsic motivation as possibly having affective elements, because "interest" is sometimes considered to be an emotion, and because the highest levels of intrinsic motivation are often referred to as "passion." Thus, we build on an earlier theoretical suggestion (Amabile & Mueller, 2008) and incorporate affect into our dynamic componential model in two major ways. Each of these is depicted in Figs. 3 and 4, as arrows leading to or emanating from Affect.

First, affect can arise from a number of sources both outside of and within the individual engaged in creative work. Most obviously, as we have discussed previously, the outcome of the individual's creative process – progress, success, or failure – can induce affect. In addition, following decades of research on the influence of organizational practices on expressed and felt emotion (e.g., Hochschild, 2003; Rafaeli & Sutton, 1989), we suggest that the work environment can influence an individual's affect.[20] Moreover, as we noted earlier, meaningful work can lead to positive affect.

[20] Since work environments are open systems, this influence is not limited to forces within the organization; broader external social and economic trends may influence such things as task-relevant resources and the pool of coworkers with particular skills, which may further influence a creative worker's affect.

Our second, and most speculative, revision of the model with regards to affect grows from a possible reconciliation of the apparently inconsistent findings regarding creativity and affect. We suspect that these inconsistencies may arise because different affective states are particularly facilitative at different stages of the creative process. Thus, we propose that positive affect, negative affect, and ambivalent affect can all have a positive influence on individual creativity, but to varying degrees and at different stages of the creative process. Based on the weight of extant findings we have reviewed, we suggest that, looking at the creative process as a whole, positive affect has the more consistent beneficial impact on individual creativity, at least within the range of emotions typically experienced in organizational settings. We believe that positive affect primarily influences individual creativity via its effects on two components, intrinsic motivation and creativity relevant processes (e.g., thinking broadly, and making unusual associations) and, in turn, those components' positive effects on the *novelty* of the ultimate outcome at Stages 1 and 3.

Positive affect should impact intrinsic motivation because, as suggested in the earliest statement of the componential model (Amabile, 1983) and reinforced in a recent paper (Madrid, Patterson, Birdi, Leiva, & Kausel, 2014), affect has a motivational function. Through this facilitative influence on intrinsic motivation, positive affect is most likely to positively influence Stage 1, formulation of the problem (which can notably influence the novelty of the solution), and Stage 3, the actual generation of novel ideas, because it is at these stages that intrinsic motivation plays its most prominent role. Positive affect also impacts creativity-relevant processes because, as noted by theorists, positive affect leads to a broadening of cognitive associations (Fredrickson, 1998; Isen, 1999a, 1999b); such associations, in turn, increase the novelty of responses generated at Stage 3.[21]

We propose that, by contrast, negative and ambivalent affect are most likely to have their facilitative impact at Stages 2 and 4 of the individual creative process, primarily by improving the *usefulness* or *appropriateness* of the ultimate outcome.[22] Extrapolating from the general notions of George and Zhou's (2007), dual-tuning model, described above, we propose that negative affect can motivate people to engage in the more detail-oriented, analytical, critical thinking that, in our model, is necessary for gathering the right information and resources (Stage 2) and checking newly-generated ideas against task criteria (Stage 4). This proposal is supported by other research. One study, framed within an emotions-as-information perspective, suggested that the experience of simultaneous, conflicting (i.e., ambivalent) emotions may signal that something is unusual in the environment (Fong, 2006) and, thus, may signal the need for gathering information – essential for Stage 2 of our process. Other research found that experiencing moderately negative affect can make individuals engage in more effortful and analytic behavior (Elsbach & Barr, 1999, p. 183), which we suggest should facilitate Stage 4.

Thus, given its clear importance at certain stages of the creative process, we propose that analytical, critical thinking be added to Individual Component C, Creativity-relevant Processes. Moreover, in Fig. 3, we have added links between this component and both Stages 2 and 4 of the individual creative process. Finally, given that the ability to hold on to ambivalence has been associated with cognitive flexibility (Pratt & Pradies, 2011; Weick, 1998, 2004), we suggest that ambivalent emotion may even be helpful at Stage 3 of the process.

8. The motivation for creativity

Our fourth major revision of the model does not, like the previous three, focus on a newly-added psychological factor that can influence the creative process. Rather, it involves revising a fundamental assumption underlying the original model. Specifically, research over the past 28 years has called into question the core construct of the componential theory of creativity: the intrinsic motivation principle, which states that people are most creative when they are motivated primarily by the interest, enjoyment, satisfaction, and challenge of the work itself, and not by extrinsic pressures or motivators in the social environment (Amabile, 1996). "Extrinsic" is a term applied to any motivation that arises from a source outside the work itself, including expected evaluation, contracted-for reward,[23] external directives, or any of several other, similar sources. Despite some inconsistencies (see Grant & Berry, 2011, for a review), the intrinsic motivation principle of creativity has received support in many experimental and non-experimental studies conducted by several different researchers in both psychology (see Amabile (1996) and Hennessey (2003) for reviews) and organizational behavior (e.g., Chen, Farh, Campbell-Bush, Wu, & Wu, 2013; Zhang & Bartol, 2010).

Challenges to the intrinsic motivation principle have come from two fronts. First, a group of researchers working in the behaviorist tradition (e.g., Cameron & Pierce, 1994; Eisenberger & Cameron, 1996, 1998; Eisenberger & Selbst, 1994) argued that their studies demonstrate that creativity can be easily increased, and is seldom undermined, by contracted-for reward. However, the results of those studies have been shown to be subject to alternative explanations (Hennessey & Amabile, 1998; Lepper, 1998; Sansone & Harackiewicz, 1998). Second, prominent scholars (e.g., George, 2007; Gerhart & Fang, 2015) have recently called for an examination of nuances and contingencies for positive and negative effects of intrinsic and extrinsic motivation on creativity. Research examining such

[21] We do not, however, suggest that affect be considered an additional individual creativity component, primarily because we argue that the effects of the components on creativity are multiplicative, and creativity is possible even when affect is neutral or nil.

[22] Recall that creativity is the production of novel and useful (or appropriate) ideas or products.

[23] This is reward that is contracted for in advance of the activity, where the individual agrees to do the activity in exchange for the reward.

nuances and contingencies suggests two important modifications of the intrinsic motivation principle.

The first modification is suggested by the work of Adam Grant and James Berry, in a paper investigating the possible interactive effects of intrinsic motivation and prosocial motivation, which is "an other-focused psychological process that directs employees' attention toward others' perspectives on what is useful, enhancing the impact of intrinsic motivation on creativity" (Grant & Berry, 2011, p. 77). Grant and Berry contend that intrinsic motivation facilitates creativity primarily by increasing the novelty of responses, and that prosocial motivation boosts the impact of intrinsic motivation by ensuring that the novel responses will also be appropriate—useful or valuable to some group of other people. This research is particularly pertinent to creative projects in which the outcome is potentially beneficial to others. Indeed, the context for all three of the Grant–Berry studies involved work that served others.

In our view, prosocial motivation may increase creativity by enhancing the meaningfulness of the work. Such an effect should be especially strong for people who have a "calling" (Wrzesniewski, McCauley, Rozin, & Schwartz, 1997) or "service" work orientation (Pratt et al., 2013). Indeed, as Wrzesniewski and colleagues (1997: 22) note, work that people feel called to do is "usually seen as socially valuable." Similarly, Pratt and colleagues (2013: 178) argue that meaningfulness in work for those oriented toward service "comes from the perceived effect on the beneficiaries of work." Further, they tie this orientation to prosocial behavior and altruism. Thus, the first modification of the intrinsic motivation principle is that the positive effect of intrinsic motivation on creativity is enhanced in individuals who have a "calling" or "service" work orientation, when the work involves service to others.

The second modification of the intrinsic motivation principle is more significant because it acknowledges that extrinsic motivation has a positive role to play in the creative process. Indeed, by a process termed *motivational synergy* (Amabile, 1993), certain types of extrinsic motivation can have harmonious effects with intrinsic motivation in stimulating creativity. A number of empirical studies support the notion of motivational synergy, both experiments (Amabile, Hennessey, & Grossman, 1986; Hennessey, Amabile, & Martinage, 1989; Hennessey & Zbikowski, 1993) and non-experimental studies (Amabile, Hill, Hennessey, & Tighe, 1994), including some in organizations (Baer, 2012).

There are two likely mechanisms by which extrinsic motivation, rather than undermining intrinsic motivation and creativity, might have additive effects with intrinsic motivation and, thus, enhance creativity. In the first, *extrinsics in service of intrinsics*, some extrinsic motivators enhance or support intrinsic motivation whereas others do not. Drawing from Deci and Ryan's (1985) statements in cognitive evaluation theory concerning "informational" extrinsic motivators (which give people information that confirms or allows them to build their competence, or confirms the value of their work) versus "controlling" extrinsic motivators (which lead people to feel controlled by an external force, undermining their sense of self-determination), we conclude that informational motivators are more supportive of intrinsic motivation than controlling ones. By this mechanism, any extrinsic factors that provide information and, thus, support a person's sense of competence or enable the person's deeper involvement with the work, without undermining the person's sense of self-determination, would be *synergistic extrinsic motivators* and, thus, should positively add to intrinsic motivation and creativity. This could be the case, for example, with recognition that acknowledges the value of the work done (such as a plaque on a company's wall of honor), or with rewards that allow the individual to engage more deeply in activities that are intrinsically interesting (such as funding for a successful team to work on a new pet project that the team has proposed). By contrast, controlling motivators inhibit self-determination and, thus, likely undermine the intrinsic motivation necessary for creativity.

Again, we see the importance of meaning; here, the meanings people attach to extrinsic motivators, particularly reward and recognition, can alter their impact. For example, extrinsic rewards may be perceived differently by individuals with a job orientation versus a craftsmanship orientation. Similarly, rewards that the company offers as "carrots" to induce behavior before the fact may be perceived by most people as more controlling, but rewards presented as recognition for a job well done, after the fact, may be perceived by most people as more informational.

The second mechanism by which extrinsic motivation, rather than undermining intrinsic motivation and creativity, might have additive effects with intrinsic motivation and creativity is called *the motivation-work cycle match*. According to this mechanism, synergistic extrinsic motivators are likely to serve their special facilitative function only at certain stages of the creative process. Intrinsic motivation (and relatively weaker extrinsic motivation) might be particularly important in Stage 1 (task presentation/problem formulation and initial engagement in the creative process) and Stage 3 (idea generation), where novelty is determined. Relatively stronger extrinsic motivation, of the synergistic type, might be particularly conducive to those stages that contribute most to the usefulness – the appropriateness or correctness – of the ideas, and where the activities might be particularly tedious: Stage 2 (preparation) and Stage 4 (idea validation and communication). If, at Stage 1, the initial level of intrinsic motivation to do the work is high, relatively strong synergistic extrinsic motivation at Stages 2 and 4 should not wipe out the intrinsic motivation necessary at Stage 3 and any subsequent Stage 1, in future iterations through the creative process.[24]

A recent meta-analysis yielded important results that speak to the role of intrinsic motivation and extrinsic incentives in performance, including creative performance (Cerasoli, Nicklin, & Ford, 2014). Most notably, this research concluded that intrinsic motivation and extrinsic rewards are not necessarily antagonistic and, thus, should be

[24] This notion that, if the initial level of intrinsic motivation is high, extrinsic motivation might have neutral or positive effects on creativity, was briefly discussed (but not named) in the original 1988 theory.

considered in tandem when examining performance effects. Nonetheless, the meta-analysis showed that intrinsic motivation remains important as a performance predictor, regardless of whether extrinsic incentives are in place, and that extrinsic incentives can "crowd out" intrinsic motivation effects if those incentives are offered with a direct tie to performance (i.e., if they are contracted-for). In other words, contracted-for extrinsic rewards can undermine the facilitative effects of intrinsic motivation on performance. Building on our arguments above, we argue that the adverse effects of these extrinsic motivators on individual creativity occur because they are largely perceived by the individual as controlling.

This is the revised intrinsic motivation principle, which incorporates the concept of motivational synergy (Amabile, 1993): *Intrinsic motivation is conducive to creativity; controlling extrinsic motivation is detrimental to creativity, but informational or enabling extrinsic motivation can be conducive, particularly if initial levels of intrinsic motivation are high*. Extrinsically motivating aspects of the organizational environment that support a sense of competence or deep task engagement, especially when coupled with autonomy, should serve as synergistic extrinsic motivators, bolstering intrinsic motivation. Qualitative analyses in the diary study described earlier (Amabile & Kramer, 2011) yielded evidence supporting this proposition. We have already reviewed the "progress catalyst" *autonomy*, in discussing the progress principle. The qualitative analyses also identified four "nourishers" of individual psychological experience, including the experience of intrinsic motivation toward the work. We propose that two of these nourishers act as synergistic extrinsic motivators. *Reward and recognition*, as noted above, can confirm competence without undermining a sense of self-determination. *Encouragement* from a supervisor or coworker when the work gets particularly difficult or tedious can keep an individual engaged in the work. Beyond the diary study, there is some additional empirical evidence that feeling cared for by coworkers can increase the meaningfulness of the work and, as a result, increase intrinsic motivation to engage in innovative projects (Vinarski-Peretz & Carmeli, 2011). Thus, in revising the componential model as depicted in Figs. 3 and 4, we add synergistic extrinsic motivation as an element of the motivation component of individual creativity, and we add arrows from the motivation component to indicate the facilitative effect of synergistic extrinsic motivation on Stages 2 and 4.

9. Dynamism in the dynamic componential model

As noted throughout this chapter, our revised model is a dynamic one. This dynamism appears in a number of ways. First, the three important psychological factors we have introduced – the progress loop, meaningful work, and affect – are interconnected, such that changes in one are likely to spur changes in the others. Second, not only have we added synergistic extrinsic motivation to the motivation component, but we have also argued that the progress loop, meaningful work, and affect are all linked to the motivation component in important ways. Indeed, although the motivation component was central in the original componential model, it is even more crucial in the revised model; one reason is that, of all the components, it is, in itself, the most dynamic. Motivation is the most easily subject to change, in the shortest temporal spans – even moment to moment – depending on changes in the immediate work environment, fluctuations in affect, changes in work meaningfulness, and progress (or lack thereof) in the work. Third, we have argued that the creative process likely involves multiple iterations through the stages. Here, we combine these insights to show how the key psychological factors and expanded motivational drivers could motivate multiple "loops" or iterations through the stages.

To start, let us clarify what's new here. In referring to the new model as "the dynamic" componential model, we do not mean to suggest that the original componential model was completely static. Indeed, given the importance of progress loops in our revision, perhaps the 1988 version was prescient in suggesting that progress can drive multiple creative-process iterations. However, the original model proposed that the creative process shuts down in the face of either success or failure. Our revised model proposes that the process can continue, multiple times, in either case.

The likelihood of continued creative episodes, or creative-process "loops," is perhaps easiest to explain in the case of success. According to our revised model, success may lead to further creative episodes, especially on creative problems in related domains, for at least three reasons. First, because success in an activity generally increases intrinsic motivation for activities of that type (Bandura, 1997; Deci & Ryan, 1985), the individual should be eager to engage in creative work on related problems—in the same domain or similar domains (Amabile, 1988). Second, successful creative work is likely to be rewarded by the organization. If these rewards are perceived primarily as informational (rather than controlling), then the principle of synergistic extrinsic motivation would suggest that motivation should further increase, thus increasing the probability of beginning a new creative venture at Stage 1. Third, success is likely to evoke positive affect, which in turn increases intrinsic motivation and further facilitates the first stage of the creative process. Fourth, to the degree that success in a creative project is part of a larger overarching endeavor (e.g., the design of a particular feature in the overall design of a new digital tablet), then success may be interpreted as not only progress, but – given the episode's link to a greater whole – progress *in meaningful work*. As such, the success can initiate a progress loop. Taken together, these forces could mean that success may lead to a virtuous cycle of further efforts toward creativity, and potentially more creative results.

The link between failure on a creative project and continued effort is a bit more complex, but perhaps more important; any significant creative endeavor in an organizational setting is likely to receive negative (even if developmental) feedback in Stage 4, and experience setbacks of various kinds along the way. On the face of it, the existence of "loops" following failure seems unlikely, especially given the resulting negative affect that should, in turn, dampen an individual's motivation. However, the

possibility of credibly positive accounts of the failure, whether provided by the organization (e.g., in leader statements or stories), by the example of colleagues, or by the individual, is critical here. Take, for example, the story often attributed to Thomas J. Watson, a highly influential CEO of IBM (from Schein, 2010, p. 244). To paraphrase the story, a young executive makes a mistake that costs the company millions of dollars. The executive is called into Watson's office, expecting to be fired. Instead, Watson proclaims that he has just spent millions training the person, so why would he want to fire him? A similar account may be used for creative endeavors—that creative failures are learning experiences that may lead to success down the road. This sentiment is echoed in the phrase attributed to the famous inventor Thomas Edison: "I have not failed, I've just found 10,000 ways that won't work." These and similar stories are potentially crucial tools in facilitating the reinterpretation of failure as learning, an important type of progress, thus instigating a progress loop and enhancing the intrinsic motivation for another iteration through the creative process. This dynamic is all the more likely in work environments marked by a high degree of psychological safety.

As we have suggested in our section on "Meaningful Work," these and similar accounts about the nature of work – that any given effort is all part of a larger process that will involve some setbacks – may be especially appealing to those with a craftsmanship work orientation, as these workers are motivated by continually doing what they do better. But accounts appealing to those with other orientations may have similar effects. As we have noted, keeping in mind the beneficiaries of one's work may facilitate meaningfulness. Thus, for those with a service orientation, knowing that one must overcome failure in order to help others may mitigate the negative affect associated with failure and may lead to the renewed intrinsic motivation necessary for another creative cycle. Even someone with a career orientation may persevere in creative work in the face of failures if he or she knows that creative output is critical to success in the organization. However, as we noted previously, some work orientations, such as a job orientation, may incline the individual towards extrinsic motivators. Unless these are synergistic extrinsic motivators, this work orientation could actually inhibit further progress after failure.

More generally, it is important to note that these dynamic processes can also work in a negative direction, serving to truncate the creative process before a successful outcome is achieved or serving to dissuade the individual from creative work in the same or similar domains. For example, negative affect that arises from events in the work environment (e.g., emphasis on short-term earnings or events that enhance fear of failure), or from external sources (e.g., steep economic downturns), should decrease the probability of a robust continuation of reiterations through the creative process. And organizational mission statements, leader statements, or accounts for failure that the individual disbelieves, finds meaningless, or is demotivated by, should have the same adverse effect.

Taken together, the additions of progress, affect, and meaningful work – as well as a deeper understanding of the motivation underlying creative work – render our model more dynamic. We have argued in the preceding sections that progress, meaningfulness, and affect are interconnected in various ways and are all connected to motivation. Thus, each may trigger and reinforce the others. In doing so, they can serve to strengthen or inhibit the creative process overall. For this reason, Figs. 3 and 4 show our new psychological factors as outside of, but acting in concert with, the components and stages of the creative process.

In this section, we have argued that our revised process is more dynamic than the original because it predicts that creativity can still emerge no matter what the initial outcome of the creative process: success, failure, or progress. It is important to reiterate, however, that even though we tend to think in terms of an iteration through the model as an "episode," *creativity is not as linear as* Figs. 3 and 4 *depict*. Specifically, even in the generation of a single idea or product, individuals and groups may go back and forth between the stages, especially when they are receiving feedback from others (Harrison & Rouse, 2014). Moreover, subsequent ideas and products (e.g., prototypes) may build from each other. Thus, we speculate that the dynamics described here may characterize both single episodes of creativity and the larger creative processes of which they are a part, catalyzing (or inhibiting) creative persistence within and between creative episodes.

10. Future directions for research on organizational creativity and innovation

Our overarching purpose in updating the original componential model to a more comprehensive and dynamic one is two-fold. First, our revision acknowledges the tremendous amount of research that has been done on creativity and innovation since 1988. Second, if we have done our job well, the new model should invite future research and conversation about where research on creativity and innovation in organizations should proceed in the coming years. In this concluding section, we begin this process of looking ahead by outlining some research areas we believe can most benefit from scholarly attention. Because there are significantly more ideas for future research than we can adequately address here, we structure our suggestions by dividing them into two main areas: research about the model itself (i.e., general recommendations), and research about our specific additions to the model. With regard to the latter, we have chosen one focal area from each of our main revisions to the model: the progress loop, meaningful work, affect, and motivation.

10.1. The dynamic componential model: general recommendations for research

We begin by taking a step back to consider the value of the model as a whole to future research. Clearly, the revised model is very complex, and it is unlikely that any single study could test all of it. That said, the purpose of such a model is to highlight how different aspects of a larger process (innovation and creativity) fit together. As we have noted previously, some relationships in this model have received considerable attention, such as the role of

intrinsic motivation in creativity, and even the role of positive affect in creativity. However, much of what we have proposed has yet to receive empirical examination. For example, there are relatively few studies on progress and creativity or meaningful work and creativity. Even some relationships that were noted in the original model can use further support and elaboration. For example, further research can examine the extent to which the relationships among the components are, indeed, multiplicative or conform to some other pattern (e.g., additive), and how the three individual components and the three organizational components interact.

Moreover, although we have added new dynamic elements to the model, much is unknown about them. Future research should explore feedback loops further, investigating not only how subsequent iterations through the creative process could be initiated, but also the mechanisms by which those subsequent iterations could be different from previous ones. And we have not even speculated on the extent to which the psychological processes we describe are conscious versus non-conscious. We suspect that both types of processes are involved, but that is one of the fascinating empirical questions that remains. Most likely, a truly comprehensive model will have to be even more complex than the one we have presented.

In the interest of increasing the comprehensiveness of the model, we encourage research not only into the relationships (both new and old) that we address in this chapter, but also into those areas we were unable to address. Due to space and cohesiveness considerations, we focused largely on individual creativity. However, this focus leaves at least three major areas unaddressed—each of which would have to be added, to develop a truly comprehensive model. To begin, we have noted in Table 1 and Fig. 3 that not all group-level (or team-level) creativity is a simple aggregate of the individual creativity of group members. We did not attempt to separate individual from group creativity in our model, but future theoretical and empirical work should do so. On the empirical front, although further research is needed on this question, there have been some promising contributions. Taggar (2002, p. 317), for example, found evidence that team creativity is a function not only of aggregated individual-level creativity, but also of team creativity-relevant processes which "may include (1) inspirational motivation [. . .] (2) organization and coordination [. . .] and (3) individualized consideration [. . .]" Goncalo and Staw (2006) note that the presence of individualistic versus collectivist values in groups may influence their creativity. In addition, as noted in Table 1, Hargadon and Bechky's work has focused directly on creativity at a collective level. In particular, their field study of management consultants (Hargadon & Bechky, 2006, p. 489) suggests that certain social activities trigger the emergence of group-level creativity, specifically "(1) help seeking, (2) help giving, (3) reflective reframing, and (4) reinforcing." Taken together, this research suggests that focusing on various team values, processes, and interactions may help us better understand the conditions under which group creativity is more than the sum of its individual contributors' ideas.

In a related vein, by focusing largely on individual creativity, we did not go into much detail on some of the links across levels of analysis, specifically across individual creativity, group creativity, organizational innovation, and the external environment outside the organization. We have added to the model the role of external influences on the work environment, and have highlighted a relationship that was central to the arguments underlying the original model: the influence of the work environment on individual creativity (see Fig. 4). However, our treatment of the influence of the external environment, in particular, was at a very broad level, and we recommend future engagement in more multi-level and cross-level theorizing (such as that done by Drazin et al., 1999). Future research, for example, could do more to explore the role of the institutional context, economic and socio-cultural forces, as well as the impact of different stakeholders (e.g., customers and investors) on the innovative behavior of firms (Hargadon & Douglas, 2001; Kanter, 1988; Murray & O'Mahony, 2007; O'Reilly & Tushman, 2013; Shane, 1992; Van de Ven & Garud, 1993), and how these institutional pressures may ultimately influence group and individual-level creativity. Similarly, more work could be done on the simultaneous influences of and interactions between individual creativity and group creativity and, ultimately, their joint influence on organizational innovation.

Finally, there is much to be done to develop and investigate the organizational innovation part of the model. We are interested, in particular, in the issue of isomorphism between organizational innovation and individual (or group) creativity. Part of the elegance of the original model is that it posited strong parallels between creativity and innovation, in terms of the components needed and the stages through which the individual, group, or organization progresses. In our revised model, we have added four psychological factors that may influence creativity. Future research should examine the extent to which there might be macro-level analogs to these micro-level variables. For example, scholars have long argued for the existence of collective affect (e.g., LeBon, 1895 trans. 1947), and have made great strides in conceptualizing group emotion and examining its effects in organizations (e.g., Barsade & Gibson, 1998, 2012; George, 1990). To what degree, if any, might group-level affect influence innovation? Similarly, we have noted that work orientations are socio-cultural in origin (Lepisto & Pratt, in press; Pratt et al., 2013). To what degree might organizations have cultural accounts about creativity and innovation and to what degree, if any, might they influence – and be influenced by – individual creativity and organizational innovation?

10.2. Recommendations for research on progress, meaningful work, affect, and motivation

We also hope that the addition of four new psychological factors in the model of individual creativity will spark future research. To begin, we believe that, although these four constitute a promising start, they are by no means an exhaustive list. Thus, researchers would do well to continue exploring psychological (as well as sociological) factors in creativity and innovation in organizations. We

also believe there is considerable promise in further exploring some of the linkages we have made here.

In the area of *progress*, we wonder what the boundary conditions around progress and progress loops might be. For example, in the diary study we described, the progress principle seemed to operate only when the progress was tied to meaningful work: of all the everyday work events that can influence perceptions, emotions, and motivation at work, the single most prominent is making progress in meaningful work. Although most work that the diarists did was meaningful to them, because it involved the most important innovation projects in their companies, some work (such as cleaning up a project display area) was not. Clearly, though, creative tasks that unfold over time may involve a variety of subtasks that vary in their meaningfulness. This raises the question of whether progress loops (see Figs. 3 and 4), might sometimes operate independently of the meaningfulness of the specific task performed. In other words, under what conditions might progress on *any* task in the overall creative process – even if such a task is mundane, tedious, or otherwise "meaningless" – be sufficient to motivate individuals to continue in their creative tasks? The proposed "extrinsics in service of intrinsics" mechanism suggests that such conditions do exist—if, for example, the individual perceives the tedious, meaningless task as serving the intrinsically motivating goal of achieving an ultimately creative outcome. Alternatively, it may be that, from a justification perspective, tedious tasks may themselves be viewed as meaningful because they ultimately contribute to a greater creative process. Future research can help disentangle these alternative explanations.

In a similar vein, we have argued that work orientation might serve as a strong moderator of the relationship between progress and motivation, as captured in the impact of work orientation on the progress loop (see Figs. 3 and 4). However, several aspects of this proposed moderation require empirical study. Perhaps most notably, we suggested in the section on meaningful work that some work orientations, such as a job orientation, may draw people toward extrinsic motivators, while others, such as a craftsmanship orientation that emphasizes continuous improvement, may draw people more toward intrinsic motivators. Thus, depending on the type of extrinsic motivators present (specifically, whether they are synergistic or not), the interaction of work orientation with work progress may actually disrupt the creative process rather than strengthen it. Research is needed to explore whether and how specific work orientations impact the way in which progress influences motivation and, thus, creativity. Moreover, it would be interesting to investigate the relative effects of different but somewhat similar work orientations on this relationship—for example, might a craftsmanship orientation bolster this relationship more than a service orientation, or vice versa?

With regard to *meaningful work*, given that most of the linkages we have suggested to meaningful work have been either unexplored or under-explored, we believe that empirical research in this area is critical. Most basically, we wonder if there is indeed a connection between meaningful work and positive affect, and if so, under what conditions this relationship might be strengthened or weakened. We also believe that research is needed on our proposed connection between leader statements about innovation and employees' perceptions of their work as meaningful (see Fig. 4).

We hope that our initial attempts to elucidate how meaningful work and work orientations might influence creativity also suggest several other interesting areas of inquiry. For example, with regard to group creativity, how might work orientations play a role? Can groups or teams have a collective work orientation—perhaps brought on by attraction-similarity-attrition dynamics (Schneider, 1987)? Alternatively, when groups are comprised of individuals with very different work orientations, are there certain combinations or proportions of different work orientations that are most conducive for creativity? Moreover, what role might the actual nature of the tasks involved (e.g., sales versus R&D work) influence these team dynamics? In addition, we wonder if work orientations might directly influence one or more of the creative process stages. For example, might some work orientations be more conducive to gathering information, or producing multiple ideas, or checking ideas?

In the area of *affect*, although most research – including the diary study – has found a facilitative influence of positive affect on creativity, we have noted that other research has found positive effects for negative and ambivalent emotions. One simple possible explanation for these conflicting findings is methodological. Creativity-and-affect studies vary in terms of whether affect is primed, self-reported, or simply observed, and some emotional states, especially ambivalence, are notoriously difficult to measure (Rothman et al., in press). Moreover, measures of creativity vary in terms of its magnitude (radical versus incremental) and operationalization (e.g., fluency, or the number of responses, versus the content of responses). A meta-analysis that controls for these methodological differences might simplify the picture considerably.

More substantively, we have suggested that perhaps these conflicting affect findings could be reconciled by considering the impact of positive and negative affect at the different stages of the creative process—for example, idea generation versus idea validation. Although little prior research has attempted to break the creative process down to stages that may be separately examined, we believe that methods for doing so could be highly useful—and the examination of our speculation about different types of affect is just one use to which such methods might be put.

Alternatively, in addition to our arguments that different emotions may play a role at different points in the creative process, it may be that certain types of creativity (incremental vs. radical) may be better served by different emotional states. For example, Gasper and Clore (2002) have proposed that positive mood broadens attention, but negative mood narrows it. If this is the case, we speculate that the ability of positive mood to broaden the focus of attention may facilitate creative tasks involving a major change from the status quo – radical creativity – whereas negative mood may help make smaller, more incremental creative refinements by focusing attention more narrowly on details. In short,

much research is needed to better understand the conditions under which affect – and different types of affect – may influence different aspects of the creative process and different types of creativity.

Finally, with regard to *motivation*, we believe that the most fundamental question is: under what conditions, by what mechanisms, and at what stages of the creative process are intrinsic and extrinsic motivation conducive or detrimental to creativity? For example, there is little research on synergistic extrinsic motivation. It remains to be empirically investigated whether informational and enabling rewards can indeed lead to higher levels of performance in task preparation (Stage 2) and idea validation (Stage 4), compared to controlling rewards. And we do not yet know whether all forms of extrinsic motivation undermine the initial tackling of creative problems (Stage 1) and idea generation (Stage 3). Might individuals' work orientations play a role in moderating these effects? And how do such effects operate? The original componential model proposed a self-perception explanation for the intrinsic motivation principle, but there has been little research on mechanisms for any of these motivational effects. Moreover, given empirical evidence that children's intrinsic motivation and creativity can be boosted by procedures to "immunize" them against the negative effects of contracted-for reward (Hennessey et al., 1989; Hennessey & Zbikowski, 1993), similar empirical investigations into ways of immunizing adults could be valuable both theoretically and practically.

As we proposed earlier, there may be indirect motivational effects, as well. The original model suggested a feedback loop when some progress was made or (perhaps) when complete success was achieved, such that either outcome would increase intrinsic motivation that, in turn, could enhance the other two individual creativity components; stronger intrinsic motivation could lead to learning more skills and knowledge in the domain, and could also stimulate the growth of creativity-relevant processes. Our revised model has proposed that these feedback loops, which we now term "progress loops," can operate even when an attempt has failed—if the work environment is psychologically safe. These propositions and others about the new, more dynamic elements of the model present a fertile field for future empirical investigations.

Finally, and most radically, we wonder if intrinsic and extrinsic denotations are even the best ways to think about the motivation for creative work. Perhaps the most conducive motivational state for each stage of the creative process has less to do with the specific source of the motivation (intrinsic to the work itself versus extrinsic) and more to do with the cognitive-emotive states that the as-yet-unnamed types of motivation engender.

11. Conclusion

We hope that our dynamic componential model will stimulate fruitful new empirical work yielding both a deeper understanding of creativity and innovation, and a fresh set of prescriptions for organizational leaders who aspire to innovative leadership in their industries. In other words, we hope that both scholars and practitioners will find meaningful progress in our work.

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