The primal mark: How the beginning shapes the end in the development of creative ideas

CrossMark

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A B S T R A C T

While creative ideas are defined as both novel and useful, novelty and usefulness often diverge, making it difficult to develop ideas that are high in both. To explain this tradeoff between novelty and usefulness and how it can be overcome, this paper introduces the concept of the "primal mark"—i.e., the first bit of content employees start with as they generate ideas, which anchors the trajectory of novelty and usefulness. In four experiments, participants started with primal marks that contained varying degrees of novelty. Results suggest that familiar primal marks foster usefulness at the expense of novelty, while new primal marks foster novelty at the expense of usefulness. However, the results also suggest a solution to this tradeoff: integrative primal marks that combine new and familiar content, fostering an optimal balance of novelty and usefulness. Implications for theory and research on creativity in organizations are discussed.

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Introduction

"If at first the idea is not absurd, then there is no hope for it."
[-Albert Einstein (Pritscher, 2010: 57)]

As the world becomes more dynamic and competitive, organizations must continually generate creative ideas in order to keep up with ongoing pressures to be adaptive and innovative. To be deemed creative, an idea must be subjectively judged as high in both novelty (degree to which the idea is unique from existing ideas) and usefulness (degree of value offered by the idea) within the organization and broader domain in which it is embedded (Amabile, 1996; Csikszentmihalyi, 1990; Ford, 1996). Past research on creativity in organizations has tended to examine novelty and usefulness together in one overall creativity construct, assuming these two dimensions travel together in creative ideas (e.g., Oldham & Cummings, 1996; Shalley & Perry-Smith, 2001). However, scholars are increasingly recognizing that novelty and usefulness often diverge (Diehl & Stroebe, 1987; Ford & Gioia, 2000), and tend to be conflicting dimensions in the evaluation of ideas (Fleming, 2001; Mueller, Melwani, & Goncalo, 2012; Rietzschel, Nijstad, & Stroebe, 2010). In short, ideas are often seen as either novel or useful, but may rarely be seen as high in both dimensions.

Despite the abundant scholarly and practitioner attention paid to creativity, little theory and research has addressed when and why novelty and usefulness diverge in the development of ideas, nor how employees can overcome this tradeoff to construct ideas that are novel *and* useful. Building on theories of anchoring (Northcraft & Neale, 1987; Tversky & Kahneman, 1974), priming (Chartrand & Bargh, 1996; Friedman, Fishbach, Förster, & Werth, 2003), and design fixation (Ward, 1994; Ward, Smith, & Finke, 1999), I propose that the final novelty and usefulness of ideas depends on the seeds that are planted near the very beginning of creative tasks. In particular, the content that employees first lay down as they set out to develop creative ideas may act as an anchor that shapes the novelty and usefulness of the ideas they ultimately produce. To capture this first bit of content, I use the term "primal mark," which is borrowed from painting theory (Strassberg, 1989). The concept is that the first brush stroke a painter makes on a blank canvas, known as the primal mark, is especially important because it shapes what the painter subsequently paints on the canvas. This parallels the notion that the initial raw material that employees use in creative tasks may anchor how they build their emerging ideas in ways that enable or constrain their novelty and usefulness.

In this paper, I build and test hypotheses about the role of the primal mark in explaining the tradeoff between novelty and usefulness and how it can be overcome to produce creative ideas that are high in both dimensions. In four experiments, participants started to develop ideas with primal marks that contained varying

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degrees of novelty, and expert raters assessed the novelty, usefulness, and overall creativity of their final ideas. The results offer three key implications for theory and research on creativity in organizations. First, the results shed light on pivotal anchoring effects in the creative process, illuminating how the first bit of content used in emerging ideas can have a powerful effect on the subsequent trajectory of novelty and usefulness. Second, rather than viewing novelty and usefulness as independent dimensions of creative output, the results unearth key dynamics between these two dimensions throughout the creative process. Third, the results elucidate the importance of considering not only *what* knowledge is used, but also *when* it is used in the creative process.

The primal mark

Amabile's (1996) model of the creative process posits that creative ideas are often developed in four basic stages: (1) task identification (defining the creative problem at hand), (2) preparation (gathering and activating knowledge that might be relevant to the task), (3) response generation (developing possible ideas by recombining elements from knowledge base), and (4) response validation (elaborating and evaluating possible ideas until one is satisfactory). The primal mark is set at the transition point between the preparation and response generation stages, just as employees have a bit of content in mind and commit to further developing it into an emerging idea. Following theory and research on anchoring effects (Mussweiler & Strack, 2000; Northcraft & Neale, 1987; Tversky & Kahneman, 1974), the primal mark acts as an anchor that establishes the likely trajectory of novelty and usefulness for the idea that grows from it. Thus, within a given creative task, each possible idea that employees generate begins with a primal mark, and the only way employees can reset their primal mark is if they drop the emerging idea altogether and return to the preparation stage of the process.

A considerable amount of past theory and research has focused on the impact of how creative tasks are framed in the task identification stage, including work on goal setting (e.g., Madjar & Shalley, 2008; Shalley, 1995), problem constructions (e.g., Csikszentmihalyi & Getzels, 1971; Mumford, Whetzel, & Reiter-Palmon, 1997), and constraints (e.g., Medeiros, Partlow, & Mumford, 2014). In essence, this past work has focused on framing effects, or "the finding that subjects often respond differently to different descriptions of the same problem" (Frisch, 1993, p. 399). In contrast, rather than focusing on how creative tasks are framed, the primal mark concept draws attention to anchoring effects driven by the actual content or raw material initially used to build ideas within creative tasks. Focusing on anchoring effects—in addition to framing effects—offers a valuable theoretical lens because the content that employees put in their primal marks may have anchoring effects that operate regardless of how the task has been framed. Parallel to the way numerical anchors exert disproportionate influence on the final number chosen in numerical tasks (e.g., Northcraft & Neale, 1987; Tversky & Kahneman, 1974), the initial content in the primal mark may impact novelty and usefulness disproportionately more than content added later in creative tasks.

Despite the abundance of research on anchoring effects in numerical tasks, little research has addressed anchoring effects in creativity tasks. However, research from at least three literatures suggests that the initial content used in creative tasks may be key in anchoring the creativity of the ideas produced in the end. First, research on design fixation suggests that when trying to develop new ideas, employees often take the path of least cognitive resistance and rely on familiar categories and schemas, limiting the

novelty of any "new" ideas they generate (e.g., Baughman & Mumford, 1995; Finke, 1990, 1995; Smith, Ward, & Schumacher, 1993). Second, research on inadvertent plagiarism and conformity suggests that when employees are exposed to example ideas as they begin creative tasks, they involuntarily incorporate aspects of the examples into their ideas (Kohn & Smith, 2011; Marsh, Ward, & Landau, 1999). Third, research on functional fixedness suggests that once employees associate a form with a given function, their thinking gets trapped within the form-function relationship and they have trouble thinking of any other functions that the form could serve (Adamson, 1952; Duncker, 1945; German & Barrett, 2005).

The underlying suggestion of this past theory and research is that starting with familiar content in mind when generating ideas constrains the creativity of any ideas that are ultimately developed. The primal mark concept integrates and extends beyond this past work in two key ways. First, these past perspectives have focused on how the initial content used impacts the subsequent novelty of ideas, overlooking the usefulness dimension of creativity in organizations. When usefulness is also considered, familiar content may be a blessing—not just a curse—for creativity. Thus, the primal mark concept examines how the initial content in emerging ideas anchors the trajectory of both novelty and usefulness. Second, whereas past perspectives have focused principally on how initial content *constrains* creativity, the primal mark concept highlights how initial content can constrain or *enable* creativity (depending on how it anchors the trajectory of novelty and usefulness). By allowing novelty and usefulness to be constrained or enabled, the primal mark concept may help tell a more complete story of how the initial content employees use in their emerging ideas influences the creativity of their ideas in the end.

In the following section, I build hypotheses on how distinguishing between familiar vs. new primal marks—and the anchoring effects triggered by each—can help explain when and why novelty and usefulness diverge in creative tasks. The content of *familiar primal marks* is derived mainly from ideas that are already well known and conventional within the focal domain. The content of *new primal marks* is derived mainly from ideas that are novel to the domain, perhaps because they come from another domain. Later, I build hypotheses on how *integrative primal marks*, which combine content from familiar and new ideas, may help employees overcome the novelty–usefulness tradeoff. Fig. 1 provides a visual summary of all the hypotheses.

Experiment 1: Familiar vs. new primal marks in the divergence of novelty and usefulness

Scholars have long recognized that creative ideas come from recombining elements of existing ideas (Koestler, 1964; Welch, 1946). As Weick (1979, p. 252) states, developing creative ideas entails "putting new things in old combinations and old things in new combinations." However, starting with "old things" (i.e., familiar primal marks) may have very different implications than starting with "new things" (i.e., new primal marks). Within any organization, ideas get developed and circulated to serve the purposes of people in one or more broader domains (Burt, 1992, 2004). Over time, some ideas gain legitimacy and become taken for granted within the domain (Meyer & Rowan, 1977). These familiar ideas are represented in the mind as schemas—i.e., mental frameworks for organizing and processing knowledge (Thorndyke, 1984). As ideas become more familiar to employees, they form richer and more elaborate schemas of them (Tversky & Hemenway, 1984), making the familiar ideas more likable

Trajectories of Familiar, New, and Integrative Primal Marks
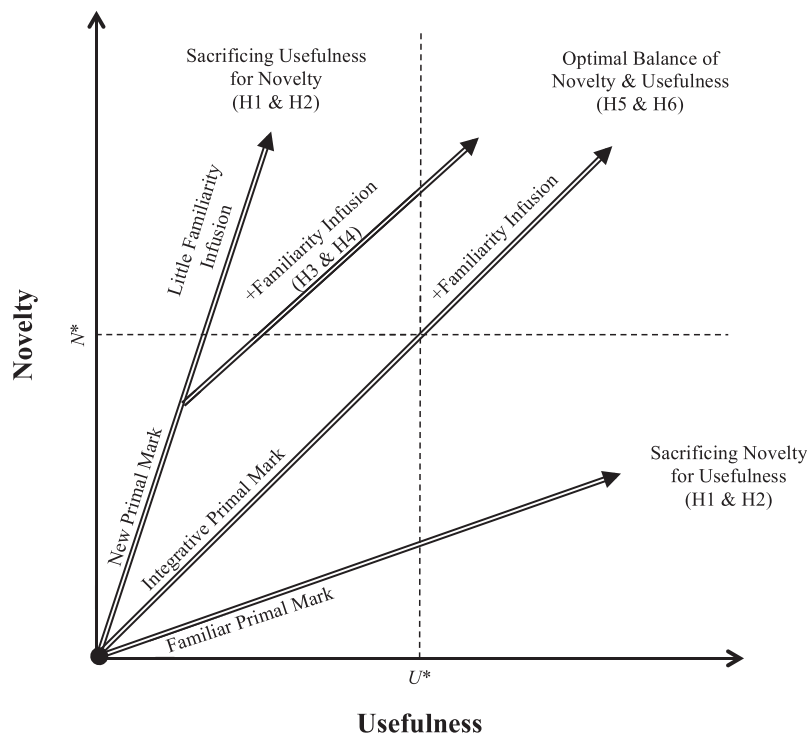
Note: While N^* and U^* are theoretical midpoints when the number of possible ideas is theoretically infinite, for a finite sample of ideas, N^* and U^* can be operationalized as the means of perceived novelty and usefulness respectively.

Fig. 1. Trajectories of familiar, new, and integrative primal marks. *Note:* While N^* and U^* are theoretical midpoints when the number of possible ideas is theoretically infinite, for a finite sample of ideas, N^* and U^* can be operationalized as the means of perceived novelty and usefulness respectively.

(Zajonc, 1968; Monahan, Murphy, & Zajonc, 2000), memorable (Bornstein & D'Agostino, 1992), and difficult to change (Ward, 1994). Consequently, within any mature organization and domain, employees are embedded in a constellation of familiar ideas that they carry around in their minds as relatively vivid, readily available, and fixed schemas.

When employees lay down a familiar primal mark, they may anchor their thinking within such a constellation of familiar ideas. Because familiar ideas are more readily available in memory than more novel ideas (Schwarz et al., 1991; Tversky & Kahneman, 1973), the vivid schemas that they associate with the familiar elements in the primal mark are likely to come to mind (Tversky & Hemenway, 1984). Thus, employees may be primed to have familiar schemas dominate their thinking as they develop their ideas, diminishing the ease with which any relatively novel elements or associations may come to mind as they flesh out their emerging ideas (e.g., Chartrand & Bargh, 1996; Friedman et al., 2003). In other words, familiar primal marks may anchor employees' thinking such that the path of least cognitive resistance is to only consider ideas that are closely related to the familiar primal mark (Ward et al., 1999). Because employees tend to take the basic structure of familiar ideas for granted (Finke, 1990; Ward, 1994), they are likely to get "stuck in the weeds" and focus on relatively minor modifications to any familiar ideas that come to mind (Förster, 2009). While this may promote convergent thinking that helps them identify useful improvements to familiar ideas (Cropley, 2006), remaining within the basic boundaries of familiar schemas may come at the expense of novelty.

Whereas familiar primal marks are likely to anchor employees' thinking within familiar schemas, primal marks derived mainly from novel content—i.e., new primal marks—may anchor their thinking in a constellation of schemas that are relatively novel to the domain (Tversky & Hemenway, 1984). Because employees are unlikely to have conventional associations with the content in new primal marks, they are unlikely to have familiar schemas dominate their thinking as they develop their ideas (Schwarz et al., 1991; Tversky & Kahneman, 1973; Ward, 1994). Instead, as employees flesh out new primal marks, the path of least cognitive resistance is likely to include elements of relatively novel ideas that they associate with the content of the new primal mark. In this way, new primal marks may enable employees to escape the anchoring effects of familiar schemas early in creative tasks, which may help them see opportunities for recombining elements of ideas in more fundamental and divergent ways (Förster, 2009; Friedman et al., 2003). However, the highly novel ideas that result may be perceived as low in usefulness, as others in the domain may lack the schemas to understand and appreciate them (Hargadon & Douglas, 2001). Taken together, these arguments suggest a novelty–usefulness tradeoff: familiar primal marks favor usefulness at the expense of novelty, while new primal marks favor novelty at the expense of usefulness.

Hypothesis 1. New primal marks lead to final ideas that are more novel than familiar primal marks.

Hypothesis 2. New primal marks lead to final ideas that are less useful than familiar primal marks.

Method

Participants and procedures

This first experiment was designed to test H1 and H2. Participants were 185 university students (57.8% female), ranging in age from 18 to 34 years ($M = 20.66$, $SD = 1.64$). The experiment followed a 2 (primal mark: new, familiar) × 2 (creative problem: new, familiar) factorial design with both factors varied between subjects. The novelty of the creative problem at hand was manipulated to help differentiate framing effects in the task identification stage from the subsequent anchoring effects of the primal mark. Research on problem constructions suggests that when creative tasks are framed around a novel problem/goal, the ideas produced are more creative in the end (Csikszentmihalyi & Getzels, 1971; Mumford et al., 1997). Thus, the effects of the primal mark were tested within a relatively new problem and a more familiar problem to help test the discriminant validity of the primal mark concept and the robustness of its anchoring effects on novelty and usefulness.

The procedures were designed to foster both mundane and psychological realism (Berkowitz & Donnerstein, 1982). To foster mundane realism, the task was designed to mirror Amabile's (1996) aforementioned four-stage model of the creative process, as empirical evidence suggests employees often develop creative ideas through these four basic stages (Lubart, 2001). To foster psychological realism, the creative task was from a domain about which participants had fairly extensive knowledge—their university bookstore—and participants were informed that their product ideas would be passed along to the bookstore.

Participants were guided through the procedures by a computerized survey. First, participants were informed that the university bookstore was looking for creative ideas for an innovative product to sell to students. Following evidence that creativity is facilitated by explicit goals to produce novel and appropriate/useful output (Shalley, 1991), participants were told that their goal was to develop a novel and useful idea. While all participants started the task identification stage with this same information, to manipulate the creative problem at hand, participants were either informed that the bookstore was looking for product ideas that will help roommates stay organized (familiar problem) or help roommates get along better (new problem). Then, during the preparation stage, to manipulate the primal mark, all participants were told: "It is helpful to use aspects of existing products as inspiration for coming up with ideas for a new product. So, when coming up with your different ideas, start with one or more elements of the product pictured below." For the familiar primal mark conditions, the photo was a white/cork board, and for the new primal mark conditions, the photo was a fishing pole.

These stimuli were selected from a pretest of 40 photos of products and 26 problems, which were rated by a separate sample of 30 university students. Half of the possible photos for the primal mark manipulations were of products already sold in the bookstore and half were products from other domains. Similarly, half the possible problems had conventional associations with products already sold in the bookstore (e.g., helping students show school pride) and half were associated with products from other domains (e.g., helping students meet new people). Respondents rated the possible products on novelty—or the degree to which they saw each product as novel (vs. conventional) for the bookstore domain. They rated the possible problems on novelty and potential usefulness—or the degree to which students would find a product to be useful if it solved the given problem. Both novelty and potential usefulness were rated on a 7-point scale (1 = "very low", 7 = "very high"). To foster fair comparisons between conditions (Cooper & Richardson, 1986), the familiar and new problems were selected

to differ in novelty but not in potential usefulness, such that participants in all conditions started with an equally high ceiling on usefulness. The new stimulus pretested as significantly more novel than the familiar one for both the primal mark, $t(29) = 18.09$, $p < .00001$, $d = 4.01$, and the problem, $t(29) = 11.10$, $p < .00001$, $d = 1.96$, but the two problems did not significantly differ in potential usefulness, $t(29) = 0.13$, $p = .42$.

Next, in the response generation stage, participants were asked to generate a list of at least three different ideas, then choose one of the ideas to further develop. Asking for at least three different ideas was intended to strengthen the primal mark manipulations by encouraging deeper processing of the task, as well as foster higher-quality ideas based on evidence that quantity can boost quality in creative tasks (Beaty & Silvia, 2012; Paulus, Kohn, & Arditti, 2011). In all four experiments, at least 97% of participants generated three ideas, and no participants generated more than five ideas. Also, the percentage of participants who selected the first, second, third, fourth, or fifth idea they generated did not significantly differ between conditions in all four experiments. The response generation stage concluded with participants selecting one of their nascent ideas to further develop, carrying the primal mark they set in generating the idea with it into the response validation stage.

In the response validation stage, all participants were asked to spend at least 5 min developing their nascent idea on scratch paper. To help embed participants in the bookstore domain and thus simulate what employees typically experience when trying to elaborate creative ideas in organizations, participants were shown photos of nine different products that were sold in the bookstore and were told that they should feel free to consider these products as they develop their idea. To help control the amount of time participants spent elaborating their ideas across conditions, they could not advance until 5 min had passed. After participants finished developing their idea on scratch paper, they described their finalized idea on the other side of the paper.

Measures

Amabile's (1996) consensual assessment technique was used to measure the novelty and usefulness of participants' ideas. Since the viewpoints of both the bookstore and its customers are important in determining the usefulness of products in this domain, raters were recruited to provide both of these perspectives. Specifically, a total of nine expert raters assessed the final ideas, including three managers from the bookstore (General Manager, Assistant General Manager, and Purchasing Manager) and six customers of the bookstore. The three managers averaged 14 years of experience working in university bookstores, and six years in this particular bookstore. The six customers had all been undergraduates at the university for at least two years, and they all extensively reviewed the products sold by the bookstore before rating. In addition, a separate set of three undergraduates rated participants' selected nascent ideas.

All of the raters were blind to the hypotheses and procedures of the study, and each rater received the same set of instructions. Following suggested practice, each rater assessed the ideas in a different randomized order, and looked over 15 ideas before rating (Amabile, 1996). Novelty and usefulness were each rated using the same 1–7 scale (1 = "very low", 4 = "moderate", 7 = "very high"). Both dimensions were defined broadly to ensure that they were equally relevant to both managers and customers, but also in a way that accounted for context. Novelty was defined as: "The degree to which the idea is unique from other products, especially compared to products sold in the bookstore, but also compared to products that exist in general. How original is the idea?"

Table 1
Means, standard deviations, interrater statistics, and correlations by experiment.

Variable	Mean	SD	ICC2	AD_M	AD_{Md}	1	2	3	4	5	6
Experiment 1											
1. Nascent novelty	3.23	1.53	.76	0.96	0.81						
2. Final novelty	3.42	1.10	.84	1.12	1.04	.63***					
3. Nascent usefulness	3.99	1.17	.64	0.74	0.62	.15*	−.08				
4. Final usefulness	3.86	0.89	.84	0.93	0.89	.09	.04	.53***			
5. Final creativity	3.38	0.98	.62	0.74	0.65	.53***	.75***	.16*	.42***		
6. Minutes taken	14.48	3.08	n/a	n/a	n/a	.15*	.16*	.13	.25**	.25***	
Experiment 2											
1. Nascent novelty	3.68	1.63	.73	1.08	0.92						
2. Final novelty	3.35	1.11	.87	1.03	0.99	.52***					
3. Nascent usefulness	4.06	1.17	.59	1.06	0.80	.40***	.14*				
4. Final usefulness	4.15	0.83	.82	0.92	0.90	.08	.07	.35***			
5. Final creativity	3.40	1.03	.68	0.69	0.64	.37***	.60***	.14	.33***		
6. Minutes taken	14.81	4.81	n/a	n/a	n/a	.23**	.22**	.21**	.23**	.18*	
Experiment 3											
1. Nascent novelty	3.09	1.76	.82	0.85	0.71						
2. Final novelty	3.20	1.27	.86	0.90	0.86	.69***					
3. Nascent usefulness	4.28	1.37	.68	0.91	0.78	.19**	.10				
4. Final usefulness	4.09	0.83	.73	0.92	0.96	.09	.14*	.57***			
5. Final creativity	3.25	1.06	.78	0.73	0.66	.56***	.80***	.20**	.32***		
6. Minutes taken	14.00	2.59	n/a	n/a	n/a	.00	.16*	.04	.13	.17*	
Experiment 4											
1. Nascent novelty	3.38	1.05	.52	1.22	1.21						
2. Final novelty	3.77	0.95	.88	0.84	0.81	.24***					
3. Nascent usefulness	3.06	1.10	.66	1.20	1.19	.10	−.20**				
4. Final usefulness	3.40	0.82	.83	0.87	0.83	−.15*	−.23**	.45***			
5. Nascent creativity	3.02	0.92	.51	1.08	1.08	.55***	−.05	.78***	.25***		
6. Final creativity	3.28	0.70	.79	0.82	0.77	.07	.53***	.25***	.58***	.21**	
7. Minutes taken	13.34	4.47	n/a	n/a	n/a	.07	.17*	−.17*	−.08	−.09	.04

AD_M = average deviation from mean.
AD_{Md} = average deviation from median.
For AD_M and AD_{Md}, values below 1.20 are considered high interrater agreement for 7-point scales (LeBreton & Senter, 2008).
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Usefulness was defined as: "The degree of value offered by the idea. How useful would this product be if it was sold in the bookstore?" Three of the customers also rated the final ideas on overall creativity, defined as: "Overall degree to which the idea is both novel and useful. How innovative is the idea in the university bookstore domain?" The manager and customer ratings were highly correlated ($r = .65$ for novelty, and $r = .67$ for usefulness), and thus were averaged together to provide a consensual assessment of novelty and usefulness from both of these key stakeholders in the domain (Amabile, 1996).[1]

Each set of raters met conventional standards for reliability and agreement—see Table 1 (LeBreton & Senter, 2008). Both novelty and usefulness showed a fair amount of stability over time, as nascent novelty and final novelty were significantly correlated, as were nascent usefulness and final usefulness. Final ideas that were rated high in novelty but low in usefulness included a trash can on wheels that could be retrieved from across the room using a magnet, as well as a pulley system between roommates beds' for sharing notes and food items. Final ideas rated low in novelty but high in usefulness included a digital electronic whiteboard and a bookshelf with whiteboard sides. Final ideas rated high in both novelty and usefulness included an adjustable room divider, as well as an electronic "communication sign" for the door that roommates could use with a wireless remote control. Means by condition are in Table 2.

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[1] When analyzed separately, the pattern of results was the same for both the manager and customer ratings in Experiments 1 and 2.

Results

To test H1 (new primal marks yield more novel ideas than familiar primal marks), a between-subjects ANOVA was used, crossing the primal mark and the problem with final novelty as the dependent variable (see Table 3). Because H1 is concerned with the variance that novelty and usefulness do not share, final usefulness was included as a control to account for any spillover between the two dimensions. This revealed a significant main effect for the primal mark, $F(1, 180) = 32.20$, $p < .00001$, $\eta^2 = .15$. As predicted in H1, new primal marks ($M = 3.82$, $SD = 1.06$) led to final ideas that were higher in novelty than familiar primal marks ($M = 3.05$, $SD = 1.00$).

To test H2 (new primal marks yield less useful ideas than familiar primal marks), the same ANOVA was used, but with final usefulness as the dependent variable and final novelty as a control. This revealed a significant main effect for the primal mark, $F(1, 180) = 6.23$, $p = .01$, $\eta^2 = .03$. As predicted in H2, new primal marks ($M = 3.65$, $SD = 1.03$) led to final ideas that were lower in usefulness than familiar primal marks ($M = 4.06$, $SD = 0.69$).

In sum, the results from Experiment 1 support H1 and H2. However, it is possible that these results were driven by idiosyncrasies in the stimuli used in the manipulations, rather than the psychological effects of new vs. familiar primal marks. Thus, Experiment 2 was designed to not only test H3 and H4 (which are developed below), but also to constructively replicate H1 and H2 by using different stimuli in the manipulations.

Table 2
Experiment 1: Means, temporal changes, and Tukey HSD results.

Condition	Nascent novelty (*SD*)	Final novelty (*SD*)	Novelty Δ	Tukey HSD: Final novelty (H1)[a]	Nascent usefulness (*SD*)	Final usefulness (*SD*)	Usefulness Δ	Tukey HSD: Final usefulness (H2)[b]	Final creativity (*SD*)[c]
New problem									
New primal mark (*n* = 43)	3.16 (1.49)	4.09 (0.97)	[*t*(42) = 4.84, *p* = .00002, *d* = 0.74]		2.94 (1.01)	3.37 (1.10)	[*t*(42) = 2.46, *p* = .02, *d* = 0.41]		3.48 (1.06)
Familiar primal mark (*n* = 47)	3.06 (1.49)	3.06 (1.04)	[*t*(46) = −0.06, *p* = .95, *d* = 0.00]	[*M* = 1.04, *CI*.95 (0.62, 1.46), *p* < .00001, *d* = 1.02]	4.32 (1.13)	4.04 (0.76)	[*t*(46) = −2.07, *p* = .045, *d* = −0.29]	[*M* = −0.66, *CI*.95 (−1.02, −0.31), *p* = .0003, *d* = −0.71]	3.35 (1.03)
Familiar problem									
New primal mark (*n* = 46)	3.46 (1.38)	3.56 (1.07)	[*t*(45) = 0.60, *p* = .55, *d* = 0.08]	[*M* = 0.54, *CI*.95 (0.11, 0.96), *p* = .01, *d* = 0.52]	4.09 (0.84)	3.91 (0.89)	[*t*(45) = −1.31, *p* = .20, *d* = −0.21]	[*M* = −0.54, *CI*.95 (−0.89, −0.18), *p* = .003, *d* = −0.54]	3.58 (0.93)
Familiar primal mark (*n* = 49)	3.28 (1.76)	3.04 (0.97)	[*t*(48) = −1.39, *p* = .17, *d* = 0.17]	[*M* = 1.05, *CI*.95 (0.63, 1.47), *p* < .00001, *d* = 1.08]	4.47 (1.07)	4.08 (0.63)	[*t*(48) = −2.97, *p* = .005, *d* = −0.44]	[*M* = −0.71, *CI*.95 (−1.06, −0.35), *p* = .0001, *d* = −0.79]	3.14 (0.87)

Notes: Δ = pairwise *t*-tests from nascent to final.
[a] Difference in final novelty between the new primal mark, new problem condition and each other condition.
[b] Difference in final usefulness between the new primal mark, new problem condition and each other condition.
[c] New primal marks (*M* = 3.53, *SD* = 0.99) yielded ideas significantly higher in overall creativity than familiar primal marks (*M* = 3.25, *SD* = 0.95), *t*(183) = 2.00, *p* = .048, *d* = 0.29.

Table 3
Experiment 1: ANOVA results.

Variable	Hypothesis 1 (DV = Final novelty)			Hypothesis 2 (DV = Final usefulness)		
	df	*F*	η^2	*df*	*F*	η^2
Primal mark	1	32.20***	.15	1	15.91***	.08
Problem[a]	1	5.00*	.03	1	6.93**	.04
Primal mark × Problem[b]	1	4.35*	.02	1	5.21*	.03
Final usefulness (final novelty for usefulness DV)	1	5.68*	.03	1	5.68**	.03
	R^2 = .18 *F*(4, 180) = 9.76***			R^2 = .12 *F*(4, 180) = 6.39***		

* *p* < .05.
** *p* < .01.
*** *p* < .001.
[a] Regarding the significant main effects for the problem, ideas from the new problem conditions (*M* = 3.55, *SD* = 1.13) were higher in final novelty than the familiar problem conditions (*M* = 3.29, *SD* = 1.05), and ideas from the new problem conditions (*M* = 3.72, *SD* = 0.99) were lower in final usefulness than the familiar problem conditions (*M* = 4.00, *SD* = 0.77).
[b] Regarding the significant interactions between the primal mark and problem, Tukey HSD tests between each of the four conditions revealed that the new primal mark, new problem condition led to final ideas that were significantly more novel—and significantly less useful—than each of the other three conditions (see Table 2). In addition, the new primal mark, familiar problem condition led to ideas that were significantly more novel than both familiar primal mark conditions: new problem, [*M* = 0.50, *CI*.95 (0.09, 0.92), *p* = .02, *d* = 0.47], and familiar problem, [*M* = 0.52, *CI*.95 (0.11, 0.93), *p* = .01, *d* = 0.52]. However, the new primal mark, familiar problem condition was not significantly different from the two familiar primal mark conditions in final usefulness. These results suggest that new problems strengthen the anchoring effects of new primal marks, such that setting new primal marks to address new problems yields ideas that are even more novel—and even less useful—than setting new primal marks to address relatively familiar problems.

Experiment 2: Increasing the usefulness of ideas from new primal marks

The results from Experiment 1 suggest that familiar primal marks anchor the novelty of ideas low but the usefulness of ideas high, whereas new primal marks anchor novelty high but usefulness low. This raises the question: Can employees boost the novelty of ideas from familiar primal marks or the usefulness of ideas from new primal marks? Because familiar ideas tend to come to mind as relatively vivid, coherent, and fixed schemas (Tversky & Hemenway, 1984; Ward, 1994), the anchoring effect of familiar primal marks on novelty may be relatively difficult to overcome. In contrast, the anchoring effect of new primal marks on usefulness may be easier to overcome. The key to boosting the usefulness of ideas from new primal marks may be what design scholars call "skeuomorphs," which are familiar cues embedded in novel ideas that help individuals understand and appreciate novel ideas by leveraging their existing schemas (Heskett, 2003). For example, when it was novel, the concept of a computer "Desktop" was added to operating systems to tap individuals' existing schemas of a desktop in physical space. After employees set new primal marks, they may be able to increase the usefulness of their emerging ideas by elaborating them with familiar elements, which may infuse the novel ideas with greater meaning, clarity, and legitimacy (Hargadon & Douglas, 2001; McKinley, Mone, & Moon, 1999).

Moreover, elaborating new primal marks with familiar elements may increase usefulness without decreasing novelty. Because new primal marks anchor the development process around one or more novel elements, the novel element(s) are placed at the foundation of the emerging idea. Thus, any familiar elements that are incorporated will be folded into a relatively novel emerging idea. In other words, the familiar elements may become components of what is already a novel idea, helping others understand and appreciate the idea, thereby boosting usefulness without sacrificing novelty.

Hypothesis 3. Elaborating nascent ideas from new primal marks with familiar elements increases the usefulness of the final ideas that result.

Hypothesis 4. When elaborated with familiar elements, final ideas from new primal marks are still higher in novelty than final ideas from familiar primal marks.

Method

Participants and procedures

This second experiment was designed to test H3 and H4, as well as constructively replicate H1 and H2. Participants were 196 university students (68.9% female), ranging in age from 18 to 25 (M = 19.60, SD = 1.39). The design was the same as Experiment 1, but in addition to the novelty of the primal mark and problem framing, I also manipulated whether or not participants were encouraged to elaborate their primal marks with familiar elements. Thus, the experiment followed a 2 (primal mark: new, familiar) × 2 (problem: new, familiar) × 2 (familiarity infusion: with, without) factorial design.

Participants went through the same basic procedures as Experiment 1, except during the response validation stage when they elaborated their selected ideas for at least 5 min. During this step, participants were either shown photos of familiar products and encouraged to incorporate elements of them into their ideas or they were not shown photos nor given encouragement to incorporate familiar elements (in Experiment 1, they were shown familiar products but were not explicitly directed to incorporate them). Specifically, participants in the four conditions with familiarity infusion (as opposed to without familiarity infusion) were told: "When developing creative ideas, it helps to recombine and incorporate elements of existing ideas. So, to help develop your idea, try to incorporate elements of the bookstore products below as much as possible." To help foster motivation and psychological realism across conditions, a raffle prize was also introduced. Following suggested practice, this extrinsic reward was not introduced until the validation stage of the creative process and was explicitly tied to creative performance (Amabile, 1996). In particular, participants in all conditions were told: "Note that if your final idea is highly creative, you will be entered into a raffle for a $100 iTunes gift card. To qualify for the raffle, your idea must be considered both very novel and very useful."

Also, to help rule out the possibility that the effects from Experiment 1 were driven by idiosyncrasies of the stimuli, different stimuli were used in the manipulations. For the primal mark, I used a 3-ring binder (familiar) vs. an in-line skate (new), and for the problem, I used helping students do well in classes (familiar) vs. job interviews (new). The new stimulus pretested as significantly more novel than the familiar one for both the primal mark, $t(29)$ = 29.58, p < .00001, d = 7.31, and problem, $t(29)$ = 2.36, p = .03, d = 0.37, and the two problems did not significantly differ in potential usefulness, $t(29)$ = 1.19, p = .24. Lastly, the nine familiar products pictured in the familiarity infusion conditions were products sold in the bookstore (e.g., 3-hole puncher, calculator, index cards, etc.). These products were selected because they were relevant to helping students in classes (familiar problem) and could be analogically linked to helping students in job interviews (new problem) with relative ease.

Measures

Like Experiment 1, three managers and six customers rated the final ideas on novelty and usefulness (three of the customers rated overall creativity as well), and a separate set of three customers rated the selected nascent ideas. Each set of raters met conventional standards for both reliability and agreement—see Table 1 (LeBreton & Senter, 2008). The manager and customer ratings were again highly correlated (r = .70 for novelty, and r = .58 for usefulness), and were averaged together to provide a consensual assessment of final novelty and usefulness (Amabile, 1996). Final ideas that were rated high in novelty but low in usefulness included a Velcro arm strap with pouches for business cards, as well as "hand socks" to absorb sweat while students nervously await interviews. Final ideas rated low in novelty but high in usefulness included a binder made

especially for organizing resources for job interviews, as well as a book stand on wheels that makes it easy to move books around a workspace. Final ideas rated high in both novelty and usefulness included a notepad with voice recognition that discretely reminds the interviewee how much each person has talked during the interview, as well as a pen with small nodules that retract as time passes, helping the interviewee know how much time is left (see Appendix for example visuals). Means by condition are in Table 4.

Results

To test H1, an ANOVA was used—crossing primal mark, problem, and familiarity infusion—with final novelty as the dependent variable and final usefulness as a control (see Table 5). This revealed a significant main effect for the primal mark, $F(1,187)$ = 35.93, p < .00001, η^2 = .16. As predicted in H1, new primal marks (M = 4.01, SD = 1.03) led to final ideas that were higher in novelty than familiar primal marks (M = 3.27, SD = 0.89).

To test H2 and H3 (elaborating new primal marks with familiar elements increases usefulness), the same ANOVA was conducted but with final usefulness as the dependent variable and final novelty as a control (see Table 5). As predicted in H2 and H3 respectively, this revealed a significant main effect for the primal mark, $F(1,187)$ = 20.87, p < .00001, η^2 = .10, and a significant two-way interaction between the primal mark and familiarity infusion, $F(1,187)$ = 9.18, p = .003, η^2 = .05. As predicted in H2, new primal marks (M = 3.83, SD = 0.92) led to final ideas that were lower in usefulness than familiar primal marks (M = 4.21, SD = 0.58). As predicted in H3, a planned t-test revealed new primal marks that received a familiarity infusion led to final ideas that were significantly higher in usefulness (M = 4.17, SD = 1.01) than final ideas from new primal marks that did not receive a familiarity infusion (M = 3.48, SD = 0.66), $t(93)$ = −3.97, p = .0001, d = −0.81. In contrast, for ideas from familiar primal marks, there was not a significant difference in final usefulness between the with (M = 4.21, SD = 0.45) vs. without (M = 4.20, SD = 0.70) familiarity infusion conditions, $t(99)$ = −0.10, p = .92.

To test H4 (infusing new primal marks with familiarity yields ideas that are still more novel than ideas from familiar primal marks), a planned t-test was conducted comparing the final novelty of the two new primal mark with familiarity infusion conditions (M = 4.12, SD = 0.98) to the four familiar primal mark conditions (M = 3.27, SD = 0.89). As predicted, ideas from the new primal mark with familiarity infusion conditions were significantly higher in final novelty than ideas from familiar primal marks, $t(147)$ = 5.24, p < .00001, d = 0.91. In addition, Tukey HSD tests between the new primal mark with familiarity infusion conditions and each of the four familiar primal mark conditions were all significant in the predicted direction (see Table 4). In sum, the results from Experiment 2 constructively replicate H1 and H2, as well as support H3 and H4.

Experiment 3: Infusing novelty into familiar primal marks

To test the possibility that the novelty of ideas from familiar primal marks may be increased through infusing new elements, a third experiment was conducted. Participants were 206 university students (58.3% female), ranging in age from 18 to 30 (M = 20.04, SD = 1.92). The same manipulations from Experiment 2 were used. However, in fleshing out their primal marks, participants were encouraged to infuse elements of nine products from outside the bookstore domain, which all pretested above the median in novelty (e.g., a piano, Swiss army knife, Legos, etc.). Three bookstore customers rated participants' selected nascent ideas, and a separate set of six customers rated their final ideas—three of the six

Table 4
Experiment 2: Means, temporal changes, and Tukey HSD results.

Condition	Nascent novelty (SD)	Final novelty (SD)	Novelty Δ	Final novelty Tukey HSD for H4 (New PM with familiarity infusion conditions – each familiar PM condition)	Nascent usefulness (SD)	Final usefulness (SD)	Usefulness Δ	Final creativity (SD)[a]
New problem								
New primal mark								
With familiarity infusion (n = 24)	4.19 (1.92)	4.28 (0.93)	[t(23) = 0.30, p = .77, d = 0.06]		3.68 (1.58)	4.21 (0.66)	[t(23) = 1.82, p = .08, d = 0.44]	3.86 (0.78)
Without familiarity infusion (n = 23)	3.63 (1.76)	4.14 (0.91)	[t(22) = 1.69, p = .11, d = 0.36]		3.99 (1.40)	3.15 (0.80)	[t(22) = −3.16, p = .005, d = −0.74]	3.36 (0.89)
Familiar primal mark								
With familiarity infusion (n = 26)	3.35 (1.40)	3.13 (0.65)	[t(25) = −0.81, p = .42, d = −0.20]	[M = 0.99, CI.95 (0.37, 1.61), p = .0002, d = 1.20]	3.87 (0.66)	4.25 (0.39)	[t(25) = 2.32, p = .03, d = 0.70]	2.83 (0.92)
Without familiarity infusion (n = 25)	3.85 (1.55)	3.44 (0.79)	[t(24) = −1.51, p = .15, d = −0.33]	[M = 0.68, CI.95 (0.05, 1.30), p = .03, d = 0.76]	4.17 (0.90)	4.06 (0.61)	[t(24) = −0.61, p = .55, d = −0.14]	3.24 (0.89)
Familiar problem								
New primal mark								
With familiarity infusion (n = 24)	3.82 (1.53)	3.96 (1.03)	[t(23) = 0.46, p = .65, d = 0.11]		4.08 (1.48)	4.14 (0.68)	[t(23) = 0.20, p = .85, d = 0.05]	3.97 (0.97)
Without familiarity infusion (n = 24)	3.61 (1.77)	3.66 (1.19)	[t(23) = 0.14, p = .89, d = 0.03]		3.93 (1.24)	3.80 (1.09)	[t(23) = −0.55, p = .59, d = −0.11]	3.51 (1.09)
Familiar primal mark								
With familiarity infusion (n = 25)	3.08 (1.44)	3.10 (0.88)	[t(24) = 0.06, p = .95, d = 0.02]	[M = 1.02, CI.95 (0.39, 1.65), p = .0001, d = 1.10]	4.15 (0.91)	4.18 (0.51)	[t(24) = 0.16, p = .88, d = 0.04]	2.93 (1.12)
Without familiarity infusion (n = 25)	3.93 (1.60)	3.42 (1.17)	[t(24) = −2.31, p = .03, d = −0.36]	[M = 0.69, CI.95 (0.07, 1.32), p = .02, d = 0.65]	4.58 (0.93)	4.35 (0.76)	[t(24) = −1.31, p = .20, d = −0.27]	3.55 (1.10)

Notes: Δ = pairwise *t*-tests from nascent to final; PM = Primal Mark.

[a] As in Experiment 1, new primal marks (*M* = 3.68, *SD* = 0.96) yielded ideas significantly higher in overall creativity than familiar primal marks (*M* = 3.13, *SD* = 1.03), *t*(194) = 3.83, *p* = .0002, *d* = 0.55.

Table 5
Experiment 2: ANOVA results.

	Hypothesis 1 (DV = Final novelty)			Hypotheses 2 and 3 (DV = Final usefulness)		
	df	F	η^2	df	F	η^2
Primal mark	1	35.93***	.16	1	20.87***	.10
Problem	1	3.79	.02	1	5.43*,a	.03
Familiarity infusion	1	1.07	.01	1	13.16***	.07
Primal mark × Problem	1	2.43	.01	1	1.30	.01
Primal mark × Familiarity infusion	1	1.66	.01	1	9.18**	.05
Problem × Familiarity infusion	1	0.61	.00	1	7.62**,b	.04
Primal mark × Problem × Familiarity infusion	1	0.26	.00	1	0.95	.01
Final usefulness (final novelty for usefulness DV)	1	7.18**	.04	1	7.18**	.04
	R^2 = .20			R^2 = .24		
	F(8, 187) = 5.73***			F(8, 92) = 7.20***		

* *p* < .05.
** *p* < .01.
*** *p* < .001.

[a] Regarding the significant main effect for the problem, ideas from the new problem conditions (*M* = 3.93, *SD* = 0.76) were lower in final usefulness than the familiar problem conditions (*M* = 4.12, *SD* = 0.80).

[b] Regarding the significant interaction between the problem and familiarity infusion, the familiarity infusion significantly increased final usefulness for new problems, *t*(96) = 4.31, *p* = .00004, *d* = 0.88, but not for familiar problems, *t*(96) = 0.49, *p* = .63, *d* = 0.01.

rated the final ideas on overall creativity in addition to novelty and usefulness (see Table 1 for interrater statistics).

To test whether familiar primal marks still anchor novelty even when new elements are infused, an ANOVA was conducted, crossing the primal mark (new or familiar) and problem (new or familiar) with final novelty as the dependent variable and final usefulness as a control. This revealed a significant main effect for the primal mark, *F*(1, 201) = 28.00, *p* < .00001, η^2 = .12. As expected, familiar primal marks (*M* = 2.69, *SD* = 1.01) yielded less novel final ideas than new primal marks (*M* = 3.72, *SD* = 1.20). In addition, a paired-samples *t*-test revealed that ideas from familiar primal marks did not significantly change in novelty from nascent (*M* = 2.67, *SD* = 1.49) to final (*M* = 2.69, *SD* = 1.01), *t*(103) = 0.23, *p* = .82. These results suggest that familiar primal marks anchor

novelty lower than new primal marks even if new elements are infused after the primal mark, providing additional support for H1. The results from Experiment 3 also provide additional support for H2, in that new primal marks led to final ideas that were significantly lower in usefulness than familiar primal marks (see Table 7).

Taken together, the results for H1–H4 suggest that novelty is more rigidly anchored by the primal mark than usefulness. Thus, the best solution to the novelty–usefulness tradeoff would seem to be setting a new primal mark and elaborating it with familiar elements. Indeed, in Experiments 1–3, new primal marks yielded ideas significantly higher in overall creativity than familiar primal marks (see Tables 2, 4 and 6). Furthermore, in Experiment 2, new primal marks *with* familiarity infusion ($M = 3.92$, $SD = 0.87$) yielded ideas significantly higher in overall creativity than new primal marks *without* familiarity infusion ($M = 3.44$, $SD = 0.95$), $t(93) = 2.49$, $p = .01$, $d = 0.53$. This suggests that the boost in usefulness from infusing familiarity helps increase the overall creativity of ideas from new primal marks. However, this approach may come with the risk of producing ideas that are relatively more novel than they are useful, especially because some new primal marks may anchor usefulness more rigidly than others. This raises the question: What primal marks anchor the trajectory of emerging ideas such that novelty *and* usefulness (and thus overall creativity) are maximized?

Experiment 4: Integrative primal marks and overcoming the novelty–usefulness tradeoff

In addition to primal marks that are principally derived from familiar or new content, employees may set *integrative primal marks* by combining familiar and new content into one primal mark. To do so, they likely have to engage in analogical thinking, which is conducive to identifying novel connections between previously distinct ideas (Dahl & Moreau, 2002; Thompson, Gentner, & Loewenstein, 2000). When thinking analogically, individuals search for higher-level, abstract parallels between two or more ideas, as opposed to similarities between the lower-level literal attributes of the ideas (Gentner, 1989). Integrative primal marks are set when elements of familiar and new ideas are analogically combined into one emerging idea. Whereas familiar or new primal marks may lead to analogical thinking after the primal mark is set (as additional elements are infused), analogical thinking is required in the actual creation of integrative primal marks. Because elements of familiar and new ideas are unlikely to share many literal attributes with one another, trying to recombine familiar and new elements may prime employees to think analogically in integratively complex ways (Miron-Spektor, Gino, & Argote, 2011; Tetlock, 1983). This complex analogical thinking may foster the

identification of more fundamental—and thus more novel—ways of recombining the familiar and new content into one emerging idea. Thus, regardless of whether they address a new or familiar problem, integrative primal marks anchor the development process around a novel recombination of elements. In turn, the novelty of ideas from integrative primal marks should remain relatively high as they are developed, because any familiar elements that are added will be folded into an already novel recombination.

Integrative primal marks may also facilitate the rise of usefulness more than new primal marks. Because the core of integrative primal marks includes one or more familiar elements, employees should have a constellation of familiar schemas that they and others in the domain already associate with central aspects of the primal mark. Employees can leverage these familiar schemas to enhance the clarity, meaning, legitimacy—and thus usefulness—of their emerging ideas. For example, through analogical thinking, medical researchers realized that technology created by NASA for the Hubble Telescope to pinpoint specific stars was parallel to the challenge of finding abnormal tissue in mammograms—both involve detecting small signals amid a wide range of noise (NASA, 1997). This led medical researchers to set an integrative primal mark, in which they analogically combined elements of the Hubble technology (new content) and mammogram testing (familiar content) into one emerging idea. The researchers were able to leverage doctors' familiar schemas of mammogram testing to enhance the usefulness of the new technology in pinpointing abnormal spots of tissue. This yielded an idea that was seen as highly novel and useful in the medical domain (NASA, 1997).

Table 7
Experiment 3: ANOVA results.

Variable	H1 (DV = Final novelty)			H2 (DV = Final usefulness)[a]		
	df	F	η^2	df	F	η^2
Primal mark	1	44.72***	.18	1	5.64*	.03
Problem	1	1.47	.01	1	1.65	.01
Primal mark × Problem	1	1.35	.01	1	0.07	.00
Final usefulness (final novelty for usefulness DV)	1	7.27**	.04	1	7.27**	.04
	$R^2 = .21$			$R^2 = .06$		
	$F(4, 201) = 13.17$***			$F(4, 201) = 2.91$*		

* $p < .05$.
** $p < .01$.
*** $p < .001$.
[a] Consistent with H2, new primal marks ($M = 4.01$, $SD = 1.02$) led to final ideas that were lower in usefulness than familiar primal marks ($M = 4.17$, $SD = 0.58$).

Table 6
Experiment 3: Means and temporal changes by condition.

Condition	Nascent novelty (SD)	Final novelty (SD)	Novelty Δ	Nascent usefulness (SD)	Final usefulness (SD)	Usefulness Δ	Final creativity (SD)[a]
New problem							
New primal mark	3.78	3.69	[$t(49) = -0.54$, $p = .59$,	4.40	3.92	[$t(49) = -2.57$, $p = .01$,	3.46
($n = 50$)	(2.06)	(1.46)	$d = 0.04$]	(1.67)	(0.99)	$d = 0.35$]	(1.10)
Familiar primal mark	2.49	2.48	[$t(51) = -0.03$, $p = .99$,	4.17	4.08	[$t(51) = -0.53$, $p = .60$,	2.75
($n = 52$)	(1.43)	(1.00)	$d = 0.01$]	(1.25)	(0.51)	$d = 0.09$]	(0.94)
Familiar problem							
New primal mark	3.26	3.75	[$t(51) = 2.47$, $p = .02$,	4.15	4.10	[$t(51) = -0.33$, $p = .74$,	3.70
($n = 51$)	(1.73)	(1.14)	$d = 0.33$]	(1.39)	(1.06)	$d = -0.04$]	(1.10)
Familiar primal mark	2.85	2.91	[$t(51) = 0.31$, $p = .76$,	4.42	4.26	[$t(51) = -1.22$, $p = .23$,	3.10
($n = 52$)	(1.55)	(0.99)	$d = 0.05$]	(1.12)	(0.64)	$d = -0.18$]	(0.83)

Notes: Δ = pairwise *t*-tests from nascent to final.
[a] As in Experiments 1 and 2, new primal marks ($M = 3.58$, $SD = 1.10$) yielded ideas significantly higher in overall creativity than familiar primal marks ($M = 2.93$, $SD = 0.90$), $t(204) = 4.66$, $p < .00001$, $d = 0.65$.

In sum, familiar and new primal marks help explain why employees often face a novelty–usefulness tradeoff: familiar primal marks send ideas toward usefulness but away from novelty, while new primal marks send ideas toward novelty but away from usefulness. Integrative primal marks, however, send ideas toward an optimal balance of novelty and usefulness. In this way, integrative primal marks plant the seeds for greater novelty than familiar primal marks, greater usefulness than new primal marks, and thus greater overall creativity than both familiar and new primal marks.

Hypothesis 5. When elaborated with familiar elements, integrative primal marks lead to final ideas that are (a) more novel than final ideas from familiar primal marks, and (b) more useful than final ideas from new primal marks.

Hypothesis 6. When elaborated with familiar elements, integrative primal marks lead to final ideas that are more creative overall than final ideas from (a) familiar primal marks, and (b) new primal marks.

Method

Participants and procedures

This fourth experiment was designed to test H5 and H6, as well as constructively replicate key results from Experiments 1–3. Participants were 226 university students (63.3% female), ranging in age from 18 to 32 years ($M = 20.12$, $SD = 1.88$). The experiment followed a 4 (primal mark: new, familiar, integrative, familiar-analogy) × 2 (problem: new, familiar) factorial design. The familiar-analogy conditions were included to help rule out the possibility that the effects of integrative primal marks are driven by analogical thinking in general, as opposed to specifically analogical thinking between new and familiar content.

Participants went through the same basic procedures as Experiments 1–3, but with four key differences that were intended to build on Experiments 1–3. First, because the creative task in Experiments 1–3 involved relatively concrete ideas (i.e., tangible bookstore products), the task in Experiment 4 involved ideas that were relatively abstract in nature. Specifically, participants were asked to develop a creative idea for evaluating applicants to their university, and were informed that their idea would be sent along to the admissions office for their consideration. Second, to help mitigate the threat of demand characteristics in the primal mark manipulations, participants were told that the concept(s) they were given were randomly selected. Third, while past research suggests that setting explicit goals to produce ideas that are both novel and useful can facilitate creativity (Shalley, 1991), it is possible that setting these dual goals may affect certain types of primal marks more than others. Thus, in Experiment 4, participants were just asked to develop a "creative idea," as opposed to an idea that is both novel and useful. Fourth, because extrinsic rewards may focus participants on usefulness more than novelty, the raffle prize was not included in Experiment 4.

To manipulate the primal mark, while generating their list of at least three nascent ideas, participants in the familiar and new primal mark conditions were asked to "…start each idea with one or more aspects of the randomly-selected concept below." Then in large font below these instructions, the familiar primal mark conditions saw "Interview", while the new primal mark conditions saw "Board Game". In contrast, participants in the integrative and familiar-analogy conditions were asked to "…start each idea by combining aspects of the two randomly-selected concepts below." Then in large font below, the integrative primal mark con-

ditions saw both the familiar and new concepts—i.e., "Interview" and "Board Game". The familiar-analogy conditions saw two familiar concepts—i.e., the same one used in other conditions ("Interview"), as well as an additional familiar concept that was just used in the familiar-analogy conditions ("Recommendation Letter"). The order of the two concepts was randomized in both the integrative and familiar-analogy conditions. To make the task of recombining the two concepts feasible and realistic, the concepts in each pair were intended to share some similarities (the integrative pair involves interaction between people, the familiar pair involves communication of qualifications). However, a clear analogical link between the concepts in each pair was not immediately obvious, leaving the door open to a variety of possibilities. To manipulate the novelty of the problem framing, participants were either asked to have their idea serve as a method for evaluating applicants' intellect (familiar) or morality (new).

Similar to Experiments 1–3, these stimuli were selected from a pretest of 26 possible concepts and 26 possible problems (13 familiar and 13 new). A separate sample of 30 university students rated the concepts on novelty and the problems on novelty and potential usefulness—i.e., how useful would it be for the university to evaluate applicants on the attribute? The new concept (Board Game) pretested as significantly more novel for the admissions domain than both familiar concepts: Interview, $t(29) = 6.54$, $p < .00001$, $d = 1.93$, and Recommendation Letter, $t(29) = 5.80$, $p < .00001$, $d = 1.76$. However, the two familiar concepts did not significantly differ in novelty, $t(29) = 0.18$, $p = .86$. The new problem pretested as significantly more novel for the domain than the familiar problem, $t(29) = 5.45$, $p < .00001$, $d = 1.06$. However, the new and familiar problems did not significantly differ in potential usefulness, $t(29) = 1.42$, $p = .17$, providing an equally high ceiling on usefulness across all conditions.

After participants selected one of their nascent ideas to further develop, the rest of the experiment was the same across all conditions. First, participants were asked to brainstorm ways to further develop their chosen idea. All participants were encouraged to infuse familiar elements, using similar instructions as Experiment 2. Below these instructions, the following nine familiar ideas were listed in large font: resume, awards, YouTube, family history, essay, GPA, Facebook, standardized testing, and work sample. All nine were below the median level of novelty among the 26 concepts that were pretested. Once participants spent at least 5 min brainstorming, they could move to the final page of the survey, in which they described their final idea.

Measures

Amabile's (1996) consensual assessment technique was again used to rate participants' nascent and final ideas. All of the raters were trained in the same fashion as Experiments 1–3. Parallel to the bookstore managers and customers in the previous experiments, expert raters were recruited to provide perspectives from both sides of the admissions process—i.e., admissions officers and recent applicants. Specifically, three admissions officers and six current students at the university assessed the final ideas on novelty, usefulness, and overall creativity. The three admissions officers averaged 6.67 years of experience working in university admissions, and 3.67 years at this particular university. The six recent applicants were all undergraduates who had been through the admissions process within the previous four years. A separate set of three undergraduates rated all of the nascent ideas generated by participants (only the selected nascent ideas were rated in Experiments 1–3). Across all conditions, the nascent ideas participants selected were not significantly different in novelty, usefulness, or creativity from the other nascent ideas they generated.

Novelty was defined as: "The degree to which the idea is unique from other ideas, especially existing methods of evaluating university applicants. How original is the idea?" Usefulness was defined as: "The degree of value offered by the idea. How useful is the idea as a method for evaluating applicants in university admissions?" Creativity was defined as: "Overall degree to which the idea is both novel and useful. How innovative is the idea in the domain of university admissions?" The admissions officer and student ratings were highly correlated ($r = .65$ for novelty, $r = .69$ for usefulness, and $r = .58$ for creativity), and thus were averaged together to provide a consensual assessment from both of these key stakeholders in the domain (Amabile, 1996).[2]

Final ideas that were rated high in novelty but low in usefulness included having applicants compete in a board game tournament, as well as holding a contest in which applicants try to get as many "likes" on their YouTube videos as possible. Final ideas rated low in novelty but high in usefulness included giving applicants moral dilemmas in interviews, as well as collecting recommendation letters from leaders of volunteer activities in which applicants have participated. Final ideas rated high in both novelty and usefulness (and overall creativity) included inviting applicants to submit videos in which they present a board game that they design to represent their life and qualifications, as well as asking interviewees to create an invention using only a prescribed set of materials. Means by condition are in Table 8.

Results

Constructive replication of H1–H4

To address H1–H4, the data from the new and familiar primal mark conditions were used—the integrative and familiar-analogy conditions were excluded because they were not relevant to these hypotheses. Because all the conditions received encouragement to infuse familiar elements, H1 and H4 were tested together. In particular, an ANOVA was conducted, crossing the primal mark and problem with final novelty as the dependent variable and final usefulness as a control. This revealed a significant main effect for the primal mark, $F(1, 108) = 8.10$, $p = .005$, $\eta^2 = .07$. The main effect for the problem and the two-way interaction between the primal mark and problem were not significant. As predicted in H1 and H4, new primal marks ($M = 4.00$, $SD = 0.94$) led to final ideas that were higher in novelty than familiar primal marks ($M = 3.40$, $SD = 1.00$).

Because all conditions received encouragement to infuse familiar elements after the primal mark, the variance in final usefulness between the new and familiar primal mark conditions was likely watered down, undermining tests of H2. However, the nascent ideas were submitted before the familiarity infusion, thus the ratings of nascent usefulness from the new and familiar primal mark conditions were used to address H2. Specifically, an ANOVA was conducted, crossing the primal mark and problem with nascent usefulness as the dependent variable and nascent novelty as a control. This revealed a significant main effect for the primal mark, $F(1, 108) = 10.28$, $p = .004$, $\eta^2 = .09$. The main effect for the problem and the two-way interaction were not significant. As predicted in H2, new primal marks ($M = 2.76$, $SD = 1.23$) led to nascent ideas that were lower in usefulness than familiar primal marks ($M = 3.43$, $SD = 1.06$).[3]

To address H3, the temporal changes in usefulness for new and familiar primal marks were calculated using paired-samples t-tests. Since all conditions received encouragement to infuse familiar elements, the change from nascent to final usefulness is likely to reflect the impact of infusing familiar elements. As expected, ideas from new primal marks significantly increased in usefulness from nascent ($M = 2.76$, $SD = 1.23$) to final ($M = 3.14$, $SD = 0.94$), $t(54) = 2.22$, $p = .03$, $d = 0.35$. In contrast, the usefulness of ideas from familiar primal marks did not significantly change from nascent ($M = 3.43$, $SD = 1.06$) to final ($M = 3.42$, $SD = 0.83$), $t(57) = -0.05$ $p = .96$. In sum, these results provide additional support for H1–H4.

Results for H5 and H6

All conditions were included in the analyses for H5 and H6. To test H5a (integrative primal marks yield more novel ideas than familiar primal marks), an ANOVA was used, crossing the primal mark and problem with final novelty as the dependent variable and final usefulness as a control (see Table 9). This revealed a significant main effect for the primal mark, $F(3, 217) = 12.15$, $p < .00001$, $\eta^2 = .14$. The main effect for the problem and the two-way interaction between the primal mark and problem were not significant. As predicted, ideas from integrative primal marks ($M = 4.20$, $SD = 0.77$) were significantly more novel than ideas from familiar primal marks ($M = 3.40$, $SD = 1.00$), $t(113) = 3.47$, $p < .00001$, $d = 0.90$, as well as familiar-analogy primal marks ($M = 3.49$, $SD = 0.86$), $t(111) = 4.58$, $p = .00001$, $d = 0.87$. Tukey HSD tests comparing the two integrative primal mark conditions to each of the four familiar/familiar-analogy primal mark conditions in final novelty were all significant in the predicted direction (see Table 8). These results support H5a.

To test H5b (integrative primal marks yield more useful ideas than new primal marks), the same ANOVA was used, but with final usefulness as the dependent variable and final novelty as a control (see Table 9). This revealed a significant main effect for the primal mark, $F(3, 217) = 5.56$, $p = .001$, $\eta^2 = .07$. As predicted in H5b, ideas from integrative primal marks ($M = 3.65$, $SD = 0.80$) were significantly more useful than ideas from new primal marks ($M = 3.14$, $SD = 0.94$), $t(110) = 3.14$, $p = .002$, $d = 0.58$.

To test H6 (integrative primal marks yield more creative ideas than familiar and new primal marks), an ANOVA was used, crossing the primal mark and problem with overall creativity as the dependent variable (see Table 9). This revealed a significant main effect for the primal mark, $F(3, 218) = 12.67$, $p < .00001$, $\eta^2 = .15$. Planned t-tests showed that as predicted in H6a and H6b respectively, ideas from integrative primal marks ($M = 3.72$, $SD = 0.73$) were significantly higher in overall creativity than ideas from familiar primal marks ($M = 3.16$, $SD = 0.68$), $t(113) = 4.30$, $p = .00004$, $d = 0.79$, and new primal marks ($M = 3.09$, $SD = 0.63$), $t(110) = 4.90$, $p < .00001$, $d = 0.92$. Tukey HSD tests comparing the two integrative primal mark conditions to each of the other six conditions were all significant in the predicted direction, except for the new primal mark, familiar problem condition—though a simple t-test was significant (see Table 8). In sum, these results support H5 and H6.

Supplementary data: Frequency of familiar, new, and integrative primal marks

Results across Experiments 1–4 suggest that integrative primal marks are most conducive to producing creative ideas. However, due to the cognitive complexity required to set and build on integrative primal marks, employees may not be inclined to use them (Kruglanski & Webster, 1996). To test the extent to which

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[2] When analyzed separately, the pattern of results was the same for both the admissions officer and student ratings.

[3] The results were similar when considering the average novelty and usefulness of all the nascent ideas generated by each participant (as opposed to just the selected nascent ideas): on average, new primal marks led to nascent ideas that were significantly more novel, $t(111) = 2.69$, $p = .008$, $d = 0.49$, and less useful, $t(111) = -4.09$, $p = .00008$, $d = -1.31$, than familiar primal marks.

Table 8
Experiment 4: Means, temporal changes, and Tukey HSD results.

Condition	Nascent novelty (SD)	Final novelty (SD)	Novelty Δ	Final novelty Tukey HSD for H5a (*integrative PM conditions – each other condition*)	Nascent usefulness (SD)	Final usefulness (SD)	Usefulness Δ	Final creativity (SD)[a]	Final creativity Tukey HSD for H6 (*integrative PM conditions – each other condition*)
Integrative PM									
New problem (*n* = 28)	3.39 (0.85)	4.12 (0.71)	[*t*(27) = 3.85, *p* = .001, *d* = 0.93]		2.72 (0.84)	3.45 (0.69)	[*t*(27) = 4.93, *p* = .00004, *d* = 0.95]	3.57 (0.59)	
Familiar problem (*n* = 29)	3.37 (0.87)	4.26 (0.83)	[*t*(28) = 2.20, *p* = .00002, *d* = 1.05]		2.81 (0.96)	3.85 (0.86)	[*t*(28) = 7.08, *p* < .00001, *d* = 1.14]	3.88 (0.83)	
New PM									
New problem (*n* = 25)	3.39 (0.83)	4.04 (1.04)	[*t*(24) = 3.34, *p* = .003, *d* = 0.69]	[*M* = 0.15, *CI*.95 (−0.49, 0.80), *p* = .99, *d* = 0.17]	2.62 (0.96)	3.08 (1.02)	[*t*(24) = 2.59, *p* = .02, *d* = 0.46]	2.86 (0.59)	[*M* = 0.86, *CI*.95 (0.40, 1.33), *p* < .00001, *d* = 1.30]
Familiar problem (*n* = 30)	3.57 (1.18)	3.97 (0.86)	[*t*(29) = 1.44, *p* = .16, *d* = 0.39]	[*M* = 0.22, *CI*.95 (−0.38, 0.83), *p* = .41, *d* = 0.28]	2.90 (1.42)	3.18 (0.87)	[*t*(29) = 1.08, *p* = .29, *d* = 0.24]	3.30 (0.61)	[*M* = 0.42, *CI*.95 (−0.01, 0.86), *p* = .06, *d* = 0.64][b]
Familiar PM									
New problem (*n* = 28)	3.39 (1.02)	3.35 (0.92)	[*t*(27) = −0.19, *p* = .85, *d* = 0.04]	[*M* = 0.85, *CI*.95 (0.23, 1.47), *p* = .001, *d* = 1.00]	3.27 (1.06)	3.30 (0.96)	[*t*(27) = 0.18, *p* = .86, *d* = 0.03]	3.04 (0.59)	[*M* = 0.69, *CI*.95 (0.24, 1.14), *p* = .001, *d* = 1.02]
Familiar problem (*n* = 30)	3.26 (1.31)	3.46 (1.08)	[*t*(29) = 0.93, *p* = .36, *d* = 0.17]	[*M* = 0.74, *CI*.95 (0.13, 1.34), *p* = .006, *d* = 0.79]	3.57 (1.06)	3.53 (0.70)	[*t*(29) = −0.24, *p* = .82, *d* = −0.04]	3.28 (0.75)	[*M* = 0.45, *CI*.95 (0.01, 0.89), *p* = .04, *d* = 0.59]
Familiar-analogy PM									
New problem (*n* = 28)	3.43 (1.06)	3.46 (0.89)	[*t*(27) = 0.17, *p* = .87, *d* = 0.03]	[*M* = 0.74, *CI*.95 (0.12, 1.36), *p* = .009, *d* = 0.89]	3.16 (1.11)	3.26 (0.53)	[*t*(27) = 0.53, *p* = .60, *d* = 0.11]	3.04 (0.57)	[*M* = 0.68, *CI*.95 (0.24, 1.13), *p* = .002, *d* = 1.04]
Familiar problem (*n* = 28)	3.23 (1.22)	3.52 (0.85)	[*t*(27) = 0.98, *p* = .34, *d* = 0.28]	*M* = 0.67, *CI*.95 (0.05, 1.29), *p* = .02, *d* = 0.83]	3.56 (0.99)	3.51 (0.66)	[*t*(27) = 0.82, *p* = .42, *d* = −0.06]	3.19 (0.58)	[*M* = 0.454, *CI*.95 (0.09, 0.98), *p* = .008, *d* = 0.80]

Notes: PM = Primal Mark, Δ = pairwise *t*-tests from nascent to final.
[a] Unlike in Experiments 1–3, new primal marks did not yield ideas significantly higher in overall creativity (*M* = 3.10, *SD* = 0.63) than familiar primal marks (*M* = 3.16, *SD* = 0.68), *t*(111) = −0.247, *p* = .64. This may be due to raters weighing novelty and usefulness fairly equally in their assessments of overall creativity in Experiment 4, whereas raters in Experiments 1–3 weighed novelty more heavily than usefulness in their assessments of overall creativity (see correlations in Table 1).
[b] Simple *t*-test was significant, *t*(85) = 2.73, *p* = .008.

Table 9
Experiment 4: ANOVA results.

	H5a (DV = Final novelty)			H5b (DV = Final usefulness)			H6 (DV = Final creativity)		
	df	F	η^2	df	F	η^2	df	F	η^2
Primal mark	3	12.15**	.14	3	5.56**	.07	3	12.67***	.15
Problem	1	1.35	.01	1	6.31* a	.03	1	10.50** a	.05
Primal mark × Problem	3	0.30	.83	3	0.46	.01	3	0.45	.01
Final usefulness (final novelty for final usefulness DV)	1	18.28***	.08	1	18.28***	.08			
	$R^2 = .20$			$R^2 = .15$			$R^2 = .18$		
	$F(8,217) = 6.57$***			$F(8,217) = 4.70$***			$F(7,218) = 7.01$***		

* $p < .05$.
** $p < .01$.
*** $p < .001$.
[a] Regarding the two significant main effects for the problem, ideas from the new problem conditions ($M = 3.28$, $SD = 0.82$) were lower in final usefulness than the familiar problem conditions ($M = 3.51$, $SD = 0.80$), and ideas from the new problem conditions ($M = 3.14$, $SD = 0.63$) were lower in overall creativity than the familiar problem conditions ($M = 3.41$, $SD = 0.74$).

individuals are inclined to set familiar, new, and integrative primal marks, supplementary data were collected from a separate sample of 108 university students (62% female, $M_{age} = 21.62$, $SD_{age} = 4.47$). Participants were given seven different creativity tasks, including three parallel to the manipulations from the experiments, and four from a variety of other domains. In each task, participants were shown both a familiar idea and a new idea and asked to choose elements from one or both to serve as a starting point for a creative idea, which they would further develop on the next page of the survey. The order of the two choices was randomized, and no order effects were found. The tasks included developing an idea for a novel and useful: kitchen utensil, website, piece of exercise equipment, and way to improve customers' experience in grocery stores

(Table 10 outlines the options and results for each task). For each task, as in Experiments 1–4, participants were randomly assigned to either a relatively new or familiar framing of the creative problem. Across all seven tasks, participants chose integrative primal marks only 15.61% of the time (tasks ranged from 7.41% to 25.00%). For all tasks, the majority of participants selected a familiar primal mark, except for the admissions task, in which the majority selected a new primal mark—perhaps because the new idea (board game) could be analogically linked to evaluating applicants with relative ease. The novelty of the problem did not significantly influence the results for any of the tasks. These supplementary data—combined with the experiment results—suggest that although setting integrative primal marks may offer the best chance for developing creative ideas, employees may be unlikely to do so, preferring instead to start with more familiar or less complex primal marks.

General discussion

Across four experiments, results suggest that on average, familiar primal marks yield more useful but less novel ideas, while new primal marks yield more novel but less useful ideas. Integrative primal marks, however, have the best chance of yielding novel *and* useful ideas. Despite the potential benefits of integrative primal marks, supplementary results suggest that employees are more inclined to set familiar and new primal marks than integrative primal marks. These results offer key contributions to theory and research on creativity in organizations.

Theoretical contributions

Anchoring effects in the creative process
First, results across these four experiments suggest that just as individuals get anchored by the first number introduced in numer-

Table 10
Supplementary data on frequencies of familiar, new, and integrative primal marks.

Task	Primal mark options	Problems	Results (PM = Primal Mark)
Bookstore A (Experiment 1)	• Fishing pole (new) • White/corkboard (familiar)	Helping roommates get along better (new) vs. stay organized (familiar)	• Familiar PM: 79.63% • New PM: 12.96% • Integrative PM: 7.41% [χ^2 (2) = 104.67, p < .00001]
Bookstore B (Experiments 2 and 3)	• In-line skate (new) • 3-ring binder (familiar)	Helping students do well in job interviews (new) vs. classes (familiar)	• Familiar PM: 76.85% • New PM: 15.74% • Integrative PM: 7.41% [χ^2 (2) = 93.17, p < .00001]
Admissions (Experiment 4)	• Board game (new) • Interview (familiar)	Evaluating applicants' morality (new) vs. intellect (familiar)	• Familiar PM: 19.44% • New PM: 63.89% • Integrative PM: 16.67% [χ^2 (2) = 45.50, p < .00001]
Kitchen utensil	• Hammer (new) • Spatula (familiar)	Make cooking cheaper (new) vs. faster (familiar) for the average person	• Familiar PM: 65.74% • New PM: 16.67% • Integrative PM: 17.59% [χ^2 (2) = 51.06, p < .00001]
Website	• eBay (new) • LinkedIn (familiar)	Help people find professional mentors (new) vs. jobs (familiar)	• Familiar PM: 58.33% • New PM: 16.67% • Integrative PM: 25.00% [χ^2 (2) = 31.50, p < .00001]
Exercise equipment	• Forklift (new) • Treadmill (familiar)	Help people exercise at work (new) vs. home (familiar)	• Familiar PM: 67.59% • New PM: 19.44% • Integrative PM: 12.96% [χ^2 (2) = 57.72, p < .00001]
Grocery store	• File cabinet (new) • Shopping cart (familiar)	Help customers discover new recipes around the store (new) vs. fetch goods from around the store more easily (familiar)	• Familiar PM: 59.26% • New PM: 18.52% • Integrative PM: 22.22% [χ^2 (2) = 32.89, p < .00001]

ical tasks (e.g., Northcraft & Neale, 1987; Tversky & Kahneman, 1974), they also get anchored by the first bit of content in their primal marks as they set out to develop creative ideas. As aforementioned, previous theory and research has highlighted the importance of the beginning of creative tasks, but these past perspectives have tended to focus on framing effects in the task identification stage (e.g., Csikszentmihalyi & Getzels, 1971; Mumford et al., 1997). The primal mark concept complements these perspectives by showing that important anchoring effects are also established slightly later in the creative process, at the point when employees commit to developing an initial bit of content into an emerging idea. Across all four experiments, the primal mark anchored the trajectory of novelty and usefulness in both familiar and new problems, suggesting that the primal mark may cause anchoring effects that operate over and above framing effects established earlier in the creative task. In addition, results from Experiment 1 suggest that the primal mark and the problem framing may interact in important ways, as the anchoring effects of new primal marks on novelty and usefulness were stronger for the new problem than the familiar problem (though new primal marks still had significant anchoring effects for the familiar problem). However, this interaction was not significant in Experiments 2–4, perhaps because both the primal mark and problem manipulations were strongest in Experiment 1. In general, results across the four experiments demonstrate the theoretical value of considering the actual content that employees use to construct ideas, and the psychological implications of using different types of content.

Furthermore, models of the creative process typically posit that emerging ideas become creative ideas through many iterative cycles of elaboration, incubation, and evaluation (Amabile, 1996; Lubart, 2001). An implicit assumption underlying these models is that emerging ideas can become more creative as they are elaborated and refined with additional content. However, the primal mark concept and the results on its anchoring effects complicate this notion. While emerging ideas may increase in usefulness as they are elaborated, the novelty of emerging ideas is likely anchored by the primal mark and thus unlikely to increase much as ideas are developed with additional content. As such, when employees set familiar primal marks, they limit the novelty of any ideas they are likely to produce. Similarly, if employees set new primal marks rather than integrative primal marks, they may constrain the extent to which they are able to boost the usefulness of their emerging ideas. Therefore, compared to integrative primal marks, setting either familiar or new primal marks may place a ceiling on the creativity of ideas from the very beginning of their development. Taken together, these results on the anchoring effects of primal marks suggest that the content used earlier in the development of ideas exerts greater influence on final creativity than content incorporated later in the creative process. In other words, once the primal mark is set, the fate of any ideas that grow from it may be largely sealed.

Dynamics between novelty and usefulness

Second, this paper sheds light on key dynamics between the two dimensions of creativity—novelty and usefulness—throughout the creative process. Past creativity research has tended to focus on novelty alone (e.g., Ward, 1994), or lumped novelty and usefulness together in one overall creativity construct (e.g., Oldham & Cummings, 1996). Some research has treated novelty and usefulness as independent dimensions of creativity, suggesting that novelty and usefulness are driven by different psychological processes (e.g., Amabile, Barsade, Mueller, & Staw, 2005; Grant & Berry, 2011). Furthermore, scholars have recognized that it may be rare

for ideas to be seen as high in both novelty and usefulness (e.g., Fleming, 2001; Mueller et al., 2012; Rietzschel et al., 2010). However, all of this past research has focused on the novelty and/or usefulness of finalized ideas at the end of the creative process, overlooking the possible dynamics between novelty and usefulness throughout the creative process. This paper addresses the dynamics between novelty and usefulness by examining how each dimension changes (or not) from the beginning to the end of creative tasks.

Results across the experiments suggest that novelty and usefulness may diverge early in creative tasks. In particular, familiar primal marks may drive usefulness up and novelty down, and new and integrative primal marks may drive novelty up and usefulness down (at least in the short run). However, while ideas from familiar primal marks are likely to stay high in usefulness but low in novelty, ideas from new and integrative primal marks may increase in usefulness as familiar elements are infused, helping usefulness catch up with novelty (especially for integrative primal marks). Taken together, these results suggest that usefulness is more flexible than novelty, as novelty is more rigidly anchored by the primal mark than usefulness. Thus, favoring usefulness over novelty early in creative tasks may lead to a permanent tradeoff between the two, as novelty will be sacrificed for usefulness in the end. In contrast, favoring novelty over usefulness early in creative tasks may lead to a temporary tradeoff between the two, but allow for the tradeoff to be overcome in the end. In other words, familiar primal marks may create a more zero-sum relationship between novelty and usefulness, while new and integrative primal marks may avoid a zero-sum relationship between the two. This suggests that in both theory and practice, the relative importance that should be placed on novelty and usefulness may depend on how far along ideas are in their development. Early in creative tasks, novelty may be more important than usefulness, and vice versa later in creative tasks. In general, this research suggests that rather than viewing novelty and usefulness as independent dimensions of creative output, scholars may benefit from considering the dynamics between the two dimensions over time.

Familiar and new knowledge in creativity

Lastly, this research helps elucidate the role of familiar (vs. new) knowledge in creativity. Familiar knowledge has been construed as both an essential enabler and a harmful constraint for creativity. On one hand, scholars have argued that familiar knowledge is a critical precursor to creative ideas, as employees need to know the existing body of familiar ideas in the domain in order to know how to build on them in novel and useful ways (Amabile, 1996, Ford, 1996; Simonton, 1997). On the other hand, research on design fixation (Ward et al., 1999) and inadvertent plagiarism/conformity (e.g., Kohn & Smith, 2011; Marsh et al., 1999) suggests that familiar knowledge often constrains creativity because individuals' thinking tends to get trapped within familiar schemas. This paper helps integrate these opposing perspectives by suggesting that familiar knowledge may enable or constrain creativity depending on when and how it is used in the creative process. Results across the experiments suggest that starting with a familiar primal mark is all it takes to trap employees' thinking within familiar schemas. However, the results also suggest that familiar ideas provide key ingredients in the development of creative ideas, but only when they are combined with new elements to create integrative primal marks or incorporated after the primal mark is set. Thus, together these results suggest that familiar knowledge may be a blessing or a curse for creativity, depending on whether it is used at the right time or not. More broadly, while past research

has focused on *what* types of knowledge are recombined and *by whom* (e.g., Burt, 2004; Hargadon, 2002; Perry-Smith, 2014), this research highlights the importance of *when* types of knowledge are used in the creative process.

Limitations and future directions

These experiments have key limitations that may be addressed in future research. First, although the creative tasks were defined in a relatively open-ended way, the experiments set the parameters of the primal mark for participants and only required the generation of three nascent ideas. This may not parallel the usual experience of creative tasks in organizations, which tend to be longer term and more iterative in nature. Future research could test the external validity of these results using field experiments in which participants are allowed to generate their own primal marks and creative tasks over longer periods of time. Second, these experiments leave unanswered questions about the impact of the content included in the primal mark and the elements used to elaborate it. Future research could further examine the role of content by manipulating the usefulness, relevance, or amount of content in the primal mark and the elements used to elaborate it. Third, these experiments did not address key individual differences, such as creative self-efficacy (Tierney & Farmer, 2011), that may moderate the effects of the primal mark. Future survey research could examine the impact of individual differences. Fourth, the experiments defined the creative problem before the primal mark and then familiar or novel elements were infused shortly thereafter. However, there may be different implications if the primal mark comes before the problem is defined or if the familiar or novel elements are infused later in the creative process. Also, across the experiments, the primal mark appeared to be a more powerful driver of novelty and usefulness than the problem, but this may have been due to the primal mark manipulation being stronger than the problem manipulation. Future experiments could manipulate the order, timing, and strength of the primal mark, problem, and infusion manipulations to test for temporal and magnitude effects.

Practical implications and conclusion

The speed and need for creativity is on the rise in many organizations. This research offers guidance for employees and managers who wish to develop novel, useful, or creative ideas in organizations. For individuals seeking the quickest path to usefulness with little concern for novelty, familiar primal marks may yield the practical ideas they desire. Conversely, those who value novelty over usefulness may be well served by new primal marks. However, when more radical creativity is desired (Madjar, Greenberg, & Chen, 2011), a more optimal balance of novelty and usefulness may be required, and thus integrative primal marks may plant the best seeds for creativity. Despite the benefits of integrative primal marks, the supplementary results suggest that integrative primal marks may be relatively rare, as participants were significantly more inclined to set familiar and new primal marks. This hints that on average, the majority of ideas in

organizations may be doomed from the very beginning of their development, as they are not able to reap the benefits of integrative primal marks.

Thus, employees and managers who desire creative ideas may want to take active steps to facilitate the use of integrative primal marks. For instance, employees could purposefully explore other domains in which they are likely to find ideas that can be analogically linked to the creative task at hand (Hargadon, 2002), and make sure that any ideas they generate include a mix of new content from these outside domains and familiar content from their focal domain. Perhaps equally as important, employees may benefit from recognizing when they have been anchored by familiar primal marks—rather than struggle to make their emerging ideas more novel, employees may be better off starting over with an integrative primal mark. In addition, managers could group employees who have knowledge from outside the focal domain with employees who have knowledge within the domain to work on creative tasks together. However, given the challenges involved in group brainstorming (Diehl & Stroebe, 1987; Mullen, Johnson, & Salas, 1991), groups may converge too quickly on relatively useful ideas from familiar primal marks. Thus, managers may benefit from establishing the norm that all ideas must be constructed with a mix of new and familiar content. Once the primal mark is set, employees with more familiar knowledge in the focal domain could take the lead in elaborating the idea with familiar elements.

Furthermore, when evaluating and giving feedback on nascent ideas early in creative tasks, by default managers may value usefulness over novelty (Mueller et al., 2012). This may lead managers to reject nascent ideas from integrative (or new) primal marks prematurely, without giving them the opportunity to increase in usefulness. Rather than rejecting these novel ideas early in creative tasks, managers may actually benefit from rejecting nascent ideas that include too much familiar content. This way, employees can go back and reset primal marks with more new content, escaping the anchoring effects of familiar primal marks.

In general, the results across these experiments suggest that employees and managers ought to pay careful attention to the primal marks they or others set. As the 17th Century Chinese painter Shih-Tao admonished to his fellow artists: "…be highly aware of the first stroke, inasmuch as it has a determinative effect on all those that follow" (Strassberg, 1989).
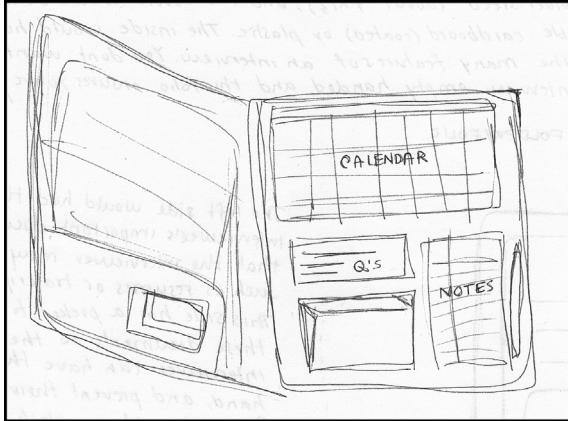
Appendix
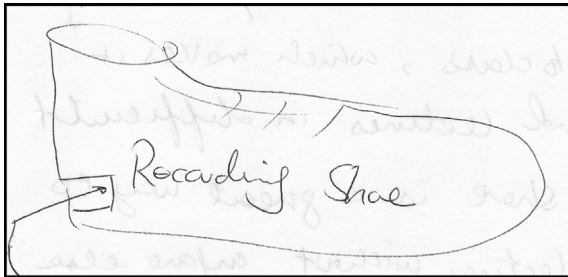
Example ideas from Experiment 2

Familiar primal mark with familiarity infusion (low novelty, high usefulness):

Nascent Idea:
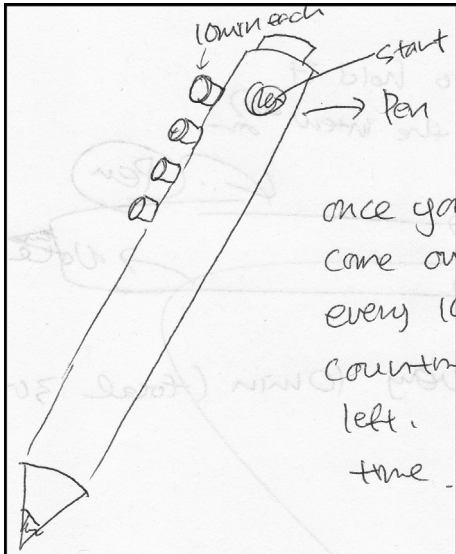"A folder with pockets for resumes, business cards, and references."

New primal mark without familiarity infusion (high novelty, low usefulness):

Nascent Idea:
"A shoe that allows you to record interviews."

New primal mark with familiarity infusion (high novelty, high usefulness):

Nascent Idea:
"Time watch that you can know how much time has passed by touching it (not looking at it). There may be 4 physical elements like skate rollers and one changes shape or texture once a certain time period passes."
Final idea (visual on left):
"Time Watcher:
   – You figure out how much time you have spent/left in the interview just by touching it.
   – Once you start, the buttons will disappear one by one every 10 min (for example). By touching and counting the number of buttons left, you can know the time without being rude and checking your watch during the interview."

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