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The Upside of Messy Surroundings: Cueing Divergent Thinking, Problem Solving, and Increasing Creativity

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Three studies show that messy surroundings enhance creativity on tasks associated with all three aspects of creativity: divergent thinking, convergent thinking, and problem solving. Moving beyond other work, we systematically control for potential competing explanations and test the effects across a wide range of tasks and participants.

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Researching Outside the Box: The Cognitive and Motivational Processes of Creativity

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Paper #1: The Upside of Messy Surroundings: Cueing Divergent Thinking, Problem Solving, and Increasing Creativity

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Paper #2: The Creative Power of Color Harmony

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Paper #3: The Pursuit of Creativity in Idea Generation Contests

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Paper #4: Creativity in Open Innovation Contests: How Seeing Others' Ideas Can Harm or Help Your Creative Performance

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SESSION OVERVIEW

Consumers regularly engage in creative thinking. For instance, consumers come up with unconventional ways to use existing possessions (Burroughs and Mick 2004), seek out purchases that enable creativity (Dahl and Moreau 2007), and play an active role in customizing new products (Moreau and Herd 2010). In addition, companies have recently been turning to consumers for creative insight, harnessing their creative ideas through online crowdsourcing platforms (Terwiesch and Xu 2008). Yet, in contrast to the importance and ubiquity of creative thinking in consumption, little research has investigated the mechanism of creative thinking. Specifically, what are the key motivational and cognitive processes underlying creativity?

The aim of this session is to contribute to this dialogue of what makes consumers creative and bring attention to this relatively underexplored topic that both consumers and companies value. We will begin with contextual elements of creativity—surroundings and color—and examine how these factors influence creative cognition. Then, we will shift our focus onto the motivational processes of creativity in the context of idea generation contests, examining the effect of goal-setting and social comparison (i.e., observing others' ideas) on creative performance.

First, Vohs, Labroo, and Dhar examine how environmental cues can influence creativity through environmental mimicry. In three experiments, they demonstrate that a messy room enhances three aspects of creative cognition: problem solving, divergent thinking, and convergent thinking. In the second paper, Youn, Shin, and Lee find that another environmental factor, color harmony, can impact not only creative production, but also the perception of creativity. Across six studies, they demonstrate that disharmonious color combinations induce processing disfluency, which activates abstract thinking, leading to improved performance on creativity tasks and intensified perceptions of innovativeness in product and logo evaluations. In the third paper, Brucks and Huang demonstrate that the pursuit of creativity in idea generation competitions could be counterproductive. Through three studies, they show that pursuing the goal to be creative reduces the number of creative ideas generated because the goal-directed monitoring process inhibits divergent thinking. Lastly,

Hofstetter et al. examine how seeing the ideas of others in innovation contests influences creative performance. Across four studies, including a field study using an actual open innovation platform, they demonstrate that seeing prior ideas from other users can facilitate creative performance or hamper creative performance, identifying competition salience as a key moderator.

Together, the four papers in the session enhance our understanding of when and why consumers are creative by capturing creativity in a variety of ways in the lab and in the field: from classic creativity paradigms (e.g., the remote association task, drawings, and insight problems) and perceptions of innovativeness to performance in open innovation contests. Collectively, these papers draw from a wide spectrum of literature including construal level theory, mimicry, goal-setting, self-efficacy, and competition to provide insight into the motivational and cognitive processes of creative thinking. By approaching creativity from different angles, methods, and literatures, we believe that this session will attract a broad audience, facilitate interesting discussions, and cultivate collaborations on topics related to consumer creativity.

The Upside of Messy Surroundings: Cueing Divergent Thinking, Problem Solving, and Increasing Creativity

EXTENDED ABSTRACT

Society frowns upon mess. Mess is presumed to reflect low productivity, income, education, and intellect (Abrahamson & Friedman, 2007). Messy people are stereotyped as uncivil, children are admonished for messiness, workplaces often mandate orderliness, and religions assert that cleanliness and orderliness are next to godliness (Abrahamson & Friedman, 2007). In this research, however, we argue for the upside of mess and propose that messy surroundings cue creative thinking.

There are reasons to believe that messiness and creativity are associated. Everyday language reflects a deep-rooted connection between mess and creativity. Creativity is associated with “outside the box” thinking (Leung et al., 2012), and considered literally, putting away things in a box organizes surroundings. Creativity is linked to wild imagination, and wild is ambiguous, unpredictable, and flexible. So is mess.

A recent paper by Vohs, Redden, & Rahinel (2013) showed — in one study with a fairly small sample for today's requirements — that disorderly surroundings can make people break away from convention and increase novelty-related thoughts. Building on these findings, we posit messy environments cue all sorts of creative thinking. We tested our premise in three experiments.

Experiment 1 employed a 2 (room: messy vs. orderly) between-subjects design. Fifty-one students participated. Depending on condition, participants were placed in an area with neatly-ordered papers or disordered paper. Participants were provided with a puzzle allegedly being tested by marketers. This puzzle is comprised of two loops that are linked and needed to be unlinked. The best solution is to twist the links in disparate ways. Participants were timed completing the puzzle. A one-way ANOVA revealed the expected effect of condition, $F(1, 37) = 4.44, p < .05$. As predicted, participants were quicker to solve the puzzle when seated in messy ($M = .93$ minutes) rather than orderly surroundings ($M = 2.22$ minutes).

Experiment 2: A limitation of experiment 1 is that the task is not one conventionally used in creativity research. Moreover, this exper-

The Creative Power of Color Harmony

EXTENDED ABSTRACT

While prior research focuses on the influence of color on creativity via the symbolic meaning that each color conveys (i.e., growth for green, and openness for blue; Lichtenfeld et al., 2012; Mehta & Zhu, 2009), the current research explores how color may influence creativity via an abstract thinking style that certain color combinations may evoke. We posit that exposure to moderately disharmonious (vs. harmonious or disharmonious) color combinations will result in a disfluent experience that induces abstract thinking (Alter & Oppenheimer, 2008, 2009; Mehta et al., 2012), leading to enhanced cognitive flexibility and creativity (Förster et al., 2004; Mehta et al., 2012). We defined harmonious, moderately disharmonious, and disharmonious color combination of any chosen colors using Moon and Spencer's (1944) theory of color harmony as applied to Munsell's (1919) color system.

The results of six studies provided support for our moderate disharmony hypothesis. In the first study, we compared moderately disharmonious color combinations with "proven" creative colors and showed that instructions printed on green or blue background color induce greater creativity in terms of generating ideas to protect the environment than red or gray, replicating prior research; but more importantly, moderately disharmonious combinations of blue and green lead to greater creativity than the single colors of blue and green.

Study 2 replicated the moderate color disharmony effect on insight problem solving as well as on the Remote Associates Test (RAT) designed to access creative performance. The results showed that participants' processing disfluency experience and their level of construal (BIF; Vallacher & Wegner, 1987) mediated the effect of color harmony on creativity.

In Study 3, we presented participants with a picture of an office, the walls of which were painted different colors, and asked them to imagine working in that office. Participants generated more creative ideas and perceived the company to be more innovative when situated in an office with moderately disharmonious (vs. harmonious or disharmonious) colors. Disfluency and abstract thinking again were shown to mediate the color harmony effect on creative idea generation and perception of company innovativeness.

Study 4 demonstrated the robustness of the color harmony effect in the context of a company logo. Participants judged the company with the moderate disharmonious (vs. harmonious and achromatic) color logo to be more innovative, and considered the logo to be more appropriate for an entertainment company; whereas they considered the company with the harmonious color logo to be more reliable and the logo was more appropriate for a bank.

Study 5 and 6 replicated the color harmony effect on product evaluation using the contexts of a computer mouse (Study 5) and a digital camera (Study 6). Further, the results of Study 6 showed that the color harmony effect carried over to actual behavior—those presented with a moderately disharmonious (vs. harmonious and disharmonious) color design of a camera were more likely to sign up to receive a catalog that provides more information on the camera.

Taken together, these findings provide convergent evidence for a color harmony effect on creativity. People exposed to moderate disharmonious color combinations were more creative; they also perceived environments (e.g., office) and targets (e.g., computer mouse, camera) with moderate disharmonious color designs to be more innovative. This effect is shown to be mediated by their processing disfluency experience that in turn activates an abstract, high level of construal.

iment did not include a cleared (empty) room condition. It is possible that a cleared room encourages creativity just as much as a messy room. Accordingly, experiment 2 made two changes: we employed a standard test of creativity, and we included a cleared room condition which we expected would be similar to the orderly room condition.

Experiment 2 employed a 3 (room: cleared vs. messy vs. orderly) between-subjects design in which performance on the RAT served as the key dependent variable of interest. The cleared and orderly room conditions were expected to serve as conceptual replicates. Seventy-three students, native English speakers, participated. As in experiment 1, participants in the messy or orderly room conditions were seated individually in a workspace comprised of disordered or orderly papers and folders, respectively. In the cleared room condition, the area was clear.

Their task involved reading word-triads and listing a fourth word that connected to each word in the triad. For example, "body" is the solution to the triad, "soul, busy, and guard." Correct responses to each of the eight remote associates were tabulated into a creativity-index.

The results showed that, as expected, participants in the messy room performed significantly better relative to those in the cleared ($M = .32$), $t(39) = 2.08$, $p < .05$, or orderly room ($M = .47$), $t(49) = 1.89$, $p = .05$. In sum, participants in the messy room were more creative. Ancillary analyses (not reported due to word constraints) showed that distraction or distress were not issues that accounted for the results.

Experiment 3 employed a 3 (room: cleared vs. messy vs. orderly) between-subjects design testing creativity of spontaneous drawings. Sixty undergraduate students participated. Participants were randomly assigned to a clear, messy, or orderly condition. Participants drew, on paper, whatever spontaneously came to mind. We adapted Amabile's (1982) method of judging creativity, which was defined as "anything unexpected that produces effective surprise in the observer." Pictures were coded by two independent judges (1 = not at all, 5 = very), which were correlated, $r = .68$, $p < .01$, and averaged. An ANOVA revealed the expected effect of surroundings, $F(2, 57) = 13.17$, $p < .01$. As expected, pictures by participants in messy room ($M = 3.63$) were significantly more creative than those in clean ($M = 2.17$) or orderly rooms ($M = 2.29$), which did not differ.

General Discussion. People are hardwired to respond to environmental cues. Three studies found that messy surroundings resulted in more disparate and disorderly ideas, which increased creativity in a convergent creativity task, a puzzle, and picture drawing task. The effects were observed independent of mood or attention to task. They were also not a function of chronic messiness, but resulted from experiencing situational mess.

While people non-consciously mimic others in their social environments (Tanner et al., 2008), people also seem to mirror their environments in non-social situations, perhaps to better understand and navigate those environments. Thus messy surroundings, which are unpredictable, increase fresh creative thinking.

An interesting question is why people in messy surroundings assimilate thinking towards rather than away from creative cues. Extremely messy surroundings may create sensory overload and shut down thinking altogether, resulting in rejection of a contrast away from creative thinking. Future research should investigate these issues systematically.

The Pursuit of Creativity in Idea Generation Contests

EXTENDED ABSTRACT

Technological advances in the past ten years have provided easy access to consumer creative insight through online crowdsourcing. Platforms are sprouting all over the Internet enabling companies to create contests to solicit creative ideas from consumers. For example, Lay's recently held a "do us a flavor" contest, promising a \$1,000,000 reward to the consumer with the most creative idea for a new chip flavor. The present research explores how pursuing a goal to be creative influences the creativity of the ideas generated in these contests.

Specifically, we propose that the pursuit of creativity can be counterproductive, leading to fewer creative ideas. We motivate our argument by drawing upon the literature of goal pursuit and early creative cognition. When consumers start generating new ideas, they engage in divergent thinking, wherein one must leverage the weak ties in memory and combine this retrieved knowledge into novel ideas (Mednick 1962; Burroughs, Moreau, and Mick 2015). Importantly, this means that divergent thinking is effortful and thrives on unfocused search, which can be inhibited by narrow thinking and judgment. Given that divergent thinking is effortful and that goal pursuit enhances motivation, compared to having no goal at all, pursuing a goal to be creative should enhance creative performance, as previous literature has shown (Shalley 1995). However, goal pursuit also engages a monitoring process that focuses attention on goal-directed behaviors and compares them to the standard set by the goal (Carver and Scheier 1982). We posit that this monitoring process hinders divergent thinking by narrowing attention and judging (blocking) early ideas against a specific and high standard of creativity. Thus, taking both effort and monitoring into consideration, we predict that in highly motivating contexts like idea generation competitions, introducing a specific and high standard to "be creative" will counterproductively reduce the number of creative ideas generated.

We conducted three studies to examine the effect of pursuing creativity on creative performance as well as the underlying mechanism. In Study 1, 152 participants competed in an idea generation contest to come up with alternative uses for a sunglasses case. Participants were randomly assigned to set either a creativity goal (i.e., "to win this competition, your task is to list as many CREATIVE uses for a sunglasses case as possible") or a quantity goal serving as the control group (i.e., "to win this competition, your task is to list as MANY uses for a sunglasses case as possible"); the quantity goal was similarly motivating but did not set a specific standard for the quality of ideas one should generate.

We followed procedures from prior literature on creativity (Friedman and Förster 2001; Vohs, Redden, and Rahinel 2013) to have two independent raters code and compute two dependent measures of creative performance—the number of ideas scoring above a high threshold on novelty (high novelty count) and both functionality and novelty (high creativity count). Participants who had the goal to be creative produced significantly fewer highly novel ideas ($M=2.99$ ideas) than participants with a quantity goal ($M=3.55$ ideas, $p<.01$).

If setting a goal to be creative is counterproductive because it engages a monitoring process that narrows attention, our hypothesized effect should be especially prevalent among people who are high on trait attentional regulation (i.e., high ability to focus). In Study 2, we replicated the effect in Study 1 with a different contest and tested the moderating role of trait attentional regulation. 201 participants first responded to an attentional regulation scale (Diehl,

Selegon, and Schwarzer 2006) embedded in filler scales and then competed in an idea generation contest to come up with names for a new Weather App. Replicating Study 1, we found that participants pursuing the goal to be creative came up with significantly fewer novel ($M=6.26$) and creative ($M=3.11$) ideas relative to the quantity condition ($M_s=7.91$ and 3.82 , respectively, $ps<.001$). Importantly, this effect was moderated by trait attentional regulation ($b = .08$, $z = 1.80$, $p = .07$), such that the counterproductive effect of setting a creativity goal was significant among high attention regulators (trait regulation scores of 3 or above on 5-point scale), but not among low attention regulators.

We posit that the monitoring process hinders divergent thinking by narrowing attention to judge/block ideas using a specific and high standard of creativity. Study 3 directly manipulated the standard set by the goal of the contest to examine this mechanism. 400 participants competed in a competition to come up with non-food related uses for peanut butter and were randomly assigned to a creativity goal (specific and high standard), a quantity goal (no specific standard for the quality of ideas generated), a childish goal (specific but achievable standard: come up with as many CHILDISH non-food related uses for peanut butter) or a baseline condition without any goal. All goal conditions performed better than the baseline, replicating past work that having a goal increases creativity relative to none at all. In addition, as in the previous two studies, participants pursuing a creativity goal came up with fewer novel ($M=3.25$) and creative ideas ($M=0.71$) relative to the quantity condition (4.2 and 0.95 respectively, $ps<.01$); mediation analysis confirmed the driving role of standard clarity/specificity between these two conditions, such that having a creativity (vs. quantity) goal was counterproductive because it set a specific standard. Importantly, participants pursuing a childish goal also performed significantly better ($M_s=4.78$, $.97$ respectively, $ps<.01$) than participants with a creativity goal; mediation analysis confirmed the driving role of standard achievability between these two conditions, such that having a creativity (vs. childish) goal was counterproductive because it set a standard that was low in perceived achievability.

These findings show that pursuing the goal to be creative can be counterproductive due to a goal-driven monitoring process that narrows attention and compares ideas to a specific and high standard of creativity. Our findings connect the literature of goal pursuit with creative cognition and have important implications for theories on creativity, divergent thinking, goal-setting, and monitoring, as well as marketing practices of idea generation contests and consumer creativity.

Creativity in Open Innovation Contests: How Seeing Others' Ideas Can Harm or Help Your Creative Performance

EXTENDED ABSTRACT

Public open innovation contests are becoming an increasingly popular way for firms to generate new ideas. In this research, we investigate how seeing ideas of others (denoted as "prior ideas") in an open innovation contest influences the creative performance of individuals. We propose that the number of prior ideas an individual sees before generating his or her own ideas can both discourage and stimulate creative performance and that competition salience (i.e., when individuals are highly aware of the fact that their ideas are competing against other's performance) drives these effects.

Specifically, we argue that seeing numerous prior ideas in a competition will discourage creative performance due to an increase in the perceived difficulty of the task that in turn negatively impacts

the competence one feels in being able to generate original ideas (H1). Indeed, when the competitive aspects of an open innovation contest are made salient, the prior ideas one is exposed to will directly influence the assessed difficulty in proposing original ideas, i.e. ideas that go beyond what has already been identified (Guilford 1968). The salience of numerous prior ideas as competitors, rather than sources of information or inspiration, will heighten the challenge of separating one's ideas from the pack. Previous research on parallel search in innovation contests adds to this argument by identifying that some ideas occur more frequently with some, the so-called "idea-hubs", being frequently mentioned by different individuals independently (Kornish and Ulrich 2011). Participants' exposure to numerous prior ideas is likely to involve such idea hubs, which then interfere with the individuals' idea generation process by discouraging the expression of ideas that are similar to already mentioned ideas. Similar to production blocking in group creativity tasks (Diehl and Stroebe 1987; 1991), seeing similar competing prior ideas may inhibit individuals from verbalizing their ideas as they occur and distract their own thinking. Consequently, the task of generating original ideas becomes more difficult to participants exposed to an increasing number of prior ideas. Competition salience triggers this effect as it introduces the need to distinguish one's ideas from the prior ones, in order for them to be perceived as original. Task difficulty in turn influences individuals' feelings of competence, which have been found to be malleable and sensitive to task-related cues (Gist and Mitchell, 1992; Tierney and Farmer 2002). Harming felt competence thus reduces individuals' willingness to expend effort (Eccles and Wigfield 2002) and their inner passion to perform the task (e.g., Deci and Ryan 1985; Ryan 1992), undermining their creative performance (Amabile 1998; Tierney and Farmer 2002).

In contrast, drawing inspiration from the cumulative innovation paradigm (Nijstad et al. 2002; 2006; Scotchmer 1991) we also expect that viewing more prior ideas can better stimulate creative performance and increase feelings of competence by making an individual's memory more accessible to the creative process (H2). Cognitive stimulation occurs from prior ideas because they activate concepts and topics that otherwise would not have been activated, potentially leading to new ideas that contain or combine such activated elements in new ways. Nijstad, Stroebe, and Lodewijckx (2002) showed how example ideas stimulate the ideation process of individuals by presenting a series of example ideas prior to participants' own idea generation. This stimulation was shown to enable creative performance as individuals built on the initial examples by leveraging them in their own creations. Dugosh et al. (2000) showed that greater stimulation and creativity can be expected if more example ideas are shown. Competition salience, however, harms this positive effect, and we find that only when competition is less salient does the positive influence of more prior ideas proffer. We thus propose that prior ideas can play a "dual role" in influencing creative performance.

From a managerial perspective, finding ways to reduce the negative effects of prior ideas on creative performance is crucial to ensure the success of open contests. We predict that the negative influence of prior ideas can be mitigated when prior ideas are related in such a way that feelings of competence are not threatened, either by validating an individual's abilities before exposure or by showing more unique prior ideas that impose less constraints on the ideation process. Indeed, numbing the competitive influence of prior ideas can decrease their demotivating effect (Ryan and Deci 2000a), and instead harness the creative benefits of viewing others' proposals.

Our contribution to the literature is defined by the empirical testing of our conceptualization. In a first study, we test the compet-

ing predictions of prior research (Boudreau, Lacetera, and Lakhani 2011; Dugosh et al. 2000; Nijstad and Stroebe 2006; Nijstad, Stroebe, and Lodewijckx 2002) that increasing the number of prior ideas can both stimulate and hinder creative performance utilizing an actual open innovation platform, European-based Atizo.com. Utilizing different measures of creative performance, we find consistent empirical evidence for a negative effect. Our second study varies the salience of competition finding that this contextual difference moderates the identified negative effect, i.e., the competitive threat of prior ideas triggers their negative influence. However, when competition is less salient, the positive effect of prior ideas is shown to manifest. Mediation analyses reveals that an increase in perceived task difficulty and a loss of felt competence underlie the negative effect (after controlling for objective winning chances), and cognitive stimulation provided by prior ideas drives the positive effects identified. In a third study, we buttress participants' abilities by explicitly having them recall a situation where they were successful in generating ideas and find that this approach mitigates the negative effects of prior ideas on competence and results in a more creative performance. Study four identifies the moderating influence of the nature of prior ideas (i.e., whether the prior ideas are unique in nature versus more redundant) on the negative effect. Here we find that the negative effect of exposure to prior ideas is mitigated when unique ideas are shown.

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