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ENVIRONMENTAL INFLUENCES ON IDEA SELECTION, REFINEMENT, AND CREATIVITY

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF PSYCHOLOGY

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Dedication

I dedicate this work to the family, friends, mentors, and colleagues that have never stopped supporting me on my journey to attaining a doctoral degree. In particular, I am forever grateful to Becca Watts, Vicki Watts, Mike Mumford, and Mark Frame.

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Abstract

Creative ideas rarely translate into successful innovations. This study investigated three factors hypothesized to influence idea selection, refinement, and creativity—the source of ideas as well as the goals and climate operating in the task environment. Undergraduates ($N = 178$) were asked to complete a complex marketing task that involved generating an initial idea list (or reviewing a list of peer ideas), critiquing these ideas, and then developing a final advertising campaign. Participants who reviewed an initial list of peer ideas included more new concepts in their final campaigns. However, participants who generated their own initial idea lists were more likely to refine these ideas, perhaps due to greater personal investment in the ideas. Further, the most creative campaigns were produced by participants who generated their own initial idea lists while focused on originality goals in a collaborative climate. Implications for designing more creative work environments are discussed.

Introduction

The majority of creative ideas never see the light of day or fail during implementation. Although scholars of creativity have historically emphasized the study of idea generation, innovation depends upon far more than the generation of many creative ideas. Indeed, creative ideas must be evaluated, selected, refined, and implemented to become innovations (Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991). For our purposes, an idea is a conceptual representation of organized information embedded in a social-cognitive context. The cognitive aspect of this definition refers to the fact that ideas are differentially perceived and experienced by individuals due to each person's unique history (e.g., knowledge, memories, experiences). Ideas are also, however, embedded in a social environment. For example, what makes an idea creative is its potential to provide a novel and useful solution to a complex problem (Runco & Jaeger, 2012). Thus, creative ideas are goal-oriented in that they emerge in response to problems, and these ideas may be combined and refined over time as they are shared among people (Bettencourt, Cintrón-Arias, Kaiser, & Castillo-Chávez, 2006). But what characteristics of an idea's social-cognitive context influence whether it is used for creative purposes? The present study investigates how three characteristics—idea source, goals, and climate—influence the selection and refinement of creative ideas and overall creative problem-solving performance. Figure 1 presents the theoretical framework used to guide this investigation.

Idea Selection, Refinement, and Creativity

Creativity refers to the generation of potentially viable solutions to complex, novel, ill-defined problems (Mumford & Gustafson, 1988), as evidenced by the quality,

originality, and elegance of these solutions (Besemer & O'Quin, 1999; Christiaans, 2002). Although creative problem solving is held to consist of multiple stages, some stages have received considerably more research attention than others. For example, idea generation has been a major focus of creativity research since the 1950s (Osborn, 1957). It was generally held that generating more ideas ultimately results in more creative solutions. Although it is well documented that the creativity of ideas tends to increase as the quantity of ideas generated increases (Mullen, Johnson, & Salas, 1991), recent studies by Rietzschel and colleagues found no relationship between the creativity of ideas generated and selected (Rietzschel, Nijstad, & Stroebe, 2006, 2010, 2014). In other words, generating creative ideas does not necessarily translate into the selection of creative ideas.

This gap between the generation and selection of creative ideas may be explained by idea evaluation processes. Idea evaluation is held to consist of cognitive operations such as appraising the idea with respect to some criterion or standard, forecasting implications associated with idea implementation, and ultimately idea refinement (Mumford, Lonergan, & Scott, 2002). Given the complex and demanding nature of idea evaluation, it is no surprise that the process often fails. Blair and Mumford (2006) found that people preferred ideas that they viewed as feasible or safe over ideas perceived as more original or risky, implying a general bias against originality in idea evaluation. In addition, Reiter-Palmon, Robinson-Morral, Kaufman, and Santo (2012) found no relationship between self-perceptions of creativity and judges' ratings of the fluency, quality, or originality of ideas generated, suggesting people may not be particularly accurate at judging the creativity of their work.

However, even selected ideas rarely reach the implementation stage successfully without undergoing some refinement. Refinement has long been recognized as critical to creativity, as evidenced by Wallas' (1926) emphasis on elaboration and Amabile's (1984) emphasis on validation. Idea refinement refers to the adaptation of an idea via conceptual combination (i.e., combining aspects of multiple ideas) or elaboration (i.e., extending the development of a particular feature). Although elaboration has not received much empirical attention, a number of studies have demonstrated that conceptual combination is critical to creative performance (e.g., Mobley, Doares, & Mumford, 1992; Scott, Lonergan, & Mumford, 2005; Wan & Chiu, 2002; Ward, 2004). In sum, when creative ideas are accurately selected and carefully refined vis-à-vis idea evaluation processes, creativity is enhanced. However, idea evaluation occurs within a social context (Mumford et al., 2002). Next, three characteristics of the social environment are discussed regarding their impact on idea selection, refinement, and creativity.

Idea Source

Idea source refers to an individual's perceptions about the source from which an idea originates, such as whether an idea is perceived as emerging from oneself or an external source. There are two potential explanations for the influence of idea source on idea selection, refinement, and creativity. The first explanation concerns differences in motivation stemming from the degree to which people are personally, or emotionally, "attached" to ideas, thereby influencing the objectivity of idea evaluation processes (Rubenson & Runco, 1992). For example, Illies and Reiter-Palmon (2004) found that undergraduates who were personally invested in their problem solutions engaged in

greater information search and ultimately produced more creative solutions. This research is relevant to our discussion of idea source because we might expect people to be more personally invested in a list of ideas they generated themselves, compared with a list of ideas generated by others, resulting in greater commitment to these personally developed ideas.

In addition, idea source may impact knowledge of an idea's history and thus the accuracy with which the originality of an idea might be evaluated. Runco and Smith (1992) found that undergraduates more accurately judged the uniqueness, or originality, of their own ideas, compared with others' ideas. Because participants were familiar with the history of their own ideas (e.g., the context of their emergence and associations with similar ideas), they could judge the novelty of these ideas with greater accuracy. In contrast, Runco and Smith (1992) observed a reversed trend for idea popularity, or feasibility. That is, undergraduates were nearly twice as accurate when judging the feasibility of others' ideas compared with their own, perhaps due to participants' personal investment in their ideas which reduced objectivity.

In other words, idea source appears to influence people's judgments about the originality and feasibility of ideas, and these judgments in turn impact the likelihood that an idea will be selected and implemented. Because personal investment narrows one's cognitive focus (Illies & Reiter-Palmon, 2004), we expected participants to select more ideas from an external source than from personal idea lists and to use fewer resources in refining ideas from external sources. This line of reasoning led to our first two hypotheses:

Hypothesis 1: Participants will include more concepts in their final campaigns when starting with a list of peer ideas, compared with those who start with a list of their own ideas.

Hypothesis 2: Participants will be more likely to refine their own ideas than peer ideas, as evidenced by conceptual combination and elaboration in final campaigns.

Goals and Climate

Marsh, Landau, and Hicks (1997) identified a number of context features that influenced the likelihood of inadvertent plagiarism—or accidentally failing to acknowledge external sources for their ideas. Specifically, Marsh et al. asked undergraduates to generate ideas in a group setting, and then conducted follow-up idea generation tests with individuals either immediately after this task or one week later. Participants asked to generate new ideas immediately after the initial generation task were less likely to inadvertently plagiarize the ideas of their peers, presumably because of the stronger source salience in recent memory. In a series of follow-up experiments, Marsh et al. identified other context characteristics that influenced inadvertent plagiarism, such as explicitly prompting participants to consider sources before responding, changing the response setting (e.g., one-on-one versus anonymous group setting), and providing less time for generation of final responses. In other words, features of the task context appear to interact with perceptions of idea source to influence idea evaluation processes, which may ultimately be expected to impact creativity.

Beyond idea source, two context features examined in the present effort included goals and climate. Rietzschel et al. (2010) found that when undergraduates were instructed to generate a list of ideas and then only select the best ideas, participants tended to reject more original ideas in favor of more feasible ideas. However, when participants were explicitly instructed to select the most creative ideas from a list, these students fared better at selecting more original ideas, albeit at the expense of feasibility. Similarly, Rietzschel et al. (2014) showed that undergraduates who were given originality instructions selected more creative ideas following a brainstorming task. Further, Licuanan, Dailey, and Mumford (2007) showed that errors in idea evaluation may be reduced by encouraging participants to actively analyze the originality of ideas being evaluated. Finally, given that people are more familiar with the originality of their own ideas than others' ideas, and the tendency for people to misjudge quality of their own ideas (Runco & Smith, 1992), we expected goals to interact with idea source in predicting creativity.

In addition to idea source and goals, climate is also held to be a critical context feature that influences the emergence of creativity. Climate refers to the subjective perceptions of organizational members concerning the work environment (Schneider, 2000). In general, collaborative climates—marked by trust, information sharing, and interdependent goal pursuit—are held to facilitate creativity and innovation, whereas competitive climates—marked by "knowledge hoarding" and individualistic goal pursuit—are viewed as disruptive (Amabile, Conti, Coon, Lazenby, & Herron, 1996; Anderson & West, 1998; Barczak, Lassk, & Mulki, 2010; Shalley & Gilson, 2004; Sveiby & Simons, 2002). Meta-analytic evidence supports the conclusion that

collaborative climates are particularly conducive for creative work (Hunter, Bedell, & Mumford, 2005). One way collaborative climates are theorized to promote creativity is by providing the psychological safety needed to explore more original ideas. Thus, we expected a collaborative climate to facilitate creativity when paired with originality goals. In addition, because people operating in competitive work environments are unlikely to receive personal credit for using others' ideas (particularly when the idea source is transparent), we expected participants in competitive climate conditions to spend fewer resources refining ideas from external sources, resulting in reduced creative performance.

Hypothesis 3: Exposure to originality goals in a collaborative climate will facilitate production of the most creative campaigns with respect to quality, originality, and elegance.

Hypothesis 4: Exposure to a competitive climate will disrupt selection and refinement of peer ideas, resulting in reduced quality, originality, and elegance of final campaigns.

Method

Sample

Undergraduates (N = 178) at a large, public, southwestern university volunteered to participate in a two-hour study of complex problem solving in exchange for research credit. The sample consisted of 123 women and 53 men (2 undisclosed), with an average age of 19 and approximately two-and-a-half years of work experience. The average reported ACT score was 26, approximately one standard deviation above national norms.

General Procedures

Upon entering a classroom, participants were randomly assigned to one of eight experimental conditions (i.e., 2 x 2 x 2 design) with packets of pre-assembled, paper-and-pencil study materials. Study materials were administered by trained undergraduate research assistants who were blind to the study's hypotheses. After completing a set of timed covariate measures, participants were asked to complete our experimental task which involved developing an advertising campaign to help a fictional clothing company expand into a new market. Finally, participants completed untimed covariate measures and were debriefed.

Covariates

Participants were asked to complete the verbal reasoning scale of Ruch and Ruch's (1980) Employee Aptitude Survey (EAS) as a measure of intelligence. Intelligence was assessed because creativity is a cognitively-demanding activity and a large body of prior work has demonstrated a modest, positive relationship between intelligence and creative performance (Kim, 2005; Mumford & Gustafson, 1988). In this 30-item measure, participants are given five minutes to work through six sets of facts, each accompanied by a set of conclusions, and mark whether each conclusion is "true", "false", or "uncertain" given the presented facts. Ruch and Ruch (1980) provided some evidence for the construct validity of the EAS. In the present study, the internal consistency coefficient was acceptable at .69.

Fluency was assessed using Merrifield, Guilford, Christensen, and Frick's (1962) consequences measure. Fluency, or the number of ideas generated in a limited span of time, was measured given the importance of divergent thinking in predicting

performance on idea generation tasks in prior studies (Vincent, Decker, & Mumford, 2002). The consequences measure consists of five timed exercises, in which participants are given two minutes per exercise to generate as many possible consequences in response to a question. An example question is, "What would happen if gravity were cut in half?" Participant responses were coded by counting the number of responses to each question. Merrifield et al. (1962) has provided evidence for the construct validity of fluency scores obtained using this measure. The internal consistency coefficient observed in the present study was acceptable at .87.

Need for cognition, or the extent to which one is intrinsically motivated to solve complex problems, was assessed using Cacioppo, Petty, and Kao's (1984) Need for Cognition Scale. Watts, Steele, and Song (2017) demonstrated that need for cognition positively predicted creative performance across multiple studies of complex problem solving. The need for cognition scale consists of 18 statements such as, "I really enjoy a task that involves coming up with new solutions to problems," to which participants indicate their level of agreement on a five-point scale. Additional evidence of the scale's construct validity has been provided by Cacioppo, Petty, Feinstein, and Jarvis (1996). The internal consistency estimate observed in this study was acceptable at .90.

Learning goals were assessed to control for individual differences in intrinsic motivation towards task mastery in academic settings. Using a 5-point scale, participants rated their agreement with Dweck's (1986) 8-item measure, including statements such as, "I do my best to achieve academic standards I set for myself." Construct validity evidence has been provided by Baranik, Stanley, Bynum, and Lance

(2010) and Day, Radosevich, and Chasteen (2003). The internal consistency coefficient obtained in the present study was .84.

Goldberg's (1990) unipolar Big-Five markers were used to assess personality traits such as openness, conscientiousness, extraversion, agreeableness, and emotional stability. Personality was assessed because a number of these traits have been identified in prior meta-analytic work as significant predictors of creativity (Feist, 1998). Participants used a 9-point scale to indicate the extent to which a list of 100 adjectives (e.g., efficient, intellectual, shy) accurately described them. The construct validity of scores from these scales is well documented (e.g., Becker, Billings, Eveleth, & Gilbert; 1997; Saucier, 2002), and the internal consistency reliabilities observed for each scale in the present study were above .80.

Finally, given the experimental task involved solving a complex problem in the domain of marketing, 6 items were used to assess marketing interests. Using a 5-item response scale, participants responded to six questions such as, "How likely is it that you will go into advertising or marketing as a career?" This scale has been used in prior studies examining creative problem solving in marketing to control for domain expertise (e.g., Gibson & Mumford, 2013). The internal consistency coefficient obtained in the present study was .74.

Manipulations

Idea Source

Idea source was manipulated by asking participants to generate their own initial list of nine ideas or review a list of nine peer ideas. Peer ideas were drawn from a pool of 41 ideas that included concepts presented in Gibson and Mumford's (2013) study and

additional concepts developed by the author. Each of these 41 ideas were rated by three judges regarding their quality (r_{wg} = .81) and originality (r_{wg} = .73). From this pool of ideas, 9 low, 9 moderate, and 9 high creativity ideas were retained (i.e., 27 total). Creativity scores were calculated by averaging quality and originality scores. Five stratified random samples were drawn from this final pool of 27 ideas, with each draw consisting of 9 ideas each, including three low (M = 1.78, SD = .70), three moderate (M = 3.22, SD = .71), and three high (M = 4.19, SD = .56) creativity ideas. The five draws of peer ideas were counterbalanced across all participants in the peer-generated idea list conditions to help reduce the potential for any confounding influence due to unique content presented in any one peer list. Further, including equal numbers of low, moderate, and high creativity ideas in peer-generated list conditions helped to ensure a range of creative ideas were represented as might be expected in real-world marketing tasks. Number of ideas and the originality and quality of initial lists were rated to ensure relative equivalence and comparability of initial lists across peer-generated and self-generated conditions.

Goals

To help ensure the salience of the goal manipulation, explicit references to quality or originality goals were embedded in two locations throughout the experimental task. In the initial description of the marketing task, participants were told that the CEO of the firm had indicated the new campaign "must demonstrate the highest levels of quality (or originality) … and must be comprehensive and feasible (or novel and unexpected)." Later in an email from the Senior Vice President, participants were once again asked to "remember that at Charamousse, delivering work of high quality (or

originality) is of utmost importance." Salience of the goal manipulation was checked with a multiple choice question following participants' completion of the experimental task: "Montgomery Foster, the founder of Charamousse, specifically asked for a marketing campaign that was high in _____." Potential answer choices included quality, elegance, originality, and attractiveness.

Climate

Explicit references to the competitive or collaborative work climate were embedded in two locations throughout the experimental task. In the competitive climate conditions, participants were told that "[the CEO] largely credits the success of Charamousse thus far to its sink-or-swim, competitive culture. Employees that produce at the highest levels are rewarded for their efforts. On the other hand, those that fail to demonstrate the value of their individual contributions rarely stay long." In contrast, participants in the collaborative conditions were told that "[the CEO] largely credits the success of Charamousse thus far to its friendly, team-based, collaborative culture. Employees tend to share credit with one another for their successes, as well as share responsibility for mistakes." In a later email from the Senior Vice President, participants were told, "We hope you (or you and your team) are up to the challenge." Salience of the climate manipulation was checked with a multiple-choice question following participants' completion of the experimental task: "The work climate at the firm might be most accurately described as _____." Answer choices included eccentric, competitive, isolated, and collaborative.

Experimental Task

The experimental task was adapted from the scenario used by Gibson and Mumford (2013). Participants were asked to take on the role of a newly hired Director of Marketing at Charamousse Clothing Company, a fictional, mid-sized firm based out of the Midwest United States interested in expanding operations into the southern market. Participants began the task by reading background information about the company as well research bearing on the firm's target market. Following the review of this information, participants were asked to review a list of nine peer ideas or generate their own list of nine ideas—the first manipulation. The other two manipulations (i.e., goals and climate) were embedded in the text used to describe the scenario to participants. Next participants were asked to identify flaws associated with each idea and then formulate a final advertising campaign. When formulating their final campaigns, participants were explicitly asked to consider new ideas in addition to those included in the initial list. Ratings of final advertising campaigns formed the basis for our dependent variables.

Dependent Variables

Three trained judges who were blind to the study's hypotheses and information about participant condition coded participants' final advertising campaigns across 8 dependent variables, including 1) number of total concepts, 2) number of old concepts, 3) number of new concepts, 4) conceptual combination, 5) elaboration, 6) quality, 7) originality, and 8) elegance. Prior to making these ratings, judges participated in a 20-hour training program in which they were familiarized with benchmark rating scales and operational definitions for each variable. Judges practiced applying these scales to a

set of sample responses and then met to discuss their ratings and resolve discrepancies. Benchmark rating scales and example responses are presented in Table 1. The first three dependent variables reflect the average number of concepts counted by raters. The remaining five dependent variables were rated on a 5-point Likert scale, with 1 indicating little to no presence of the variable and 5 indicating the variable was present extensively.

Number of Total Concepts

This variable was defined as the total number of distinct concepts or ideas present in participants' final advertising campaigns. The interrater agreement estimate was acceptable at .91.

Number of Old Concepts

Number of old concepts reflects a count of how many ideas from participants' initial lists were present in their final campaigns. This variable served as an index of idea selection, or the amount of initial ideas that were retained. The estimate of interrater agreement was acceptable at .89.

Number of New Concepts

This variable refers to the number of concepts included in participants' final advertising campaigns that were not included in their initial lists. In other words, this variable represents late-stage idea generation, or the amount of new ideas generated after the development or review of the initial list. The estimate of interrater agreement was acceptable at .87.

Conceptual Combination

Conceptual combination refers to the extent to which participants combined concepts or ideas from the initial list to form new ideas. The interrater agreement estimate was adequate at .64.

Elaboration

This variable was defined as the extent to which participants elaborated on, or described in richer detail, concepts or ideas from the initial idea list in their final campaigns. The interrater agreement coefficient was acceptable at .84.

Quality

Quality was defined as the overall completeness, coherence, and feasibility of participants' final advertising campaigns. The interrater agreement estimate was acceptable at .85.

Originality

Originality refers to the extent to which participants' final advertising campaigns evidenced novelty and were richly described. The estimate of interrater agreement was acceptable at .83.

Elegance

Elegance was defined as the extent to which participants' final advertising campaigns were articulately arranged in a succinct way. More elegant campaigns were cleverly structured to flow well from one idea to the next. The interrater agreement coefficient was acceptable at .81.

Results

Manipulation Checks

Nearly all participants who were asked to generate their own list of nine ideas actually formulated nine ideas (M = 8.98, SD = .21). The one participant that did not generated seven ideas. Thus, there was no difference in the number of ideas included in initial idea lists between self- and peer-generated list conditions. In addition, no significant difference in the originality of initial idea lists was identified between self-generated (M = 3.16, SE = .05) and peer-generated (M = 3.17, SE = .05) conditions, $F(1, 176) = 0.03$, p = .861. However, a significant difference was found for the quality of initial idea lists, $F(1, 176) = 5.63$, p = .019, such that peer-generated ideas (M = 3.25, SE = .05) were of higher quality than self-generated ideas (M = 3.07, SD = .05). Thus, quality of initial idea list was included as a covariate in subsequent ANCOVAs to help control for any potential influence on dependent variables. Finally, approximately 84% of participants answered the follow-up, goal manipulation check question correctly, while 73% answered the climate manipulation check question correctly, providing some evidence for the salience of the goal and climate manipulations.

Creativity Variables

Table 2 presents descriptive statistics, reliability estimates, and correlations. Hierarchical regression analyses were conducted to help determine what covariates to retain. Covariates were retained in ANCOVAs for all 8 dependent variables if they were significantly related (i.e., $p \leq .05$) to any of the dependent variables (Antonakis & Dietz, 2011). Main effects and interactions from one-way ANCOVA tests were interpreted as statistically significant if they evidenced a p-value $\leq .05$.

First, the influence of idea source, goals, and climate was assessed with respect to total number of concepts, number of old concepts, and number of new concepts evidenced in participants' final advertising campaigns. Table 3 presents these results. A significant main effect was found for the influence of idea source on total number of concepts. Participants asked to review an initial list of peer ideas ($M = 4.96$, $SE = .23$) included significantly more concepts in their final advertising campaigns than those asked to generate their own idea list ($M = 3.94$, $SE = .23$).

A near-significant main effect was identified for the influence of goals on the number of old concepts counted as present in final campaigns ($p = .051$). Participants who were given originality goals included fewer concepts from initial lists in their final campaigns ($M = 2.87$, $SE = .19$), compared with those who were given quality goals ($M = 3.41$, $SE = .19$).

Further, a significant main effect was found for idea source and total number of new concepts. That is, participants who reviewed peer ideas ($M = 1.84$, $SE = .17$) generated more novel concepts in their final campaigns, compared with those who generated their own initial ideas ($M = 0.77$, $SE = .18$).

Next, the influence of our manipulations was assessed with respect to refinement as evidenced by conceptual combination and elaboration in final advertising campaigns. Table 4 presents these results. Extraversion was negatively related to conceptual combination. In addition, a significant main effect was observed for idea source. Participants asked to generate their own ideas ($M = 2.11$, $SE = .07$) evidenced greater conceptual combination than those asked to review peer ideas ($M = 1.81$, $SE = .07$).

Fluency was positively related, while extraversion was negatively related, to elaboration on initial ideas in final advertising campaigns. A significant two-way interaction between idea source and goals was identified. The strongest elaboration was evidenced by participants who were asked to generate their own initial ideas while focused on originality goals ($M = 2.88$, $SE = .11$), compared with those asked to review peer ideas while focused on originality goals ($M = 2.51$, $SE = .11$). Further, a near-significant, three-way interaction was observed ($p = .054$). The strongest elaboration was evidenced by participants who generated their own initial ideas in the context of originality goals and a collaborative climate ($M = 2.93$, $SE = .16$). The poorest elaboration was observed for participants focused on the quality of their own ideas in a collaborative climate ($M = 2.41$, $SE = .15$), or the originality of peer ideas in a collaborative climate ($M = 2.42$, $SE = .15$).

Finally, the influence of idea source, goals, and climate was assessed with respect to the quality, originality, and elegance of participants' final advertising campaigns. Table 5 presents these results. Not surprisingly, initial idea list quality was positively related to final campaign quality. A near-significant, three-way interaction was identified ($p = .090$). The highest quality campaigns were evidenced by participants focused on the originality of their own ideas in a collaborative climate ($M = 3.01$, $SE = .13$), while the poorest quality was demonstrated by those focusing on the originality of peer ideas in a collaborative climate ($M = 2.71$, $SE = .13$). Other particularly poor quality campaigns were produced by participants focused on the quality of peer ideas in a competitive climate ($M = 2.79$, $SE = .12$), the originality of self-generated ideas in a

competitive climate (M = 2.79, SE = .12), or the quality of self-generated ideas in a collaborative climate (M = 2.81, SE = .13).

Need for cognition and fluency were positively related to final campaign originality. A significant main effect for idea source was identified, such that participants who generated their own initial ideas (M = 3.13, SE = .07) outperformed those who reviewed peer ideas (M = 2.89, SE = .07). This significant main effect should, however, be interpreted in the context of a significant three-way interaction. Once again, participants focused on the originality of self-generated ideas in a collaborative climate performed best with regard to final campaign originality (M = 3.39, SE = .14). The poorest originality was demonstrated by participants focused on the quality of peer ideas in a competitive climate (M = 2.77, SE = .13) or the originality of peer ideas in a collaborative climate (M = 2.79, SE = .14).

Intelligence was positively related to final campaign elegance. A significant main effect was observed for idea source, such that participants asked to self-generate ideas (M = 2.74, SE = .07) outperformed those asked to review peer ideas (M = 2.52, SE = .07). However, a significant three-way interaction was also observed following a similar pattern to the ones observed for elaboration, quality, and originality. Participants focused on the originality of their own ideas in a collaborative climate (M = 3.01, SE = .15) demonstrated the strongest elegance in their final campaigns. The poorest elegance was observed for participants focused on the originality of peer ideas in a collaborative climate (M = 2.40, SE = .14).

Discussion

A number of limitations should be noted before turning to the conclusions that might be drawn from the present effort. The sample consisted of undergraduates, not creative professionals. Although undergraduates have proven capable of producing creative marketing campaigns in prior studies (e.g., Gibson & Mumford, 2013; Redmond, Mumford, & Teach, 1993; Licuanan et al., 2007) and the average participant in the present study possessed at least two years of work experience, some caution is called for in extending the study's conclusions to the workplace. In addition, the paper-and-pencil nature of the experimental task did not allow participants to receive any feedback on their ideas. This is a limitation because creativity is held to most commonly emerge in a socially stimulating context where ideas are shared and critiqued among colleagues (Paulus, 2000). Although the task allowed for greater control over extraneous variables that are likely influence "real-world" creative work, this task also limited the range of creative processes observed.

Bearing these limitations in mind, a number of noteworthy conclusions may still be drawn. Participants starting with a list of peer ideas included more ideas in their final campaigns—our first hypothesis. One interesting finding in this regard, however, is that no differences were found between the number of initial (i.e., old) ideas used between self- and peer-generated conditions. Further, participants who were asked to review peer ideas included significantly more new ideas in their final campaigns. In other words, idea source did not impact the number of initial ideas used in final campaigns, but did influence the number of new ideas generated during idea evaluation. These findings align well with a limited cognitive resources view of creativity, in which different capacities are held to be required for execution of idea generation and evaluation

processes (Basadur, Runco, & Vega, 2000; Medeiros, Partlow, & Mumford, 2014; Runco & Basadur, 1993). Participants who reviewed peer ideas may have simply maintained more resources for late-stage idea generation compared with those that exhausted these resources during the initial idea generation task. Alternatively, late-stage idea generation may have been more feasible for participants who reviewed peer ideas due to the potentially lighter cognitive load of reviewing ideas compared with generating ideas (Hilliges et al., 2007).

General support was also found for our second hypothesis. That is, participants who generated their own initial list of ideas engaged in more refinement of these ideas, as evidenced by conceptual combination and elaboration. This point is noteworthy when interpreted in the context of the findings bearing on idea source and idea selection. That is, simply selecting more ideas, even more new ideas, did not always result in more creative campaigns. Participants who generated their own initial ideas appear to have been more willing to manipulate and refine these ideas, perhaps because they were more personally invested in working with their own ideas (Illies & Reiter-Palmon, 2004).

The most noteworthy findings occurred when goals and climate were taken into account, as evidenced by a consistent pattern of three-way interactions for elaboration, quality, originality, and elegance of final advertising campaigns. That is, participants produced the most creative campaigns (i.e., strongest elaboration, quality, originality, and elegance) when focused on the originality of their own ideas in a collaborative climate. In contrast, when participants were asked to focus on the originality of self-generated ideas in a competitive climate, creativity suffered. Thus, compared with competitive climates, collaborative climates appear to provide the psychological safety

necessary to objectively critique and improve on the creativity of one's ideas, providing some support for our final two hypotheses.

Finally, there was an interesting "non-finding"—that is, the originality of ideas in participants' initial lists was unrelated to the originality of their final campaigns. A similar pattern has been observed in prior studies of idea selection processes suggesting that people are able to judge the originality of ideas with some accuracy, but they are less willing to select, and thereby commit to, the implementation of highly original ideas (e.g., Rietzchel et al., 2010, 2014), perhaps because they view these ideas as too risky. When individuals are operating in a collaborative climate and focused on originality goals, however, they appear to be more willing to select, refine, and form implementation plans based on more original, self-generated ideas.

Implications and Future Research

Our findings suggest a number of practical implications for organizations concerned with enhancing creativity in the workplace. First, the environment in which creative ideas are generated and evaluated appears to influence idea selection, refinement, and creativity. Although this conclusion will not strike scholars of creativity as new or surprising, the present study is novel in that we provide empirical evidence suggesting the importance of three, particular interacting environmental characteristics. For example, the pattern of observed effects suggests the potential value of two alternative strategies depending on organizational priorities and situational demands. In work environments where quality and efficiency are valued over novelty, creativity might be enhanced by increasing exposure to ideas from external sources—such as ideas emerging from external, field-based networks (Medeiros, Mumford, & Watts,

2016). Exposure to environments that are rich with external ideas during early stages of the creative process may preserve cognitive resources by limiting personal investment in any single idea and thus allowing for more efficient goal execution. Alternatively, in work environments where the development of highly original solutions is a top priority, shielding creative workers from external ideas early in the creative process may prove valuable. This period of isolated autonomy during initial idea generation, when paired with originality goals, appears to enhance personal investment in ideas and thus support further investments in idea refinement and creativity. Of course, one caveat is the importance of pairing these potential strategies with a collaborative work climate. The psychological safety provided by a collaborative work environment, when paired with originality goals, appears critical to supporting individuals in pursuing the selection, refinement, and implementation of highly original ideas.

Several potentially fruitful directions for future research were also identified. First, in the present study the idea source was transparent (i.e., directly traceable) and the use of peer ideas was presented as legitimate. It is unclear, however, whether variations in idea selection might be observed when the source is less transparent or when using ideas from a source is perceived as illegitimate (e.g., idea theft)—especially in the presence of a competitive climate.

In addition, although a number of individual differences proved significant as covariates in the present study, it was beyond the scope of this study to investigate the relationships between individual differences, our manipulations, and creativity. Given the apparent importance of cognitive resources and knowledge to idea selection and

refinement, future research might benefit from investigating the influence of cognitive traits (e.g., need for cognition) and domain expertise.

Finally, participants' judgments about the creativity of initial ideas were not measured in the present study, preventing assessments of the accuracy of participants' judgments about initial ideas through comparisons of participants' and external judges' ratings (e.g., Blair & Mumford, 2007; Runco & Smith, 1992). The focus of the present study, however, was not on the accuracy of people's evaluative judgments, but rather how characteristics of the work environment impact creative performance as reflected in idea selection, refinement, and creativity. Future research might benefit from investigating the relationship between alternative sources of ideas and the accuracy of participants' evaluations, as well as the relationship between the accuracy of evaluations and idea selection.

Conclusion

Although creativity research has traditionally focused on idea generation, the fact that so many ideas either fail or are prematurely discarded necessitates a stronger focus on understanding the creative processes that occur between generation and implementation—what Perry-Smith and Mannucci (2015) recently described as the "idea journey." The present study investigated the interaction of three environmental characteristics that were found to influence multiple stages of the idea journey, including idea selection, refinement, and overall creativity. Our findings suggest organizations might support the generation and implementation of highly original ideas by designing collaborative work climates, providing originality goals, and structuring early stages of creative projects to allow for isolated, autonomous idea generation.

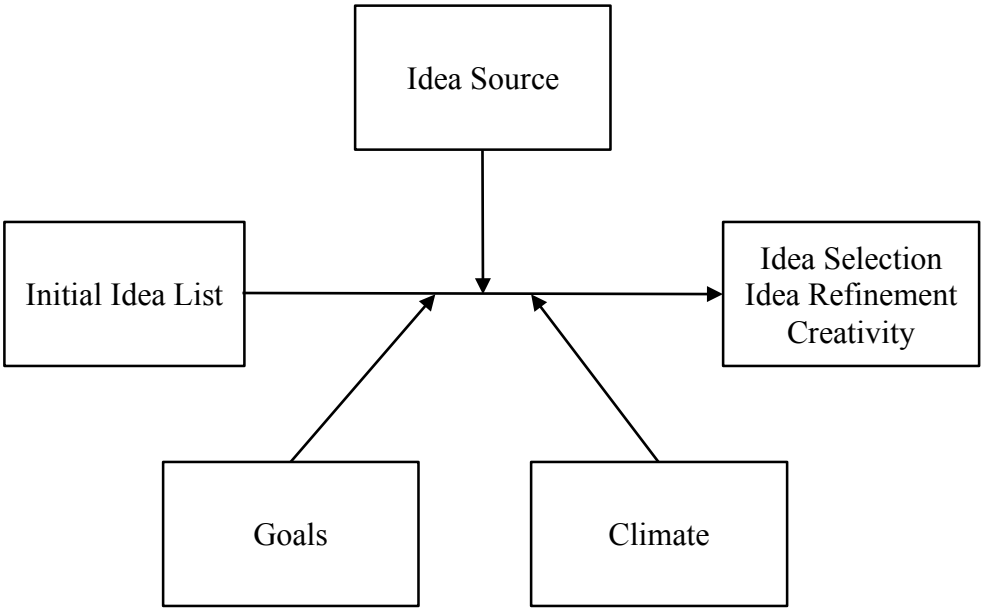


Figure 1. Theoretical Framework for Study

Table 1. Benchmark Ratings and Example Responses for Dependent Variables

Example Response 1	Example Response 2	Example Response 3
One idea that wasn't mentioned was creating a television ad. It could be broadcasted on health channels or the food network, since our target audience generally works out. I'm not 100% positive about he statistics, but I'm guessing that the average college graduate owns a TV; you could also get this based on their incomes. Also, commercials get uploaded to the Internet if they are interesting enough. Since our average customer owns Apple products, they are more likely to have access to the Internet. Hiring people for the commercial would not be that costly because we can use some of our staff that we already have.	For the final campaign I say our biggest pushes should be at local yoga studios, luxury gyms or spas, local luxury magazines, and endorsements on Instagram by locals. Lastly, placing the product in a reusable bag, like LuLulemon, will promote our growth in the South. First, placing ads of men and women wearing our clothes with a little blurb about how they are of extreme quality will catch the attention of yogies. These ads become their #goals or inspiration, they want to be those humanitarian, earthy, granola, beautiful people in the ads because yoga brings out your inner-peace, right? The effect the ads will have in yoga studios translates well to other places similar, like luxury gyms like Lifetime or local high-end spas. As a Houstonian myself, I know I use the ads I see at gyms and spas as a goal or inspiration to work harder/look better and what better to do that in Charamousse Clothing! Secondly, endorsements on Instagram by Southerners with large followings is the way to go. Tagging us in their clothes and captioning our message and motto provides a platform to explain more in depth about what makes us unique and different from other companies. Lastly, placing the product in a reusable, cool looking bag will get people to advertise for us, for free!	* We should definitely advertise on college campuses, even if they don't buy anything new they will remember us and be more likely to buy when they graduate. * We should make a big, targeted, social media push. This would allow us to go after people who already fit our customer profile in a place they are bound to see us. * We could do magazine advertising if we could find a more local magazine that has a more affluent subscriber base. * Keep our clothing lines as they are now. Trying to manage new types of clothes while expanding would be a disaster. * We could sponsor some fashion shows with a few select pieces being actually shown at the event (perhaps the one-of-a-kind lines we have). If we sponsor one on a college campus with student designs we hit two birds with one stone and do not run the risk of being upstaged by other clothing lines. * We should advertise near the places we are going to open our stores, especially malls. These are presumably areas that our kind of potential customers already hang out.
Benchmark ratings Number of total concepts = 1.67 Number of old concepts = 0 Number of new concepts = 1 Combination = 1 Elaboration = 2 Quality = 2 Originality = 2.33 Elegance = 2.67	Benchmark ratings Number of total concepts = 5.33 Number of old concepts = 3.33 Number of new concepts = 2 Combination = 1 Elaboration = 5 Quality = 4.67 Originality = 4.67 Elegance = 4.33	Benchmark ratings Number of total concepts = 5.67 Number of old concepts = 3.33 Number of new concepts = 2 Combination = 2 Elaboration = 3.33 Quality = 3.33 Originality = 2.33 Elegance = 2

Table 2. Descriptive Statistics, Reliability Estimates, and Correlations for Covariates and Dependent Variables

	Mean	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
Covariates																		
1. Initial List Quality	3.16	0.52	(.82)															
2. Intelligence	25.51	5.52	.15	(.69)														
3. Conscientiousness	132.48	20.28	.04	.06	(.89)													
4. Extraversion	114.71	22.12	.01	-.10	.02	(.88)												
5. Need for Cognition	3.40	0.67	.05	.25**	.35**	-.01	(.90)											
6. Learning Goals	4.32	0.57	.06	.00	.44**	.02	.43	(.84)										
7. Fluency	6.42	1.95	.03	.02	.03	.21**	-.02	-.02	(.87)									
8. Marketing Interests	2.39	0.75	-.09	-.11	-.12	.21**	.07	-.11	.00	(.74)								
Dependent Variables																		
9. Number of Total Concepts	4.46	2.16	-.04	.12	-.12	.06	.05	-.10	.07	.04	(.91)							
10. Number of Old Concepts	3.14	1.81	.04	.13	-.08	.11	.10	-.03	.05	.01	.66**	(.89)						
11. Number of New Concepts	1.31	1.67	-.09	.00	-.07	-.05	-.05	-.10	.04	.04	.58**	-.23**	(.87)					
12. Conceptual Combination	1.96	0.68	-.06	.10	.09	-.13	.10	.10	.11	.00	.03	.04	-.01	(.64)				
13. Elaboration	2.66	0.72	.08	.15	.14	-.13	.21**	.15	.16*	.04	-.12	-.03	-.12	.52**	(.84)			
14. Quality	2.85	0.61	.25**	.19*	.17*	-.01	.21**	.19*	.07	.08	.10	.13	-.02	.49**	.63**	(.85)		
15. Originality	3.01	0.66	.08	.17*	.13	.01	.22**	.12	.18*	.08	.01	.02	-.01	.60**	.68**	.70**	(.83)	
16. Elegance	2.63	0.66	.10	.19*	.16*	-.02	.18*	.21**	.10	.00	-.08	.01	-.12	.55**	.72**	.73**	.70**	(.81)

Note. $N = 178$; $^{*}p \leq .05$; $^{**}p \leq .01$; diagonal variances were replaced with internal scale reliability or r_{tetc} estimates in parentheses.

Table 3. Analysis of Covariate Results for Number of Total Concepts, Old Concepts, and New Concepts

	Number of Total Concepts				Number of Old Concepts				Number of New Concepts			
	df	*F*	*p*	η_p^2	*df*	*F*	*p*	η_p^2	*df*	*F*	*p*	η_p^2
Covariates												
Initial List Quality	1, 162	1.32	.251	.01	1, 162	0.16	.690	.00	1, 162	3.83	.052	.02
Intelligence	1, 162	1.71	.193	.01	1, 162	1.21	.272	.01	1, 162	0.25	.618	.00
Conscientiousness	1, 162	2.59	.110	.02	1, 162	2.53	.114	.02	1, 162	0.13	.725	.00
Extraversion	1, 162	2.01	.158	.01	1, 162	3.63	.059	.02	1, 162	0.06	.805	.00
Need for Cognition	1, 162	1.07	.302	.01	1, 162	3.39	.068	.02	1, 162	0.46	.499	.00
Learning Goals	1, 162	0.48	.487	.00	1, 162	0.18	.669	.00	1, 162	0.19	.660	.00
Fluency	1, 162	0.81	.370	.01	1, 162	0.01	.941	.00	1, 162	1.21	.273	.01
Marketing Interests	1, 162	0.01	.926	.00	1, 162	0.18	.676	.00	1, 162	0.12	.732	.00
Main Effects												
Idea Source	1, 162	9.57	.002*	.06	1, 162	0.03	.862	.00	1, 162	18.15	.000*	.10
Goals	1, 162	0.26	.615	.00	1, 162	3.85	.051	.02	1, 162	2.29	.133	.01
Climate	1, 162	0.09	.764	.00	1, 162	0.22	.644	.00	1, 162	0.01	.906	.00
Two-Way Interactions												
Idea Source X Goals	1, 162	0.07	.795	.00	1, 162	1.42	.235	.01	1, 162	0.96	.329	.01
Idea Source X Climate	1, 162	0.14	.706	.00	1, 162	1.35	.247	.01	1, 162	0.62	.432	.00
Goals X Climate	1, 162	0.05	.832	.00	1, 162	0.34	.559	.00	1, 162	0.14	.712	.00
Three-Way Interaction												
Idea Source X Goals X Climate	1, 162	1.43	.234	.01	1, 162	0.52	.470	.00	1, 162	0.59	.443	.00

Note. $N = 178$; $^*p \leq .05$; "*F*" indicates *F*-ratio, "*df*" indicates degrees of freedom, "*p*" indicates significance level, and "η_p^2" indicates effect size.

Table 4. Analysis of Covariate Results for Conceptual Combination and Elaboration

	Conceptual Combination				Elaboration			
	df	*F*	*p*	η_p^2	*df*	*F*	*p*	η_p^2
Covariates								
Initial List Quality	1, 162	0.24	.628	.00	1, 162	1.06	.306	.01
Intelligence	1, 162	1.18	.279	.01	1, 162	1.30	.255	.01
Conscientiousness	1, 162	0.31	.579	.00	1, 162	0.53	.469	.00
Extraversion	1, 162	7.96	.005*	.05	1, 162	7.60	.006*	.05
Need for Cognition	1, 162	0.25	.618	.00	1, 162	2.85	.093	.02
Learning Goals	1, 162	0.70	.403	.00	1, 162	0.58	.447	.00
Fluency	1, 162	2.90	.090	.02	1, 162	5.16	.024*	.03
Marketing Interests	1, 162	0.59	.443	.00	1, 162	2.51	.115	.02
Main Effects								
Idea Source	1, 162	8.87	.003*	.05	1, 162	1.84	.177	.01
Goals	1, 162	0.47	.496	.00	1, 162	0.36	.547	.00
Climate	1, 162	0.60	.441	.00	1, 162	0.43	.515	.00
Two-Way Interactions								
Idea Source X Goals	1, 162	0.03	.873	.00	1, 162	4.23	.041*	.03
Idea Source X Climate	1, 162	0.01	.943	.00	1, 162	0.27	.606	.00
Goals X Climate	1, 162	0.54	.462	.00	1, 162	0.11	.738	.00
Three-Way Interaction								
Idea Source X Goals X Climate	1, 162	1.82	.180	.01	1, 162	3.77	.054	.02

Note. $N = 178$; $^*p \leq .05$; "*F*" indicates *F*-ratio, "*df*" indicates degrees of freedom, "*p*" indicates significance level, and "η_p^2" indicates effect size.

Table 5. Analysis of Covariate Results for Quality, Originality, and Elegance

	Quality				Originality				Elegance			
	df	*F*	*p*	η_p^2	*df*	*F*	*p*	η_p^2	*df*	*F*	*p*	η_p^2
Covariates												
Initial List Quality	1, 162	8.62	.004*	.05	1, 162	0.85	.357	.01	1, 162	1.24	.268	.01
Intelligence	1, 162	3.09	.081	.02	1, 162	1.87	.174	.01	1, 162	4.35	.039*	.03
Conscientiousness	1, 162	1.51	.220	.01	1, 162	0.50	.480	.00	1, 162	0.76	.384	.01
Extraversion	1, 162	0.64	.423	.00	1, 162	1.21	.272	.01	1, 162	1.49	.224	.01
Need for Cognition	1, 162	0.74	.391	.01	1, 162	4.49	.036*	.03	1, 162	0.37	.545	.00
Learning Goals	1, 162	1.55	.215	.01	1, 162	0.02	.892	.00	1, 162	2.58	.110	.02
Fluency	1, 162	0.63	.430	.00	1, 162	5.75	.018*	.03	1, 162	1.45	.230	.01
Marketing Interests	1, 162	3.87	.051	.02	1, 162	2.69	.103	.02	1, 162	0.97	.325	.01
Main Effects												
Idea Source	1, 162	0.48	.490	.00	1, 162	6.32	.013*	.04	1, 162	5.08	.026*	.03
Goals	1, 162	0.00	.974	.00	1, 162	1.44	.232	.01	1, 162	2.01	.158	.01
Climate	1, 162	0.00	.950	.00	1, 162	0.43	.515	.00	1, 162	0.31	.576	.00
Two-Way Interactions												
Idea Source X Goals	1, 162	0.14	.714	.00	1, 162	1.37	.243	.01	1, 162	0.96	.328	.01
Idea Source X Climate	1, 162	0.32	.572	.00	1, 162	0.26	.610	.00	1, 162	0.99	.322	.01
Goals X Climate	1, 162	0.02	.889	.00	1, 162	0.11	.736	.00	1, 162	0.41	.525	.00
Three-Way Interaction												
Idea Source X Goals X Climate	1, 162	2.91	.090	.02	1, 162	4.06	.046*	.02	1, 162	4.08	.045*	.03

Note. $N = 178$; $^*p \leq .05$; "*F*" indicates *F*-ratio, "*df*" indicates degrees of freedom, "*p*" indicates significance level, and "η_p^2" indicates effect size.

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