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CONTEXTUAL MODERATORS OF THE EFFECTS OF MEMBERSHIP CHANGE ON TEAM CREATIVE PERFORMANCE AND TEAM VIABILITY

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ABSTRACT

Common wisdom regarding changes in team membership suggests that such disruptions have inherently negative effects on team outcomes. However, the present study argues that the effects of membership change are far more nuanced, being influenced by a number of contextual factors. In a laboratory investigation of 476 participants in 119 teams, I investigated the effects of two types of membership change on team creative performance, and examined whether or not these effects varied as a result of the type of creative task team members were engaged in. I found that task type moderated the effects of membership change on creative performance, and that the creative outcomes for teams in which the most creative member changed teams were similar to those in which no change occurred. Implications and future directions are also discussed.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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The contemporary workplace is often characterized by instability and ambiguity (Madsen, Miller, & John, 2005; Smith, 1997). Increasingly, reward structures are changing to emphasize the group rather than the individual (Ellemers, De Gilder, & Haslam, 2004), the nature of tasks themselves are often mutable (Madsen et al., 2004; Smith, 1997), and work team membership is frequently in flux, rather than stable (e.g., Arrow, 1997; Choi & Thompson, 2005; Levine, Choi, & Moreland, 2003; Mathieu, Maynard, Rapp, & Gilson, 2008). Such uncertainty is a key consideration in the study of organizational teams, particularly teams engaging in creative work.

The emergent consensus among innovation and teams scholars is that the creative process is itself ambiguous and dynamic (Amabile, 1996), and team processes do not proceed in a linear fashion (Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Mathieu et al., 2008). However, the majority of research on team creative performance tends to treat these factors as wholly stable (cf. Sundstrom, 1999). The present study attempts to rectify such an oversight by testing a model of team creative performance which accounts for the complex and dynamic influences of teams engaged in creative work—specifically, membership change.

Similar to the way in which the dynamic nature of the creative process is often overlooked, the true nature of teams in organizations is often oversimplified as well. That is, although work teams tend to be conceptualized as intact entities with stable membership (cf. Guzzo & Dickson, 1996), this is in fact rarely the case. Instead, the extant literature suggests that, for longstanding teams, some degree of membership change is almost inevitable (Levine & Choi, 2004; Lewis, Belliveau, Herndon, & Keller, 2007; Ziller, Behringer, & Goodchilds, 1962). Redressing such an oversight is critical, as the majority of creative endeavors are typically conducted by teams (Paulus & Yang, 2000). Thus, it is vital to consider not only the creative

input of each member, but how they interact with one another, including the effects of shifts in team membership. However, such an undertaking is further complicated by the nature of the creative process itself, which is inherently a conflict-laden pursuit, where problems are often ill-defined and open to varying interpretations (Amabile, 1996; M. Mumford, Baughman, Threlfall, Supinski, & Costanza, 1996). This ambiguity drives differences of opinion and competing visions that can have far-reaching influences on a team's creative performance. In particular, organizational success demands that teams not only produce novel and useful products, but also that team members remain willing and comfortable working with one another as they navigate successive iterations of the creative process. In order to understand the unique tasks and challenges that teams may face when engaged in creative work, it is instructive to first discuss the creative process itself in some more detail.

Overview of the Creative Process

Early perspectives on creativity conceptualized the construct as a unitary outcome. "Creativity" was thought to be a single product, and the processes involved in generating creative solutions were things that could not be observed or measured (Ward, Smith, & Finke, 2009). Such an approach is a hindrance to research on creative performance, as it does not allow for an examination of the processes and activities leading up to a creative result. Early attempts to capture the processes involved in creative ideation were not much of an improvement. Although such models (e.g., Dewey, 1910; Wallas, 1926), described basic stages of creative performance, creative ideas and solutions were thought to occur via "flashes of inspiration" (Wallas, 1926), and could not themselves be observed.

Such conceptualizations are not beneficial for research or practical interventions, as they do not allow the examination of steps that lead up to the development of a creative solution.

Thus, more elaborate stage-based models of creative performance are a vital tool for the empirical examination of creativity and innovation. Such models open the "black box" of creative performance, allowing the various elements leading up to and following from the development of a creative idea to be independently examined and tested. Montag and colleagues (Montag, Maertz, & Baer, 2012), call for an investigation of such processes, arguing that numerous creativity-focused behaviors can have both expected and unexpected influences on creative outcomes. Without examination of the stages and finer-grained processes involved in the generation of creative products, it is not possible to fully tease apart the relationship between designers' behavior and their eventual products (Montag et al., 2012). Thus, detailed stage-based models of the creative process are useful tools for research and practice.

The eight-stage process model. One of the preeminent stage-based models of creative performance is the eight-stage model developed by Mumford and colleagues (e.g., M. Mumford, Mobley, Uhlman, Reiter-Palmon, & Doares, 1991; Baughman & M. Mumford, 1995). This model divides creative performance into eight distinct stages that are thought to be necessary for successful creative performance. At the outset of the creative process, designers begin with *problem construction*, in which they take an initially ambiguous problem and try to define it in more specific, approachable terms. Successful problem construction makes creative problem solving more feasible, as a clearly defined problem is essential for navigating subsequent process stages (Hunter, Friedrich, Bedell, & M. Mumford, 2006). After defining the problem, workers typically engage in *information gathering*, in which additional information relevant to the problem is acquired. Next is *concept selection*, in which this new information is organized and elements that are most relevant to the current problem are identified for later use. In the following *conceptual combination* stage, these varied pieces of potentially valuable information

are further examined and grouped into new configurations that may be both novel and useful. Then, in *idea generation,* these combinations of concepts are further developed as the basis for potential solutions to the specified problem. Next, in *idea evaluation*, designers critically appraise these new ideas and determine which should be revised, explored further, or discarded. In *implementation planning*, the best of these ideas are further refined and evaluated, prior to hopefully being enacted. Finally, in the *monitoring* stage, ideas that have been implemented are evaluated and potentially maintained, refined, or discarded, based upon feedback on their performance.

Broadly, these eight stages can be grouped into two primary categories, based upon Osborn's (1963) model of creative thinking: "generative" stages, in which team members gather information and develop creative ideas, and "evaluative" stages, in which ideas are critically examined, plans for implementation are devised, and ultimately executed. Warr and O'Neill (2005) note that many established creative process models can be divided in such a manner, including Amabile's (1983) model of creative performance.

For ease of classification and examination of team-level effects at various points in the creative process, the present study will use such a two-phase taxonomy of the creative process, in which Mumford and colleagues' stages are grouped into distinct "generative" and "evaluative" phases. Adding support to such a perspective, creativity scholars frequently draw a distinction between "creativity" and "innovation" (or outcomes of creative performance) by arguing that "creativity" involves generating novel and useful ideas, whereas "innovation" involves developing practical solutions based around such ideas (Reiter-Palmon, Wigert, & de Vreede, 2012; West, 2002). Indeed, Lonergan, Scott, and Mumford (Lonergan, Scott, & M. Mumford,

(2004) note that idea generation and idea evaluation are distinct facets of the creative process, involving separate cognitive processes.

Drawing from Osborn's (1963) classification, the generative phase of the creative process will be conceptualized to include the first five stages, through *idea generation*. In this group of stages, team members gather information relating to the problem, develop a pool of concepts related to a possible solution, and ultimately create preliminary solutions. Following from this, the evaluative phase includes the final three creative process stages: *idea evaluation, implementation planning, and monitoring*. In these stages, team members narrow down the range of potential solutions to select the most promising one, then decide how to best enact it, and how to evaluate its eventual success or failure.

It is important to note that, although the creative process stages described here have been discussed in a linear fashion, the path through this process is not inherently linear. Indeed, successful navigation of the creative process often involves revisiting prior stages to make modifications, adjustments, or improvements to a potential creative solution (Ward et al., 2009; Warr & O'Neill, 2005). Lonergan and colleagues (2004) likewise acknowledge that there can be a great deal of interaction between the generative and evaluative phases of the creative process. This gives rise to a process that is frequently reciprocal, with performance from later stages feeding back into earlier stages. This fuels successive iterations that, ideally, result in a more effective innovative solution.

The numerous elements and nonlinear nature of the creative process make it quite complex. These processes are further complicated because they often occur in the context of a *team*, rather than as the result of a lone individual. Indeed, recent literature argues that the emergent processes and interactions that arise within a team mean that team creative

performance is qualitatively distinct from such performance at the individual level (Reiter-Palmon et al., 2012). Therefore, having discussed the creative process itself, it is now important to examine how this process might play out in the context of a team. This necessitates discussion of a process- based model of team performance.

Overview of Team Processes

As team members continue to work together, their ongoing interactions and experiences shape their performance and attitudes toward one another and their tasks. By navigating these novel experiences as a group, teams grow, evolve, and change (Ilgen et al., 2005; Kozlowski & Klein, 2000). Thus, effective models of team performance should account for the effects of such experiences, and for the ways in which teams can change over time. However, typical models of team performance have failed to account for such flux (Kozlowski & Bell, 2003; Kozlowski & Klein, 2000). Given that the creative process is itself recursive, often involving revisiting prior stages and revising or altering ideas (Ward, Fink, & Smith, 2009), any process model used to assess team creative performance must allow for such recursive effects. Furthermore, Reiter-Palmon and colleagues (2012) argue that the team should not be considered a stagnant background context for creative performance, but rather that the emergent processes associated with team will exert their own influence on the creative process.

Within organizational teams, team dynamics are frequently in flux and prone to change (McGrath, Arrow, & Berdahl, 2000). This is further compounded by the nature of creative the creative process, which involves ambiguous problems that are often prone to change as they develop (Amabile, 1996). Thoroughly understanding the drivers of team performance necessitates studying teams in terms of their ongoing interactions and experiences in context (Day, Gronn, & Salas, 2006).

However, in a review of process models of team performance, Ilgen et al. (2005) identified that most frameworks for examining team performance over time were sorely lacking. In particular, the researchers argue that, prior to the mid-1990s, empirical research on teams focused on clear-cut outcomes (such as team performance and viability), with little consideration of the complex processes that allow teams to reach these outcomes (Ilgen et al., 2005; Goodwin, Burke, Wildman, & Salas, 2008; Wiggins & Crowston, 2010). Typical approaches therefore classify team performance as a simple equation, and ask what inputs (such as team composition variables and organization contextual factors) lead to the best performance outcomes (Wiggins & Crowston, 2010). This mirrors research on team membership change, in which membership change is typically conceptualized as a single outcome, which studies attempt to predict.

However, such models ignore the ways in which teams interactions and experiences shape future events and attitudes about the team. In the context of the present study, this means that membership change (typically conceptualized as an outcome) is rarely examined with regard to its effects on the rest of the team. Instead, it would be beneficial to understand how membership change operates within the broader ecosystem of a team; that is, once changes in membership occur, what are the effects, and how do these effects impact the team's future interactions?

Ilgen and colleagues (2005) propose a mediated model of team performance that is complementary to the eight-stage creative process model described previously. This approach allows for various instances of performance to feed back to influence the team. In this model, team inputs, such as individual differences, attitudes, environmental factors, and task characteristics, influence early team performance through a variety of potential mediators (Ilgen et al., 2005; Richardson & West, 2010; Wiggins & Crowston, 2010). Ilgen and colleagues

(2005) divide these mediators into processes and emergent states. Processes are operationalized as interactions among team members (such as sharing information and ideas) (Wiggins & Crowston, 2010), whereas emergent states include cognitive and affective factors, such as team conflict, team viability, and team climate perceptions (Ilgen et al., 2005; Wiggins & Crowston, 2010). These inputs and mediating factors give rise to outputs, which are the outcomes of individual team performance episodes. Such outcomes may include both specific products and evaluations of the team's processes (Ilgen et al., 2005).

Experiences that occur as a result of navigating tasks and experiences as a team can have a profound impact on the team's subsequent interactions and task performance (Ilgen et al., 2005; Reiter-Palmon et al., 2012). Conceptualizing team performance as such ongoing series of events means that successful ongoing performance necessitates team members *wanting* to continue working together (Sundstrom, DeMeuse, & Futrell, 1990). That is, the recursive processes associated with team performance in general and creative performance in particular will begin to fail if team members do not wish to continue working toward subsequent phases of the task. In order to understand such affective influences on team creative performance, it is now essential to consider the construct of team viability.

Team Viability

Team viability has been identified as a core component of overall team effectiveness (Guzzo & Dickson, 1996; Hackman, 1987; Sundstrom et al., 1990). Generally speaking, Team viability is a measure of team members' willingness to work with one another in the future (Bell & Marentette, 2011; West, Borrill, & Unsworth, 1998). Despite its recognized importance, viability is under-studied in teams literature (Bell & Marentette, 2011). This may be largely due

to construct confusion; Mathieu et al (2008) note that "viability" has become a generic term that is used to mean many different things in different contexts.

A recent study by Bell and Marentette (2011) attempted to clarify the definition of team viability, and reaffirm its importance as a driver of team success. They conceptualize team viability as a team's "capacity for the sustainability and growth required for success in future performance episodes" (Bell & Marentette, 2011, p. 276). In the context of the present study, team viability is an essential construct because both team performance in general, and creative performance in particular, are being conceptualized as a series of interconnected episodes. If team members do not feel a desire to continue working with one another, performance on these later stage processes, as well as successive tasks, is likely to suffer.

Furthermore, as discussed by Ilgen and colleagues (2005), outcomes of one team performance episode act as inputs for future performance. Thus, if team viability suffers as a result of a task episode, future performance on the same project may suffer. Phrased in a more positive light, Mathieu and colleagues (2008) note that affective reactions to the team (such as team viability) that develop after a particular performance episode, may generate higher levels of performance on future tasks. Thus, continued team success depends on team members wanting to continue working together.

Having discussed the role of team viability in team performance, it is important to acknowledge that the nature of teams' tenure within organizations is often a complicated issue. That is, although team members may *wish* to remain together, circumstances often dictate that one or more members need to leave the team. Thus, for various reasons, teams often do not remain intact indefinitely, and changes in team membership can have widespread impact on the restructured team's ability to successfully develop creative solutions (Nemeth & Ormiston, 2007;

Skilton & Dooley, 2010). Such changes can result in a wide range of outcomes for the team, some beneficial and some detrimental.

In line with Ilgen and colleagues' (2005) conceptualization of team performance, members' experiences following a major affective event like membership change can exert a great influence on ongoing performance. That is, the outcomes of a change in membership can have major implications for project success, and for team members' ongoing and future performance as a unit. As it will be shown, how the team handles these changes can impact affective reactions to the team (such as team viability), perceptions of team climate, and ultimately, the team creative performance. Thus, it is vital to examine the nature and potential effects of team membership change more closely.

Team Membership Change and Creative Performance

Beyond the nature of the creative process and team processes themselves, additional factors can greatly complicate the way in which team members interact to develop innovative solutions. Specifically, although teams are often studied as intact entities, the reality is that team membership may undergo temporary or permanent change for numerous reasons (Hirst, 2009; Levine, Choi, & Moreland, 2003; Moreland & Argote, 2003), and that such change is eventually a certainty in long-term teams (Choi & Thompson, 2005). Such changes can have a dramatic impact on team performance in general (e.g., Arrow & McGrath, 1993; Hirst, 2009; Lewis, et al., 2007) and creative performance in particular (e.g., Choi & Thompson, 2005; Klijn & Tomic, 2009; Nemeth & Ormiston, 2007; Skilton & Dooley, 2010).

Furthermore, given the dynamic nature of team processes (Ilgen et al., 2005), the creative process itself (Amabile, 1996; Baughman & M. Mumford, 1995), and the frequently unstable nature of team tenure (Lewis et al., 2007), conceptualizing creative teams as stable entities

ignores meaningful data. However, despite the widespread impact that membership change can have on teams' ability to develop creative solutions, the processes and outcomes involved in such changes are not widely studied (Hirst, 2009), ignoring the effects of losing or gaining members (Hirst, 2009; Kane, Argote, & Levine, 2005) on team creative performance. Thus, an understanding of team creative performance cannot be complete without examining the effects of membership change.

In fact, to the extent that membership change is considered in the team performance and team creativity literature, it tends to be assumed to have negative effects. Of the limited studies addressing the effects of membership change on team outcomes, even fewer have examined possible benefits of such change on creative performance (cf. Choi & Thompson, 2005; Ziller, Behringer, & Goodchilds, 1962). In fact, much of the extant literature on team membership change has emphasized the ways in which turnover can negatively impact group functioning (Choi & Thompson, 2005), ignoring other, more nuanced effects. The present study will attempt to advance the scope of knowledge on this topic in several ways. First, it will examine the mechanisms by which membership change may influence the creative process in teams. Second, it will attempt to identify the points in the creative process at which membership change will exert beneficial effects. Finally, it will examine potential moderators of these effects. Before proceeding further with such lines of inquiry, it is important to examine the extant literature on team membership change and creative performance.

Membership change, including both the addition of new members and the attrition of older members, is a natural part of organizational life (e.g., Schneider, 1987). When such change alters the composition of a work team, the disruption can have a far-reaching impact on the team's performance. With so much work being done in teams, understanding the impact of such

changes is vital for organizational success. For instance, the attrition of a team member could potentially disrupt team processes, or could streamline (and thus enhance) team interactions. Conversely, the addition of a new member might interfere with the team's established way of thinking (e.g., Nemeth & Ormiston, 2007), which could either enhance or impair creative performance.

Despite these potential effects, Summers, Humphrey, and Ferris (2012) note that there has not been adequate construct development to conceptualize the nuanced effects of changes in team membership. This is problematic, they note, because of the widespread effects that membership change can have on intrateam coordination. These researchers draw on entrainment theory (Ancona & Chong, 1996) and the theory of small groups as complex systems (Arrow, McGrath, & Berdahl, 2000) to suggest that effective coordination among team members is critical for successful team performance. As team members navigate a task together, their shared time and experiences lead to them forming stronger shared mental models for the team in general and the task at hand in particular (Klimoski & Mohammed, 1994). When a factor such as membership change occurs, it induces flux, or transitional processes in which the team's focus from the task is disrupted (Summers et al., 2012). Thus, managing this flux, and reestablishing equilibrium, is essential to effective performance (Summers et al., 2012).

With regard to membership change in creative teams, there are further practical concerns. Specifically, organizations often try to keep creative teams intact if they have previously developed successful innovations, under the assumption that continued collaboration is beneficial for team performance (Skilton & Dooley, 2010). The logic here is that, if a team has helped the organization in the past, then they are expected to be equally effective in the future. Likewise, teams that retain stable membership are likely to have higher levels of comfort with

one another, and stronger social relationships (Nemeth & Ormiston, 2007). This would suggest that team members would likely view a change in their membership as an unwelcome event that would impair their performance—in fact, membership change among previously intact teams has been found to reduce satisfaction within the team (Nemeth & Ormiston, 2007). Thus, disrupting team membership could negatively impact perceptions of team viability, potentially impairing future performance (Hackman & Morris, 1975).

However, these common attitudes, both by organizations and team members themselves, present a paradox for team creative performance. That is, despite common wisdom that constant membership leads to greater creative success, teams tend to become *less creative* with successive collaboration (Skilton & Dooley, 2010). It is noteworthy to draw on theory development by Nemeth and Ormiston (2007), which indicates that teams experiencing stable membership report greater satisfaction and perceived creativity, but that in fact creativity tends to be lower than in groups experiencing disruptions in membership.

Expanding on this concept, introducing new members can lead to the presentation of new perspectives and ideas (Skilton & Dooley, 2010), enhancing team creativity through *creative abrasion*, a process through which creative performance is enhanced by the open sharing and discussion of novel, distinct, and potentially conflicting ideas (Hirschberg, 1999; Leonard & Swap, 1999; Skilton & Dooley, 2010). On the other, disrupting membership can impair team performance by disrupting established routines and processes.

Crawford and LePine's (2013) configural theory of team processes provides impetus for further examining this tension. They note that, although common wisdom asserts that enhancing team processes is inherently beneficial for team performance, maintaining consistent team processes are not always a best-case scenario. Instead, highly effective teams need different

configurations of processes, depending on the nature of their interactions and their task. That is, depending on the task, some individuals within the team may exhibit stronger team processes among one another than they do with other members of the team, and this may in fact improve performance.

In conventional intact teams, as team members spend more time with one another, they form strong shared mental models that guide how they think and interact as a unit (Cannon-Bowers, & Salas, 2001; Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000; Skilton & Dooley, 2010). Such a model helps team members understand one another's perspectives, skills, and knowledge (Cannon-Bowers et al, 2001), thus enhancing the team's efficiency. However, as teams remain intact and members become increasingly familiar with one another, performance can begin to suffer (Arrow & McGrath, 1993; Guzzo & Dickson, 1996). Additionally, Katz (1982) notes that intra-team communication can begin to degrade in longstanding intact teams. Furthermore, the mental models formed through repeat collaboration also lead to team members exercising a preference for ideas that fit with the team's established preferences and beliefs (Skilton & Dooley, 2010). Such a bias toward consistency and the status quo is at odds with the demands of the creative process.

In line with such an idea, Miron-Spektor and her colleagues (Miron-Spektor, Gino, & Argote, 2011) found that variability in cognitive styles among team members enhanced creative performance, relative to teams composed of individuals who engaged in more conformist thinking. Following from this, it appears that membership change may be able to enhance creative performance by diversifying cognitive perspectives within the team. However, in order for such benefits to be realized, the potential impact on team satisfaction and viability must be minimized. This contributes to the previously described tension between spurring the team to

continue innovating through their creative endeavors, while maintaining team members' satisfaction and enjoyment with the team.

Despite these potential benefits, disrupting membership can also impair team viability and reduce team members' desire to continue working together. As Aubé and Rousseau (2005) note, shared team goal commitment is related to team viability; thus disrupting the unity of the team can reduce these positive affective reactions. Similarly, close ties among team members is related to high perceptions of viability (Balkundi & Harrison, 2006). Membership change inherently weakens such ties (by introducing a stranger into the team), and thus can reduce perceptions of team viability. Similarly, several scholars note that disrupting the cohesiveness of an established group will likely reduce perceptions of team viability (Baumeister & Leary, 1995; Tekleab, Quigley, & Tesluk, 2009).

Furthermore, members are likely to base their perceptions of team viability in part on how efficiently the team is able to complete their tasks. To the extent that disruption in membership (by introducing new, unsocialized team members) is seen to reduce efficiency, it will likely also reduce perceived viability. Thus, disrupting membership can potentially reduce perceptions of team viability, by weakening established ties among team members, and introducing new members who may not be seen as being fully committed to the team's goals. This impact could potentially be compounded if the new team members exercise a dissenting minority position (e.g., Nemeth, 1986).

The present study contends that the best way to balance the benefits and detriments of membership change necessitates looking at both the creative process tasks during which such change can occur, as well as moderators of its effects. As can be inferred from the various stages of the creative process described previously (e.g., M. Mumford et al., 1991), disruption in team

membership at different points in the process will likely have different sorts of effects on creative performance. The potential of membership change to be beneficial will likely depend on the point in the creative process at which it occurs, and other factors present in the team, such as team climate.

In line with Skilton and Dooley's (2010) research on repeat collaboration, we expect that membership change *can* result in creative performance above and beyond that of teams with constant membership, provided that it occurs at the proper time, and in the presence of certain beneficial contextual factors. Such a supposition draws on Ziller's (1965) research on team membership change, which suggests that "closed groups" (those with constant membership) are less able to explore opposing views, and are less open to change. Conversely, "open groups" (those whose membership is in some degree of flux) can lead to greater levels of team creativity, by encouraging members to examine new ideas or challenging existing ones (Nemeth & Ormiston, 2007; Nemeth, Personnaz, Personnaz, & Goncalo, 2004; Skilton & Dooley, 2010).

Such an approach is consistent with Nemeth's research on minority dissent and team creativity (e.g., Nemeth, 1986; Nemeth, Brown, & Rogers, 2001; Nemeth & Nemeth-Brown, 2003; Nemeth & Wachtler, 1983), which suggests that a vocal minority team member can lead to a more novel team product. Membership change can often bring about such beneficial dissent, by introducing a new member who has not yet been socialized to the group's established way of thinking (Nemeth & Ormiston, 2007). Such a member may be able to contribute unique ideas that enhance the team's creative performance.

An empirical test of such a proposition may be observed in a study by Ziller and colleagues (Ziller et al., 1962). In their study, it was found that changes in group membership increased production on an idea generation task. This may suggest that membership change

earlier in the creative process can lead to the generation of a larger pool of ideas, potentially enhancing creative outcomes later. Arrow and McGrath (1993) found that membership change at the outset of a reflective task resulted in greater group performance, greater focus on the task, and less interpersonal disagreement than occurred in teams that did not experience a change. Extrapolating from these findings, it appears that under the correct circumstances, membership change may be able to enhance creative performance.

Choi and Thompson (2005) likewise suggest that team membership change can enhance team creative performance. In two experimental studies of membership change and group idea generation, the researchers found that groups that experienced membership change developed a greater number of ideas, as well as a wider variety of ideas, than teams that did not experience a change. Furthermore, it was found that creative newcomers positively affected the creativity of existing group members, again suggesting that a creative minority can enhance team creative performance (e.g., Nemeth, 1986; Nemeth & Ormiston, 2007; Nemeth & Wachtler, 1983; Nemeth et al., 2004). These effects were thought to be driven in part by the introduction of the new member's ideas, and in part by the social dynamic introduced by such a new, unfamiliar individual (Choi & Thompson, 2005).

Thus, it is important to consider what sort of impact membership change will have on the social dynamics of a group. Likewise, it is important to consider what effects an established group's social dynamics will have on the outcomes of membership change (Nemeth & Ormiston, 2007). It is expected that the nature of the task during which membership change occurs is a key factor that will determine whether team dynamics are hampered or sustained, and whether such change enhances or impairs team creative performance.

Generative versus Evaluative Tasks and Membership Change

As previously suggested, introducing a new team member can enhance a team's idea generation efforts leading to an increase in creative performance (Ziller, 1965; Ziller et al., 1962). However, the type of outcome that might be generated by introducing a new team member will in part be determined by the nature of the creative task during which the individual is introduced into the team. Howard-Jones (2002) suggests that different cognitive processes are operating during idea generation and idea evaluation, and that different influences may drive creative performance during these phases. Furthermore, Mumford and colleagues (T. Mumford, Van Iddekinge, Morgeson, & Campion, 2008) draw on dramaturgical theory (Hare & Blumberg, 1988) to note that different roles within the team may be differentially valuable through the team creative process. For instance, a dissenting voice may help generate more ideas, but might derail the team as they attempt to flesh out and troubleshoot a design. Similarly, Dahlin, Weingart, and Hinds (2005) note that teams with a variety of perspectives are not inherently more creative than homogeneous teams—instead, team members must listen to and understand one another's perspectives. Developing such an understanding requires cognitive resources that may not always be available (Hoever, van Knippenberg, van Ginkel, & Barkema, 2012). In the context of team creative performance, change induced by a dissenting new member may have benefits during certain phases of the creative process, whereas such change during other points may do more harm than good.

In the earlier, generative stages of the creative process (such as during *problem construction, information gathering*, and *concept selection*), team members are largely focused on acquiring information and novel concepts that can be used to address the problem at hand (e.g., M. Mumford et al., 1991; Baughman & M. Mumford, 1995). Similarly, the model of team

roles suggested by Mumford and colleagues (T. Mumford et al., 2008) notes that the role of an unconventional "creator" is useful in these generative stages, when tasks are ambiguous and the work process is ill-defined. The dissenting voice of a new team member may meaningfully contribute to this role. To the extent that introducing new members increases the diversity of ideas presented (Levine, Choi, & Moreland, 2003), it is expected that membership change during such generative phases of the creative process will lead to greater team creative performance. However, such change will likely disrupt team member socialization (e.g., Rentsch & Klimoski, 2001), since a new team member is by definition not familiar with the ideas, processes, and behaviors that had previously been occurring within the team. Since team viability is associated with teams with strong instrumental connections (Balkundi & Harrison, 2006), it is expected that the disruption caused by introducing a new team member will impair team viability.

> *Hypothesis 1a: The nature of the effects of membership change on team outcomes will depend upon the phase in which membership change occurs, such that membership change during a generative creative process task will increase creative performance, but will decrease team viability.*

Although membership change may enhance creative performance under certain circumstances, research indicates that fluctuations in group membership can also derail performance. For instance, such changes may require the team to spend additional time socializing the new member (Levine & Moreland, 1999), thus disrupting established, unspoken routines for task completion (Edmondson, Bohmer, & Pisano, 2001), or by removing knowledge held by a former member (Argote, 1999). Similarly, Ancona and Caldwell (1992) note that, although diversity in members' tenure can be beneficial to problem solving and idea generation, it reduces the effectiveness of idea implementation by reducing coordination among team members.

Thus, it appears that, if a team is already entrenched in the design process, such as evaluating a final design, changing membership may exert detrimental effects on team processes, which may in turn impair creative performance. In the context of Mumford and colleagues' (e.g., M. Mumford et al., 1991; Baughman & M. Mumford, 1995) eight-stage creative process model, such "entrenching" is likely to occur in the later, evaluative phase of the creative process (i.e., the *idea evaluation, implementation planning,* and *monitoring* stages). In this later phase, team processes are likely focused on how to best implement a solution, and how to evaluate its success or failure. At this juncture, disrupting existing relationships among team members can impair established schema within the team (Balkundi & Harrison, 2006), reducing coordination among team members (Rentsch & Klimoski, 2001). Along these lines, Balkundi and Harrison (2006) note teams with stronger interpersonal ties exhibit greater levels of goal attainment. Since the central purpose of the evaluative phase of the creative process is to develop a single, effective creative solution (e.g., Osborn, 1963), reduced coordination or fragmented perceptions of the task will likely impair creative performance. Furthermore, Howard-Jones (2002) notes that the analytical processes associated with evaluative creative performance require more focused attention than the earlier, generative processes. Thus, during idea evaluation, team members may have less cognitive resources available to engage in the perspective taking (cf. Hoever et al., 2012) necessary to integrate distinct viewpoints into the team's design.

Furthermore, during an evaluative task, the team is attempting to converge on and evaluate a single design in order to ensure effectiveness. Introducing a new, unsocialized team member during such a task may fragment the team's progress, sowing confusion and disagreement about how to consolidate ideas into a coherent solution (West, 2002). Similarly, Mumford and colleagues (T. Mumford et al., 2008) suggest that later in the creative process, the

"critic" is an important role, but that if criticism comes from a source that is not fully accepted by the team, it can instead be disruptive. Thus, although introducing a new member in the evaluative phase of the creative process may have the *potential* to enhance creative performance by increasing the variety of skills, knowledge, and perspectives present in the team, without other factors to integrate this minority voice into the broader team, creative performance is likely to suffer.

> *Hypothesis 1b: The nature of the effects of membership change on team outcomes will depend on the phase in which membership change occurs, such that membership change during an evaluative creative process task will decrease creative performance and decrease perceptions of team viability.*

The Role of New Member Creativity

Furthermore, as much as it is important to consider the effects of a new member's arrival, it is also critical to consider the nature of the new member him or herself. Specifically, the unique nature of creative individuals suggests that they may respond differently to changes in team membership than would less creative individuals. Meta-analytic work by Feist (1998) suggests that creative individuals can possess a number of personality characteristics that predispose them to being difficult to work with. Such traits include impulsivity, hostility, inflexibility, dominance, and arrogance. Silvia and colleagues (Silvia, Kaufman, Reiter-Palmon, & Wigert, 2011) add that creative individuals tend to be particularly low in the dimension of honest-humility, further suggesting that highly creative individuals may make for hostile teammates who have a strong need to have things their way.

When such creative individuals are subject to membership change, the outcomes may be different than what would occur when less creative, more "typical" individual experience membership change. Since creative individuals likely value creative performance (Jaussi,

Randel, & Dionne, 2007), and because these individuals are more predisposed to speak their mind without regard to others' feelings (Feist, 1998, 2009; Silvia et al., 2011), it is expected that when membership change introduces a highly creative member into a team, this individual will pose a greater disruption to the team's established ideas and processes.

That is, these creative individuals are more likely to express their own ideas, question the established team's way of thinking, or criticize previously accepted ideas than less creative individuals (Feist, 2009). Said differently, a new, highly creative team member is more likely to present ideas that conflict with the group's established schema for the task at hand (Rentsch & Klimoski, 2001). These individuals are particularly well suited to play the role of "critic," and therefore can have a strong impact on team outcomes (T. Mumford et al., 2008). Such activity is likely to disrupt established team cognitive processes, which may have varying effects on team outcomes, depending on the phase in which such disruption occurs (e.g., T. Mumford et al., 2008). Therefore, drawing on previous predictions regarding the effects of membership change on team creative performance and team viability, it is expected that membership change involving creative individuals will demonstrate stronger effects on team outcomes (creative performance and viability) than membership change that occurs among less creative members.

> *Hypothesis 2: The effects of membership change on team outcomes will be further influenced by the type of change that occurs. Specifically, membership change involving creative team members will demonstrate stronger effects on creative performance and team viability than will membership change that occurs at random.*

The expectations discussed here operate on the assumption that no additional factors influence the effect of membership change on team creative performance. However, given the inherently social context in which teams operate, there are team dynamics that constitute important influences on the creative process, and these must be examined. Indeed, such

processes may be essential in understanding *how* membership change can influence team creative performance.

In particular, introducing new team members, with new ideas and perspectives is likely to result in conflict of ideas and disagreement about the team's tasks. Such task-related conflict is an example of an emergent state that can act as a mediator of team performance outcomes (Ilgen et al., 2005). Framed in terms of Ilgen and colleagues' (2005) model of team performance, membership change is a clear and meaningful change in a team's circumstances, and would therefore constitute an important input to team processes, giving rise to conflict as a mediating variable of team performance. Research suggests that the nature of such task-related disagreement has far-reaching impact on team creative performance, and thus it is essential to consider the role of task conflict as a mediator of the effects of team membership change.

The Mediating Role of Task Conflict

As teams navigate the creative process, they will face ambiguous problems and ill-defined solutions (Amabile, 1996; Baughman & M. Mumford, 1995). Such problems allow for multiple disparate perspectives and approaches, which can lead to debate and conflicting ideas among team members. Such disagreement about how the team should navigate a task is commonly conceptualized as task conflict. Jehn (1995) defines task conflict as debate or differences of opinion regarding how the team should approach their tasks. This includes debate about ideas and variability in viewpoints or perspectives. Such disagreement is theoretically distinct from relationship conflict, which focuses on interpersonal disagreement among team members, including interpersonal tension, dislike, and discontent (Jehn, 1995). Research consistently identifies relationship conflict as detrimental to team processes and outcomes (e.g.,

Carnevale & Probst, 1998; Jehn, 1995; Simons & Peterson, 2000; Staw, Sandelands, & Dutton, 1981), however, the effects of task conflict are less clearly defined.

Although findings regarding the effects of task conflict on team performance are not conclusive (e.g., Hülsheger, Anderson, & Salgado, 2009), it is generally expected that, under favorable circumstances, task conflict will be positively related to team creative performance (De Dreu, 2008; Nemeth et al., 2004). Conversely, in the absence of such circumstances, task conflict will prove detrimental. The present study examines these effects further, by conceptualizing task conflict as a manifestation of minority dissent. When examined in such a context, it is expected that task conflict will arise as an important mediator of team outcomes.

According to theoretical perspectives on minority dissent (e.g., Nemeth, 1986; Nemeth & Kwan, 1987; Nemeth & Ormiston, 2007; Nemeth et al., 2004), exposure to minority viewpoints helps to reduce rigid thinking and avoids fixation on common solutions to the problem at hand. Classically, Nemeth (1986) argues that if the majority perspective is allowed to dominate problem solving, divergent thinking and creative performance are impaired. It is thought that such an effect occurs as team members blindly accept the most frequently expressed viewpoints, and base their solutions on such perspectives. Nemeth and colleagues (2001) also found that authentic dissent toward the majority perspective enhanced the quality of solutions that teams generated. In a more recent study, Nemeth and Ormiston (2007) likewise found that the presence of a dissenting opinion enhanced number of creative ideas proposed by team members. Furthermore, research has demonstrated that such authentic dissent generates results superior to what occurs if an existing team member takes a "devil's advocate" position in a group discussion (Nemeth et al., 2001; Schulz-Hardt, Jochims, & Frey, 2002; Shulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, & Frey, 2006).

In line with this perspective, Arrow and McGrath (1993) argue that membership change can influence team performance by altering team processes, and Choi and Thompson (2004) note that membership change can increase team members' focus on the task at hand. Thus, introducing a new team member with a dissenting voice into an established team *should* enhance team creative performance. Such a novel perspective is thought to encourage team members to examine problems more critically, and to utilize more novel ideas in their eventual solutions (Nemeth, 1986; 1995). In an elaboration of such a process, Skilton and Dooley (2010) propose a theoretical model through which task conflict is thought to enhance creative abrasion (Hirschberg, 1999). In this model, team members' initial conflicting ideas help to generate a wide range of ways to conceptualize the problem, as well as numerous potential approaches to solving it. After identifying the problem, differences of opinion among team members are thought to drive debate and discussion, leading members to consider alternative or unconventional solutions. Finally, team members must ultimately reach a consensus about how to implement their solution. The present study expects that membership change can influence team creative performance by driving such productive dissent. Furthermore, conflict and debate that arises as a result of membership change is expected to influence members' perceptions of the continued viability of the team.

Hypothesis 3a: Task conflict will mediate the relationship between membership change and team creative performance.

Hypothesis 3b: Task conflict will mediate the relationship between membership change and perceptions of team viability.

Methodology

Design and Participants

The present study is a 2 (generative vs. evaluative task) x 3 (membership change at random, creative member change, or no change) design. Experimental manipulations occurred at the team level, and both individual member and team-level data were collected. Participants were psychology students who received course credit for their participation. 476 participants, divided into teams of four, participated in this study, for a total of 119 teams.

Over the course of the study, participants were asked to work with their assigned team to develop a creative solution to a scenario posed to the group. This type of brief laboratory design has been successfully used to investigate team membership change and related effects in several prior studies (e.g., Choi & Thompson, 2005; Ziller et al., 1962).

Procedure

Team assignment. Upon arrival to the laboratory, participants were randomly assigned to either begin work individually, or to a four-person team, depending on the experimental condition. In all conditions, individuals or teams were stationed in adjacent rooms, and received the same manipulations. In team-based conditions, after being assigned to teams, a pair of experimenters provided simultaneous task instructions to both teams. Participants were instructed that they are going to be asked to develop a creative solution for a university-wide initiative (a new philanthropic event). The specific task-related instructions varied based on the experimental condition.

In all conditions, participants initially completed a brief preliminary survey, in order to collect demographic information and covariates. Following this survey, participants were presented with detailed instructions for their task, and were then given a total of 40 minutes to

complete it. Depending upon the experimental condition, participants engaged in different tasks during this time. After 20 minutes, participants were instructed to pause working to individually complete a brief survey, designed to assess team dynamics. After all participants completed the survey, teams were instructed to return to their task for the next 20 minutes. At the conclusion of this time, participants were instructed to turn in their completed task and complete a final dynamics survey.

Follow-up. One month after the completion of the task, team members were sent an online survey, asking to what extent they would want to work with their team again. This was intended to assess continued perceptions of team viability. However, due to low response rates (coupled with low agreement regarding team viability), these data were not utilized in analyses.

Manipulations

Task type. Given that this study posits differential effects of membership change on the generative and evaluative phases of the creative process, it was necessary to examine whether any observed effects due to membership change are in fact due to the stage in which they occur, and not simply due to how long team members have been working together. As such, the types of tasks that teams are engaging in were manipulated. Teams were randomly assigned to either engage in an idea generation task or an idea evaluation task. In the *idea generation* condition, participants were first given five minutes to individually generate as many ideas for philanthropic events as they can. At the conclusion of this individual idea generation time, participants were asked to work with their group to develop potential creative ideas for a university-wide philanthropic event. They were instructed to be as original as possible, and to not limit their ideas to events they may have seen or heard about. Furthermore, participants were encouraged to include as much detail in each of their ideas as they feel they are able to.

In the *idea evaluation* condition, teams were provided with five previously developed ideas for university-wide philanthropic events. Each idea was something that could conceivably have been developed by a team during the idea generation phase. Team members were first given five minutes to individually evaluate the five ideas. Teams were then instructed to evaluate these ideas as a group and select the one idea they felt was the most worthy to pursue. They were then required to develop a plan to implement that idea at the university.

Membership change. Membership change was manipulated by having a member of each concurrent team switch teams partway through the task. This change occurred after all participants had completed the survey assigned at the midpoint of the task (i.e., after 20 minutes of work). During team assignment, one member of each team was assigned to leave the team partway through the task and be replaced with a new member from the concurrently running team. Participants were not told who was selected to change teams until the switch occurred. A control condition, in which membership change does not occur, was also included. In both conditions involving membership change, the switch occurred after all participants had completed the survey at the midpoint in the task.

Nature of membership change. Depending on the experimental condition, the nature of the team's new member varied. In the "random change" condition, at the time of membership change, one team member was randomly selected to leave each team and was instructed to join the team working on the same task in an adjacent room. In the "creative change" condition, prior to membership change, each team members' individual idea sheets were collected and coded for creative performance by the research team. Using these data, the most creative individual from each team was informed that he or she was identified as having the most creative ideas, and that he or she was selected to change teams for the remainder of the task. Finally, in the control

condition, no membership change occurred, and team members completed the entire task as intact teams.

Measures

Controls. Participants' age, gender, and GPA, were collected and used as control variables in our analyses.

Personality characteristics. Participants' personality characteristics were collected for use in potential supplemental analyses. Traits were measured using an inventory based on the Five Factor model of personality (Goldberg, 2006). Dimensions were measured on a five-point Likert scale, with anchors ranging from "Strongly Disagree" to "Strongly Agree." In our study, estimates of reliability were quite high for each of the scale dimensions, including *extraversion* (α = .81), *agreeableness* (α = .84), *conscientiousness* (α = .80), *neuroticism* (α = .88), and *openness to experience* (α = .74).

Task conflict. Task conflict was assessed using a four-item measure adapted from Jehn's (1995) Intragroup Conflict scale (α = .75). Sample items include "Members of my team often disagree about opinions regarding the work being done" and "There frequently are conflicts about ideas in my team." All items were assessed on a five-point Likert scale, with anchors ranging from "Strongly Disagree" to "Strongly Agree."

Team viability. Team viability was assessed using a three-item measure from Bushe and Coetzer (2007) (α = .83). Items include "Being a member of this team has been personally satisfying," "I would choose this team to work on similar tasks in the future," and "Being a member of this team was a positive experience." These items were measured on a five-point Likert scale, with anchors ranging from "Strongly Disagree" to "Strongly Agree."

Creative performance. Overall team creative performance was measured on three dimensions: *quality*, *originality*, and *elegance* (Besemer & O'Quin, 1999; Redmond, M. Mumford, & Teach, 1993). According to this classification, *quality* represents the degree to which a design fulfills its intended purpose, including completeness, interpretability, and coherence (Besemer & O'Quin, 1999). *Originality* represents the degree to which a design is novel, surprising, or unexpected (Besemer & O'Quin, 1999). Finally, *elegance* represents how straightforward, "organic," and well-integrated the elements of the design are (Besemer & O'Quin, 1999).

These elements were assessed using a modified Q-sort technique (Redmond, M. Mumford, & Teach, 1993). In this procedure, a team of three trained coders developed benchmarks for low, moderate, and high performance on each dimension of creative performance, and then used these benchmarks to independently assess each dimension. Interrater agreement for each creative performance dimension was determined to be sufficiently high to justify aggregation for ratings of *quality* (α = .91), originality, (α = .92), and elegance (α = .87). Thus, scores were averaged across coders to develop final ratings of each creative performance dimension.

Results

Prior to conducting primary analyses, bivariate correlations were analyzed in order to determine any preliminary trends in the data. Examination of the correlation matrix for the variables included in this study revealed modest intercorrelations among several of the variables of interest. In particular, task conflict (as measured at the conclusion of the team task) was moderately negatively correlated with each facet of creative performance. The three facets of creative performance themselves were strongly positively correlated with one another, as is typically observed in studies of creativity using this methodology (e.g., Redmond, Mumford, &

Teach, 1993). Additionally, no personality factors were significantly correlated with any facet of creative performance. Unexpectedly, a very low nonsignificant correlation was observed between teams' average GPA at Time 1 (pre-membership change, where applicable) and teams' average GPA at Time 2 (r = .103). In all likelihood, this effect was driven by outliers with GPAs substantially higher or lower than the mean. If such individuals underwent a change in team membership, they may have skewed the new team's mean GPA and altered the correlation. The correlation matrix for variables included in this study is presented in Table 1.

Insert Table 1 about here

Given that the primary research questions in this study were team-oriented, data from this study needed to be aggregated to the team level prior to conducting analyses. For each team-level construct, team-level scale scores were computed for measures of task conflict and team viability. ICC2 analyses suggest a modest level of intrateam agreement regarding task conflict (.503) and team viability (.521) at Time 1, and somewhat higher levels of agreement regarding task conflict at Time 2 (.614). However, agreement regarding team viability was somewhat lower at Time 2 (.473).

Team-level averages for individual difference factors (e.g., age, GPA, and personality factors) were also computed. Due to changes in team composition following membership change, two sets of averages were computed for each team – a pre-change average (Time 1) and a post-change average (Time 2). For teams not undergoing membership change, these values are identical. Descriptive statistics, including means, standard deviations, and indices of interrater agreement (where applicable) are presented in Table 2.

Insert Table 2 about here

To first rule out any main effects of testing session on our outcomes of interest, a series of ANOVA analyses were conducted, using *testing session* as the predictor, and creative performance facets (*quality*, *originality*, and *elegance*), as well as *team viability*, as outcome variables. No differences were found due to testing session for *quality* ($F(1,118) = .518$, $p = .994$), *originality* ($F(1,118) = .984$, $p = .530$), *elegance* ($F(1,118) = .708$, $p = .908$), or *team viability* ($F(1,118) = 1.014$, $p = .485$). This suggests that testing session did not have an impact on the outcomes of interest in this study. Furthermore, a series of multilevel analyses were conducted using hierarchical linear modeling (HLM, Bryk & Raudenbush, 2002) to test the effects of membership change timing on team outcomes, including facets of creative performance and team viability. The team-level variables of interest were entered into level one of these models, while level 2 represented the testing session in which these teams completed the study. Evaluation of the empty model (with no predictors) for each outcome revealed that approximately 99.9% of the variance in performance quality was due to team-level (rather than session-level) factors. Similarly, 94.2% of the variance in product originality, 99.9% of the variance in elegance, and 92.2% of the variance in team viability were due to team-level factors. Nonetheless, given the slight possibility of increased Type 1 error rates, multilevel modeling in HLM was as the primary tool to test effects in this study. It should be noted, however, that all analyses were supplemented with ANCOVA equivalents, with similar results being observed across analytic approaches.

Effects of Task Type

Hypothesis 1 predicted a moderating effect of task type on the relationship between membership change and team creative performance and viability. To evaluate these potential effects, a series of analyses were conducted in HLM. Given the categorical nature of the study condition variables, dummy coded variables were developed for each type of membership change (random change, creative member change, and no change). The "creative change" and "random change" variables were entered into the model as level-one predictors, with the "no change" condition set as the reference category. Additionally, interaction terms for "task type" and both "creative change" and "random change" were computed and entered into the model. Finally, average age, gender, and GPA (at Time 2) were entered into the model as level-one covariates.

In evaluating these models, a number of significant interaction effects emerged. That is, task type (generative vs evaluative task) was found to moderate the relationship between membership change and ratings of performance *quality* (γ = .813, p = .039), *originality* (γ = 1.372, p = .001), and *elegance* (γ = .944, p = .028). However, this effect only held when drawing comparisons between the random change condition and the remaining two categories; no such interaction effect was observed for teams in the "creative change" condition (results for this condition will be discussed in greater detail in the following section).

Additionally, no evidence was found to suggest an effect of membership change and task type on team viability, either for teams in the "random change" condition, (γ = .080, p = .697), nor teams in the "creative change" condition (γ = -.111, p = .566). However, this null effect may have been due to the low level of intrateam agreement regarding team viability. Therefore, a follow-up analysis was conducted to evaluate the potential effects of task type and membership

change on individual-level *perceptions* of team viability. A three-level HLM model was constructed, in which individuals were nested within teams, which were in turn nested within testing sessions. Task Type, Membership change conditions, and the interaction terms were entered into the model as team-level predictors (as described above), and individual-level perceived team viability was entered as the outcome. In this model, task type did not emerge as a significant moderator for either the "creative change" (γ = .084 p = .523) or "random change" (γ = .084 p = .682) conditions, nor were the main effects of membership change significant.

Insert Table 3 about here

In sum, these results demonstrate partial support for hypothesis 1: The creative process task during which change occurred did influence team creative performance outcomes following membership change, but only when a random member changed teams. This phenomenon will be further examined below. No corresponding effect was identified for team viability, either as a team-level construct, or in terms of individual-level perceptions.

Insert Figure 1 about here

Effects of new member creativity

To evaluate Hypothesis 2, which predicted a stronger interaction effect for membership change involving creative individuals, further multilevel evaluation was conducted. As indicated previously, HLM analyses of the interaction between task type and membership change type suggest that the "creative change" condition performed similarly to the control condition in

which no membership change occurred. Once again, teams in the "random change" and "creative change" conditions were compared to a reference category, consisting of teams that did not experience membership change. Results of these multilevel analyses provide further support for the aforementioned conclusions. On the whole, teams in the "creative change" performed similarly to teams that did not undergo membership change. Results indicate that creative change was not significantly related to ratings of *quality* (γ = .522, p = .068), *originality* (γ = .189, p = .603), or *elegance* (γ = .353, p = .216). Likewise, no effect was found for *team viability* (γ = -.112, p = .566).

Taken together, these findings indicate that hypothesis 2 was unsupported, as teams in which a creative member changed teams performed similarly to teams in which no change occurred across all outcomes of interest. Interestingly, in teams working on an evaluative task, experiencing membership change involving a random team member was associated with greater performance than stable membership, or undergoing change involving the team's most creative member.

The mediating role of task conflict

In order to test for the proposed mediating role of task conflict on team outcomes, a series of tests of indirect effects were conducted, as outlined in Preacher and Hayes' approach for testing mediation models with categorical predictors (Hayes & Preacher, 2013). First, the indicator coding procedure described previously was used to create dummy coded variables for each membership change condition. Additionally, interaction terms were computed, crossing membership change conditions with "task type." As in the previous analyses, the "no membership change" condition was used as the reference category. These terms were entered as predictors in the proposed mediation model. Additionally, team-level average age, gender, and

GPA were entered as covariates. Task conflict at Time 2 (post-change, where applicable) was identified as the proposed mediator. For each dependent variable, bootstrapped estimates of the coefficients for the direct and indirect paths were compared. For all facets of creative performance, as well as for team viability, the confidence intervals for each test of indirect effects included zero, suggesting that task conflict was not operating as a mediator of these relationships.

However, given the relatively low level of intrateam agreement regarding levels of task conflict in the team, an alternate, model was constructed, in which both mean levels of task conflict and the standard deviation of perceived task conflict within each team were used as potential mediators. This model was tested using Preacher and Hayes' (Hayes, 2013; Preacher & Hayes, 2008) approach for testing mediation models with multiple potential mediators. Confidence intervals for the indirect effects of task conflict on each outcome of interest included zero, suggesting a lack of mediation.

However, in acknowledgement of the likelihood that low intrateam agreement may have masked potential effects of task conflict, additional mediation analyses were conducted. Specifically, data were examined at the individual level, to evaluate if experiencing membership change influenced individual-level *perceptions* of task conflict, and whether such perceptions exert an effect on perceived team viability. Note that because creative performance was conceptualized as a team-level construct, comparable individual-level mediation analyses could not be conducted for the facets of quality, originality and elegance.

To test the potential mediated relationship between experiencing membership change and perceived team viability, a nested model was constructed in HLM, in which individuals were nested within their respective teams. This model was then used to derive coefficients for

mediation testing. Initially, an adaptation of Baron and Kenny's (1986) approach was used to evaluate potential multilevel mediation effects (Krull & MacKinnon, 1999, 2001). Using this technique, a dummy coded variable for "membership change" was entered as the predictor at the team level (0 = "did not experience membership change," 1 = "experienced membership change"), and "perceived task conflict" was entered as an individual-level outcome. Membership change did not emerge as a significant predictor (γ = .118, p = .083). Next, "membership change" (at the team level) and "perceived task conflict" (at the individual level) were entered as predictors perceived team viability. Perceived task conflict was negatively related to ratings of *perceived viability* (γ = -.382, *SE* =.043, p < .001). However, a Sobel test of these coefficients suggests that there was no significant mediation effect (z = *-1.70*, p = .09). Numeric results of these mediation analyses are presented in *Table 4.*

Insert Table 4 about here

Based on these results, support was not found for the proposed role of task conflict as a mediator of the effects of membership change. However, given the highly conservative nature of the Sobel test (MacKinnon, Warsi, & Dwyer, 1995), and recent evidence that Sobel test-based approaches can produce incorrect estimates in multilevel mediation models (Zhang, Zyphur, & Preacher, 2009), additional evaluation was conducted.

Specifically, a more recent procedure for testing multilevel mediation (Bauer, Preacher, & Gil, 2006) was used to further evaluate the potential mediating role of perceived task conflict. In this approach, the individual-level dataset was restructured to allow for predicting both the proposed mediator and distal outcomes from a single independent variable (in this case,

"membership change condition"). A series of HLM analyses were conducted for each outcome of interest (ratings of *quality*, *originality*, and *elegance*, as well as *perceived team viability*). In accord with Bauer and colleagues' (2006) approach, covariance matrices for random and fixed effects were used to evaluate the indirect effects of perceived task conflict on each outcome of interest. In each case, the confidence intervals for the test of indirect effects included zero, and thus no evidence for mediation effects were identified. Therefore, hypothesis 3 remains unsupported; neither team-level task conflict, nor individual-level perceptions of task conflict mediated the relationship between membership change and outcomes of interest (creative performance and team viability). Although this study failed to identify task conflict as a mediator of the relationship between membership change and team outcomes, it is possible that other mediating mechanisms may exist. Such potential mediators should be evaluated in future research.

Supplemental Analyses

In order to examine the potential influence of team members' personality factors on outcomes in this study, a series of supplemental analyses were conducted. Multilevel models were constructed in which team members' personality characteristics were used as predictors of team outcomes. No significant interactions with membership change or task type were observed, but several main effects contribute to extant theory on team-level personality, and therefore bear mentioning.

Through these analyses, it was identified that the standard deviation of *extraversion* at *Time 1*was positively related to *originality* (γ = 1.519, $p < .05$) but this effect disappeared at *Time 2.* Instead, the standard deviation of *extraversion* at this time point was negatively related to *originality* (γ = -.863, $p < .10$). Additionally, the standard deviation of *neuroticism* was

marginally positively related to *quality* at *Time 1* (γ = .816, p < .10), but negatively related to *quality* at *Time 2* (γ = -1.088, p < 05). Taken together, these results suggest that different combinations of personality characteristics may exert differential influences on team outcomes throughout a creative task. Future research should therefore continue to investigate the role of team compositional factors on creative performance.

Discussion

Summary of findings

This study investigated contextual factors that may influence the impact of team membership change on team outcomes, including team creative performance. The creative process task during which such change occurred, as well as the nature of the change itself was investigated, and in general, it was found that contextual factors did play a role in team outcomes following membership change. More specifically, teams undergoing membership change involving a randomly selected team member performed worse when change occurred during an evaluative (rather than generative) task. Furthermore, it was identified that teams in which membership change involved a highly creative member performed similarly to teams in which no change occurred at all. Finally, the expected mediating effect of task conflict was not found. The following discussion will address these findings in more detail, and will then provide some insight into study limitations, implications, and future directions.

The Moderating Role of Task Type

The results of this study support the prediction that the nature of a team's creative task would influence the way in which membership change impacted creative performance. However, the specific nature of this effect emerged contrary to what was expected. Specifically, when teams were engaged in generative tasks, undergoing membership change (specifically change

involving a random team member) resulted in lower performance than teams in which membership change did not occur. This finding runs counter to extant literature that suggests that membership change may enhance idea generation (e.g., Choi & Thomspon, 2005; Ziller et al., 1962). Such conflicting results suggest the need for future research to look at additional moderators of the effects of membership change.

Unexpectedly, the results of the present study also demonstrated that teams undergoing membership change involving a random member exhibited the *highest* levels of creative performance when such change occurred during an evaluative task. Although it was expected that change during such a task would prove disruptive to team processes (e.g., Howard-Jones, 2002; Summers et al., 2012), it instead appears that such change may result in a team that is better able to thoroughly evaluate and improve upon a creative product.

When membership change occurs, the new member is, by default, someone who has not yet been socialized into the team, and has not taken part in the team's established idea evaluation processes. This could better enable individual to bring a fresh perspective to evaluating the team's established processes and solutions, or to point out flaws in the team's work. In the context of Mumford and colleagues' (T. Mumford et al., 2008) application of dramaturgical theory, such an individual is well-suited to playing the role of critic, by questioning the team's direction or assumptions regarding the task at hand. Such an effect is theoretically consistent with Nemeth's work suggesting that minority dissent can enhance team creative performance by questioning the status quo (Nemeth, 1986; Nemeth & Kwan, 1987; Nemeth & Nemeth-Brown, 2003). Therefore, to the extent that a new member takes on this role and is accepted by the established team, he or she is in a unique position to help enhance the team's creative performance.

Thus, although teams experiencing membership change during an evaluative task may experience disruptions in team processes (Howard-Jones, 2002), such a disruption may not be detrimental, to the extent that it enables the team to better critically evaluate their ongoing production. That is, idea evaluation may be a task in which strong team processes may not be optimal for creative performance (Crawford & LePine, 2013). Instead, some level of disruption may lead to more effective evaluation and therefore, better creative outcomes.

Influence of New Member Creativity

It is important to note that the effects of membership change on creative performance only occurred when membership change involved a random member of the team being replaced with a member drawn at random from another team. This finding runs counter to the effect expected in this study, whereby it was predicted that change involving creative individuals would exhibit stronger effects than change at random. In light of the often disagreeable, outspoken, and potentially antisocial characteristics of creative individuals (e.g., Feist, 1998; Silvia et al., 2011), it was expected that introducing a highly creative as a result of membership change would result in a new member with numerous, likely unconventional, ideas who had few reservations about sharing them. This was expected to result in magnified effects of membership change on team outcomes.

Instead, when membership change involved the exchange of a team's most creative member with a similarly creative individual from another, team creative performance was similar to situations in which no membership change occurred at all. This suggests that *who* is involved in membership change matters a great deal. Most likely, if during idea evaluation, a team member is lost or gained due to uncontrolled events, teams will experience a decrement in performance, as that team members' knowledge, ideas, and experiences leave with him or her.

However, if the individual who leaves was highly creative, and is replaced with someone who is similarly creative, his or her creative ability may compensate for the loss.

Preliminary support for such a finding can be drawn from work by Pirola-Merlo and Mann (2004). These researchers developed and tested a model indicating that team creativity can be partially explained by the maximal level of creativity among members of the team. In our methodology, "creative" membership change occurred when the most creative member from one team was exchanged with the most creative member of another team. Thus, although the individuals themselves changed, the maximal level of creativity in each team stayed relatively constant. Said differently, in the event that team membership is disrupted during an evaluative task, performance can remain high, provided that the composition of the team remains stable, with regards to creative ability. In further support of this finding, Summers and colleagues (Summers, Humphrey, & Ferris, 2012) note that instability or flux as a result of membership change is increased when there is little information transfer during a change. In the present study, there was no direct transfer of information in either membership change condition, but the "creative change" condition may constitute a proxy for such transfer; in this condition, although a team member has been replaced, the creative potential of this individual has ostensibly been maintained.

Thus, it appears that "creative composition" of a team is an important resource. By maintaining creative members, even after changes in the team, creative performance can remain high. In the context of Mumford and colleagues' (T. Mumford et al., 2008) team roles, the introduction of a (potentially outspoken) creative member may result in the loss of a potential cooperator, but this may be offset by gaining a valuable creator. This individual may be able to inject new ideas to overcome "creative and strategic stagnation" (T. Mumford et al., 2008, pp.

254) that can occur when team members are failing to meet desired levels of creative performance. Although this appears to manifest as maintained equilibrium in the present study, there is evidence that, when faced with a larger-scale or longer-term project, this extra level of critique could result in performance that not only matches, but exceeds, that of continuously intact teams. For example, in light of evidence that longstanding teams become less creative over time (Leonard & Swap, 1999; Skilton & Dooley, 2010), swapping out one creative team member for another may be a way to boost ongoing creative performance.

Task conflict as a Mediator

This study attempted to investigate the mechanism by which membership change influenced outcomes for creative teams. Specifically, it was expected that task-focused conflict would be a driving mechanism through which membership change operated. However, this study failed to identify team-level task conflict as a mediator of the relationship between team membership change and team outcomes (creative performance and team viability). This may have been due to low levels of intrateam agreement regarding task conflict. Specifically, conflict may take a longer time, and multiple team interactions, in order to fully develop as a team-level construct (e.g., Jehn & Mannix, 2001). Therefore, additional mediation analyses examined individual-level *perceptions* of task conflict as a potential mediator of this relationship. Again, no significant effect was identified. It is, however, possible that a partial mediating effect could still occur at the team level if teams continued operating together for a longer span of time. That is, task conflict may not exhibit its effects immediately, but may play a larger role as teams engage in successive interactions. Additionally, due to the lack of support for task conflict as a mediator, it is possible that alternative mediation models may explain how membership change

impacts team-level outcomes. Therefore, future research should examine other mechanisms that may explain the effects of membership change on team outcomes.

Supplemental Analyses

Given a desire to better understand the role of individuals' personality factors in team interactions and team outcomes, a series of supplemental analyses were conducted. On the whole, these analyses identified several personality traits that can be positively or negatively related to team outcomes, particularly facets of creative performance. More interestingly, however, this study identified that personality-based predictors of team creative performance may be influenced by teams' circumstances. Specific to this study, personality factors predictive of creative performance differed after teams underwent a change in membership. The effects of these personality factors were most interesting when examined in terms of their variability among members of the team. Mohammed and Angell (2003) likewise note that variability in a number of personality traits can influence team performance, and that contextual factors (task type) influences the nature of these relationships, in terms of the predictors that emerged.

Prior to changes in membership, variability in openness to experiences was negatively related to creative performance factors and team viability, while variability in extraversion was positively related to creative performance. However, following membership change, it appears that variability in extraversion is *negatively* related to creative performance dimensions. Similarly, prior to membership change, variability in neuroticism was positively related to creative performance (specifically performance quality), but this turned to a negative relationship after teams underwent changes in membership. These effects are partly in line with work by Humphrey and colleagues (Humphrey, Hollenbeck, Meyer, & Ilgen, 2007; 2011) who note that, for certain personality traits, maximizing variance can enhance team performance, whereas

performance benefits from minimizing intrateam variance on other traits. Of note, Humphrey and colleagues' (2007) study identifies that variance in extraversion should be positively related to team performance.

The results of the present study support this finding, but *only* prior to undergoing membership change, after which the effect appears to reverse. Mumford and colleagues' (2008) classification of team roles may provide some insight into this effect. Prior to undergoing membership change, and early in team's tasks (whether the tasks be generative or evaluative), it is important for the team to determine their course of action, and identify what knowledge and skills each member can provide. As such, a crucial role is that of a "contractor" (T. Mumford et al., 2008). This is a (often informal) leadership position in which a team member motivates his or her peers and provides structure to the task by suggesting roles for people, based on their expertise and the needs of the situation. As suggested by Humphrey and colleagues (2007), such emergent leadership is more likely to occur when team members exhibit a high level of variability in extraversion. In contrast, after a team has experienced membership change, a new important role may emerge: that of "calibrator" (T. Mumford et al., 2008). A team member assuming this role is responsible for resolving tensions, power struggles, or differences of opinion that may arise within the team, which can arise when team composition has been disrupted (T. Mumford et al., 2008). However, it may be difficult for an individual to mend disagreements and build trust among his or her teammates if people are not equally willing to participate in discussion.

The present study also noted a similar trend for variability in neuroticism, in which a high level of variance was positively related to creative performance prior to membership change, but negatively related afterward. It could be that, when a team is navigating a task as an intact group,

having some more anxious individuals could drive the group to focus on addressing task-relevant problems, provided that this is tempered by more grounded, stable individuals. After membership change occurs, it may be more beneficial to have a team of similarly emotionally stable individuals to adjust to the disruption and focus on completing the task.

Implications for Future Research

Typically, researchers have examined membership change as an outcome of team processes or climate (i.e., turnover) (Choi & Thompson, 2005; Levine & Choi, 2004). However, this study demonstrates that membership change has clear effects on the remaining team, and thus change should be examined as a *process.* Thus, research should continue to investigate the role of membership change in shaping team outcomes, both by investigating the mechanisms through which membership change operates, and also by examining the contexts and boundary conditions in which it may exert beneficial effects.

One important avenue for future research is to investigate potential mediators through which membership change may impact team outcomes. The present study failed to find an expected mediating role for task conflict, but as stated previously, this may be in part due to limitations in the study design. Given the logic that introducing new ideas and perspectives is likely to induce task-related conflict (e.g., Nemeth & Ormiston, 2007), the proposed relationship between membership change and task conflict appears sound. Thus, further research is warranted in order to investigate the conditions under which it may arise, and also the extent to which it may impact creative performance. Additionally, it is possible that other mechanisms, such as transactive memory (Lewis, 2004), group potency (Guzzo, Yost, Campbell, & Shea, 1993), or team coordination-oriented processes (Marks, Mathieu, & Zaccaro, 2001) may mediate the relationship between membership change and team outcomes, such as creative performance and

viability. Therefore, future research should continue to investigate such potential alternative mechanisms as well. Since these effects may emerge or vary over time, future research that examines membership change in a longitudinal context would be highly beneficial.

Furthermore, by identifying that the effects of membership change depend upon the context in which such change occurs, future studies should continue to examine moderators of team membership change, in order to both minimize potential negative effects and maximize potential benefits. For instance, preliminary analyses in this study have identified several personality factors that exhibit effects on team creative performance. However, additional research should examine how such factors (both aggregate personality characteristics and dispersion of traits) may interact with other team-level factors to influence creative performance. Such a recommendation is in line with work by Mohammed and Angell (2003), who identified that variability in personality traits is significantly predictive of team performance, but that the specific personality factors varied depending on the team's task. Moreover, Hausknecht and Holwerda (2013) recently investigated a number of factors that influence outcomes of employee turnover. Although these researchers did not look at personality factors in particular, extrapolation from their findings, along with the results of this study, suggest this would be a fruitful avenue for further research. Of particular note, Hauscknecht and Holwerda's (2013) research turnover as a negative phenomenon that needs to be managed. By expanding this lens to incorporate less maladaptive, perhaps even beneficial, changes in personnel (i.e., membership change), additional noteworthy findings may be uncovered.

Additionally, further studies are needed in order to identify the mechanisms underlying the effects of membership change on team outcomes, such as creative performance. Consider the work of Taggar (2001, 2002), who identified "team creativity-relevant processes" that are

necessary in order for creative individuals to successfully innovate as a group. In the context of membership change, there are likely similar team climate variables that increase the likelihood that membership change will be a positive event, both by encouraging new team members to voice their ideas in a productive manner, and by increasing receptivity to new members' ideas. Future studies should therefore consider constructs such as psychological safety (Edmondson, 1999) or facets of team climate for innovation (e.g., West & Anderson, 1996).

Finally, this study failed to find significant predictors of team viability, due to low levels of agreement regarding team viability. Thus, future studies should examine alternate means of investigating this construct, in order to determine how changes in team membership may impact the affective reactions of the remaining members.

Implications for Practice

Contrary to common wisdom, changes in team membership are not inherently negative events. Instead, the phase in which membership change occurs, and the nature of the change itself, influence its effects on the team. In light of evidence that longstanding teams begin to underperform on creative tasks (e.g., Skilton & Dooley, 2010), employers may want to consider periodically "shaking up" membership in creative teams. For instance, if a team is attempting to finalize a design for an innovative product, changing out one team member for a new member with a different perspective may prove beneficial, as this newcomer may play the role of a valuable critic (T. Mumford et al., 2008). Likewise, if a team is encountering difficulty generating new ideas, removing one creative individual and replacing him or her with someone else may be able to inject new ideas into the team, without impairing the team's ongoing creative performance.

Conversely, this study also demonstrated that membership change also has the potential to be detrimental to team creative performance. When not managed carefully, changes in team membership can result in notable performance decrements. This effect appears particularly dramatic when unmanaged (i.e., "at random") during generative tasks. Therefore, managers of creative teams may want to take care to either minimize unmanaged attrition during idea generation. During idea evaluation, when membership change may be beneficial, managers should likewise make sure that any new team member has a unique perspective to share, and that the established team will be willing to listen to and incorporate his or her insight.

In order to maximize potential benefits and minimize detrimental effects of membership change, employers will want to take care to make sure that membership change occurs at the proper time, and among the proper individuals. This will necessitate a close understanding of the team's current task, and also a thorough profile of each team member. This latter point may have implications for performance monitoring and employee development – organizations would do well to identify their existing creative members, to be used as potential "agents of change" in creative tasks. This will entail having a thorough understanding of employees' dispositions and personality, so that the correct composition of individuals can be brought together to navigate creative endeavors throughout their lifespan.

Limitations & Future directions

Though rigorous methodology was followed in the conducting of this study, there are a few limitations that are worth noting. First, this study was a relatively short-duration laboratory experiment. Although numerous scholars have identified that such a format is appropriate for drawing generalizable conclusions in social science research in general (e.g., Berkowitz & Donnerstein, 1982) and team creativity research in particular (e.g., Choi & Thompson, 2005),

there may be limits to the inferences drawn from this design. First, as previously stated, the short duration of this study may not have been sufficient to examine team dynamics that may change or develop as a result of membership change. This is important to examine, as membership change that occurs in a longstanding team may have a different effect from change that occurs in a recently formed team (Hirst, 2009).

Additionally, study utilized a college student sample. Although some may note this as a limitation, a wide range of social science studies have utilized similar samples, and in particular, team creativity research has used such samples to great effect (e.g., Choi & Thompson, 2005; Nemeth, Brown, & Rogers, 2001; Taggar, 2001). Furthermore, the task developed for this study is one in which the sample has a great deal of expertise; the task asked students to develop a charitable event, and the student sample was drawn from the university that houses the nation's largest student-run charity. Nonetheless, future research set in an applied setting would help examine additional conditions that may influence team creativity following membership change. Specifically, in the present study, students largely had relatively similar backgrounds. However, in an actual organization, a project team may be built from individuals with a diverse range of backgrounds and specialties (e.g., Dahlin et al., 2005; Mannix & Neale, 2005). Thus, the effects of membership change may differ, depending on the knowledge and skills lost or gained as a result of a change.

With regard to the relatively short duration of the study, a longer-term study would be beneficial to identify team outcomes and processes that may not arise, or be as clearly identifiable, in the short-term. In particular, affective team outcomes, such as perceptions of viability, may not stabilize at the team level until the team has worked together for an extended period of time. Thus, future longitudinal research on the effects of team membership change

would be highly beneficial. This would enable researchers to examine effects that may arise over time, and would also open the door for finer-grained analysis of team member interactions (such as via event sampling methodology).

In sum, membership change is an under-researched topic in studies of team performance and team creativity. The present study contributes to this knowledge gap by providing meaningful insight into the phenomenon of membership change in creative teams. The results shed light on some of the contextual factors that may influence membership change outcomes, and also suggest promising avenues for future research.

Table 1. *Correlation Matrix*

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	***Quality* Rating**	**.906**																				
2	***Originality* Rating**	.628**	**.920**																			
3	***Elegance* Rating**	.883**	.672**	**.871**																		
4	**Age (Time 1)**	-.094	.052	-.053	**--**																	
5	**Age (Time 2)**	.018	.182*	.098	.264**	**--**																
6	**GPA (Time 1)**	-.014	.024	.040	.011	.159	**--**															
7	**GPA (Time 2)**	.043	-.026	-.010	.024	-.098	.103	**--**														
8	**Agreeableness (Time1)**	.004	-.025	-.079	-.027	-.111	.064	-.065	**.836**													
9	**Agreeableness (Time 2)**	-.025	.009	-.052	-.008	-.086	.025	-.128	.871**	**.836**												
10	**Openness to Experiences (Time 1)**	.057	-.016	.003	.028	-.063	.083	-.191*	.366**	.297**	**.741**											
11	**Openness to Experiences (Time 2)**	.003	-.016	-.046	.032	-.063	-.012	-.325**	.273**	.332**	.803**	**.741**										
12	**Conscientiousness (Time 1)**	.090	.105	.080	.023	.011	.051	.083	.200*	.176	.008	.005	**.798**									
13	**Conscientiousness (Time 2)**	.069	.065	.073	.060	-.025	-.003	-.002	.126	.152	-.069	-.022	.864**	**.798**								
14	**Extraversion (Time 1)**	.134	.060	.104	-.032	-.196*	-.147	.053	.309**	.294**	.370**	.275**	-.049	-.132	**.814**							
15	**Extraversion (Time 2)**	.077	.113	.078	.000	-.171	-.202*	-.076	.267**	.396**	.298**	.389**	-.117	-.116	.855**	**.814**						
16	**Neuroticism (Time 1)**	-.047	-.082	.007	.103	.058	.008	-.009	.002	-.051	-.027	-.061	-.089	.006	-.143	-.196*	**.876**					
17	**Neuroticism (Time 2)**	-.142	-.082	-.060	.108	.080	.118	-.040	.017	.032	.052	-.020	-.096	-.060	-.122	-.120	.848**	**.876**				
18	**Task Conflict (Time 1)**	-.047	-.221*	-.095	-.048	-.094	.119	-.021	-.115	-.166	.207*	.077	-.301**	-.177	-.058	-.104	.189*	.125	**.745**			
19	**Task Conflict (Time 2)**	-.234*	-.282**	-.216*	-.001	-.061	.163	.020	-.159	-.172	.058	.041	-.390**	-.275**	-.209*	-.161	.153	.162	.542**	**.745**		
20	**Team Viability (Time 1)**	-.067	.037	-.100	.118	-.024	.010	.027	.287**	.271**	.007	-.052	.139	.080	.210*	.180*	-.071	-.058	-.305**	-.264**	**.829**	
21	**Team Viability (Time 2)**	.076	.118	.038	.100	-.043	-.092	-.084	.169	.210*	-.043	-.017	.127	.129	.177	.126	-.022	-.088	-.256**	-.361**	.703**	**.829**

** Correlation is significant at 0.05 level; ** Correlation is significant at the 0.01 level or below.*

⁺Values on the diagonal represent scale reliabilities (where applicable).

Table 2. *Descriptive statistics for variables of interest*

		Mean	SD	ICC2	r_{wg}
1	***Quality* Rating**	2.88	.96	--	--
2	***Originality* Rating**	2.73	1.01	--	--
3	***Elegance* Rating**	2.77	.96	--	--
4	**Age (Time 1)**	19.50	3.08	--	--
5	**Age (Time 2)**	19.00	1.03	--	--
6	**GPA (Time 1)**	3.26	.52	--	--
7	**GPA (Time 2)**	3.48	.41	--	--
8	**Agreeableness (Time1)**	3.99	.28	--	--
9	**Agreeableness (Time 2)**	4.00	.27	--	--
10	**Openness to Experiences (Time 1)**	3.50	.26	--	--
11	**Openness to Experiences (Time 2)**	3.51	.24	--	--
12	**Conscientiousness (Time 1)**	3.56	.34	--	--
13	**Conscientiousness (Time 2)**	3.56	.35	--	--
14	**Extraversion (Time 1)**	3.57	.37	--	--
15	**Extraversion (Time 2)**	3.57	.37	--	--
16	**Neuroticism (Time 1)**	2.84	.41	--	--
17	**Neuroticism (Time 2)**	2.84	.39	--	--
18	**Task Conflict (Time 1)**	2.03	.41	.503	.462
19	**Task Conflict (Time 2)**	2.17	.50	.614	.521
20	**Team Viability (Time 1)**	3.76	.43	.521	.374
21	**Team Viability (Time 2)**	3.84	.46	.473	.498

Table 3a. *Summary of Multilevel Effects on Ratings of Quality*

Fixed Effect	*γ*	*Standard Error*	*Approx. df*	*Sig.*
Task Type	-0.492	0.222	42	.032
Random Change (Dummy Code)	-0.286	0.224	42	.209
Creative Change (Dummy Code)	-0.349	0.197	42	.083
Interaction (Task Type X Random Change)	0.813	0.382	42	.039
Interaction (Task Type X Creative Change	0.522	0.278	42	.068

*Control Variables: Aggregate Age, Gender, GPA
** "No Change" served as the reference category for the dummy coded "Membership change" variable.

Table 3b. *Summary of Multilevel Effects on Ratings of Originality*

Fixed Effect	*γ*	*Standard Error*	*Approx. df*	*Sig.*
Task Type	-0.933	0.260	42	.001
Random Change (Dummy Code)	-0.872	.284	42	.004
Creative Change (Dummy Code)	-0.258	.318	42	.422
Interaction (Task Type X Random Change)	1.372	0.388	42	.001
Interaction (Task Type X Creative Change	0.189	0.361	42	.603

*Control Variables: Aggregate Age, Gender, GPA
** "No Change" served as the reference category for the dummy coded "Membership change" variable.

Table 3c. *Summary of Multilevel Effects on Ratings of Elegance*

Fixed Effect	*γ*	*Standard Error*	*Approx. df*	*Sig.*
Task Type	-0.622	0.233	42	.011
Random Change (Dummy Code)	-0.438	0.234	42	.068
Creative Change (Dummy Code)	-0.318	0.217	42	.150
Interaction (Task Type X Random Change)	0.944	0.414	42	.028
Interaction (Task Type X Creative Change	0.353	0.281	42	.216

*Control Variables: Aggregate Age, Gender, GPA
** "No Change" served as the reference category for the dummy coded "Membership change" variable.

Table 3d. *Summary of Multilevel Effects on Team Viability*

Fixed Effect	*γ*	*Standard Error*	*Approx. df*	*Sig.*
Task Type	-0.009	0.115	42	.936
Random Change (Dummy Code)	-0.147	0.151	42	.334
Creative Change (Dummy Code)	-0.137	0.149	42	.364
Interaction (Task Type X Random Change)	0.080	0.203	42	.697
Interaction (Task Type X Creative Change	-0.112	0.194	42	.566

*Control Variables: Aggregate Age, Gender, GPA
** "No Change" served as the reference category for the dummy coded "Membership change" variable.

Table 4. *Summary of Mediation Analyses*

Proposed Mediator	*Quality*		*Originality*		*Elegance*		*Team Viability*		*(SD) Team Viability*	
	95% CI Lower Bound	95% CI Upper Bound	95% CI Lower Bound	95% CI Upper Bound	95% CI Lower Bound	95% CI Upper Bound	95% CI Lower Bound	95% CI Upper Bound	95% CI Lower Bound	95% CI Upper Bound
Task Conflict	-.197	.022	-.213	.019	-.192	.015	-.126	.025	-.044	.015
(SD) Task Conflict	-.023	.098	-.015	.127	-.017	.094	-.050	.007	-.048	.017
Total Indirect Effect	-.189	.051	-.210	.073	-.187	.037	-.126	.022	-.068	.020

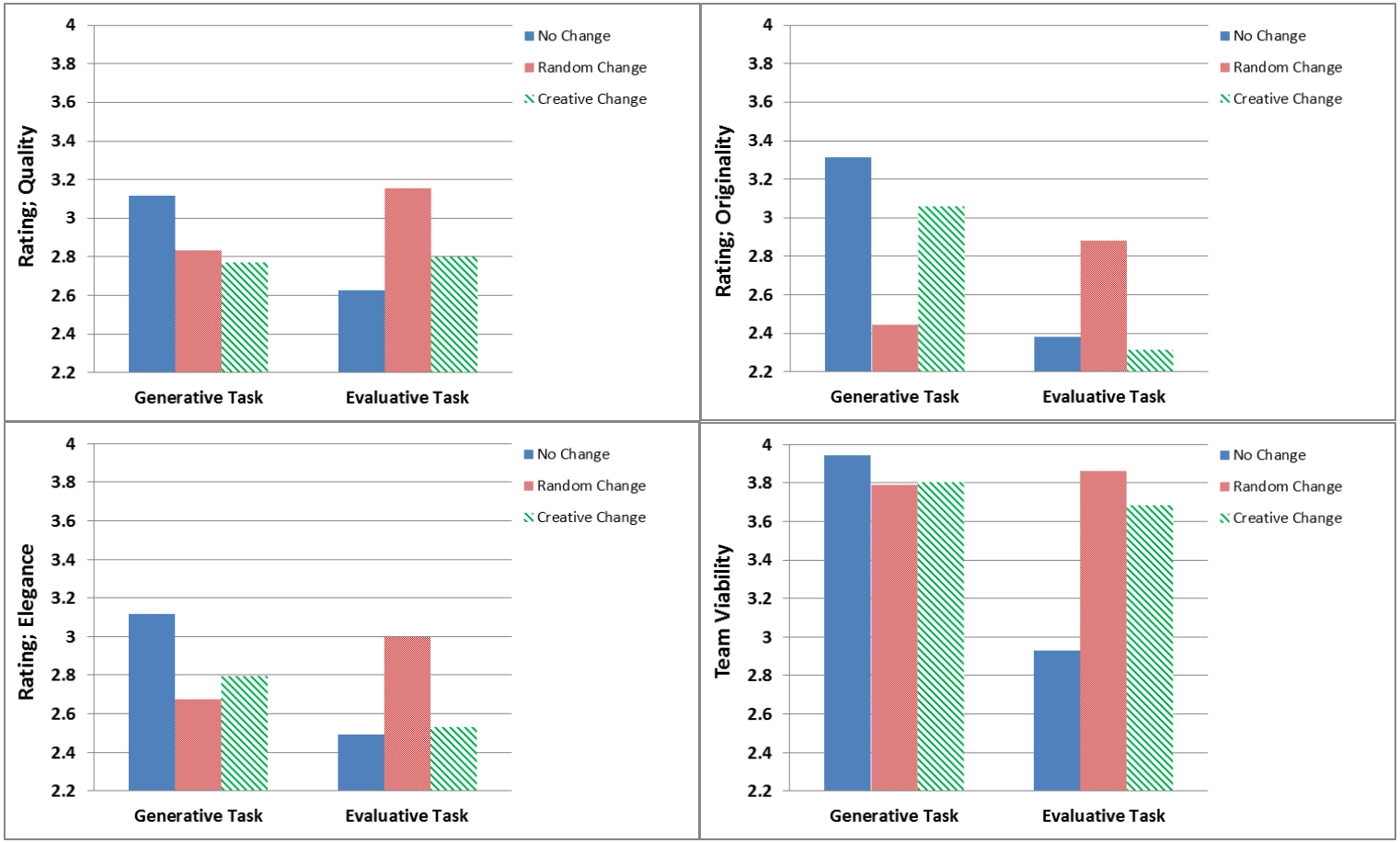

Figure 1. *Interaction of Task Type and Membership Change Type on Creative Performance*

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EDUCATION

The Pennsylvania State University (2008 – Present)
Ph.D., Industrial/Organizational Psychology (Expected August 2013)
Minor: Statistics and Research Methods
M.S., Industrial/Organizational Psychology (May 2011)

The University of Connecticut (*2003 – 2007*)
B.A., Psychology (May 2007)
Summa cum Laude

SELECTED PUBLICATIONS AND CONFERENCE PRESENTATIONS

Fairchild, J., Cushenbery, L. D., Maneotis, S., Drescher, A., & Hunter, S. T. (2013, April). Individual-level personality traits as predictors of team conflict: Timing matters. Paper presented at the 28th annual meeting of the Society of Industrial and Organizational Psychology. Houston, TX.

Fairchild, J., Cushenbery, L. D., Maneotis, S., Drescher, A., & Hunter, S. T. (2013, April). Evaluating an intervention for team creative performance. Paper presented at the 28th annual meeting of the Society of Industrial and Organizational Psychology. Houston, TX.

Fairchild, J. & Hunter, S. T. (In Press). "We've got creative differences": The interaction of conflict and participative safety on design originality. In press at *The Journal of Creative Behavior*.

Fairchild, J., Eubanks, D., & Hunter, S. T. (In Press). Effects of intuition, positive affect, and training on creative problem solving. In: E. G. Carayannis (Ed.) *The encyclopedia of creativity, invention, innovation, and entrepreneurship.* Springer.

Farr, J. L., **Fairchild, J.**, & Cassidy, S. E. (In Press). Technology and performance appraisal. In: M. D. Coovert & L. F. Thompson (Eds.) *The psychology of workplace technology*. Wiley.

Hetrick, A., Cushenbery, L. D., **Fairchild, J.** & Hunter, S. T. (2013, April). Gender and leader recovery from task and relationship-oriented mistakes. Poster presented at the 28th annual meeting of the Society of Industrial and Organizational Psychology. Houston, TX.

Hunter, S. T., Cushenbery, L., **Fairchild, J.**, & Boatman, J. (2012). Partnerships in leading for innovation: A dyadic model of collective leadership. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 5,* 427-430*.*

Fairchild, J., Cassidy, S., Cushenbery, L., & Hunter, S. (2011). Integrating technology with the creative design process. In A. Mesquita (Ed.) *Technology for creativity and innovation: Tools, techniques and applications.* Hershey, PA: IGI Global.

TEACHING EXPERIENCE

Instructor	Summer 2013; Research Methods in Psychology (Penn State) (Online) – 20 Students
Instructor	Spring 2013; Research Methods in Psychology (Pen State) (Online) – 19 Students
Instructor	Fall 2012; Research Methods in Psychology (Penn State) (Online) – 18 Students
Instructor	Summer 2012; Research Methods in Psychology (Penn State) (Online) – 18 Students
Instructor	Fall 2011; Leadership in Organizations (Penn State) – 69 students
Lab Instructor	Spring 2009; Research Methods (Penn State) – 2 sections, 25 students each
Teaching Assistant	Fall 2008; Intro to I/O Psychology (Penn State) – 1 section, 140 students
Teaching Assistant	Fall 2008; Senior Seminar: Work-Family Balance (Penn State) – 1 section, 25 students

SERVICE & HONORS

Penn State Representative, SIOP Doctoral Consortium (*April 2013*)
Co-Chair, I/O Program Graduate Recruitment (*2009-2012*)
I/O Graduate Student Service Award (*Honorable Mention, 2009, 2011, 2012*)
Mirian Graddick-Weir Summer Fellowship Recipient (*2011*)
Psi Chi Teaching Assistant of the Year Award (*2009*)