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## Audere est Facere: Reconsidering Proactivity and Examining its Impact on Teams

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AUDERE EST FACERE:  
RECONSIDERING PROACTIVITY AND EXAMINING ITS IMPACT ON TEAMS

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
In partial fulfillment of the  
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in

The Department of Management

by  
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## ABSTRACT

Proactivity has become one of the most prominent phenomena in organizational behavior over the last twenty-five years. Scholars have established several different methods of assessing proactivity as a dispositional trait, and identified numerous different types of proactive behaviors. Further, interest in proactivity as a phenomenon within and among teams has been an area of growing recent interest. However, the literature is plagued with a number of problems that limit our understanding of proactivity and impede the growth of the field. At the conceptual level, scholars frequently lament the lack of theoretical unity and the proliferation of overlapping constructs that results from the lack of parsimony. Likewise, at the team-level, little is known so far about how proactivity arises within and benefits teams, despite growing research in that area. This work addresses these prominent issues in three parts. The first part of this dissertation directly addresses the lack of theoretical synthesis by offering social cognitive theory (SCT) as a unifying framework for understanding proactivity, and suggesting a theoretical typology of agentic behaviors drawing from the core properties of human agency offered by SCT (i.e., intentionality, forethought, and self-reactiveness). The second part of this work proposes a model of team-oriented proactivity upon team task performance as mediated by team coordination. Results suggest that team coordination is the critical factor in converting team-oriented proactivity into team task performance, and that proactivity has curvilinear effects on team performance, with a positive effect from low to moderate levels, but a diminishing effect at high and very high levels of proactivity. In the final part of this dissertation, I investigate how proactivity arises within work teams and contributes to emergent team states and important team outcomes. Specifically, I suggest behavioral contagion as a mechanism by which proactivity arises within teams, and develop hypotheses for the effect of team-oriented proactive behaviors

upon team emergent states and, subsequently, team viability, and task performance. Testing this model with results from a lab study reveals that perceptions of team-oriented proactive behavior within the team significantly influences team processes and, to a lesser extent, team performance outcomes.

## **AGENTS OF CHANGE: A REVIEW AND SYNTHESIS OF HUMAN AGENCY USING SOCIAL COGNITIVE THEORY**

Today's employees work in increasingly dynamic and unpredictable environments (Griffin, Neal, & Parker, 2007; Ilgen & Pulakos, 1999; Mathieu, Maynard, Rapp, & Gilson, 2008). As demonstrated by an expansive and growing body of research (Parker & Collins, 2010; Tornau & Frese, 2013), human agency is critical for adapting to and succeeding in these ever-changing environments. While multiple definitions of agency exist under multiple overlapping constructs (e.g., proactivity, initiative), the common thread is that being agentic represents an individual's active effort to improve circumstances rather than passively reacting to them (Bandura, 1989a; Crant, 2000; Frese, Fay, Hilburger, Leng, & Tag, 1997). Agency can take shape as an individual characteristic, typically involving elements of anticipation and taking control of situations in order to affect change (Grant & Ashford, 2008; Parker & Collins, 2010; Parker, Williams, & Turner, 2006), and can be identified as actions and behaviors that are conscious and self-driven (Bandura, 2001).

However, as Crant (2000, p. 435) noted in his substantive review of the decade-and-a-half of research in proactivity accumulated by the turn of the millennium, scholarship on this concept "has not emerged as an integrated research stream.... There is no single definition, theory, or measure driving this body of work." Another decade-and-a-half has elapsed since that time and, while the field has progressed measurably, integration remains elusive. More recently, others have lamented this fact and called for a greater focus on areas such as the cognitive *process* that leads to agentic behaviors (e.g., Parker & Collins, 2010), the *behavioral* component of agency (e.g., Grant & Ashford, 2008), differentiating *individual differences* driving agency from behavioral outcomes (e.g., Tornau & Frese, 2013), the *contexts* that influence agentic behaviors (e.g., Grant & Ashford, 2008; Grant & Parker, 2009), and the *interaction* between

person and situation (Li, Fay, Frese, Harms, & Gao, 2014). Although there is general agreement regarding the need for integration, there is evidently less agreement regarding how to achieve it.

One of the key issues plaguing research on agency is the proliferation of related constructs (Parker, Bindl, & Strauss, 2010; Parker & Collins, 2010; Tornau & Frese, 2013), which are often considered independently despite sharing core conceptual similarities. A representative (though incomplete) list of these constructs is displayed in Table 1, below. Despite several meta-analyses (e.g., Fuller & Marler, 2009; Spitzmuller, Sin, Howe, & Fatimah, 2015; Thomas, Whitman, & Viswesvaran, 2010; Tornau & Frese, 2013) and other efforts to make empirical distinctions among agency-related behaviors (e.g., Parker & Collins, 2010), the field remains simultaneously fragmented and overcrowded. This stymies the accumulation of knowledge (Le, Schmidt, Harter, & Lauver, 2010), limits the impact of research advancements within this area (Pfeffer, 1993), and violates theoretical parsimony (Le et al., 2010; Shaffer, DeGeest, & Li, 2016). Put succinctly, the lack of integration threatens our ability to understand and advance knowledge of the concept of human agency.

Despite these noted issues, a number of researchers have made important contributions to the literature on agency since Crant's (2000) original review. Scholars have, for instance, explored the cognitive processes underlying agentic behaviors through cognitive states (e.g., Parker et al., 2010, 2006; Parker, 2000), increased our understanding of how work contexts influence agency (Grant & Parker, 2009; Griffin et al., 2007), related personality factors that drive agency to key concepts such as leadership (e.g., Williams, Parker, & Turner, 2010) and innovation (e.g., Rank, Pace, & Frese, 2004), and explored factors that cause changes in these underlying traits (e.g., Li et al., 2014). Thus, despite the fragmented state of the research, important contributions have emerged.

Table 1 - Agency-Based Constructs and Definitions

Construct	Definition
Proactive Personality	The relatively stable tendency to effect environmental change (Bateman & Crant, 1993)
Personal Initiative	A behavior syndrome resulting in an individual's taking an active and self-starting approach to work and going beyond what is formally required in a given job (Frese, Kring, Soose, & Zempel, 1996)
Taking Charge	Discretionary behavior intended to effect organizationally functional change (Morrison & Phelps, 1999)
Proactive Feedback Seeking	Actively seeking feedback from the environment in order to attain goals (Ashford & Cummings, 1985)
Feedback Inquiry	Directly asking someone for feedback (Vancouver & Morrison, 1995)
Feedback Monitoring	Unobtrusive observation to obtain feedback clues (Ashford & Cummings, 1983)
Proactive socialization	Newcomer information seeking in order to reduce uncertainty in the work environment (Saks & Ashforth, 1996)
Issue Selling	Individuals' behaviors that are directed toward affecting others' attention to and understanding of issues (Dutton & Ashford, 1993)
Individual Innovation	Problem recognition and the generation of ideas or solutions, either novel or adapted (Scott & Bruce, 1994)
Proactive Career Management	Initiation of or intervention in a career situation such that agents act in valued directions as opposed to responding passively to imposed change (Fryer & Payne, 1984)
Career Initiative	Actively attempting to promote one's career rather than passively responding to the job situation (Seibert & Kraimer, 2001)
Voice	Promotive behavior that emphasizes expression of constructive challenge intended to improve rather than merely criticize (Van Dyne & LePine, 1998)

(Table 1 continued)

Construct	Definition
Problem Prevention	Taking action to prevent the reoccurrence of challenges and barriers to work (Frese & Fay, 2001)
Strategic Scanning	Proactively surveying the organization's environment to identify ways to ensure a fit between it and the organization (Parker & Collins, 2010)
Job Change Negotiation	Pushing for job changes aimed at creating jobs that better suit individual's skills and abilities (Ashford & Black, 1996)
Consideration of Future Consequences	A stable individual difference in the extent to which people consider distant versus immediate consequences of potential behaviors (Stratham, Gleicher, Boninger, & Edwards, 1994)
Felt Responsibility for Change	An individual's belief that he or she is personally obligated to bring about constructive change (Morrison & Phelps, 1999)
Emotional Labor	Actively regulating emotions as opposed to passively responding to emotional demands (Brotheridge & Grandey, 2002)
Change Orientation	Having an active orientation toward change and a positive approach toward errors (Frese & Fay, 2001; Parker et al., 2006)
Flexible Role Orientation	Felt ownership for a range of strategic problems (Parker, Wall, & Jackson, 1997)
Control Appraisals	The belief that one can control and have an impact on work outcomes (Parker & Collins, 2010)

One particularly noteworthy area of recent growth is agency in the form of emergent team-level proactivity (Harris & Kirkman, 2016; Williams et al., 2010). This is noteworthy because teams are—like proactively performing individuals themselves—an increasingly attractive means for organizations to address the dynamic and uncertain environments of the modern workplace (Mathieu et al., 2008; Wageman, Gardner, & Mortensen, 2012). Teams are attractive to modern organizations because a set of individuals with different but complementary skills working in an

interdependent fashion toward a common goal is able to achieve a higher rate of effectiveness than could those individuals working alone (Cannon-Bowers & Bowers, 2011). This is in part because teams foster greater role flexibility (Griffin et al., 2007) and increased autonomy to address organizational problems (Kirkman & Rosen, 1999; Williams et al., 2010). In other words, effective teams are greater than the sum of their parts. As a reflection of the increased organizational importance of teams, scholarly research into team phenomena has become one of the largest areas of growth in organizational behavior studies (Morrison, 2010). Yet despite the growth in this important area of research, little research so far examines how individual agentic behaviors emerge and aggregate to yield team-level agency, and how this inter-team agency influences team task performance.

In order to facilitate substantive growth and advancement in agency research, this work offers a number of specific contributions to help meaningfully move the field forward. First, I offer a unified perspective of human agency utilizing social cognitive theory (SCT; Bandura, 1986, 1989, 1991) as an overarching theoretical framework. One of the foremost theories in explaining human behavior in organizations (Locke & Latham, 2004), SCT shares both a conceptual core with prevalent notions of agency and proactivity (Bateman & Crant, 1993; Frese et al., 1997, 1996), and adopts an interactionist perspective that accounts for the influence of environments on behavior that make it uniquely well-suited to explaining and predicting proactivity. Further, the theory offers a clear set of core properties that define agency in human behavior which provide a natural means of focusing and grouping its various forms currently spread throughout the literature.

Second, I build from this foundation to explore, in two studies, how team-oriented proactivity (Hirschfeld, Jordan, Thomas, & Feild, 2008) emerges and spreads within teams, and

how these team-oriented proactive behaviors influence team processes and outcomes. Team-oriented proactive behaviors are those that go above and beyond individual role expectations in order to benefit the overall team. Specifically, team-oriented proactivity involves taking on extra work relative to teammates and helping teammates with their tasks and responsibilities, for instance, to aid the team in achieving its collective goals. I assess these agentic behaviors first by examining the influence of team-oriented proactive behaviors on team coordination and team effectiveness using archival team performance data. In particular, I use individual and team-level data from World Cup soccer competition, including heat map analysis and movement tracking statistics to assess the model. I then conduct a second study using priming experiment to investigate proactive behavior contagion and its impact upon team viability and team task performance, and the mediational effects of collective efficacy and team affective tone. Given that agentic behavior at the team level is an important if under-studied phenomenon (Crant, 2000; Williams et al., 2010), these efforts yield several contributions to the broader literature. For one, the work that has accrued so far, while important, has yet to fully address how agency in the form of proactivity evolves from an individual-level behavior to a team-level phenomenon. This work therefore advances team-level proactivity scholarship by explaining behavioral contagion as one mechanism through which team processes emerge and subsequently impact team effectiveness. Additionally, despite increasing attention to proactivity within teams, relatively little work to date has examined the relationship between proactivity and team effectiveness. By examining important team processes and outcomes across two studies, I further contribute to this growing literature by offering a model of team agency that is consistent with existing team-level theory and provides a test of SCT's fit as a unifying theory for the study of agency.

Toward these objectives, I first offer a primer on SCT and a unifying framework derived from the theory as a typology of agency. I then provide a comprehensive overview of the domain of human agency and use the SCT typology to map constructs into the nomological network of human agency as a means of addressing the proliferation of related constructs within the domain. I subsequently apply SCT to team-oriented proactive behaviors and develop hypotheses and a proposed methodology first for the field study, and then for the experimental study.

### **SCT and Human Agency**

SCT was developed as a response to early psychological theorizing that failed to account for agentic behavior. Specifically, SCT argues that human behavior is the outcome of a dynamic interaction—typically referred to as the triadic reciprocation—between personal differences, environmental factors, and behavioral determinants (Bandura, 1986). In this multi-way exchange, behavior is an outcome of interactions among individual differences in affect, cognition, and other dispositional factors; behavioral choices and the feedback from the outcomes of those choices; and environmental constraints including social expectations and modeling. Interactions among these factors provide feedback to the individual on his or her efficacy in carrying out certain tasks, and the rewards and consequences of individual efforts and behaviors. While the theory explains how such experiences in childhood lead to the development of trait characteristics and beliefs (for a detailed discussion, see Bandura, 1989b), the theory's strength rests in providing a framework for how those traits and characteristics interact with behaviors and environments in the workplace to determine both the goals and actions of individuals, as well as the goals and actions of collectives. According to this framework, the influence between individual differences and behaviors reflect intentions and expectations in that cognitive factors such as thought and affect manifest in actions which reveal expectations,

beliefs, and goals. In other words, what people think, feel, and believe informs how they behave, and the effects of these behaviors provide the feedback that determine thought patterns and emotional reactions (Bandura, 1989b). Thus, as an individual encounters success with agentic behaviors, such as taking charge of situations or actively solving problems—particularly in early life—the individual comes to believe him/herself efficacious in such efforts and expects that his/her behaviors can and will have a positive impact on the environment.

Likewise, social expectations influence behavioral feedback to inform how an individual perceives the value of human agency to other actors in the environment. In some situations, agentic behaviors are not encouraged or may even be punished (as might be the case with enlisted soldiers in boot camp, for instance), and experiencing the negative repercussions following agentic acts, or seeing others experience such repercussions following agency, inform future behavioral choices. Indeed, one of the most frequently cited studies of human agency examined such environmental influences on human agency: Frese and colleagues' (1997, 1996) seminal studies on personal initiative assessed human agency in Cold War era East and West Germany, demonstrating that individuals living and working under the West German paradigm of increased job discretion and responsibility showed greater rates of personal initiative, while those in East Germany, where highly centralized planning and tight regulations on behavior were more common, found substantially fewer incentives to engage in personal initiative and little to no positive feedback for doing so. Subsequently, those in East Germany made far fewer attempts to affect their environments through human agency.

While the triadic reciprocation model is ideal for understanding how these factors interact to influence behavior, the theory also offers a more nuanced means of understanding how individuals come to differ in their orientation toward agency. Specifically, SCT offers a set of

core properties of human agency that underlie active behavior: intentionality, forethought, self-reactiveness, and self-reflectiveness (Bandura, 2006). These core properties, in essence, differentiate human behavior that is agentic in nature from behavior that is passive, and provide an ideal system for organizing the domain of agentic behaviors.

### **A Framework of Human Agency**

The first of SCT's core properties of human agency is *intentionality*—purposeful, rational action to affect environments and deliberately bring about goals. Intentionality entails deciding on goals that “include action plans and strategies for realizing them” (Bandura, 2009, p. 8). These goals then inform behaviors. Put simply, intentionality is the desire to be a sculptor of the environment rather than a sculpture within it (Bell & Staw, 1989). It is a personal tendency that involves forming ideas for actions that will bring about desired end states as opposed to merely hoping or wishing for an end state to occur. Perhaps the central pillar of the agentic views that ground SCT and common adaptations of agency (e.g., proactivity), intentionality speaks to the commitment to take action rather than passively accept outcomes (Mallin, Ragland, & Finkle, 2014)—to have a plan that the individual is committed to executing, even if the plan is not specified in full detail (Bandura, 2001) or is merely a visualization of action that could affect the environment. This is part of the foundational idea of trait-level proactive personality (Bateman & Crant, 1993). That is, intentionality underscores differences among individuals in the extent to which they are motivated to engage in environment-changing behaviors in a self-starting manner, while the absence of intentionality represents one who simply accepts the environment and its constraints with little or no aim of changing his/her environment or circumstance. As a behavioral manifestation, intentionality speaks to taking action to improve a given referent (e.g., working environment, career); to self-start and take control of a given situation or circumstance.

While intentionality addresses goals that inform actions, the emphasis is on immediate action. Another of the core properties of human agency set forth under SCT, *forethought*, involves a longer-run consideration of the personal goals an individual sets. Specifically, *forethought* involves anticipating the consequences of potential actions, and ultimately selecting those actions that are most likely to result in desired outcomes (Bandura, 1991a). Though similar in definition to intentionality, *forethought* entails forming longer-run objectives, considering different behavioral paths for achieving those objectives, and anticipating and comparing the consequences and effectiveness of different action paths. According to SCT, this focus on future actions and events determines individual motivation (Bandura, 2001) by influencing the individual's visualization of a desired future state and a set of actions required to achieve those goals, much as a student who wishes to attend a highly-ranked graduate school weighs different action paths and their effectiveness in achieving that goal, then becomes motivated to carry out behaviors judged most likely to facilitate goal accomplishment, such as spending extra time studying. *Forethought* is generally associated with altering the status quo—such as improving one's job prospects by attending a good graduate school—but can also influence intentional acts to preserve the status quo. That is, *forethought* governs intentionality by placing shorter-term action goals into a framework of longer-term plans and objectives. As such, an individual may experience the intentionality-driven desire to, for example, point out a flaw or mistake by one's supervisor in the hopes of correcting the problem, but *forethought*-governed motivation may cause the individual to exercise constraint or select a different course of action in order to facilitate longer-run objectives, such as attaining a promotion. Thus, *forethought* and intentionality can interact to influence action choices, even if the action involves maintaining rather than altering the status quo.

The two remaining core properties of agency are the closely-related concepts of *self-reactiveness* and *self-reflectiveness*. These speak to the range of “self-referent subfunctions” that provide feedback on an individual’s goals and progress toward them, as well as the adjustments to action plans and behavioral paths that incorporate this feedback (Bandura, 2001). Given their similarity, I consider these as a single final component under the header of *self-reactiveness*—a factor that adds a component of self-monitoring and self-adjustment to the action-orientation of intentionality and future-orientation of forethought. Self-reactiveness informs behaviors and cognitions that provide information on one’s progress toward goals, and the likelihood of planned actions yielding success, by accepting and processing feedback from the environment and prior behavior to provide information on goal progress and efficacy. In other words, this self-referent subfunction involves observing oneself and other actors in the environment to determine what plans and actions are likely to be successful in altering the status quo.

Altogether, I assert that these core properties outlined by SCT serve as an appropriate, theoretically-derived organizing framework for the broad domain of human agency. Using SCT’s core of human agency in this way gels with the widely-adopted definition of agency as self-starting in nature, oriented toward change, and focused on the future (Parker et al., 2010) but adds the self-reactive component. That is, intentionality is in concert with the first component of that commonly-adopted definition of proactivity (i.e., self-starting), and forethought with the latter two components (i.e., change-oriented and future-focused). I combine these latter two components together under the banner of forethought because to be change-oriented is also to be future-focused. In other words, to be oriented toward enacting change is to see a better way of doing things in the future. To this definition I add the element of feedback-seeking and self-reaction suggested by SCT. This final factor addresses both an awareness of one’s actions and

the effect of those actions in creating change, as well as accounting for feedback-seeking and integrating actions. Together, intentionality, forethought, and self-reactiveness provide a higher-order means of grouping the full range of proactive behaviors. In the following sections, I first review the major constructs in the domain of agency and then use this higher-order grouping to map them onto this typology.

## **Organizing the Domain of Human Agency**

### **Early Conceptualizations of Agency in Organizational Science**

One of the first areas where research on agentic behaviors developed was in workplace social processes. Among the earliest conceptualizations was that of proactive feedback seeking (Ashford & Cummings, 1983, 1985), which proposed that individuals can be proactive in pursuing and attaining feedback on their progress toward organizational goals. Similar notions emerged in the organizational socialization literature to explain instances in which organizational newcomers actively seek out information to quicken their socialization process (Saks & Ashforth, 1996), and in actively negotiating job tasks and responsibilities to better suit the individual's skills and abilities (Ashford & Black, 1996). Other scholars researching social processes around this time also noted differences in those who proactively build and expand social networks from those who passively accept their network (Morrison, 1993; Ostroff & Kozlowski, 1992).

While the agentic perspective began to take root among researchers of social processes, similar perspectives were emerging in the research on work structures. Staw and Boettger (1990), for instance, introduced the concept of task revision, or taking action to revise procedures or job expectations that are dysfunctional in order to increase job effectiveness. This marked a change from typical considerations of extra-role behavior as an extension of in-role

responsibilities by explaining situations where individuals take agency in improving those in-role responsibilities, and to bring them more in line with organizational goals. Researchers also adopted the agentic perspective to reconsider employee goal-setting in organizations, demonstrating that employees can take an active role in setting goals with managers as opposed to passively receiving them (Latham, Erez, & Locke, 1988), and can go as far as proactively setting their own goals (Roberson, 1989).

Simultaneously, similar agentic concepts began to emerge among scholars investigating work environments, particularly how the individual can take action to impact and improve his/her circumstances. As early as 1984 researchers noted that individuals can initiate or intervene in the paths of their own careers to create more favorable environments for themselves. At that time, the dominant line of thought revolved around the deprivation hypothesis, which posited that the absence of the structures and resources provided by the work environment is psychologically destructive because individuals depend upon these structures to guide and inform behavior. However, in researching the behaviors of unemployed persons, Fryer and Payne (1984) presented evidence directly counter to the deprivation hypothesis by demonstrating that individuals who take agency and responsibility for their own outcomes not only stave off psychological deterioration, but become agents of their own future by initiating desirable career paths as opposed to helplessly responding to their circumstances. Increasingly, researchers viewed individuals as “sculptors” as opposed to “sculptures” of their own fates in organizational life (Bell & Staw, 1989). Scholars also began considering how these “sculptors” used agency in improving their environments by championing ideas and issues that were personally meaningful with the intention of affecting organizational change (e.g., Dutton & Ashford, 1993).

Early conceptualizations of human agency in workplace, then, emphasized taking intentional actions to improve working conditions and individual performance without the guidance or urging of others. This is consistent with the concept of intentionality from SCT despite a great deal of overlap among these constructs themselves, perhaps owing to their simultaneous growth in different fields (i.e., socialization, work structure). Fryer and Payne's (1984) study of unemployed individuals also began hinting at the concept of forethought, the future-focused component of agency, by demonstrating that more agentic individuals not only prevent undesirable conditions such as stress from being unemployed, but also take actions to improve their long-run career prospects. Thus, early conceptualizations, while focused mostly on how the intentional actions of certain individuals lead to better outcomes, gave some consideration to forethought: the longer-term focus on the future. Missing from these early views, however, were notions of what leads some individuals to be more intentional and forward-looking than others. Consequently, scholars in the 1990's became increasingly focused on the personal differences underlying human agency, beginning with the most recognizable construct in this domain, proactive personality.

### **Proactivity as a Dispositional Difference**

**Proactive Personality.** One of the first<sup>1</sup> and most influential attempts to take an integrative view of proactivity was Bateman and Crant's (1993) proactive personality. Bateman and Crant (1993, p. 103) define the construct as a stable personal tendency that "identifies differences among people in the extent to which they take action to influence their environments." The construct is rooted in the interactionism literature in that behavior is seen as both internally and externally controlled, and that individuals act to influence their situations as

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<sup>1</sup> Although the concept was introduced as early as the 1960's (see Swietlik, 1968), considering proactivity from a dispositional perspective did not gain traction until the 1990's.

much as situations influence the person (Bandura, 1986; Bowers, 1973; Schneider & Reichers, 1983), consistent with SCT. However, Bateman and Crant (1993) emphasized the dispositional component and assumed that individuals are relatively unconstrained by their environments. Proactive behaviors in this view, then, are those that are intended to change the person's environment for the better—as with intentionality—and proactive individuals are those who are dispositionally driven to change environments rather than to merely adapt to them.

The measure developed by Bateman and Crant (1993), or varieties of it (e.g., Seibert, Crant, & Kraimer, 1999), is the most commonly-used means of measuring the proactive disposition. A strength of using this measure is that it is designed to capture stable personal tendencies that are not impacted by situations and contexts. Others have noted, however, that this provides little information about what behaviors should be considered as proactive (e.g., Crant, 2000; Grant & Ashford, 2008); nevertheless, establishing the stable tendency to be proactive is an important step forward because of the central role of individual differences in determining behavior.

The proactive personality measure itself is not without limitations, however. In terms of scale development, Bateman and Crant (1993) initially developed 47 items, but the method of item development is not revealed. Further, the authors simply selected 27 of those initial items that they deemed to be most representative without subjecting the item pool to the evaluation of subject matter experts. Additionally, several of the items in the original measure raise questions. For example, five of the seventeen items address an individual's tendency to be a champion for his/her own ideas (e.g., "If I believe in an idea, no obstacle will prevent me from making it happen"). While proactive personality and championing ideas are not innately in opposition, they are not necessarily related, either. That is, "defending" one's ideas and overcoming opposition to

them may be construed as being argumentative, for instance, as opposed to taking initiative, and there's no implication that those ideas inherently relate to improving the environment.

Additional items in the measure simply seem out of place. One item, while certainly addressing an individual's desire to enact environmental change, goes a bit beyond the realm of the environment implied by interactionist psychology (i.e., "I feel driven to make a difference in my community, and maybe the world"). Yet another seems as though it may be more appropriate as a means of identifying socially-desirable responding (i.e., "If I see someone in trouble, I help out in any way I can"). Many researchers overcome these limitations by reducing the measure from 17 items to 5 or 6. In fact, the shortened versions used by others authors (e.g., Parker, 1998; Seibert, Crant, & Kraimer, 1999) are increasingly common stand-ins for the original measure.

**Personal Initiative.** While proactive personality emphasizes underlying individual differences to the exclusion of contextual factors, Frese and colleagues (1996, 1997) focused on the behaviors themselves as a means of differentiating people, specifically an individual's tendency to take an active and self-starting approach to tasks and to go beyond prescribed role requirements. The authors conceptualized five components of the construct: 1) the behavior is consistent with the organization's mission, 2) the behavior has a long-term focus, 3) the behavior is goal-directed and action-oriented, 4) the individual perseveres in the face of obstacles and setbacks, and 5) the individual is self-starting and proactive (Frese et al., 1996). They summarize the construct as "a behaviour syndrome that is based on developing a fuller set of goals that goes beyond what is formally required in the job and by being *proactive*" (Frese et al., 1997, p. 141), and focused on "overcoming problems, dealing with difficulties, and thinking of alternative ways to do a task" (Frese et al, 1996, p. 38). The authors conceptualized this set of behaviors as representative of a personal tendency to be motivated toward action, to persevere in the face of

challenges, and focused on solving problems and improving work environments. Ultimately, then, personal initiative takes an outside-in approach to agency, by focusing on behaviors to determine individual differences.

This conceptualization is distinct from Bateman and Crant's (1993) in that it more specifically defines the domain of proactive behavior, and the construct incorporates both anticipation and a forward-looking mentality (Grant & Ashford, 2008). Personal initiative is also different in that it is more contextually-defined than proactive personality. That is, the construct emphasizes behaviors that occur within organizations that are intended to benefit the organization itself, and was initially developed as a means of understanding how contexts—specifically, differences between Cold War era East and West Germany, as discussed above—differently influence individuals' initiative. Thus, proactive personality is seen as a latent individual difference that drives an action orientation in all areas of life, whereas personal initiative focuses more on assessing the contexts and behaviors that arise in a working context, and separating people based on those actions.

Another difference is the theoretical perspective the authors utilized to ground the construct. Frese and colleagues (1996, 1997) drew from action theory, which predicts that individuals plan actions, and actions are guided by goals (Miller, Galanter, & Pribram, 1960). The theory is built upon fundamental differences in individual tendencies to be state-oriented or action-oriented. In either instance, the individual may have goals, but the state-oriented individuals are more focused on their thoughts and feelings than on actions and may not be motivated to action, whereas action-oriented individuals prioritize accomplishing goals over the state of their own psychological well-being (Kuhl, 1992). In essence, the theory addresses how individuals regulate themselves. In the case of facing obstacles, for instance, those that are

action-oriented are likely to focus their energies on overcoming the obstacle—to become motivated to action. State-oriented individuals, on the other hand, are likely to withdraw from action and focus on maintaining emotional well-being in the face of challenges as opposed to continuing onward (Wanberg, Zhu, & Van Hooft, 2010).

Yet, while this measure of personal initiative has a great many strengths in conceptualization, its methodological implementation is limited. Frese and colleagues sought not to derive a survey instrument but rather to arrive at a method for conducting personal interviews that would allow for differentiating individuals on this individual difference. It is the seven-item companion measure that is commonly used to gauge personal initiative—not the set of interview instruments that were developed as the key means of assessing the construct—that has attained wide use as a measure of initiative. Also, as mentioned above, the methodology was pursued to understand differences in the workforces of East and West Germany. Though many useful nuances to work environments can be gleaned from evaluating differences between these two cultures, the sample for which the approach was originally validated has questionable generalizability.

Thus, while proactive personality and personal initiative are among the most impactful and important constructs in the human agency domain insofar as they represent major strides toward differentiating individuals on components of agency, they still do not capture the full picture of agency as predicted by SCT. While both constructs hold a dispositional orientation toward intentionality at the heart of their conceptualizations, proactive personality is more focused on the individual at the expense of the environment, while the opposite is true of personal initiative. Likewise, personal initiative accounts more for forethought by being more forward looking, though both conceptualizations have largely lost the feedback component that

was a centerpiece of those early notions of agency. However, other constructs emerged at this time with different foci.

### **Context-Specific Proactivity Constructs**

While there is considerable overlap in proactive personality and personal initiative, and the two concepts are often treated as interchangeable, the notable differences in their attention to underlying individual differences or context-based behaviors provide a broad-bandwidth means of differentiating individuals. Scholars continued to pursue higher fidelity constructs, however, particularly by emphasizing the contextual factors that influence proactive behaviors.

In his review of the literature at that time, Crant (2000) noted two context-based constructs as particularly aligned with proactive personality and personal initiative, *role breadth self-efficacy* (RBSE; Parker, 1998) and *taking charge* (Morrison & Phelps, 1999). RBSE is designed to capture “the extent to which people feel confident and feel that they are able to carry out a broader and more proactive role, beyond traditional prescribed technical requirements” (Parker, 1998, p. 835). RBSE is the first construct that addresses human agency broadly within organizations, as opposed to more specific precursors such as feedback-seeking and proactive socialization, and accounts explicitly for the environmental influences on those behaviors. To wit, an important advancement arising from this work is the expectation that RBSE *will* change as environmental influences change. While more recent researchers have noted that RBSE is a state and an antecedent of agentic behavior, and rather part of the environmental drivers of action as opposed to a distinct part of the domain of human agency (Tornau & Frese, 2013), the development of the construct introduces an important part of the cognitive processes of agency. Specifically, it can be viewed as a state-like mediator between individual differences and agentic behaviors.

The other context-based construct addressed by Crant (2000), *taking charge*, enjoys a more prominent status as one of the core agentic concepts (Tornau & Frese, 2013). The construct focuses on “voluntary and constructive efforts, by individual employees, to affect organizationally functional change with respect to how work is executed within the contexts of their jobs, work units, or organizations” (Morrison & Phelps, 1999, p. 403). A notable distinction of the concept is that it reconsiders organizational citizenship behaviors that largely focus on efforts to maintain the status quo (Organ, 1988) and sets apart those extra-role efforts that are implicitly challenges to the status quo—behaviors that are designed to change the way work is done in an organization. In other words, taking charge captures intentionality in the form of agentic behaviors that are meant to bring about positive change in an organization while also accounting (perhaps to a lesser extent) for forethought by including in its domain an aspect of forward-looking change orientation.

One other behavioral construct that has become increasingly prominent is the concept of *voice*, which addresses “promotive behavior that emphasizes expression of constructive challenge intended to improve rather than merely criticize” (Van Dyne & LePine, 1998, p. 109). Voice is defined particularly to capture “constructive change-oriented communication” that is intended to affect environmental change within the organizational context (LePine & Van Dyne, 2001, p. 326), and was adopted as one of four core agentic concepts by Tornau and Frese (2013) in their meta-analysis, alongside proactive personality, personal initiative, and taking charge. Voice is a behavioral construct addressing a specific set of behaviors, like taking charge, with an emphasis on raising important-if-challenging issues and bringing them to the attention of others. Tornau and Frese (2013) include voice among their “core four” because it, like the others, addresses an active as opposed to passive orientation and an orientation toward change rather

than stasis (i.e., intentionality), along with a focus on the future (i.e, forethought). It should be noted, however, that the difference between voice and taking charge is perhaps a very fine distinction: one emphasizes active behavior while the other emphasizes active communication. The two share a base of change-oriented, contextually-based promotive behavior.

### **Proliferation of Related Constructs**

While these constructs form a strong base of agency, with emphases ranging from stable individual differences to specific and context-dependent behaviors, an oft-noted problem in this stream of literature is that constructs continue to appear that overlap with these core concepts, frequently to a great degree. I noted above the conceptual similarity of broadly-accepted concepts such as voice and taking charge, but other concepts such as issue-selling (Dutton & Ashford, 1993) tap essentially the same domain as voice. Likewise, even the foundational notion of proactive feedback seeking has siblings in feedback inquiry (Vancouver & Morrison, 1995) and feedback monitoring (Ashford & Cummings, 1983), which are distinguished from each other only to the extent that the former entails directly asking for feedback, whereas the latter focuses on unobtrusive observation toward the same end.

A number of related constructs with varying degrees of popularity have emerged that assess an individual's agency that is not directed specifically at his/her organization, as well. Proactive career management (Fryer & Payne, 1984), for instance, assesses an individual's tendency to intervene in his/her career path as opposed to passively responding to imposed change, and is nearly identical to Seibert and Kraimer's (2001) concept of career initiative. Other constructs that focus on specific agentic behaviors that can benefit either the individual or the organization include individual innovation, or the tendency to recognize problems and generate ideas to solve them (Scott & Bruce, 1994), and proactive coping, which gauges actions taken to

“head off” a potentially stressful event before it occurs (Aspinwall & Taylor, 1997). The concept of emotional labor—an individual’s ability to actively regulate emotions as opposed to passively responding to emotional demands (Brotheridge & Grandey, 2002)—has also been cited within the domain of human agency.

As noted above, taking charge focuses on proactive extra-role behaviors, but it also shares that space with more specific behavioral constructs that seem to fall under the same umbrella. For instance, pro-social rule breaking investigates extra-role behaviors that go against prevailing norms or policies but are intended to affect positive organizational change (Morrison, 2006). Problem prevention has also been set forth as a way of distinguishing behaviors designed to prevent the reoccurrence of challenges in the workplace (Fay & Frese, 2001) and strategic scanning as a set of behaviors designed to identify ways to help the organization adapt to and fit in its environment (Parker & Collins, 2010).

Yet other constructs have been developed to further hone in on the underlying individual differences that influence agency. Consideration of future consequences—the tendency to consider distant rather than immediate consequences of personal behaviors (Stratham et al., 1994)—certainly captures the forward-looking and anticipatory nature of agency. Also capturing an isolated dimension of agency is change orientation, the tendency to have an active orientation toward change itself (Fay & Frese, 2001; Parker et al., 2006). Similar ideas exist in control appraisals, or an individual’s belief that he or she can have an impact on work outcomes (Parker & Collins, 2010), and felt responsibility for change, which gauges the extent to which an individual feels personally responsible for effectuating constructive change (Morrison & Phelps, 1999).

Clearly, there is no lack of content coverage within this domain. However, while this proliferation problem has frequently been noted (e.g., Crant, 2000; Grant & Ashford, 2008; Parker & Collins, 2010), attempts to bring unity to this stream of research have typically focused more on one part of proactivity (e.g., behaviors) while neglecting others (e.g., individual differences). Thus, such attempts have not succeeded in unifying the field as their focus has been too narrow, and explanatory frameworks that capture the full domain of agency have yet to emerge. Consequently, the growth of the field is impeded as new but overlapping constructs continue to proliferate as opposed to advancements in our understanding of established constructs. Another notable issue—and a driver of the proliferation problem—is a subjugated role of theory in explaining proactivity. However, using SCT and its derivative core properties of human agency provides an ideal means of organizing agentic behavior.

### **A Typology of Agentic Behavior**

SCT is an ideal framework for organizing the wide range of proactive behaviors as the theory provides a thorough explanation of the personal, environmental, and feedback-related factors that govern human behavior generally, and delineates core properties that identify agentic behaviors specifically. Using those core characteristics to type the range of proactive behaviors, then, brings unity to the fragmented field of agentic behavior under a single theoretical framework.

*Intentionality*, as discussed above, addresses the personal tendency toward actions intended to shape one's environment rather than passively accepting it. This speaks directly to the common notion of proactivity as individual commitment to action rather than passivity (Mallin et al., 2014). As such, intentionality fundamentally addresses behaviors reflective of being an agentic actor rather than a passive reactor, and aligns closely with taking charge

(Morrison & Phelps, 1999), and voice (Van Dyne & LePine, 1998). What these constructs share is a focus on behavior that is intended to improve environments and circumstances without needing external direction. As discussed above, taking charge is behavior designed to effectuate improvements to organizational processes, while voice entails communicating issues and ideas toward the same end. Likewise, individual innovation deals with generating ideas or solutions to improve organizational processes. Thus, while these concepts have fine-grained differences among them (i.e., enacting change, raising issues, and creating solutions), they all involve deliberately taking an active approach toward one's environment rather than merely accepting and reacting to it.

Other constructs can be folded in among these, such as issue-selling (Dutton & Ashford, 1993) which essentially involves trying to influence organizational strategy through voice. Scholars have even gone as far as to separate issue-selling into issue-selling willingness and issue-selling credibility to differentiate the amount of time an individual engages in selling issues from his/her previous track record in successfully affecting change through issue-selling (e.g., Morrison & Phelps, 1999; Parker & Collins, 2010). Constructs such as job change negotiation (Ashford & Black, 1996) can also be condensed under this type as the construct is a mere context-specific instance of taking charge (i.e., taking charge of one's own role expectations). Focusing on taking charge, voice, and individual innovation, therefore, is sufficient to capture the range of proactive behaviors associated with intentionality in that they draw from active orientations and sufficiently subsume other related constructs.

Using *forethought*, meanwhile, as a way to differentiate constructs that are deliberately focused on the future and enacting change is another means of condensing the broad range of proactive behaviors. While not opposed to intentionality (e.g., taking charge can be

simultaneously active in orientation and focused on improving the organization's future operations), a number of constructs place a greater degree of emphasis on this forward-thinking orientation. Career initiative (Seibert & Kraimer, 2001) and other career-focused constructs, for instance, are inherently future and change-oriented in that they entail behaviors designed to set the individual on a path of personal advancement and improved situation. Other future-focused proactive behaviors take a more organizationally-oriented bent, such as problem prevention (Frese & Fay, 2001), which involves behaviors to prevent barriers to work from arising or recurring. By categorizing future-focused behaviors as either individually-focused or organizationally-focused, though, other overlapping constructs can be condensed within the domain of forethought. Proactive career management (Fryer & Payne, 1984), for instance, is indistinguishable from career initiative when considered in this way, and concepts such as strategic scanning (Parker & Collins, 2010) and consideration of future consequences (Stratham et al., 1994) fit under the umbrella of considering and addressing potential future barriers and issues for one's work context and organization. To the extent that emotional labor (Brotheridge & Grandey, 2002) and proactive coping (Aspinwall & Taylor, 1997) are considered agentic behaviors, they too can be grouped under this categorization of future-oriented behaviors.

Lastly, agentic behaviors linked to *self-reactiveness* involve seeking and utilizing feedback. This quite easily aligns with the constellation of feedback-related agentic behaviors, namely proactive feedback seeking (Ashford & Cummings, 1985), feedback inquiry (Vancouver & Morrison, 1995), and feedback monitoring (Ashford & Cummings, 1983), though I would argue that the conceptual overlap of these constructs is sufficiently captured by the first construct, proactive feedback seeking. That is, feedback inquiry and feedback monitoring are merely types of feedback seeking and can be combined together under general feedback seeking.

Other related constructs fit under this heading as well, such as proactive socialization (Saks & Ashforth, 1996), which deals with seeking out environmental information and feedback to hasten a specific, applied outcome (i.e., organizational socialization). Table 2 displays these agency types alongside their definitions and representative constructs.

Table 2 – A Typology of Agency

Agentic Property	Component of Agency	Behavior	Representative Construct
Intentionality	self-starting, action oriented	Taking action to improve organizational processes	Taking Charge
		Communicating ideas to improve organizational processes	Voice
Forethought	change-oriented, future-focused	Individually-oriented actions to improve one's own situation	Career Initiative
		Organizationally-oriented actions intended to prevent the re-occurrence of problems or barriers to work	Problem Prevention
Self-reactiveness	seeking and integrating feedback	Gathering and utilizing information to improve one's performance	Proactive Feedback Seeking
		Gathering and utilizing information to improve one's organizational fit	Proactive Socialization

### Discussion

Human agency is an important and prominent area of research, but this research suffers from problems of construct proliferation and a lack of theoretical integration (Crant, 2000; Parker et al., 2010; Parker & Collins, 2010; Tornau & Frese, 2013). As outlined, SCT is an ideal means of addressing these problems because it captures the shared underpinnings of the predominant conceptualizations of agency and yields a network of theoretical predictions that

scholars can use to advance our understanding of agency. In particular, the triadic reciprocation suggested by SCT integrates the individual differences, environmental constraints, and feedback factors that make up the domain of agency but are often overlooked as scholars focus on only one or two of the factors. Moreover, through its core components of agency (i.e., intentionality, forethought, and self-reactiveness), the theory provides a natural system for ordering the various overlapping constructs in a unifying typology. Understanding where constructs fit within this typology will foster less construct proliferation and facilitate a greater integration of agentic behaviors in future research.

To the former point, the triadic interaction of SCT offers a useful and nuanced explanatory framework for capturing the full range of agentic behaviors, their antecedents, and their consequences. Many studies, for instance, consider the interaction of personal factors (such as proactive personality) with environmental factors as a key determinant of proactive behaviors (e.g., Chen, Farh, Campbell-Bush, Wu, & Wu, 2013; Grant & Ashford, 2008; Grant & Parker, 2009); however, SCT also predicts that the feedback received from these efforts is equally important in determining behavior. Work that considers career advancement, for example, as a focal outcome is typically conducted at a single point in time, and thus little is known about how an individual's efforts in achieving a promotion or other career advancement subsequently impacts future efforts of career advancement. Do behaviors that lead an individual to an improved job situation cease at this terminus, or do individuals continue striving to improve their work situations even after a promotion? SCT provides an opportunity to expand our knowledge of career initiative by providing a theoretical framework to assess how feedback influences behavior, and examine how individual's early career successes subsequently influence task and agentic behaviors.

Using SCT as a guiding theoretical framework also opens new paths for examining environmental influences on behavioral feedback and, subsequently, behavioral enactment. A particularly appropriate area for these considerations is climates for proactivity, an emerging area of research (e.g., Baer & Frese, 2003; Fischer et al., 2014; Michaelis, Stegmaier, & Sonntag, 2010) addressing how norms and practices within organizations encourage and foster agentic behavior and important outcomes of agency, such as innovation. SCT provides a theoretical means of integrating climate perspectives by accounting for environmental constraints and behavioral feedback mechanisms in addition to personal factors. That is, SCT's triadic reciprocation suggests a guiding theory that can integrate climate into the broader domain of agency scholarship.

A related strength of using SCT as a unifying theoretical framework is the theory's application across levels of analysis. As noted above, agency within teams and as a team-level phenomena is an important and growing area of scholarship. Like the rest of the field of agentic behavior, however, theory has been absent or inconsistent in the work that has accrued so far. Opportunely, the main components of SCT are theorized homologously, with specific tenets for collective agency. In particular, Bandura (2001) notes the ability of collectives to receive and process environmental cues and feedback is paramount for adaptation and survival, accounting for the environmental and behavioral feedback components of the triadic reciprocation. As for the personal factors component at the collective level, shared intentions and compiled knowledge, skills, and abilities of collective members interact and combine to yield the group factors component of the triad. This provides another avenue for proactivity climate research as a collective factor in determining group agency. Likewise, other contextual factors and their relationship to agentic behavior can be explored from this framework, including team

empowerment (e.g., Kirkman & Rosen, 1999), team-level compositional factors, and proactive state factors such as interpersonal norms, trust, viability, and collective efficacy (Harris & Kirkman, 2016).

SCT, therefore, provides not only a unifying theoretical perspective to focus the development of the construct, its domain, and its nomological network, the theory also provides a framework for assessing agentic behavior and its antecedents and outcomes at the collective level. While a major strength of this work is offering SCT as a unifying theoretical framework, an equally important contribution is the typology of agentic behaviors that emanate from the SCT's predictions. The development of the field has been stunted by construct proliferation (Crant, 2000; Parker & Collins, 2010). Using theory to group related and overlapping constructs has the benefit not only of focusing the field and stemming the problems arising from proliferation, it also provides a means of matching antecedents and outcomes that are theoretically related.

An open question, then, is the extent to which different components of the triadic interaction impact the components of agentic behavior laid out here. Individual innovation, for instance, is inherently focused on improving technologies or processes to enhance an organization's products or work procedures. While individual differences such as proactive personality may make individuals more or less inclined to innovate, accounting for environmental and feedback factors provides more detailed explanations of what leads to individual innovation in organizations. Moreover, these factors and processes may behave differently when the emphasis is more on *forethought* than *intentionality*, such as with the construct of problem prevention. In other words, do environmental constraints lead to action that is focused more on near-term goals, such as problem prevention, or do they have greater

influence on individuals' longer term motivations? Does positive or negative feedback affect whether an individual takes immediate action or alters his/her longer-term motivation? Future scholarship should take a greater accounting of these factors to build upon this work.

## **TEAM-ORIENTED PROACTIVE BEHAVIORS AND TEAM PERFORMANCE**

While employee proactivity is one useful means of addressing today's dynamic and decentralized workplace, as discussed above, the use of work teams in organizations is also an increasingly common tool for responding to these unpredictable and ever-changing environments. Teams are particularly effective in this regard (Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Mathieu et al., 2008) as they offer greater role flexibility (Griffin et al., 2007)—enabling team members to utilize a wider range of knowledge, skills and abilities—and because teams can operate with increased autonomy to address organizational problems (Kirkman & Rosen, 1999; Williams et al., 2010). Given their increasing importance to organizations and their ability to address organizational uncertainty, scholars have begun to turn their attention to proactive work teams, demonstrating that that team proactivity arises from high levels proactive personality within teams (e.g., Williams, et al., 2010), for instance, as well as team structure (e.g., Griffin et al., 2007), and team empowerment (Kirkman & Rosen, 1999). Given that both proactivity and teams are noted for their effectiveness in achieving goals amidst uncertainty, this is a logical progression for both streams of literature.

However, despite this recent growth, scholars have yet to investigate how proactivity among team members influences important team outcomes, including team task performance. Though proactivity at the team level has only recently received attention, understanding how it affects a team's ability to function and resolve task demands is crucial for two important reasons. First, as noted above, teams are increasingly significant in organizational life, and assessing how proactivity influences team functioning and team outcomes is a crucial step in understanding how teams operate. Second, though a considerable body of research speaks to the influence of individual proactivity upon individual outcomes, phenomena do not always operate in the same

ways at the team level as at the individual level of analysis (Kozlowski & Klein, 2000).

Investigating how proactivity affects teams, and ways in which it is similar and different from the individual level, is therefore important to advancing scholarship on team proactivity.

To address these issues, I draw from social cognitive theory (SCT; Bandura, 1986, 1989, 1991) to offer a model of team effectiveness that places team-oriented proactivity as a key input influencing team coordination as a mediating team process, and team task performance as the focal outcome using player heat map data from World Cup soccer competition. These efforts are useful contributions to the literature because the growing body of research on proactivity has turned increasingly toward phenomena within and among teams, as discussed above, but to my knowledge this research represents the first concerted effort to assess team-oriented proactivity's direct and mediated influence on team task performance. This has important implications both for research and practice as advancing our understanding in this area not only enhances our knowledge base on proactive behaviors, but provides insight into how this specific constellation of behaviors influences team task performance. Further, by utilizing data from World Cup soccer matches, I demonstrate with objective measures the impact of team-oriented proactivity on team task performance. In so doing, I overcome challenges associated with measuring team inputs and outcomes and reduce biases that often arise in traditional survey data (Hill, White, & Wallace, 2014) that can limit our understanding of proactivity. To achieve these goals, I draw upon SCT to hypothesize the relationships between team-oriented proactivity, team coordination, and team task performance. I then hypothesize curvilinear relationships between team-oriented proactivity and both team coordination and team task performance before discussing methods and results.

## **SCT and Team-Oriented Proactivity**

SCT is an ideal explanatory framework for this study because, as discussed above, the theory is rooted in human agency and is founded on the belief that individuals can be “sculptors” rather than “sculptures” in their work contexts (Bell & Staw, 1989). Importantly, however, the view of individuals as sculptors of their environment is not unique to the individual level. In fact, Bandura (1997) argues that collective agency arises when group attainments depend on the interaction of and coordination among individuals pursuing a common goal and that, when these collectives rely on adaptation to dynamic environments, coordination among team members is required to achieve those larger collective goals. In other words, teams rely on the same fundamental process suggested by SCT—especially in dynamic environments—to coordinate individual efforts and yield effective agentic action at the team-level. This is so partly because teams represent a social structure of a sort: one that informs individuals of skills and abilities of team members as well as how the various individual efforts of the team are coordinated in order to achieve shared goals (Bandura, 1997). Put simply, SCT suggests that the collective level of human agency guides individuals within teams as to what behaviors are needed to achieve team goals, and in what way they can contribute to the achievement of those goals.

Team-oriented proactivity is one such manifestation as it entails individuals going “above and beyond” to contribute to the team’s functioning and performance. SCT suggests that the distinction between team-oriented proactive behaviors from typical, individual-level proactive behaviors is rooted in the feedback an individual receives from the team structure and the environment, specifically in assessing the tasks necessary to coordinate team inputs and achieve performance goals.

## **Team Task Performance**

This prediction of SCT is consistent with the IMOI model of team effectiveness. The IMOI model, in particular, suggests that positive team outcomes are incumbent upon a team's ability to utilize various inputs, including characteristics of the work being done and individual behaviors—specifically team-focused proactive behavior (Harris & Kirkman, 2016). Team outcomes, thus, arise in large part from the collective sum of the efforts and activities of the individual team members to resolve team task demands (Mathieu et al., 2008). Applying SCT to team outcomes, then, suggests that teams in dynamic environments perform more effectively when individual team members are able to recognize and resolve obstacles to team goals by engaging in behaviors that advance team objectives.

While prior research has yet to investigate this direct link between team-oriented proactive behaviors and team task performance, prior research in related areas provides support for this theoretical prediction. Several meta-analyses demonstrate that *taking charge* behaviors, the individual-level proactivity manifestation most similar to team-oriented proactivity, significantly relates with performance (Thomas et al., 2010; Tornau & Frese, 2013). Likewise, research indicates that proactivity as a team-level phenomenon positively influences team effectiveness (Kirkman & Rosen, 1999). Thus, while comparatively few studies have investigated the relationship between proactive behavior and team performance, findings thus far are consistent with the theoretical predictions that team-oriented proactivity will positively influence team task performance.

Hypothesis 1: Team-oriented proactive behaviors positively relate to team task performance.

## **Team Coordination**

While successful task performance is clearly the primary objective for teams, SCT also places coordination as an important interactive element in its model of group action. Specifically, Bandura (1997, p. 14) notes that group effectiveness arises not merely from compiling inputs but also from “the interactive, coordinated, and synergistic dynamics of their transactions.” This collective agency arises when a team is able to build upon the individual-level inputs and work together to resolve tasks, consistent with the IMOI framework, which suggests that important team processes mediate the relationship between team inputs and outcomes (Ilgen et al., 2005). One of the primary mediating processes is team coordination (Marks, Mathieu, & Zaccaro, 2001): the extent to which team members integrate and synchronize team inputs and efforts.

Team-oriented proactivity has a specific contribution to a team’s coordination in addressing task demands. Among the hallmarks of this type of proactivity is helping teammates resolve their own task demands. Activities such as these clearly help individual team members with their tasks, but can only contribute to effective overall performance if the teammate receiving the assistance is able to take advantage of the situation to continue pursuing task demands. That is, if the individual receiving help with his/her tasks comes to expect additional help, or does not resume pursuing his/her task responsibilities after receiving help, “social loafing” occurs and the individual comes to rely on the help of others, thus hindering team task performance (Barnes et al., 2008; Gully, Incalcaterra, Joshi, & Beauien, 2002). When individuals take advantage of help from teammates, however, to maintain pursuit of team goals, team effectiveness increases.

In sum, team-oriented proactivity is antecedent to team coordination as it entails one or more team member making exceptional contributions toward achieving team goals or helping

teammates meet their task goals. It represents a contribution to be integrated and synchronized through coordination—an action process that arises from such behaviors and mediates the relationship with team outcomes (Mathieu et al., 2008). As such, I expect team coordination to be both influenced by team-oriented proactive behaviors, and to mediate proactivity's relationship with team task performance.

Hypothesis 2: Team-oriented proactive behaviors positively relate to team coordination.

Hypothesis 3: Team coordination mediates the relationship between team-oriented proactive behaviors and team task performance.

### **Curvilinear Effects of Team-Oriented Proactivity**

While a large body of research demonstrates the positive impact of proactivity on performance (Crant, 2000; Parker & Collins, 2010; Tornau & Frese, 2013), I expect there to be limitations to this relationship at the team-level. The primary hallmark of teams is that individual efforts are interdependent—that the team, when functioning effectively, can achieve more than any given individual (Cannon-Bowers & Bowers, 2011; Kozlowski & Bell, 2003; Mathieu et al., 2008). However, a drawback of teams is that, when any given individual neglects his or her task responsibilities, this interdependence begins to break down and team performance suffers. Indeed, while SCT does not make specific predictions about excesses of agentic behavior, the group effectiveness hypothesis set forth in the theory explicitly states that group attainments require both individual and team level inputs, as well as interaction, coordination, and synergy (Bandura, 1997). Yet, when individual level efforts are overly focused on exceeding in-role expectations, or helping team members to the neglect of one's own task responsibilities, the interaction, coordination, and synergy break down.

Such effects have been previously demonstrated among teams. Barnes and colleagues (2008) empirically demonstrated that, for instance, when individuals engage in “backing-up” behaviors—those intended to help team members complete their responsibilities—the help-giver by necessity is neglecting his/her own responsibilities while expending effort and energy to help another. The authors demonstrate, in two studies, that backing-up behavior is actually detrimental to team performance under certain circumstances. Pierce and Aguinis (2011) refer to such phenomena as the “too-much-of-a-good-thing effect” and suggest that scholars too frequently assume linear relationships when reality is more complex.

In this case, if too many team members are engaging in team-oriented proactive behaviors, or if team members engage in such behaviors to the extent that they neglect their own role responsibilities, progress toward team goals will stop as the tasks required to reach team outcomes will be neglected. Interdependence breaks down. I expect, therefore, that team-oriented proactive behaviors will have an asymptotic, leveling-off relationship with both team coordination and team task performance as the occurrence of those behaviors increases.

Hypothesis 4: Team-oriented proactive behaviors have a curvilinear relationship with a) team task performance and b) team coordination such that the magnitude of the effect decreases as the number of instances increase.

## **Methods**

### **Sample and Setting**

Measuring team phenomena presents a number of challenges, including decisions about aggregating and assessing agreement among individual perceptions, and observing teams without affecting the research context (Cole, Bedeian, Hirschfeld, & Vogel, 2011; van Mierlo, Vermunt, & Rutte, 2009). To overcome some of these difficulties, I assessed hypotheses using unobtrusive

archival measures from the FIFA World Cup, the international soccer competition held every four years. A key advantage of such archival data over more traditional survey or interview methods is that they allow for observation without interfering in the research context, thus eliminating potential contamination concerns or other threats to validity (Hill et al., 2014). Further, the World Cup is in many ways an ideal sample for this research. First, soccer teams are uniquely well-suited for investigating team-related hypotheses as many of the behaviors that organizational teams rely on to succeed are the same behaviors a soccer team depends on, such as planning and coordination (Cannon-Bowers & Bowers, 2006; Day, Gordon, & Fink, 2012). Additionally, soccer players occupy defined roles on the team with generally similar role responsibilities across teams, yet have enough latitude and opportunity to engage in behaviors that are above and beyond their role's typical expectations, and to assist other teammates with their responsibilities, creating an ideal venue for observing team-oriented proactivity. Lastly, the data available from this sample provide a simultaneously fine-grained and objective means for stringently testing the proposed relationships. For these reasons, my sample consists of the 32 international soccer teams playing three games each in the group stage of the 2014 World Cup<sup>2</sup>, with a total of 96 team-level observations and 960 individual-level observations<sup>3</sup>.

## Measures

*Team-Oriented Proactivity.* I used variability in player spatial position as my measure of team-oriented proactivity. This value represents the variance in area covered on a soccer pitch

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<sup>2</sup> I restricted the sample to the "Group Stage" of the World Cup (as opposed to the tournament-formatted "knockout" stage) as a means of controlling for team quality issues. I used data from the 2014 World Cup as it offers the widest range of player and team data of any soccer competition, available at [www.fifa.com](http://www.fifa.com). Data from the 2014 World Cup was used exclusively for this reason, and because of disparity in the statistics available from this and previous World Cups.

<sup>3</sup> The 960 individual-level observations reflect the 10 "outfield" players for each team-game, excluding goalkeepers. Goalkeepers are excluded because their roles are uniquely restricted, largely preventing them from engaging in team-oriented proactivity and making their statistics distinct from those of outfield players.

during the course of a game. In other words, this measure reveals the area, in squared meters, over which a player was involved in “game action” during the course of a match. To capture this variable, I analyzed player position heat maps (for an example heat map, see Figure 1), which are attained by advanced video and GPS tracking during World Cup matches and display player movements as a 2-dimensional shaded-surface plot, with larger shaded areas representing locations on the pitch where a player was most frequently active.

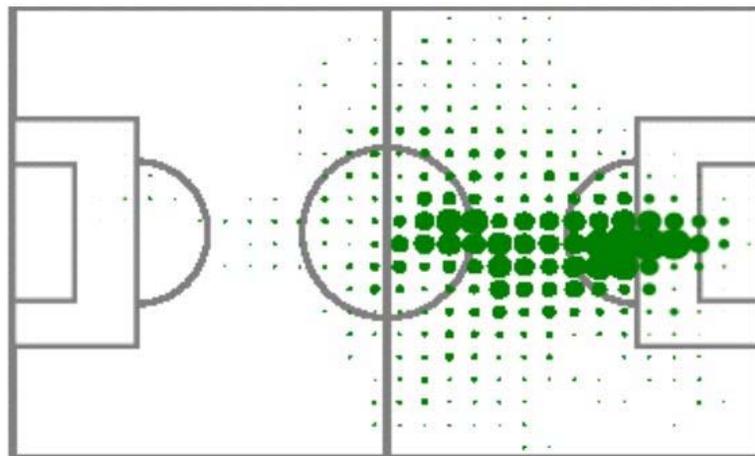


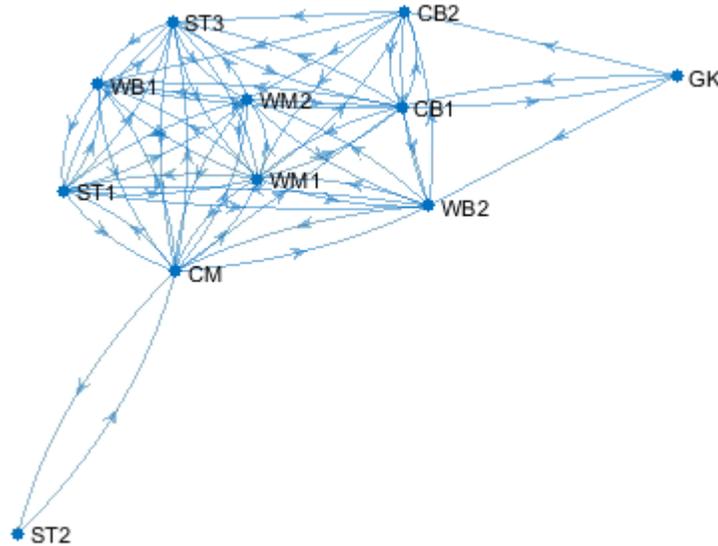
Figure 1 - Example Player Heat Map

I used an algorithm in *Matlab* (which appears in the Appendix) to recognize the pixel colors of these heat maps and convert them into numerical matrices containing the 2-dimensional coordinates of player locations. The algorithm then converts the scale of the data from pixels to meters and computes the mean position of the player on the pitch. Then, using principal components analysis, I identified the eigenvectors and eigenvalues for the two primary axes of movement from the mean position. Taking the square root of the two eigenvalues yields the standard deviations of player movement about the mean along both axes (Moura, Santana, Vieira, Santiago, & Cunha, 2015), which I then used to compute the player’s area of variability in square meters by applying the formula for the area within an elliptical area ( $A = \pi * \sigma_1 * \sigma_2$ ). I then standardized variability scores across the full sample by player position (i.e, central

defender, wingback, central midfielder, wide midfielder, striker) to remove variance due to different role responsibilities. By measuring player position variability in this way, I assess the extent to which a given player's involvement in game action was restricted to or expanded beyond his role responsibilities, thus gauging the extent to which the player was involved in helping achieve team goals beyond his specific responsibilities. I then summed these values for each team to form an additive composition model of team-oriented proactivity (Chan, 1998).

*Team Coordination.* One of the key factors for a soccer team to succeed is for the team to pass the ball effectively. Much as a police force, for instance, relies on strategically placed units and efficient exchange of information among those units, a soccer team's success is heavily influenced by the strategic distribution of players on the pitch and the ability of the team to move the ball among those strategic positions. Consequently, I used a team's level of *passing centralization* to measure team coordination. Centralization is a type of network analysis that assesses differences between the centrality scores of the most central node in a network and all other nodes to compute the variance in the total level of network centrality. To compute this coefficient, I used the passing matrix of each team (the network, in this instance), which reveals the number of successful passes each team member received from and made to all of the other players on his team (including the goalkeeper). I then computed a centrality score for each of the 11 starting players on each team using an algorithm in *Matlab* (which appears in the Appendix). Since the network data derived from the passing matrices include both input and output (i.e., bidirectional) data, I used "betweenness" as my measure of centrality, which captures the extent to which a node lies on the path between other nodes. That is, betweenness captures the degree of influence of a given node by that node's relative influence or control over exchanges between other nodes. Thus, a player with a high level of betweenness centrality is an important link

between other players, much as an airline hub is an important link between other airports. A visual example of a team's betweenness network is displayed in Figure 2.



*Note:* GK is goalkeeper, CB is central defender, WB is wide defender, CM is central midfielder, WM is wide midfielder, and ST is striker. Shorter lines of exchange represent higher frequencies of exchange, and placement nearer the center of the network represent higher levels of influence, or centrality.

Figure 2 - Example Network Centrality Map

The overall level of centralization, then, reflects whether or not a network is dominated by one or a small number of nodes, or whether exchange is spread fairly evenly across the entire network. I used Freeman's (1979) formula for centrality,

$$C_D = \frac{\sum_{i=1}^g [C_D(n^*) - C_D(i)]}{[(N-1)(N-2)]}$$

where  $C_D(n^*)$  is the maximum value in the network (i.e., the highest centrality score of any player on a given team), and  $C_D(i)$  is centrality of each node  $i$ . Since a higher coefficient of  $C_D$  represents a higher level of centralization, I took the multiplicative inverse of  $C_D$  such that a lower value represents a higher degree of centralization and a higher value represents a more

even dispersion of exchanges among all team members and, thus, a higher level of team coordination.

*Team Task Performance.* Since team-level theories suggest that team performance is a multidimensional construct (Ilgen et al., 2005; Mathieu et al., 2000; McGrath, 1984), I modeled team task performance using three specific team outcomes. The first was a categorical variable representing *match outcome*. Consistent with the points awarded in the group stage of the World Cup, a match win was scored as 3, a draw as 1, and a match loss as 0. The second measure utilized by the World Cup to determine advancement from the group stage is *goal differential*, which is computed by subtracting the opposing team's score from the focal team's score. In addition to these two traditional measures of team success, I also used *team final position* to measure a team's ultimate success in the World Cup. Specifically 16 of the 32 teams in the World Cup advance from the group stage into a four-round "knock-out" tournament. I used an ordinal variable to represent a team's final place, with 1 representing a team that was eliminated in the group stage, 2 representing teams eliminated in the round of 16, 3 representing those teams eliminated in the quarter finals, and then 4-7 representing the teams that ultimately finished 4<sup>th</sup>, 3<sup>rd</sup>, 2<sup>nd</sup>, and 1<sup>st</sup> in the tournament, respectively<sup>4</sup>.

## **Analysis**

As the variables in the hypothesized model are all nested within teams, I treated them as Level 1 variables (i.e., *team-game*) nested within *Team* as a Level 2 variable. I initially sought to analyze the model using a multilevel, multiple indicators-multiple causes (MIMIC) model analyzed via path analysis using *MPlus* version 7.31 (Muthén & Muthén, 1998-2012). However, the measurement model demonstrated extremely poor fit, with RMSEAs consistently above 0.14

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<sup>4</sup> The World Cup features a "third-place game" contested between the losers of the two semi-finals, facilitating a final ranking of this fashion.

and CFIs and TLIs consistently below 0.70—numbers well short of typically-accepted cutoff values. Part of this poor fit is likely due to the multilevel nature of the data as analyses such as these require adequate fit not for a single covariance matrix (as with single-level SEM) but fit within multiple covariance matrices. Additionally, modeling team performance as a latent construct involved using only one normally-distributed continuous variable (goal differential), alongside two categorical variables (outcome and finishing place). In addition to modeling problems arising from the different distributions of these three reflective indicators, I also note that finishing place correlated comparatively weakly with outcome and goal differential. I would assert that this partly due to the tandem nature of the latter two variables (i.e., goal differential determines the categorical variable outcome), and also due to the fact that the latter two variables are “within” variables that change within clusters while finishing place is, in essence, a level 2 variable that only changes between clusters. Given the poor fit of the measurement model, I elected instead to analyze the hypotheses via multiple regression. Consequently, I analyzed each hypothesis independently using mixed effects regression in *Stata* version 13 (StataCorp, 2013) with the primary study variables as fixed effects and *Team* as a level 2 random effect.

## **Results**

Table 3 displays the means, standard deviations, and correlations of all study variables. Prior to running analyses, I log transformed the passing dispersion values I am using for team coordination because the distribution was severely skewed and non-normal (Shapiro-Wilk  $W = .08, p < .05$ ). Log transforming the variable did not fully normalize the distribution ( $W = .76, p < .05$ ), but demonstrated the greatest improvement over other transformation methods (e.g., square root, inverse square root, negative reciprocal). As depicted in Table 3, team-oriented proactivity significantly correlates with team coordination, but not with the performance outcomes. Team

coordination also correlates significantly with two of the three performance outcomes, namely goal differential and team final position.

Table 3 – Means, Standard Deviations, and Intercorrelations of Study Variables

Measure	Mean	SD	1	2	3	4
1. Team-Oriented Proactivity	0.00	5.40				
2. Team Coordination	13.9	101	.22*			
3. Goal Differential	0	1.77	.05	.23*		
4. Match Outcome	1.41	1.37	.05	.13	.87**	
5. Team Final Position	2	1.51	-.03	.20*	.47**	.50**

$N = 96$ . \*  $p \leq 0.05$ , \*\*  $p \leq 0.01$ .

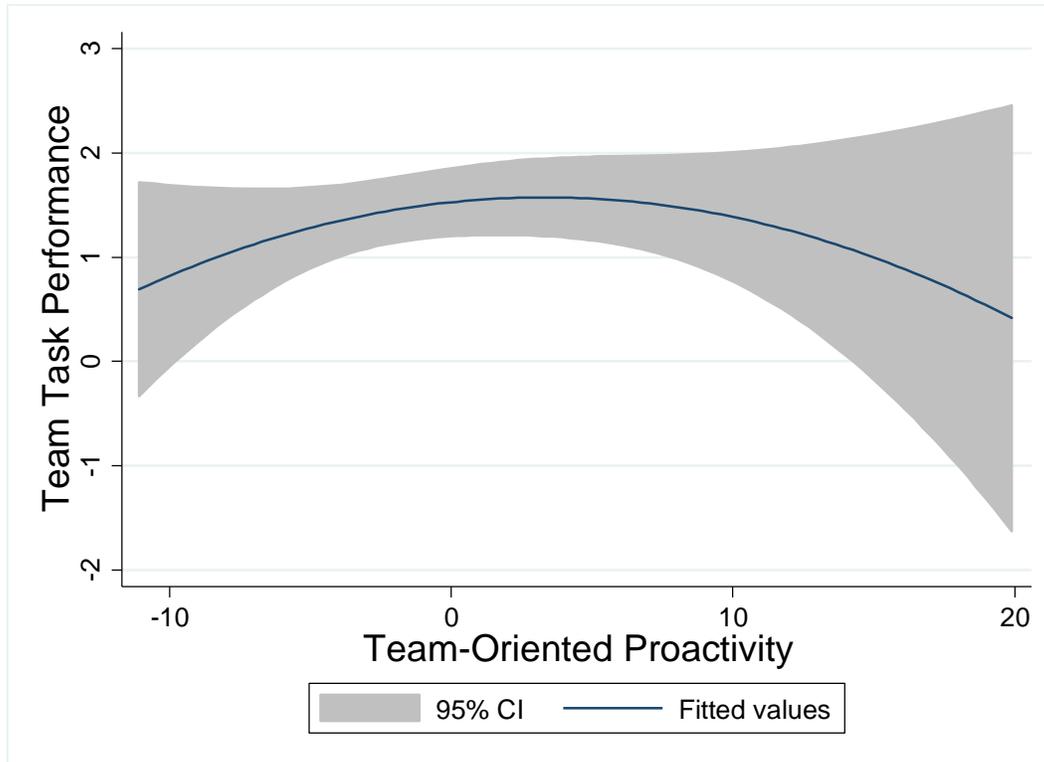
In terms of hypothesis 1, which states that team-oriented proactive behaviors positively relate to task performance, team-oriented proactive behaviors did not significantly predict goal differential ( $\gamma = .02, n.s.$ ) or match outcome ( $\gamma = .02, n.s.$ ) in mixed effects linear modeling, nor did it significantly predict team final position in multinomial regression in any case but for the two teams eliminated in the quarterfinals. The latter result is borne out in ANOVA. Specifically, the overall F-value is statistically significant ( $F = 2.87, df = 95, p < .05$ ), but Bonferroni contrasts again indicate that only the quarterfinal teams are significantly different on team-oriented proactivity. Results held when using the total unstandardized sum of player position variability as the primary regressor. Hypothesis 1, therefore, is not supported. As an ancillary analysis, I created a binary variable for *win* (1=win, 0 = draw or loss). Mixed effects logistic regression again did not reveal a significant main effect (log-odds = .03, *n.s.*). I also calculated the within-team-game standard deviation of standardized player position variability as a dispersion model of team proactivity. When controlling for total levels (i.e., unstandardized) of position variability to discount variance associated with overall wider ranges of player movement, the dispersion model yields significant effects on goal differential ( $\gamma = -1.02, p < .05$ ), and a nontrivial effect on win (log-odds = -1.39,  $p < .10$ ), indicating that lower levels of

dispersion among team-oriented proactive behaviors do positively impact game-level performance outcomes. This suggests that team performance is enhanced not when the total team level of proactivity is high, but when there is consistency in the levels of proactivity among all team members. That is, when members of the team are engaging in similar levels of proactivity, team performance is enhanced regardless of the total level team-oriented proactivity. I'll address this finding in more detail in the discussion section.

Hypothesis 2, which proposes a direct relationship between team-oriented proactivity and team coordination, is supported ( $\gamma = .03, p < .05$ ). Hypothesis 3 suggests a mediational effect of team coordination between team-oriented proactivity and team task performance. The traditional Baron and Kenny (1986) approach to mediation suggests that a primary main effect must be established as a precondition to testing mediation; however, subsequent scholarship suggests that this step is not a necessary condition to establish mediational effects, particularly in cases of full mediation (Kenny, Korchmaros, & Bolger, 1998) and when the power available to detect the direct effect is low (Kenny & Judd, 2014). Given the weak effect sizes but consistent direction of the relationship between team-oriented proactivity and the performance variables in primary hypothesis tests, the comparatively small power afforded by the group-level sample, and the significant correlations between the mediating variable and performance outcomes, I considered it appropriate to proceed with mediation testing. Following Hayes (2013), to overcome the inherent difficulties in assessing mediation in the presence of level 2 effects, I modeled all effects as random, allowing slopes and intercepts of the mediational model to vary around common averages associated with teams. Put more simply, this allows for a mediation analysis of these effects “within team” as opposed to between clusters. Using *Mplus*, I adopted the approach of Preacher, Zypher, and Zhang (2010) to assess the mediational effects with goal differential as the

outcome. The indirect effect of team-oriented proactivity on goal differential through team coordination was small but non-trivial (.012, Sobel's  $Z = 1.79, p < .10$ ). Results for the indirect effect when treating outcome as a continuous response variable were not significant (.009, Sobel's  $Z = 1.15, n.s.$ ), and the categorical nature of team final position precludes such an analysis. However, results with the binary outcome win were significant (.012, Sobel's  $Z = 3.92, p < .05$ ). Thus, I conclude that hypothesis 3 is partially supported.

Hypothesis 4 asserted a non-linear relationship between team-oriented proactivity and both team task performance and team coordination. Nested regression with both a linear and polynomial variable for team-oriented proactivity yields a significant and negative polynomial effect for match outcome ( $\gamma = -.014, p < .05$ ), though the direct effect remains nonsignificant ( $\gamma = .043, n.s.$ ). A Wald test of the combined effect of the linear and polynomial effects, however, demonstrates a total nontrivial effect upon match outcome ( $\chi^2 = 4.83, p < .10$ ). Figure 3 plots this curvilinear effect along with a 95% confidence interval band. Figure 3 demonstrates that increasing levels of team-oriented proactivity relate to increased values of match outcome up to a point approximately 1 standard deviation beyond overall mean levels of team-oriented proactivity, at which point increasing levels negatively relate to match outcome. Tests with goal differential as the outcome did not produce significant results, nor did multinomial assessment with team final position. Using nested logistic regression upon win did produce a nontrivial curvilinear effect for team-oriented proactivity (log-odds =  $-.014, p < .10$ ), consistent with the finding for match outcome. A Wald test did not, however, support a significant total effect of linear and curvilinear team-oriented proactivity on win ( $\chi^2 = 3.47, n.s.$ ). Including a cubic term



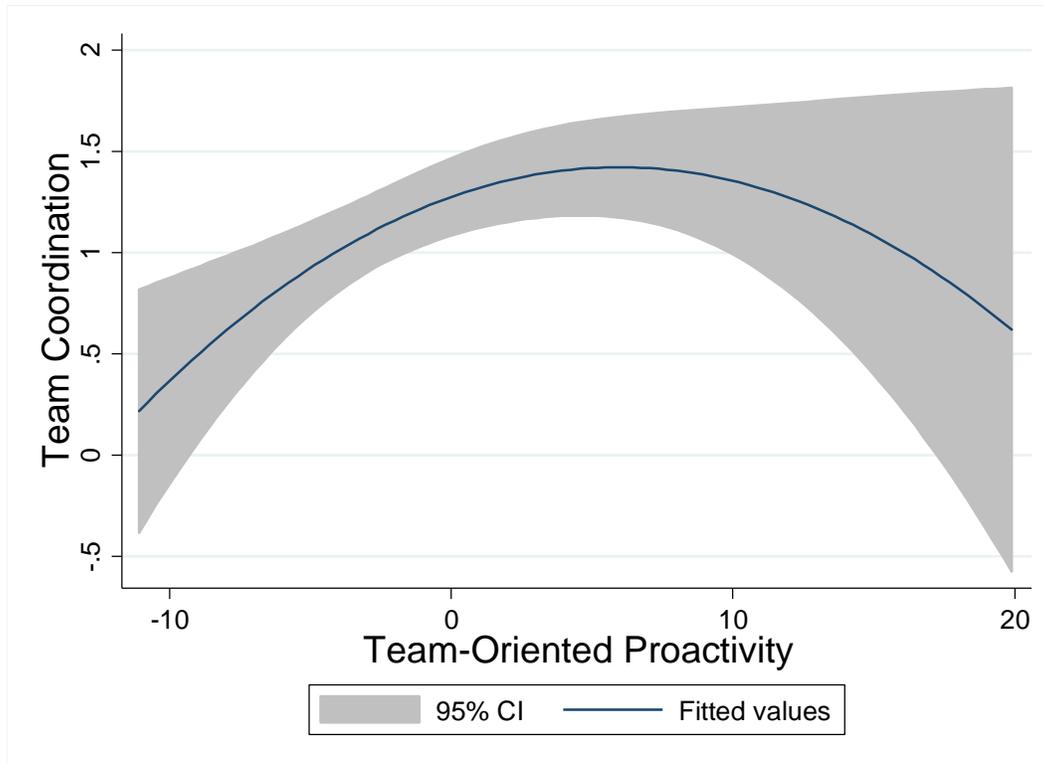
*Note:* Match Outcome is the measure of Team Performance, where 0 represents a loss, 1 represents a draw, and 3 represents a win. Team-Oriented Proactivity is the sum of individual spatial variability, standardized by player position. The blue line represents the estimated values and the gray bands are the 95% confidence interval about the prediction.

Figure 3 – Curvilinear effect of Team-Oriented Proactivity on Team Performance

with any of the aforementioned analyses did not improve results. I therefore conclude that hypothesis 4a is partially supported.

To assess hypothesis 4b—that there is a curvilinear effect of team-oriented proactivity upon team coordination—I regressed the linear and quadratic values of proactivity upon the logged variable for team coordination.

This produced both a significant direct ( $\gamma = .051, p < .05$ ) and polynomial effect ( $\gamma = -.004, p < .05$ ), confirming the negative effect of higher levels team-oriented proactivity on team outcomes as found above, and lending support to hypothesis 4b. Figure 4 demonstrates this curvilinear effect on the log of team coordination with a 95% confidence interval band.



*Note:* Team-Oriented Proactivity is the sum of individual spatial variability, standardized by player position. The blue line represents the estimated values and the gray bands are the 95% confidence interval about the prediction.

Figure 4 - Curvilinear effect of Team-Oriented Proactivity on Team Coordination

## Discussion

Exercising agency within organizations is an increasingly important means of overcoming obstacles and advancing organizational goals (Kirkman & Rosen, 1999; Williams et al., 2010), especially as working environments become more dynamic and unpredictable (Griffin et al., 2007). And while prior research has considered the impact of agency on individual level outcomes (for a review, see Crant, 2000; Grant & Ashford, 2008; Spitzmuller et al., 2015), the

antecedents of team proactivity (Williams et al., 2010), the impact of team-oriented proactivity on individual outcomes (Hirschfeld, Thomas, & Bernerth, 2011), and the impact of team-oriented proactivity on team-level innovation (Chen et al., 2013), research has yet to accrue that considers the impact of team-oriented proactivity specifically on team performance. By investigating aggregate proactive behavior and its influence on important team outcomes, this research presents a number of important implications for research and practice.

First, to the best of my knowledge, this study represents the first attempt to assess team-oriented proactivity's direct and mediated effect on team task performance, and to do so in a true team context with actual measures of team performance. Although effects found in primary tests of the team-oriented proactivity upon performance were weak at best, ancillary tests involving dispersion levels of proactivity do relate to performance. This suggests that the overall effect of team proactivity on team performance may not be a simple linear relationship in which more proactivity is inherently beneficial, but rather that a degree of consistency in proactivity across all members of the team is what influences performance outcomes. This more complex relationship is also evident in non-linear relationships revealed in this study. Specifically, these results demonstrate that there is a diminishing return of increasing levels of team-oriented proactivity upon team performance, and that the effect of proactivity on team performance is severely diminished at both low and high levels of aggregate team-oriented proactivity. This "too-much-of-a-good-thing" effect (TMGT; Pierce & Aguinis, 2011) is logical in that too great a degree of proactivity among team members may be reflective of an overall lack of structure within the team. Put differently, extreme levels of proactivity—particularly in this sample—may reflect too much behavior focused on solving other members' problems or trying to "work ahead" and anticipate challenges to the neglect of task responsibilities. As with any other work

team—from airline flight crews to surgical teams to oil derrick inspection units—the neglect of task responsibilities will have a detrimental impact on team performance, even if the neglect is the result of a team member trying to anticipate and solve future problems or assist other parts of the team in task completion. Thus, it stands to reason that the relationship between team proactivity and team task performance is a complex one.

A parallel stipulation is that teams must coordinate tasks effectively for team-oriented proactivity to have a meaningful influence on performance outcomes. Results of this study show that team-oriented proactivity directly influences team coordination, and that the effect is highest at levels of proactivity that are nearer the mean. That is, the TMGT effect is also at work in the relationship between team-oriented proactivity and team coordination, with levels of proactivity that are both substantially lower and substantially higher than average markedly diminishing its influence on coordination. This makes sense especially at higher levels of proactivity because, as suggested above, when task roles are neglected in favor of proactively pursuing other objectives, team roles and norms breakdown as team members are (quite literally, in this sample) out of position and unavailable for coordination. Likewise, the importance of coordination is also evidenced by its mediational effect on the proactivity-to-performance relationship. In fact, given the non-significant finding for direct effects of proactivity upon performance, these results suggest that, at the team level, the effect of aggregate team-oriented proactivity is virtually useless in improving team performance unless it is accompanied by and facilitates effective team coordination.

Taken together, these findings suggest that team-oriented proactivity can and does positively influence important team processes and outcomes, but also that the relationships are more complex at the team level than at the individual level (Klein & Kozlowski, 2000). That is,

while several meta-analyses suggests that individual level proactivity enhances outcomes such as job performance (e.g., Fuller & Marler, 2009; Thomas et al., 2010; Tornau & Frese, 2013), and research suggests that team-oriented proactivity increases outcome such as career advancement (Hirschfeld et al., 2008), scholarship has yet to accrue that assesses curvilinear effects of proactivity upon performance, nor that assesses team-oriented proactivity on measures of team coordination or team performance. In fact, a recent test for curvilinear effects of proactivity on individual role performance revealed a null result (Sylva & Mol, 2015). Moreover, proactive behaviors must be coordinated within a broader constellation of actions within and by a team to be effective, whereas an individual can proactively address task responsibilities that enhance performance without the complications of coordination required by a team. Consequently, the results of this study suggest that proactivity within teams does not have the same direct, linear relationship with performance as does proactivity at the individual level.

These findings are also supportive of the IMOI model of team effectiveness in that they support a complex and mostly mediated impact of team inputs on team outcomes, and suggest some advancements to team-level SCT. For instance, integrating the IMOI model with SCT reveals that, as discussed above, a key to performing effectively in dynamic environments involves recognizing and resolving obstacles to team goals by taking agency to engage in behaviors that advance team objectives. However, these findings demonstrate that merely taking agency as an individual is insufficient to advance team goals unless these actions are coordinated with others. For instance, Kirkman and Rosen (1999) found that a team's proactivity and productivity is strongly influenced both by human resource policies and team-level social structure. It may be, then, that the effect of individuals' agentic efforts are lost in the absence of coordinating mechanisms such as policies, social structure, or other factors such as shared mental

models and transactive memory. Thus, while SCT is intended to be isomorphic across levels of analysis (House, Rousseau, & Thomas-Hunt, 1995), and posits that synthesizing and coordinating members' actions is an important part of team success (Bandura, 1997), there may be some qualifications or limitations to the theory's portability across levels. More precisely, while SCT suggests that feedback is one of the key factors in the environmental or contextual corner of the triadic reciprocation, the source or nature of that feedback is likely an important influence from outside of the triad. While some generic forms of feedback operate in similar fashions—such as vicarious modeling or performance feedback (Prussia & Kinicki, 1996)—feedback in terms of formal or social constraints such as policies or team norms may have a disproportionate influence. For instance, organizational or team policies can quite literally limit what actions and solutions are acceptable in the working context, and team norms directly influence cooperation (e.g., Chatman & Flynn, 2001) and cohesion (Patterson, Carron, & Loughhead, 2005). The presence of these policies or norms may be an important determinant of team effectiveness that is not fully addressed by the SCT model. Thus, while Bandura (1997) suggests that the coordinated actions of the team is a factor of the team's efficacy and, therefore, part of the outcome from the triadic reciprocation, it may be that team coordination is influenced not only by individual and team level inputs but also social and structural factors that can arise from within or without the SCT triad and mediate the predicted relationships.

In sum, this study demonstrates that team-oriented proactivity as a team input has a complex but generally positive relationship with team performance, and that perhaps the most influential factor in the equation is team coordination. This is an important contribution to scholarship as it represents the first attempt to assess these factors. Future scholarship can further elucidate these findings by investigating other elements that can influence team coordination,

such as policies and social structures. This research also raises questions about the homologous nature of SCT. Indeed, while pairing the theory with the IMOI model provides a framework for predicting and understanding factors such as those under investigation here, more work is needed to test SCT at the team level, particularly with mediating factors that lie between team inputs and team task performance. As this study reveals, relationships at the team level frequently involve a higher degree of complexity.

### **Practical Implications**

Given the increasing importance of teams in working life, this study has several specific implications for organizations. First, this research suggests a net positive benefit of team-oriented proactivity in team effectiveness. This is consistent with one of the underlying fundamental advantages of teams, specifically that teams foster greater role flexibility (Klein, Ziegert, Knight, & Xiao, 2006). Greater role flexibility in teams is an important corollary for proactivity because, particularly in this sample, team-oriented proactivity usually involves an individual stepping outside of his or her assigned role to help others resolve their own task demands, or to address newly arisen obstacles to team goal accomplishment. Consequently, it stands to reason that work teams that deliberately foster a greater degree of role flexibility will be more likely to produce team-oriented proactive behaviors, and to benefit from them. Managers and team leaders would be well-advised to foster greater role flexibility within teams to take advantage of these benefits.

Another important practical implication revolves around the critical role of team coordination. As these results demonstrate, inputs such as proactive behaviors have limited influence on task performance unless the team can work cohesively. While a great many factors can influence team cohesiveness, managers and team leaders should be particularly attentive to team coordination to facilitate team success, and should take action to increase coordination

among team members when it breaks down. For instance, observing Figure 2 once more reveals that one of the team members, Striker 2, had extremely limited engagement in the team's coordination. This player was replaced by his manager during the match, and team coordination improved afterwards, with his team ultimately winning the match. Acting quickly to replace team members that do not gel with or contribute to overall coordination should lead to greater team task performance.

Despite these positive implications for organizational practice, the diminishing returns of team-oriented proactivity should also be noted. Given that the positive effects of such behaviors begin to diminish around one standard deviation above the mean, and decrease team effectiveness at two standard deviations, managers should note the limits of team-oriented proactivity. Providing loose structures for teams is likely to help organizations avoid the diminishing returns demonstrated in this study. That is, the results suggest that teams are most likely to succeed when enough flexibility exists to engage in proactive behaviors, but too little structure results in chaos where tasks associated with individual roles are not resolved. Anecdotally, the sample in this study provides ancillary support for this notion. Teams with loose structures and high levels of individual position freedom fared comparatively poorly. Conversely, teams with rigid and inflexible team structures performed just as poorly. Teams that had structures that allowed for individuals to expand roles occasionally and in turn, however, were more successful. Indeed, the German team that won the 2014 World Cup is well known for applying just such a philosophy—they adopt a firm structure in the team, but allow for occasional individual role expansions, as long as the team remains the priority (Markovits, 2014). Organizational teams can benefit from similar approaches.

## **Limitations and Future Research**

As with any study this work is not without limitations. For example, the results from these analyses may not be as generalizable as other potential samples. Sports teams share many common attributes with organizational work teams (Cannon-Bowers & Bowers, 2006), but the objectives for a soccer team is very clear (e.g., score goals, win games). Organizational work teams may also have clear goals—such as a sales team that is measured by revenue produced, or a customer service team whose main outcome is customer satisfaction—but less clear avenues for achieving those goals, or may even have rather ambiguous goals (such as ad hoc committees). While I acknowledge these differences, I do not feel that they necessarily limit the contribution of this study. Rather, sports teams generally and soccer teams in particular have more commonalities with organizational teams than differences. Soccer teams, for instance, are susceptible to losing key team members to turnover, frequently have changes in external leadership, and can suffer from both functional and dysfunctional conflict just as organizational work teams. Likewise, though soccer teams have clear objectives, the means of attaining them are not, in fact, perfectly evident. Rather, multiple strategies exist for achieving team objectives, and frequently the mere presence of exceptionally capable team members proves fruitless (such as the English soccer team that exited the 2014 World Cup in the first round) while teams with virtually no “star” players but a coherent team strategy substantially outperform their peers (as when Leicester City won the English Premier League in 2017). Nevertheless, opportunities for future scholarship surround the level of ambiguity that exists in which proactivity can occur. That is, some structural variables have been shown to increase proactivity (e.g., leader behavior; Kirkman & Rosen, 1999) whereas other similar influences decrease proactivity (e.g., high

centralization; Frese et al., 1996). Future research can elucidate how the presence of clear or ambiguous goals and environments influence team-oriented proactivity.

A related limitation is the interpretability of results. For instance, despite the clear objectives pursued by a soccer team, measuring performance in terms of wins or goal differential is an imperfect proxy. For instance, 9 of the 48 matches in this sample ended in a draw. For some teams in certain situations, a draw represents a success. The Algerian team, for example, achieved a draw in their final group-stage match against Russian team that was favored to win. Though both teams earned one point for the even outcome, it was enough for Algeria to advance to the knockout stage of the World Cup, and to prevent Russia from advancing. Thus, though the two teams achieved the same measured outcome, the drawn match was decisively a positive team outcome for Algeria and an extremely disappointing one for the Russians. However, this is not reflected in any of the outcome variables used in this study. More likely, though, is that the results reported here are conservative because of these factors. That is, there is less variance to be explained in quantitative team outcomes, limiting the ability of the predictors to generate substantial effects. As such, I do not feel that this limitation greatly inhibits the impact of this study. Rather, the high degree of fidelity available in the predictor variables represents a strength of this data, even in the face of low resolution response variables. Nevertheless, a number of variables are not easily studied in such samples, such as team transactive memory and shared mental models. Likewise, little is known yet about the nature of environmental influences affecting how and when proactive behaviors arise within a team, and how those individual level behaviors specifically influence team-level outcomes. Future research considering these constructs and their mediating or causal influence on team proactivity may help advance our understanding of the relationships uncovered in this study.

## PROACTIVITY CONTAGION AND TEAM EFFECTIVENESS

While the field study detailed above provides some preliminary support for team-oriented proactivity's role in team effectiveness, it does not reveal what personal and environmental factors give rise to such behaviors, nor how those behaviors influence important team phenomena such as perceived efficacy or shared affective tone. Understanding these influences is important for several reasons. First, explaining what environments and team compositional inputs are more likely to elicit proactivity is important in advancing our understanding of proactivity at the team level. As noted above, constructs do not always behave in homologous fashion across levels of analysis, and providing a theoretically-driven explanation of these influences provides a foundation upon which future team level proactivity scholarship can be built. Additionally, the field study reveals the importance of team coordination but provides little insight into what contributes to that coordination. By focusing on the internal validity of the model of team-oriented proactivity and team effectiveness, I further elucidate phenomena that drive team coordination and performance. Toward these ends, I offer behavioral contagion as a key influence that impacts the emergence and spread of team-oriented proactivity among team members and, subsequently, team effectiveness.

Though *emotional* contagion has received more traction and attention within organizational studies (e.g., Barsade, 2002; Hatfield, Cacioppo, & Rapson, 1994; Pugh, 2001; Totterdell, 2000), more than half a century of research demonstrates that *behaviors* can also be “caught,” whether in the emergence of an elementary school food fight (e.g., Redl, 1942), occurrences of rioting (e.g., Bohstedt, 1994), the spread of rudeness and aggression (Foulk, Woolum, & Erez, 2016), or more positive behaviors such as transformational leadership (e.g., Bass, Waldman, Avolio, & Bebb, 1987) and ethical leadership (e.g., Mayer, Kuenzi, Greenbaum,

Bardes, & Salvador, 2009). SCT provides an explanatory framework for how such behaviors spread from one individual to another through the triadic interaction of personal factors, environmental contingencies, and behavioral feedback. Although existing research has adopted an interactionist perspective to explain how, for instance, high mean levels of proactive personality within teams increases team proactive performance (Williams et al., 2010), scholars have yet to empirically investigate proactivity as an emergent phenomenon within teams, and what factors impact the likelihood of its occurrence in teams. Given the increasing demand for teams to respond to the dynamic and uncertain environments faced by modern organizations, this is a critical consideration. Understanding how personal characteristics interact with environmental and behavioral feedback factors, such as displays of proactivity by team members, enhances both our understanding of the proactivity phenomenon and adds an important factor in behavioral contagion to team-level theory. Thus, in an attempt to empirically study these issues and advance theory, I examine the impact of proactive behavioral contagion on team effectiveness with an experimental study.

Specifically, I utilize a priming experiment for this study to assess proactive behavior contagion in teams, and its impact upon team viability and task performance as well as the mediating effects of collective efficacy and team affective tone. I examine these specific variables because theory suggests that team effectiveness is a multi-dimensional construct that is impacted by team inputs such as team member attributes, as well as emergent states such as team affect and cognition (Ilgen et al., 2005; Marks et al., 2001). By studying these relationships, I make three important contributions to the broader literature. First, whereas a large body of literature addresses individual-level proactivity, proactive behavior at the team level is an equally important area given the increasing reliance upon teams (Crant, 2000; Williams et al., 2010), but

relatively little research has accrued thus far that explains how proactivity influences team processes and outcomes. More specifically, little is known about how proactivity evolves from an individual action to a team level phenomenon. I therefore advance team-level proactivity scholarship by explaining behavioral contagion as one mechanism through which team processes emerge and subsequently impact team effectiveness. Second, while team proactivity has received increased attention, few works have assessed its impact on team effectiveness. By investigating two theoretically important team outcomes in viability and task performance, I further contribute to this growing literature by offering a model of team proactivity that is consistent with existing team-level theory. Lastly, I advance our understanding of the process of proactivity. Despite several calls for further inquiry into proactive processes (e.g., Crant, 2000; Grant & Ashford, 2008), and recent advances at the individual-level (e.g., Parker, Bindl, & Strauss, 2010), little is known so far about proactive processes at the team-level. By using the well-established but often-overlooked phenomenon of behavioral contagion, I add to our growing knowledge of proactivity processes by providing insight into how these processes operate at the team level.

### **Behavioral Contagion**

Behavioral contagion can be defined as “an event in which a recipient’s behavior has changed to become more like that of the actor or initiator. This change has occurred in a social interaction in which the actor has not communicated intent to evoke such a change” (Polansky, Lippit, & Redl, 1950, p. 322). In other words, behavioral contagion describes an occurrence where an individual adopts similar behavioral patterns to a referent other even though the other individual does not overtly express a desire to effectuate this change. In one of the seminal early works of behavioral contagion, Redl (1942) argues that behavioral contagion occurs when an individual has an impulse toward enacting a given behavior but withholds that behavior either

due to social pressures or influence from the ego or superego, but observes another individual engage in the desired behavior without fear, guilt, or negative repercussions. Teachers may be familiar with such a phenomenon when presenting a point of discussion to a group of students. The teacher may at first be greeted with only an awkward silence, for instance, but once the first student speaks, others become more comfortable and willing to engage in the discussion, as well.

While much of the early work on behavioral contagion explained the spread of undesirable behaviors such as rioting and other forms of rule-breaking, organizational scholars have found less cynical applications for behavioral contagion. Bass and colleagues (1987), for instance, demonstrate that leaders who engage their followers with displays of caring and encouragement of participation in organizational decision-making see those behaviors carried forward by their subordinates, who then engage in similar behaviors with each other. Mayer and colleagues (2009), adopting SCT as an explanatory framework, demonstrate a similar effect in ethical leadership, namely that when leaders display ethical behaviors, their subordinates are less likely to engage in deviant workplace behaviors.

### **SCT and Behavioral Contagion**

Much like the concept of proactivity itself, as discussed above, SCT was developed as a means of explaining agentic behavior—human action that is conscious and self-driven (Bandura, 2001). To explain such behaviors, SCT adopts a triadic view of the antecedents of behavioral outcomes, including personal differences, environmental factors, and behavioral determinants (Bandura, 1986). More specifically, personal differences in personality and cognition interact with environmental constraints to produce behavioral choices. These behavioral choices then produce feedback as to the relative success or failure of that particular action, which in turn influences perceptions of environmental influences and personal factors such as self-efficacy.

Individuals, for instance, have different thought patterns, goals, and behavioral preferences—developed and learned from behavioral feedback throughout life—which then inform their behavioral intentions (Bandura, 1977, 1991b).

While personal differences interact with behavioral feedback to mutually determine each other, the third component of the triad plays an equally important role in determining human behavior. Environmental factors such as social influences also convey information that evoke and inform emotional reactions and expectations (Bandura, 1989b). As mentioned above, a given individual in a work meeting may be predisposed to engage in meeting discussion, but social norms or the fear of negative social feedback may dissuade that individual from doing so. In concert with this, Frese and colleagues (1996), when initially examining the concept of personal initiative, found that individuals in autocratic and highly-regulated work environments developed and displayed considerably less personal initiative than did those in environments that granted more autonomy. Put simply, environmental factors interact with personal differences to either facilitate or suppress the behavior of an individual.

Environments, therefore, play a critical role in the feedback individuals receive as to what behaviors are supported and encouraged, but SCT further predicts that when individuals perceive that they can alter that environment through their behaviors, agentic or proactive behavior emerges (Bandura, 1986, 2001; Bateman & Crant, 1993). Critically, however, individuals are able to take feedback cues from the behaviors of others as opposed to merely their own. In other words, observing another individual engage in a behavior without incurring negative repercussions satisfies the behavioral feedback-to-environment interaction link as effectively as receiving feedback on one's own behavior, consistent with both SCT (Bandura, 1989b) and theories of behavioral contagion (Redl, 1942; Wheeler, 1966). Thus, the employee who is

predisposed by personal differences to engage in meeting discussion may feel enabled to do so when another employee voices ideas or raises concerns without fear or negative consequence. This is so because the feedback received from that individual's behavior signals that speaking up in the meeting is accepted within the social environment and can, in fact, alter that social environment itself.

Moreover, individuals who lack the predisposition through personal traits toward a given behavior are also likely to experience behavioral contagion. SCT suggests that cognition and individual goals also motivate specific action (Bandura, 1991a, 2012) such that when an individual observes the behavior of another as successfully facilitating a mutual goal, the individual becomes motivated to enact a similar set of behaviors. In a work meeting, for instance, an employee may be motivated to voice ideas or raise concerns, and observing other employees successfully engage in the meeting discussion can motivate similar behaviors even when the individual is not predisposed to. A similar effect occurs when the individual is motivated by social acceptance, and executing specific behaviors (or failing to execute these behaviors) results in a greater likelihood of social acceptance (or ostracism; Bandura, 2002). Prior research reveals this effect even among behaviors that few people are predispositionally inclined toward, such as picking up other people's trash and litter, when those behaviors are enacted by others and associated with achieving a common goal or facilitating social acceptance (Long, Harre, & Atkinson, 2014; Perry, Johlin, & Normark, 2010). Thus, I predict that:

Hypothesis 1: There is contagion of proactive behaviors among team members.

Proactive behavior, as one of the fundamental forms of agentic behavior, should also emerge and operate when primed individuals have a predispositional inclination toward proactivity. Meta-analyses demonstrate that proactive personality is strongly related to proactive

behavior at the individual-level (Fuller & Marler, 2009; Thomas et al., 2010; Tornau & Frese, 2013), and prior work demonstrates that team-level proactivity is positively associated with the mean level of proactive personality of team members (Williams et al., 2010). Further, proactive behaviors are more likely to emerge when perceptions of team support for proactivity is high (Griffin et al., 2007), consistent with the contagion hypothesis. Together, these factors account for both the personal factors and behavioral feedback components of SCT to suggest that individuals who are inclined toward proactivity who then observe support for exactly that behavior are more likely to engage in proactive behaviors themselves. Thus, given the influence of personal differences on determining behavior as predicted by SCT, and prior findings on proactive behavior among teams with higher mean levels of proactive personality, I expect this effect to be stronger when teams have higher mean levels of individual proactive personality.

Hypothesis 2: The rate of proactive behavior contagion is higher among teams with higher mean levels of individual proactive personality.

### **Proactivity Contagion and Team Effectiveness**

To explain how proactivity contagion impacts team effectiveness, I complement the predictions of SCT with the IMOI framework (Ilgen et al., 2005). SCT suggests that proactivity positively influences effectiveness, and explains intervening factors such as efficacy and attitudes (Bandura, 2012), and the IMOI model provides a framework for mapping those predictions onto a mediated model of team performance. Specifically, the IMOI framework emerges from the classic input-process-outcome model (IPO; McGrath, 1964) of team effectiveness but accounts for two more complex features. Namely, the IMOI model incorporates recursive effects from prior performance episodes and, more importantly for this research, expands upon the mediating component to account for emergent states in addition to team

processes. Team processes, on one hand, are the interdependent actions of team members that convert inputs such as resources and team characteristics into outcomes through cognitive or behavioral activities (Marks et al., 2001). Proactive behaviors by team members that facilitate team goal accomplishment, then, include anticipating or preventing future problems, taking task initiative, or engaging in longer-run planning, to name only a few.

Emergent states, on the other hand, represent the dynamic influence of team member attitudes, cognitions, and motivations (Marks et al., 2001) and include factors such as interpersonal norms and affective evaluations of the team and its abilities. Harris and Kirkman (2016) argue that several emergent team states are particularly influential in fostering team proactive behaviors and mediating their impact on team effectiveness, including team affective tone and collective efficacy. This is so because emergent states such as these provide more nuanced insight into how inputs such as behaviors and KSAOs create environments and opportunities for behavioral enactment to occur, and for those behaviors to subsequently influence team performance.

Team affective tone, or consistent and similar positive affective reactions among team members (George, 1990), is an established emergent team state encompassing shared cognitions and affect arising from the behaviors and interactions of and among individuals, as well as individual-level affect and cognition (Kozlowski & Bell, 2003). While researchers have established that affect itself is contagious and, subsequently, that individual-level affect can directly influence team affective tone (Barsade, 2002; Ilies, Wagner, & Morgeson, 2007; Totterdell, 2000), non-affective factors also influence team affective tone, though scholars have lamented the relative dearth of such explanations (e.g., George & King, 2007). SCT suggests that proactivity contagion is one such influence.

As noted above, SCT adopts an interactionist perspective of behavior, but the theory also posits more nuanced predictions of how social factors and internal environments influence human behavior. One particular mechanism by which social factors such as the actions of others can influence affect is through self-regulation and self-reaction, a process that Bandura suggests is “at the very heart” of the behavioral process (Bandura, 1991a, p. 248). This is so because human self-regulatory functions convert goals and desires into motivations through symbolic activity. Put differently, behavior itself is partly “pulled” from motivation to achieve a desired outcome—as achieving that outcome is an external reward—and partly “pushed” by underlying individual goals and cognitions. This is the self-regulation component of SCT. Self-reaction, on the other hand, encompasses the evaluative self-reactions related to those motivations and behaviors that facilitate goal achievement (Bandura, 1991b, 2002). In a team environment, then, positive affective reactions are engendered when an individual engages in proactive behavior that facilitates team goals, and compounded when the individual him/herself also engages in such goal-facilitating proactivity.

Scholars have supported the outcomes of similar processes in previous works studying team affective tone. One stream of research demonstrates that as individual actions become increasingly similar or synchronized, the cooperating individuals experience increasing positive affect, liking, and affiliation (Kelly, 1988; Kelly & Barsade, 2001; Lakin, Jefferis, Cheng, & Chartrand, 2003). Thus I expect that as proactive behavior spreads among team members, team affective tone will increase.

Hypothesis 3: Proactive behavior contagion positively impacts team affective tone.

A second important emergent state that I expect to arise from proactivity contagion is collective efficacy. Collective efficacy is a team’s belief in its ability to complete actions that

will yield a desirable level of performance and resolve team goals (Bandura, 1982, 1997). While efficacy is often cited as a homologous at multiple levels of analysis (c.f. Klein & Kozlowski, 2000), Bandura (1997) notes that collective efficacy arises from reciprocal social influence in a way distinct from self-efficacy. Specifically, the nature of team tasks require social interaction, cooperation, and coordination among different individuals that, in the process of these interactions, come to have mutual influence on the beliefs and motivation of their teammates. Thus, consistent with the mutual determination of person, behavior, and environment, SCT suggests that collective efficacy arises as a team experiences events that reinforce the notion that the team is effectively performing (Bandura, 1977).

While research on the relationship between proactivity and efficacy has yet to accrue to the team-level, a growing body of research documents that efficacy at the individual-level works in this way. Speier and Frese (1997) and Morrison and Phelps (1999), for instance, find strong, positive relationships between proactive behavior and self-efficacy. Thus, I expect that proactive behavior contagion will also positively relate to team-level collective efficacy.

Hypothesis 4: Proactive behavior contagion positively impacts team-level collective efficacy.

While team affective tone and collective efficacy are both emergent states and mediators consistent with SCT, logic and theory suggest that proactivity contagion will also influence team outcomes, which are often divided into two separate but necessary components for team effectiveness: team viability and team task performance (Kozlowski & Bell, 2003). Team viability (sometimes referred to as team cohesiveness) is the willingness of team members to continue working together (Goodman, Ravlin, & Schminke, 1987; Hackman, 1987). Viability is more social and person-related than task-oriented outcomes, and is crucial for long-run team

performance as it speaks to a team's ability to remain intact and function for several performance episodes.

Not surprisingly, given its roots as a social phenomenon, prior research and theorizing suggests that team viability is an outcome achieved by similar processes to team affective tone. Specifically, early scholarship revealed viability as arising from interpersonal liking and positive team affect (Lott & Lott, 1965), although research increasingly demonstrates that viability also results from cognitive processes that reveal similar categorizations of team membership, particularly in interpreting similar actions (Hogg & Turner, 1985). In other words, team viability arises when team members enjoy working with each other, a feeling they are more likely to experience when similar cognitive processes lead to a similar set of behaviors that are deemed acceptable and beneficial to the team. SCT offers further explanation as to why this is the case.

As discussed above, two important mechanisms in SCT are feedback and self-regulation, the former providing information as to what behaviors facilitate goal attainment, and the latter spurring the motivational processes that beget such behaviors. As these cognitive and motivational processes converge (i.e., as proactive behavior spreads among team members), shared affective evaluations of the team and its ability to perform increase, which subsequently increase the willingness of team members to continue working as part of the team.

Prior work supports these effects. Specifically, scholars have found that non-verbal behaviors that team members find agreeable increase team viability (Tickle-Degnen & Rosenthal, 1987), and that the spread of information as to what types of behaviors positively influence the team also convey information about team viability (Levenson, 1996). Thus, while contagion has not yet been evaluated as a variable that impacts viability, theory and existing research suggest that behavioral enactment positively influences a team's viability.

Hypothesis 5: Proactive behavior contagion positively impacts team viability.

However, as noted above, SCT and the IMOI framework also suggest that team outcomes such as viability are mediated by team processes, as teams require coordination and cooperation to convert inputs into outputs. More specifically, inputs such as proactive behaviors first influence the processes and emergent states in which a team engages, which subsequently increase (or decrease) the team's ability to perform. Prior findings support these effects, as well. Prussia and Kinicki (1996), using SCT as a theoretical base, demonstrate that vicarious experience and positive feedback influence outcomes such as team viability, but also have a mediated effect through team processes such as affective evaluations and collective efficacy. Thus, theory and prior research suggest behavioral contagion, as an agent of information about acceptable team behaviors, impacts affective reactions and the team's perceived efficacy, as well as directly influencing perceptions of the team's viability. In addition to its direct effect on team viability, proactive behavior contagion therefore should also relate to team viability indirectly through the processes of team affective tone and collective efficacy.

Hypothesis 6: The impact of proactive behavior contagion on team viability is mediated by a) team affective tone and b) collective efficacy.

Finally, I expect proactive behavior contagion to positively influence team task performance. This is because proactive behaviors such as identifying and preventing problems in advance, working ahead, and improving processes, for example, contribute to improving team task performance by removing barriers to task accomplishment. This is consistent with the predictions of SCT that agency will positively influence a team's ability to resolve task demands, and with the IMOI framework of team performance, as suggested by Harris and Kirkman (2016) as team-level proactivity serves as a process through which individual's interdependent actions

facilitate the accomplishment of team goals. Thus, I expect that as proactive behaviors spread amongst team members, team task performance will improve.

A large body of research demonstrates the link between proactive behaviors and performance, including several individual-level meta-analyses (Fuller & Marler, 2009; Thomas et al., 2010; Tornau & Frese, 2013). Yet, while team-level proactivity research is on the rise, little research so far investigates the impact of team proactivity on team task performance. Chen and colleagues (2013), for instance, demonstrate the impact of proactive motivation on team innovative performance, and Kirkman and colleagues find a significant correlation between team-level proactivity and team-level productivity (Kirkman & Rosen, 1999) and customer service (Kirkman & Rosen, 1999; Kirkman, Rosen, Tesluk, & Gibson, 2004). Further, Druskat and Kayes (2000) find a significant and strong relationship between proactivity in problem-solving and team performance among short-term project teams. Thus, while researchers have yet to consider proactivity behavior contagion, an emerging body of research supports that proactivity enhances performance at the team-level.

Hypothesis 7: Proactive behavior contagion positively impacts team task performance.

As discussed above, a strength of the IMOI framework is that it accounts for a more nuanced relationship between inputs and outcomes by explaining the influence of team emergent states as a mediating factor. In addition to directly influencing team task performance, I also expect proactivity contagion to transmit an effect through the emergent states of team affective tone and collective efficacy. While this relationship is supported by SCT and both the general IMOI framework and Harris and Kirkman's (2016) proactivity-specific IMOI framework, evidence of the link between these emergent states and team task performance is also manifest in prior scholarship. Sy, Côté, and Saavedra (2005) find, for example, that team affective tone

demonstrates a strong relationship with team effort, and Tsai and colleagues demonstrate the effect of team affective tone on creative tasks (Tsai, Chi, Grandey, & Fung, 2012), while recent meta-analyses support the relationship between collective efficacy and team task performance (e.g., Gully, Incalcaterra, Joshi, & Beauien, 2002; Stajkovic & Luthans, 1998). I therefore expect proactivity contagion to directly influence team task performance, and to indirectly influence team task performance through team affective tone and collective efficacy.

Hypothesis 8: The impact of proactive behavior contagion on team task performance is mediated by a) team affective tone and b) collective efficacy.

### **Methods**

Since the emphasis of this study is on understanding how proactive behaviors within teams influence intra-team phenomenon, I assessed hypotheses via laboratory experiment. This approach is ideal since experimental settings allow for a higher level of internal validity and, consequently, more precision in understanding how the constructs in question influence and relate to each other (Campbell & Stanley, 1963). As such, 226 undergraduate students (122 female, 103 male, 1 sex not reported) enrolled in management and marketing courses were recruited through the university's behavioral lab to participate in the study in exchange for extra course credit. Students participated in the experiment in 53 teams of 3-6, with groups randomly assigned to treatment and control conditions (26 treatment groups and 27 control groups). The average team size was 4.3 (s.d. = .94). The participants' mean age was 20.84 (s.d. = 1.73) 68.6% were business majors, 11.9% were engineering majors, and 19% reported a different major.

Participants engaged in a team activity based on The Marshmallow Challenge (Wujec, 2010) and were informed that the study pertains to team task performance. For the activity, teams were given twenty sticks of uncooked spaghetti, one yard of masking tape, one yard of

string, and one marshmallow and instructed to build the tallest free-standing structure possible with the marshmallow on top in a fifteen-minute period. Incentives were provided in the form of \$25 gift cards for each member of the team that constructed the tallest structure in each semester of data collection. Instructions were presented in identical fashion to all teams, and all teams were alerted when the time remaining was 10 minutes, 5 minutes, 2 minutes, 1 minute, 30 seconds, and 10 seconds, respectively. Participants were debriefed as to the full purpose of the study after completing the post-activity survey.

### **Experimental Design & Procedure**

The experiment was a static-group comparison experiment (Campbell & Stanley, 1963) involving a treatment group and control group. The treatment involved non-task-related priming of team-oriented proactive behavior through an interaction of the experimenter and a trained confederate<sup>5</sup>. Specifically, participants arrived at the experimental session knowing that they would be participating in a team-based activity and were randomly assigned to seats indicated with a place card and a seat number (from 1 to 6). No leader or individual task roles were assigned. A camera located at the foot of the table was aimed so as to capture all of the participants but not the experimenter to avoid biasing the video-coders based on the experimenter. A large window was located behind the video camera at the foot of the table.

Before beginning the activity, participants first filled out a consent form (agreeing to participate in the study and to be videotaped) and a short, paper-based survey of pre-test measures (displayed in the appendix) to capture demographics, proactive disposition, and other factors that may make teams substantially different, such as preference for team-based activities, experience working in teams, and a short personality measure.

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<sup>5</sup> Four confederates and two experimenters were utilized over the course of the study. ANOVA revealed no substantial differences in team outcomes based on different confederates or experimenters.

In the treatment condition, the trained confederate entered the room while the teams completed the pre-survey and approached the experimenter to enact a scripted dialogue designed to demonstrate team-oriented proactive behavior on the part of the experimenter. The confederate, in particular, approached the lab room, noticeably peered in the window, then opened the door and announced to the experimenter a problem with the analysis of a shared research project in a tone loud enough to be overheard. The experimenter then offered a solution, and volunteered to take on extra work to help solve the problem, thus enacting two of the behaviors from Hirschfeld and colleagues' (2008) team-oriented proactivity scale as a means of priming subjects for team-oriented proactive behaviors. Following the completion of the pre-survey, all teams were given instructions and materials for the activity.

Immediately following the conclusion of the fifteen minutes allotted for the activity, the complete tower was measured in inches from its base (non-standing towers were recorded as 0), and participants were asked to complete an exit survey (displayed in the appendix) to measure the study's focal variables.

## **Measures**

**Proactive Disposition: Scale Development.** As existing measures of proactive disposition have several limitations (as discussed in Paper 1), I first empirically validated a new measure of the proactive disposition. Using SCT as a guide, I followed the deductive approach to item generation (Hinkin, 1998), yielding a pool of 48 potential items. To these I added the 17 items from Bateman and Crant's (1993) original measure of proactive personality, and the 7 items from Frese and colleagues' (1997) survey measure of personal initiative. I then recruited three subject matter experts (SMEs) with advanced training in organizational behavior and research methods to evaluate the pool of 72 items for content validity. SMEs responded to how

well each item represents the proactive disposition construct, defined as “a dispositional construct addressing one’s tendency to take an active and self-starting approach to tasks, and to persist in overcoming challenges and setbacks.” SMEs responded on a scale of 1 (not at all representative) to 4 (very representative). I removed items that received an average score below 2.67 (34 items) so that the remaining items received a consensus response of 67% that the item adequately represents the construct. This is below Hinkin’s (1998) recommended threshold of 75%. However, I adopted a lower threshold with the intention of capturing a broader range of items to empirically reduce since I was including items from previously established scales. In all, the SMEs classified six proactive personality items as representative of the construct, four initiative items, and 28 of the newly written items.

I then recruited 196 working adults who were referred by students participating in the University’s behavioral lab in exchange for extra credit. The sample was 55% female and the average participant age was 45. Participants responded to these 28 items as well as other measures to assess criterion validity. Exploratory factor analysis (PCA with orthogonal rotation) revealed that, after items with low ( $<.70$ ) and double factor loadings were removed, a single-factor solution emerged, consistent with Bateman and Crant’s (1993) original theorizing and findings of proactive personality. For parsimony, I further eliminated all items with factor loadings below  $.80$  and one additional item that was nearly identical to another (i.e., “When I encounter a problem, I solve it” was dropped and “When I encounter a problem, I try to solve it” was retained). Reliability analysis revealed that the remaining 9 items had a Cronbach’s alpha of  $.95$  and that reliability would not improve by deleting additional items, and an EFA with principal axis factoring confirmed the factor structure. The final scale items appear in Table 4 with their PCA and principal axis factor loadings. All inter-item correlations exceed  $.50$ , as

demonstrated in Table 5. These 9 items will be included on the pre-assessment survey to assess proactive disposition.

Table 4 - Proactive Disposition Items and Factor Loadings

Item	Factor Loadings	
	PCA	Principal Axis
1. When I encounter a problem, I try to solve it	0.86	0.84
2. I am a self-starter	0.86	0.84
3. When I run into a problem with my work, I start looking for solutions right away	0.85	0.83
4. I don't wait for others to tell me how to overcome obstacles	0.84	0.82
5. I always take an active approach to solving problems	0.84	0.82
6. I excel at overcoming challenges	0.84	0.81
7. When I encounter a problem in my work, I just work harder	0.83	0.80
8. I work hard to overcome challenges	0.81	0.78
9. When I see something that needs to be accomplished, I start working on it	0.80	0.78

**Proactive Behavior Contagion.** Four coders were trained over the course of two, 90-minute sessions to recognize and identify team-oriented proactive behaviors. These training sessions involved an explanation of the task and the domain of proactive behavior, after which I watched one of the team videos with the coders and pointed out examples of proactive behaviors, pausing for discussion and explanation. In the second training session, the coders pointed out proactive behaviors and, when different perceptions arose, discussed the behavior until agreement was achieved. Both during the training sessions and as a companion to independently coding the videos, the coders were provided with a list of behaviors including those from Hirschfeld and colleagues' (2008) scale of team-oriented proactivity, and Harris and Kirkman's (2016) list of team proactive behaviors. All four video coders then independently watched each

Table 5 - Proactive Work Disposition Inter-Item Correlations

Items	1	2	3	4	5	6	7	8
1. I don't wait for others to tell me how to overcome obstacles								
2. When I see something that needs to be accomplished, I start working on it	.65							
3. When I encounter a problem, I try to solve it	.66	.68						
4. I am a self-starter	.64	.64	.74					
5. I always take an active approach to solving problems	.68	.61	.67	.76				
6. When I run into a problem with my work, I start looking for solutions right away	.73	.67	.74	.69	.66			
7. I work hard to overcome challenges	.64	.58	.66	.65	.61	.60		
8. When I encounter a problem in my work, I just work harder	.67	.70	.62	.65	.61	.66	.69	
9. I excel at overcoming challenges	.66	.60	.67	.69	.70	.67	.67	.63

of the 56 team videos and tallied the number of proactive behaviors enacted by each team member individually. I then took a per-participant average of these four ratings. I assessed proactive behavior contagion by investigating both mean levels—assuming that higher mean levels of proactivity represent a greater rate of occurrence among participants within the team—and the team-level standard deviation of proactive behaviors while controlling for the mean level of proactivity as a dispersion model of proactive behavior contagion. That is, while holding mean levels of proactivity constant, a lower standard deviation represents a greater degree of parity in proactive behaviors among team members, which I took as an indication of a higher rate of contagion. Reliability of the judges' ratings [using ICC(2)] was .79.

**Collective efficacy.** Individuals responded to six items adapted from Riggs and colleagues' (1994) collective efficacy beliefs scale on the post-activity assessment survey. Items were reworded to focus on groups instead of departments, and one item was removed as it focused on individual's ability to perform their jobs and not on perceptions of group effectiveness ("some members of this department cannot do their jobs well"). Cronbach's alpha for this measure was .82.

**Team affective tone.** Following others (e.g., Chi, Tsai, & Tseng, 2013; Tsai et al., 2012), I assessed team affective tone using the PANAS scale (Watson, Clark, & Tellegen, 1988) and adopted a direct consensus model of aggregation (Chan, 1998). Consistent with the definition and operationalization of team affective tone (George, 1990), the PANAS assesses an individual's mood states as opposed to more enduring affective traits or emotional reactions, and can be arranged to assess affect associated with a particular referent. As such, individuals were asked to respond to a list of adjectives describing how they felt *during the team activity*. Alphas were .89 for positive affect and .73 for negative affect.

**Team viability.** I assessed team viability with three items (i.e., "I would like to work with this team on future tasks," "I would be willing to continue working with this team," "I would be happy to work with this team again") derived from Balkundi, Barsness, and Michael, (2009). Cronbach's alpha for this measure was .92.

**Team task performance.** Team task performance was assessed by the height of the completed structure, with taller structures indicating a higher level of task performance. Specifically, the height of the structure was calculated as the number of inches from the base of the structure to the top of the marshmallow.

**Manipulation check.** Several items were included on the post-activity survey as manipulation checks. One item addressed perceived differences in the helpfulness of the experimenter, (i.e., “On a scale of 1-10, how would you rate the experimenter's helpfulness in completing the task?”). Another item asked respondents about their willingness to cooperate with their teammates (i.e., “How willing were you to help your teammates after completing the initial survey?”). Neither of these manipulation checks revealed significant differences between treatment and control groups, however ( $F = 0.25$  and  $1.21$ , respectively). Each respondent also responded to an adapted version of Hirschfeld and colleagues’ (2008) measure of team-level proactivity with a referent shift to focus perceptions on the team’s proactivity (e.g., “How likely are members of this team to suggest to the team a different way to solve a problem?”). Alpha of this measure was .81. Lastly, an open-ended question was also included that asked if participants suspected that they knew the true purpose of the study; however, only 1 of the 226 participants mentioned the confederate. Results after excluding the individual’s responses were not substantively different for that particular team, nor were overall results changed by including or excluding the team in question. As such, I proceeded with the individual’s responses included.

**Control Variables.** Several items were included on the pre-test to rule out potential alternative explanations. Individuals were asked to report their *sex*, *age*, *major* (i.e., business major, engineering major, other), and *classification* (e.g., Sophomore, Junior) to assess any potential differences between the treatment and control groups. Participants also completed a short version of the five-factor personality measure by Donnellan, Oswald, Baird, and Lucas (the mini-IPIP; 2006) to control for any differences arising from the composition of personality within the groups (alphas ranged from .68 to .84). Individual *preference for groupwork* was assessed using five items from Shaw, Duffy, and Stark’s (2000) measure (two items with

loadings of less than .70 in the authors' original validation of the measure were excluded). Cronbach's alpha for this measure was .84. I also included a single item inquiring about an individual's experience working with teams (i.e., how often have you worked as a member of a group or team in a work or school setting?) as these factors may influence an individual's preference, willingness, or ability to cooperating with others and confound results.

### **Analysis**

I used multiple regression to assess my hypotheses. This was the most appropriate approach since I aggregated study variables to a single level (i.e., team level) but did not have sufficient sample size to conduct structural equation modeling (Kline, 2011). Analyses were conducted using *Stata* version 13 (StataCorp, 2013) and *MPlus* version 7.31 (Muthén & Muthén, 1998-2012).

### **Results**

Means, standard deviations, and intercorrelations of study variables appears in Table 6 below. Before testing hypotheses, I first computed intraclass correlations for study variables to verify the appropriateness of using aggregate measures. All constructs aggregated via direct consensus and referent shift exceeded the frequently-adopted .10 minimum ICC(1) (Bliese, 2000). Specifically, ICC(1)'s were .14 for positive affect, .20 for negative affect, .28 for collective efficacy, .17 for team viability, .14 for team viability, and .14 for the survey measure of team-oriented proactivity. Before aggregating the data, I investigated the influence of missing data from the individual surveys. For the full dataset, about 0.1% of data were missing, and all but one case also fell well below the missingness threshold of 10%, up to which missingness can be considered ignorable (Hair, Black, Babin, & Anderson, 2010). Additionally, *Mplus* revealed distinct patterns of missingness for all cases with missing data. To assess the influence of the one

Table 6 – Means, Standard Deviations, and Intercorrelations of Study Variables

Measure	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Treatment	0.49	0.50										
2. Total Team Proactive Behaviors	12.2	2.99	-.06									
3. Avg. Team Proactive Behaviors	2.91	0.66	.02	.55**								
4. Team Proactivity Dispersion	4.51	0.57	-.14	.24 <sup>t</sup>	.16							
5. Proactive Disposition	5.41	0.34	-.06	.20	.26 <sup>t</sup>	-.21						
6. Team Positive Affective Tone	3.60	0.41	.08	.08	.29*	.03	.13					
7. Team Negative Affective Tone	1.50	0.26	-.08	-.01	-.06	-.13	.15	.16				
8. Collective Efficacy	5.34	0.57	-.03	.04	.18	-.00	.05	.66**	-.08			
9. Team Viability	5.22	0.65	-.00	-.00	.16	-.04	.14	.67**	.09	.86**		
10. Team Task Performance	12.7	11.3	-.10	-.12	-.01	-.14	-.21	.26 <sup>t</sup>	-.28*	.53**	.33*	
11. Team-Oriented Proactivity	5.35	0.50	-.07	.18	.35*	-.05	.32*	.54**	.21	.48**	.57**	.25 <sup>t</sup>

*N* = 53. Treatment is coded 1 for treatment groups. Team-oriented proactivity is perceptual, while proactive behaviors and proactive dispersion are observed.

<sup>t</sup>*p* < 0.10

\**p* < 0.05

\*\**p* < 0.01

case with 11.5% missingness, I compared the aggregate construct values from a simple mean aggregation ignoring missing data, to the aggregate value when imputing the missing data using maximum likelihood estimation in *Mplus*. Results were similar, so I proceeded by treating missing data as missing completely at random and ignorable. Prior to each analysis, I also assessed the influence of potential covariates. Consistent with statistical control guidelines (Becker, 2005; Bernerth & Aguinis, 2016; Breauh, 2006), I removed control variables from analyses when they did not impact the focal relationships.

Hypothesis 1 states that higher levels of proactive behavior would be observed in the treatment groups than in the control groups. The correlation matrix in Table 6 above reveals very small, nonsignificant effect sizes for the treatment condition on both total team proactive behaviors and average proactive behaviors, and a modest but nonsignificant effect of the treatment on team proactivity dispersion. ANOVA and linear regressions reveal similar null findings for both team and individual levels. Tests using the dispersion measure of team proactivity are slightly more promising, with consistent negative relationships with the treatment condition both in simple regression when controlling for average levels of team proactive behavior, as well as when holding constant personality dimensions such as proactive disposition, conscientiousness, and agreeableness ( $b = -0.17, n.s.$ ). This is a somewhat-encouraging finding, indicating proactive behavior was more evenly dispersed in treatment teams. However, the relationship remains nonsignificant, and thus hypothesis 1 is not supported.

Hypothesis 2 suggests that rates of proactive behavior are higher when teams are higher in aggregate proactive disposition. Regressing aggregate proactive disposition upon the average number of proactive behaviors per team member produces meaningful results both in isolation ( $b = .50, p \leq .05$ ), and when controlling for the conceptually-related (Spitzmuller et al., 2015)

aggregate levels of conscientiousness and extraversion ( $b = .62, p \leq .05$ ). Further, the new measure of proactive disposition demonstrated a stronger relationship with proactive behaviors than did the most commonly used form of Bateman and Crant's (1993) measure (i.e., Seibert et al., 1999), both in isolation ( $b = .44, n.s.$ ) and when controlling for conscientiousness and extraversion ( $b = .52, n.s.$ ), lending convergent and discriminant validity to the proactive disposition measure. Regressing aggregate proactive disposition on the dispersion measure of team proactive behaviors while controlling for total levels of proactivity reveals a similar effect ( $b = -.45, p \leq .05$ ). Here again, the traditional proactive personality measure failed to produce significant results ( $b = -.43, n.s.$ ). I also investigated a dispersion model of aggregate proactive disposition, with results demonstrating that higher rates of dispersion decrease the average number of proactive behaviors within teams in this sample ( $b = -.53, p < .05$ )—a result that also holds when controlling for conscientiousness and extraversion. Thus, hypothesis 2 is supported.

Given that the coder ratings of proactivity were largely unrelated with study outcomes, I elected to assess the remaining hypotheses using the perceptual measure of team-oriented proactivity. This may, in fact, be a more appropriate approach despite the weak effects from the coded ratings since hypotheses 3-8 involve perceptual outcomes, and it stands to reason that the team's own perceptions of their level of proactivity would be more salient to their responses than would the video coders' perceptions. Indeed, within-team agreement was sufficient to justify aggregation ( $r_{wg(j)} = .78$ ), so I moved forward with the aggregated perceptual measure team-oriented proactivity.

Hypothesis 3 proposes that higher rates of proactivity impact team affective tone. Tests of this hypothesis yields a positive and significant effect for positive team affective tone ( $b = .65, p < .05$ ), but a nonsignificant finding for negative team affective tone ( $b = .41, n.s.$ ), lending partial

support to hypothesis 3. Hypothesis 4 states that higher levels of proactivity impact collective efficacy, which is supported by the data ( $b = .42, p < .05$ ). Hypothesis 5 also received support, as higher levels of proactivity positively associate with higher levels of perceived team viability ( $b = .74, p < .05$ ).

Hypothesis 6 suggests that the relationship between team proactivity and team viability is mediated by team affective tone. I tested this hypothesis by requesting indirect effects in *Mplus* with 1,000 bootstrapped iterations to generate standard errors and 95% confidence intervals. Results show only a trivial amount of variance is indirectly attributable to team-oriented proactivity for team viability through positive team affective tone (Sobel's  $Z = 0.69, n.s.$ ). Tests of the mediating effect of negative team affective tone are significant, however, when controlling for the effect of positive team affective tone (Sobel's  $Z = 2.24, p < .05$ ; 95% CI of the indirect effect = [.003, .077]). This suggests that a small amount of the variance associated with team oriented proactivity is transmitted through negative team affective tone to have a positive effect on viability. This finding will be addressed in the discussion section, below. Results using collective efficacy as a mediator also produced inconsequential effects (Sobel  $Z = 0.14, n.s.$ ). Hypothesis 6 is, therefore, partially supported.

Hypothesis 7 suggests that higher team levels of proactivity relate to increased team task performance. Using the height of towers assembled as the measure of team task performance produces a result that approaches significance ( $b = 1.91, p < .05$ ), suggesting support for this hypothesis. Hypothesis 8 states that this relationship is mediated by team affective tone and collective efficacy. I found no indirect effects through positive team affective tone (Sobel's  $Z = 0.17, n.s.$ ). Mediation through negative team affective tone produced a marginal effect (Sobel's  $Z = 1.64, p \leq .10$ ) although the 95% confidence interval for the indirect effect contained zero (95%

CI = [-.060, .007]). Mediation through collective efficacy produced a negligible result (Sobel's  $Z = 0.14$ , *n.s.*). Thus, hypothesis 8 is not supported.

### **Discussion**

This study makes a number of important contributions to the literature on teams and proactivity. One such contribution is demonstrating that proactivity within teams relates both team coordination processes and important team outcomes. Though the observed measure of proactivity fell short in this study, team members' aggregate perceptions of team-oriented proactivity does relate with important team processes such as collective efficacy and team affective tone, and outcomes such as viability and task performance. These are significant findings because, for one, a team's willingness to stay intact and work on future tasks together impacts team long-run effectiveness (Balkundi et al., 2009; Mathieu et al., 2008), not just short-run task performance. Specifically, teams higher in viability have opportunities to increase coordination processes such as transactive memory and shared mental models, subsequently increasing coordination processes and overall team effectiveness on team tasks. Likewise, the relationships between team-oriented proactivity and both affective tone and collective efficacy are substantial in that they reveal proactivity as a vital behavioral input for teams. This is the first study to demonstrate these relationships, to the best of my knowledge, and marks a first step toward understanding how proactivity relates to team effectiveness.

Another contribution of this study is in offering a new measure of proactive disposition. Aside from overcoming the methodological limitations of prior measures, this one not only arises from theory but also related more strongly to rates of proactive behaviors among team members than did other established scales. Further, the effect remained strong and significant even when

controlling for other personally factors including conscientiousness and extraversion—a result that the most commonly used measure of proactive personality failed to match.

One particularly interesting finding in this study is that negative team affective tone had a nonsignificant direct relationship with team-oriented proactivity, but mediation analyses suggest that negative affective tone is, in fact, a significant mediator between proactivity and team viability. Moreover, the indirect effect was positive, suggesting somewhat counter-intuitively that the effect of team-oriented proactivity that is transferred through negative affective tone increases team viability, if only slightly so. It may be that higher levels of shared affective tone increase team outcomes, even if that tone is negative. In other words, misery may love company, and misery with company may increase cohesion. Prior research has, in fact, supported similar findings, particularly that experienced negative emotions relate a desire to increase social connectedness and social behavior (e.g., Gray, Ishii, & Ambady, 2011). Further, research shows that teams that operate under high levels of time-pressure (and the resultant negative affectivity) actually experience increases in coordination activities and, subsequently, increased task performance, especially when those time pressures are combined with higher levels of ambiguity (Serfaty, Entin, & Volpe, 1993). Given that the teams in this study did work in an environment with high time pressures and ambiguity about completing the assigned task, and that team-oriented proactivity is a social behavior, it may be that the perceived stress of the task and environment influenced this finding such that higher levels of proactivity and agreement in negative affective tone do, in fact, increase team viability.

An area in which this study fell short, however, is the null finding for proactive behavior contagion. Though consistent with both theory and prior scholarship, no contagion effect for proactive behavior revealed itself. There could be a number of factors that influenced this

finding. It may be that the manipulation in the study was insufficient to create an environment that is supportive of proactive behaviors, perhaps because the exchange occurred between individuals external to the study. That is, perhaps a manipulation involving a confederate who was a member of the team as opposed to an outsider would have been more effective (c.f., Barsade, 2002). It could also be that conducting the manipulation while participants were already engaged in a task (i.e., completing a survey) prevented them from attending to the interaction. On the other hand, it may be that positive behaviors do not spread as readily as do negative behaviors. Indeed, the tradition of behavioral contagion lies in negative behaviors such as fighting (e.g., Redl, 1942) and rioting (e.g., Bohstedt, 1994), and more recently in studies of rudeness contagion (Foulek et al., 2016). A recent study involving hospital ICU teams used a fairly similar design to this study, with the manipulation involving an outsider to the team engaging in an act of incivility prior to a team training exercise (Riskin et al., 2015). Even with less than half the sample size of the present study, however, the incivility manipulation negatively and significantly influenced team outcomes including rudeness between team members, diagnostic errors, and treatment errors. In fact, video coders involved in the study also found reduced levels of collaboration and communication in the treatment groups. Thus, as suggested by others (e.g., Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001), it may be that negative behaviors are more salient than positive ones.

Despite null findings in the treatment groups for total and average levels of proactive behavior, there was some indication that the dispersion of proactive behaviors within teams was potentially affected by the treatment, with coefficients consistently negative even if falling short of statistical significance in treatment groups. Additional work is needed to assess the robustness of this finding, but these results may indicate that an environment that supports proactive

behaviors leads to a more even share of team-oriented proactivity within a team. Specifically, a lower rate of dispersion of such behaviors within a team, while accounting for the total amount of proactive behaviors, suggests that greater levels of consistency in behavior among team members. As such, an environment that reduces dispersion of these behaviors among team members—particularly when total levels of proactivity are higher—would be an important findings as it would indicate more consistency in the actions of team members. This higher rate of consistency may, then, relate to higher levels of coordination and subsequent performance, fostering greater rates of anticipation and cohesion among team members (e.g., Lim & Klein, 2006). Scholars should consider additional team-level inputs in investigating this further, such as team tenure and functional similarity, especially since participants in this study were largely strangers and frequently from very different majors.

### **Practical Implications**

Although results of this study were not supportive of contagion effects of team-oriented proactivity, the aggregate perceptions of team-oriented proactivity were related to increases in team processes and team viability. That is, when team members perceived their group as more prone to engage in proactivity—whether or not video coders agreed—team effectiveness increased. Although the manipulation did not prove effective in this instance, theory and prior research suggest that maintaining a supportive and conducive environment for teams and for proactive behaviors is important for enhancing team effectiveness (e.g., Baer & Frese, 2003; Fischer et al., 2014), and the relationship between perceived team-oriented proactivity and important team processes and outcomes in this study suggests that creating opportunities for such behaviors within teams is wise.

Another important point is that higher mean levels (and lower levels of dispersion) of proactive disposition related to team-oriented proactivity, and did so incrementally beyond extraversion and conscientiousness. While the importance of typical (e.g., Five factor model) personality composition in teams is well established (e.g., Mathieu, Tannenbaum, Donsbach, & Alliger, 2014), this work demonstrates that proactive disposition is also important in facilitating team outcomes. Managers and team leaders can utilize this information to assemble teams with higher mean levels of proactive disposition, and/or lower disparity among team members in levels of proactive disposition.

### **Limitations and Future Research**

As with all studies, this work is not without limitations. One such limitation revolves around the sample. As noted above, students engaging in this study were largely strangers prior to the team activity, which limits the generalizability to work teams. More specifically, teams in organizations are more likely to have worked together before and have preexisting transactive memory systems in place, while teams in this lab study had no prior knowledge of individual's strengths or abilities. However, this external generalizability is a weakness common to laboratory studies (Campbell & Stanley, 1963), and the students who participated in this study had experience working in student teams prior to participating in the study. In fact, the majority of participants indicated that they worked as a member of a team at work or school at least "somewhat often." Further, the need to quickly coalesce with team members, even though they were strangers, to accomplish a task against a tight deadline may enhance the fidelity of these results since it simulates the dynamic and unpredictable environment in which work teams commonly operate (Mathieu et al., 2008). Researchers should investigate the role of proactivity, and particularly proactive behavior contagion, in different settings to assess how different levels

of tenure and KSAOs, as well as how differing levels of dynamic environments, impact these variables.

Lower power arising from the comparatively small number of groups is also a concern with this sample, several of the effects reported here failed to achieve conventional levels of significance. However, reporting effects that approach significance (i.e.  $p < .10$ ) has value in adding to the overall picture of findings. More specifically, a number of effects displayed significance probabilities that only just miss the standard significance cutoff (e.g.,  $p = .055$ ), a result that may be different with higher power. Consequently, I feel that presenting such findings as marginally significant provides a clearer view of the relationships in this study than would manifest by treating such findings as categorically nonsignificant and, therefore, without meaning. Further, addressing findings in this way reveals directions that warrant future attention from scholars. Investigating and advancing these findings with wider samples will, then, enhance our understanding of these phenomena.

One final limitation of the lab study is that results in predicting team performance were comparatively weak. Specifically, the mediational effects of proactivity upon performance through process variables were not influential. One cause of this may be the atypical nature of the performance variable, namely the height of towers constructed by the teams. Specifically, 20 of the 53 teams that participated in the study assembled towers that collapsed before being measured. While the object of the team activity was to ensure that the tower would ultimately stand, and failure to achieve this goal represents failure to accomplish the desired performance outcome, a number of factors influence this. For instance, many teams assembled a standing tower with time to spare, then attempted to make it taller with the time remaining, only to topple the tower as a result. Others built tall structures but neglected to place the marshmallow on it

until time was expiring, thus leaving little time to make adjustments when the weight of the marshmallow rendered the tower structurally unsound. Conversely, some teams assembled towers that did maintain structural integrity but were small compared to most assembled structures. These groups typically completed the task with sufficient time remaining to improve their structures, but elected not to. Ultimately, each team received clear instructions on what their goal was, and failing to achieve that goal is a *de facto* failure to perform. Nevertheless, it stands to reason that team performance is more complex than the measurement used in this study. It is important that scholars consider a range of options in measuring team performance outcomes to clarify the relationships in this study.

Additional opportunities for future research suggested by these results include utilizing the measure of proactive disposition offered in this study, and investigating curvilinearity in some of the effects reported here. To the former point, this new measure of proactive disposition displayed stronger relationships with the key outcome (i.e., proactivity) than more commonly used measures as well as discriminant validity above and beyond five factor traits. Consequently, utilizing this new measure may reveal a clearer view of how proactive disposition influences important outcomes at both the team and the individual level. As for curvilinearity in reported relationships, the mediational effects of team affective tone in particular warrant further investigation. For instance, negative team affective tone was a significant mediator where positive affect was not. However, it seems plausible that this relationship would not hold at higher levels of shared negative affect. Likewise, there was greater variability in the measure of positive affect (as shown in Table 6), and positive affect displayed a direct relationship with both team-oriented proactivity and team viability, but not a mediational effect. It may be that the

influence of positive team affective tone is non-linear, presenting an opportunity for future research.

### **General Discussion**

Work teams are an increasingly important component of organizational effectiveness, especially in unpredictable and dynamic environments (Ilgen et al., 2005; Mathieu et al., 2008), and understanding how individuals work together to achieve common goals in such unstructured environments is an important means of understanding the mechanisms that lead to team success. The two studies in this work demonstrate that team-oriented proactivity is one of the key drivers of this success. Specifically, the field study provides external validity for the influence of team-oriented proactivity upon team coordination and, subsequently, on team performance, while the lab study offers internal validity for the relationship of proactivity with mediating team processes and team viability. This work is important for several reasons. First, this marks the first concerted effort to understand proactivity as a team level input, and particularly its relationship with performance outcomes. While a considerable body of research has considered the effect of proactivity on individual-level outcomes (Spitzmuller et al., 2015; Tornau & Frese, 2013), and a growing body of research has considered team-oriented proactivity on such outcomes as observed leadership potential (Hirschfeld et al., 2008) and team innovation (Chen et al., 2013), or as a team-level outcome unto itself (e.g., Druskat & Kayes, 2000; Kirkman & Rosen, 1999), this is the first concerted effort to assess team-oriented proactivity's role in the IMOI model of team effectiveness.

Findings in both the field and lab study support proactivity's relationship with team processes including coordination, collective efficacy, and team affective tone, providing support for team-oriented proactivity as a crucial behavioral input for team success. Likewise, results

from both studies demonstrate that team-oriented proactivity has both direct and mediated effects on team performance outcomes as well as on team viability. These are important findings in elucidating the factors that lead teams to succeed in dynamic environments, and in understanding how proactivity impacts team processes and outcomes. For instance, results of both studies reveal that team-oriented proactivity has a consistent relationship with process factors, though somewhat less consistent relationships with outcome variables. While the field study suggests that the weaker relationship with outcomes is partly due to non-linear effects of proactivity upon team performance (insofar as extreme levels of high or low proactivity have less of an effective on outcomes, ultimately washing out the total direct effect), it also stands to reason that team-oriented proactivity unto itself does not substantially improve team outcomes unless the team is adequately able to process and utilize those inputs, as discussed above. For instance, results from the lab study demonstrate a fairly consistent relationship between team-oriented proactivity and team affective tone and collective efficacy, and a mediated influence on team viability. As consistent with SCT, which states that inputs such as proactive behaviors must interact with a conducive environment to affect team outcomes, these findings suggest that teams with higher levels of shared belief in the team and shared emotional states from working together are better able to apply those behaviors toward task resolution. This is especially salient given the weak and/or null direct effects of proactivity upon team performance in these two studies.

Yet, while the findings lend support to the IMOI model of team effectiveness and demonstrate the soundness of the basic premises of collective-level SCT, they also raise questions about the fidelity of the theory. As discussed above, the prominent role of team processes across both studies is perhaps not fully accounted for in SCT, which treats inputs and process factors as roughly equal. This suggests that collective-level SCT may lack the specificity

to fully explain team effectiveness, and that a more pronounced role for team processes is called for. Teams scholars should consider this and further test the applicability of SCT to team-level phenomena. Perhaps the opportunity rests in combining the IMO model with SCT, as done in this study. To wit, while the IMO model is not a theory *per se* but rather a framework, it provides a degree of precision that seems to be lacking from SCT. Whatever the case, there appear to be more processes than merely collective efficacy that mediate the interaction between inputs and constraints and team outcomes.

In sum, the two studies presented in this research advance our understanding of how proactive behaviors influence team effectiveness, suggesting that agency within teams is a positive influence on team processes outcomes, but with limitations. Specifically, non-linear effects presented here reveal that too much proactivity has a TMGT effect with diminishing utility at higher levels. Future research should consider the nature of these relationships in subsequent research, particularly in further illuminating why very high or low levels of proactivity are actually unproductive to team success. Perhaps additional variables, such as team structure or leadership, influence whether team-oriented proactivity is valuable at high and low levels. Consequently, little research to date has considered that relationships involving proactivity at the individual level may not be linear. As such, opportunities abound for exploring the nature of this relationship in more detail.

Likewise, while this work contains modest support for a direct effect of proactivity on team outcomes, the role of team processes appears to be a greater factor in influencing those outcomes, with team-oriented proactive behavior influencing processes (i.e., team coordination, team affective tone, and collective efficacy) and proactivity's relationship with outcomes being generally strengthened when those processes are strong. Given that these findings are the result

of the first thorough investigation into these relationships, this work can serve as a foundational work for future research to build upon. Specifically, further consideration of the fit between SCT and the IMOI is warranted as SCT appears to give too little significance to the role of coordination and process factors within teams, and the IMOI is a general framework that lacks the predictive hallmarks of sound theory. Further, while this work marks a first step toward understanding proactive behavior as a key input for team effectiveness, more work is needed to understand other variables that might influence these relationships. Contextual factors, such as leadership, organizational structure, and ambiguity are just some of the influences that might influence the nature and direction of proactivity's impact on team outcomes, much as has been previously demonstrated at the individual level (e.g., Frese et al., 1996; Fryer & Payne, 1984; Martin, Liao, & Campbell, 2013; Parker & Collins, 2010). Given the increasing importance of teams and of working in dynamic environments, further exploring the nature of team-oriented proactivity will provide valuable knowledge for both scholars and managers.

### **Conclusion**

This research uses SCT as a grounding theory to offer a typology for grouping agentic behaviors around the concepts of intentionality, forethought, and self-reactiveness; combines the predictions of SCT with the IMOI framework of team effectiveness to explain how team-oriented proactive behavior impacts team processes and outcomes; and introduces a new measure of proactive disposition. In two studies, I found that team-oriented proactive behaviors have a direct relationship with team performance, but the effect is limited. More substantially, team-oriented proactive behaviors and perceptions of team proactivity positively relate to team processes such as team coordination, team affective tone, and collective efficacy. These process variables have more substantial associations with team performance outcomes, and mediate the

impact of team-oriented proactivity upon team performance. I also found preliminary evidence for the incremental validity of the new measure of proactive disposition over the more traditional measure of proactive personality. Overall, this work furthers our understanding of how proactivity relates to team effectiveness, particularly through important team processes. These findings suggest that collective SCT fails to fully account for the important mediating role of team processes beyond collective efficacy, and that combining the theory with facets from the IMOI framework provides a more robust explanation for team effectiveness.

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APPENDIX

I: EXPERIMENTAL STUDY IRB EXEMPTION APPROVAL

ACTION ON EXEMPTION APPROVAL REQUEST



TO: Erik Taylor  
Management

FROM: Dennis Landin  
Chair, Institutional Review Board

DATE: September 9, 2016

RE: IRB# E10037

TITLE: A study of the contribution of team-oriented behaviors to overall team effectiveness

Institutional Review Board  
Dr. Dennis Landin, Chair  
130 David Boyd Hall  
Baton Rouge, LA 70803  
P: 225.578.8892  
F: 225.578.5983  
[irb@lsu.edu](mailto:irb@lsu.edu) | [lsu.edu/irb](http://lsu.edu/irb)

New Protocol/Modification/Continuation: New Protocol

Review Date: 9/9/2016

Approved X Disapproved \_\_\_\_\_

Approval Date: 9/9/2016 Approval Expiration Date: 9/8/2019

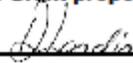
Exemption Category/Paragraph: 2b

Signed Consent Waived?: No

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING – Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.**

\*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

## II: EXPERIMENTAL STUDY CONSENT FORM

### A Study of the Contribution of Team-Oriented Behaviors to Overall Team Effectiveness

Erik Taylor

Jeremy Beus, PhD

#### Consent Form

1. Study Title: A Study of the Contribution of Team-Oriented Behaviors to Overall Team Effectiveness
2. Performance Site: Via the Marketing Department Behavioral Lab
3. Investigators: The investigators are available for questions about this study, Monday through Friday, 9am-5pm.  
Erik Taylor, 336-926-6468  
Dr. Jeremy Beus, 225-578-6150
4. Purpose of the study: This study investigates personal and group factors that impact the effectiveness of teams in performing a given task
5. Subject Inclusion: Individuals between the ages of 18 and 65 who are not pregnant, not incarcerated, and do not report psychological or neurological conditions, and who are enrolled in the LSU behavioral lab for course extra credit.
6. Number of Subjects: 200-400
7. Study Procedures: The study will consist of a brief survey that asks about personal characteristics and preferences. The group will then be assigned an activity to complete together, after which a short survey will ask questions about the individual's views of the team's effectiveness. The period for these activities is 30 minutes.
8. Benefits: All participants will receive extra course credit through the behavioral lab SONA system. Additionally, the team with the tallest structure this semester will be rewarded with \$25 Amazon gift cards for each team member via email at the end of the semester.
9. Risks: The only study risk is the inadvertent release of information. Every effort will be made to maintain confidentiality of the study records. Files will not include participant names or phone numbers, and will be secured electronically on a University computer.
10. Right to Refuse: Participants may choose not to participate or to withdraw from the study at any time without penalty.
11. Privacy: Results of the study may be published, but no names or identifying information will be included in the publication. Participant identity will remain confidential unless disclosure is required by law.
12. Questions: You may direct any questions to the experimenter, or you may contact the investigators at the phone numbers and/or email addresses listed above at any time.

13: Consent to Recording: In order to transcribe the team activity in this experiment, we would like to make an audiovisual recording of this session. The audiovisual recording will be used *only* for transcribing original study data, and *only* members of the research team will have access to the audiovisual recording. During the course of the study, the recordings will be kept on a secure university computer. Once the study is completed (after roughly 12 months), the audiovisual recording will be destroyed.

14: Signature: The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators. If I have questions about participants' rights or other concerns, I can contact Dennis Landin, Institutional Review Board, (225) 578-8692, [irb@lsu.edu](mailto:irb@lsu.edu), [www.lsu.edu/irb](http://www.lsu.edu/irb). I agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Participant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### III: EXPERIMENTAL STUDY PRE-ACTIVITY ASSESSMENT

TEAM # \_\_\_\_\_

PARTICIPANT # \_\_\_\_\_

These questions are intended to help us better understand our experiment participants. Please remember that this form is completed anonymously and your answers will not be used to identify you.

*Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”*

**1. When I have a choice, I try to work in a group instead of by myself.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**2. I prefer to work on a team rather than on individual tasks.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**3. Working in a group is better than working alone.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**4. Given the choice, I would prefer to do a job where I can work alone rather one where I have to work with others in a group.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**5. I prefer to do my own work and let others do theirs.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

*Please answer the following question based upon your work and school experience.*

**6. How often have you worked as a member of a group or team in a work or school setting?**

Very Seldom    Seldom    Somewhat Seldom    Undecided    Somewhat Often    Often    Very Often  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”

**7. I am the life of the party.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**8. I don’t talk a lot.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**9. I talk to a lot of different people at parties.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**10. I keep in the background.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**11. I sympathize with others’ feelings.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**12. I am not interested in other people’s problems.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**13. I feel others’ emotions.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**14. I am not really interested in others.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**15. I get chores done right away.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”

**16. I often forget to put things back in their proper place.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**17. I like order.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**18. I make a mess of things.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**19. I have frequent mood swings.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**20. I am relaxed most of the time.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**21. I get upset easily.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**22. I seldom feel blue.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**23. I have a vivid imagination.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**24. I am not interested in abstract ideas.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”

**25. I have difficulty understanding abstract ideas.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**26. I do not have a good imagination.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**27. I am constantly on the lookout for new ways to improve my life.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**28. Wherever I have been, I have been a powerful force for constructive change.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**29. Nothing is more exciting than seeing my ideas turn into reality.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**30. If I see something I don't like, I fix it.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**31. No matter what the odds, if I believe in something I will make it happen.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**32. I love being a champion for my ideas, even against others opposition.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**33. I excel at identifying opportunities.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”

**34. I am always looking for better ways to do things.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**35. If I believe in an idea, no obstacle will prevent me from making it happen.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**36. I can spot a good opportunity long before others can.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**37. When I encounter a problem, I try to solve it.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**38. I am a self-starter.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**39. When I run into a problem with my work, I start looking for solutions right away.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**40. I don't wait for others to tell me how to overcome obstacles.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**41. I always take an active approach to solving problems.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**42. I excel at overcoming challenges.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

*Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”*

**43. When I encounter a problem in my work, I just work harder.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**44. I work hard to overcome challenges.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**45. When I see something that needs to be accomplished, I start working on it.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree  
①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**46. Please fill in the bubble that best describes you.**

Male                       Female                       Prefer not to identify

**47. Please enter your age in years: \_\_\_\_\_**

**48. Please fill in the bubble that best describes you.**

Business or Related Major                       Engineering Major                       Other Major

**49. Please fill in the bubble that best describes you.**

Freshman                       Sophomore                       Junior                       Senior

**50. Have you heard of or had prior experience with “The Marshmallow Challenge?”**

Yes                       No

#### IV: EXPERIMENTAL POST-ACTIVITY ASSESSMENT

Thinking about the group you just worked with, Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”

**1. The group I worked with has above average ability.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**2. The group I worked with is poor compared to other groups I have worked with.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**3. This group was not able to perform as well as it should have.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**4. The members of this group have the skills to complete tasks.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**5. Some members of this group should be removed due to a lack of ability.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**6. This group is very effective.**

Very Seldom	Seldom	Somewhat Seldom	Undecided	Somewhat Often	Often	Very Often
①	②	③	④	⑤	⑥	⑦

**7. I would like to work with this team on future tasks.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**8. I would be willing to continue working with this team.**

Strongly Disagree	Disagree	Somewhat Disagree	Undecided	Somewhat Agree	Agree	Strongly Agree
①	②	③	④	⑤	⑥	⑦

**9. I would be happy to work with this team again.**

Strongly Disagree    Disagree    Somewhat Disagree    Undecided    Somewhat Agree    Agree    Strongly Agree

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

Based on your experience with this group, please fill in the blank to indicate extent to which you felt this way **during the group activity.**

1	2	3	4	5
Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely

\_\_\_\_\_ **10. Interested**

\_\_\_\_\_ **20. Irritable**

\_\_\_\_\_ **11. Distressed**

\_\_\_\_\_ **21. Alert**

\_\_\_\_\_ **12. Excited**

\_\_\_\_\_ **22. Ashamed**

\_\_\_\_\_ **13. Upset**

\_\_\_\_\_ **23. Inspired**

\_\_\_\_\_ **14. Strong**

\_\_\_\_\_ **24. Nervous**

\_\_\_\_\_ **15. Guilty**

\_\_\_\_\_ **25. Determined**

\_\_\_\_\_ **16. Scared**

\_\_\_\_\_ **26. Attentive**

\_\_\_\_\_ **17. Hostile**

\_\_\_\_\_ **27. Jittery**

\_\_\_\_\_ **18. Enthusiastic**

\_\_\_\_\_ **28. Active**

\_\_\_\_\_ **19. Proud**

\_\_\_\_\_ **29. Afraid**

Please fill in the bubble that best reflects the extent to which you agree or disagree with each of the following statements, where 1 is “strongly disagree” and 7 is “strongly agree.”

**How likely are members of this team to:**

**30. suggest to the team a different way to solve a problem?**

Very unlikely      Unlikely      Somewhat unlikely      Undecided      Somewhat Likely      Likely      Very likely

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**31. volunteer to help each other with work?**

Very unlikely      Unlikely      Somewhat unlikely      Undecided      Somewhat Likely      Likely      Very likely

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**32. take on extra work?**

Very unlikely      Unlikely      Somewhat unlikely      Undecided      Somewhat Likely      Likely      Very likely

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**33. suggest new ways of organizing the team?**

Very unlikely      Unlikely      Somewhat unlikely      Undecided      Somewhat Likely      Likely      Very likely

①                      ②                      ③                      ④                      ⑤                      ⑥                      ⑦

**34. On a scale of 1-10, how would you rate the experimenter’s helpfulness in completing the task (1=extremely UNhelpful, 10=extremely helpful)?** \_\_\_\_\_

**35. On a scale of 1-10, how willing were you to help your teammates after completing the initial survey (1=extremely UNwilling, 10=extremely willing)?** \_\_\_\_\_

**36. Did you suspect that the purpose of the activity was something other than what was stated by the experimenter? If so, what did you suspect the purpose was?**

## V: MATLAB HEATMAP ALGORITHM

```
A = imread('file.fmt'); % import het map image

[lines, columns]=find(A(:,:,1)<100 & A(:,:,2)>10 & A(:,:,3)<100); % identify the lines and
columns of the "data_double" matrix that represent the green pixels

Mean_coordinates = [mean(columns) mean(lines)]; % calculate the mean pixel coordinates

X = columns * .184859 % convert columns from pixels to meters (105/568)

Y = lines * .19941 % convert lines from pixels to meters (68/641)

XY = [X Y] % combine X & Y into a single matrix

[eigenvectors, scores, eigenvalues]=princomp(XY); % conduct principal components analysis
and save the results, including eigenvectors and eigenvalues
```

## VI: MATLAB NETWORK ANALYSIS ALGORITHM

```
X = [ input matrix]; % Read in the appropriate matrix  
  
node_names = {'A','B','C','D','E','F','G','H','I','J','K'}; % Assign names to nodes  
  
G = digraph(X,node_names) % Graph matrix  
  
G.Edges %Check matrix values  
  
plot(G,'Layout','force') %Graph the network  
  
C = centrality(G,'betweenness') % Compute centrality scores
```

## VITA

Erik Taylor is a Leo and a college football fan. He has swam a mile in Lake Pontchartrain, fallen into the Potomac River in front of the Lincoln Memorial, and encountered a 10-foot tiger shark in the open ocean. He has visited 4 countries, 3 estados, 2 provinces, 29 states, and the District of Columbia. He once got stuck in the elevator of a Leggett's department store. Leggett's has since been acquired.