

THESIS

EMPLOYEE ENGAGEMENT IN THE INTERPERSONAL CONTEXT

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ABSTRACT

EMPLOYEE ENGAGEMENT IN THE INTERPERSONAL CONTEXT

To advance the theoretical understanding and research on engagement, I examined how engagement spreads within the interpersonal context. I developed and tested a theoretical framework built upon Kahn's (1990) conceptualization of employee engagement, Byrne's (2015) newly proposed mechanism of engagement contagion, and research on team dynamics. The study sample included students ($N = 148$) working in teams on a semester-long course project. Through the measurement of engagement levels and individual differences related to emotional and cognitive contagion, I assessed two potential mechanisms for the transmission of engagement. Results showed that emotional contagion (as assessed with emotional contagion susceptibility) is not a significant predictor of change in affective engagement scores between two time points. Further, although cognitive contagion (as assessed with perceptions of shared mental models) significantly predicted change in cognitive engagement scores, students reporting higher levels of this construct experienced small changes in cognitive engagement. Based on these findings, recommendations for future research are discussed.

TABLE OF CONTENTS

ABSTRACT.....	ii
LIST OF TABLES.....	v
INTRODUCTION	1
Employee Engagement	3
The Spread of Engagement.....	6
Current Study	13
METHOD	18
Participants.....	18
Procedure	18
Measures	19
RESULTS	26
Change in Engagement	26
Study Hypotheses.....	26
Post-hoc Analyses.....	29
DISCUSSION.....	33
Study Strengths	36
Study Limitations.....	37
Future Research Directions.....	41
CONCLUSION.....	45
TABLES	46
REFERENCES	56

APPENDIX A.....	68
APPENDIX B.....	69

LIST OF TABLES

Table 1. Factor Loadings for Final Individual Perceptions of SMMs Scale	46
Table 2. Descriptive Statistics and Cronbach's Alpha for Main and Control Variables	47
Table 3. Correlations Among Main and Control Variables.....	48
Table 4. Confirmatory Factor Analysis Results for All Study Variables	49
Table 5. Regression Results for Affective Engagement Model.....	50
Table 6. Regression Results for Cognitive Engagement Model.....	51
Table 7. Regression Results for Overall Engagement Model.....	52
Table 8. Regression Results for Affective Engagement Model (Directional Difference Score)...	53
Table 9. Regression Results for Cognitive Engagement Model (Directional Difference Score)..	54
Table 10. Regression Results for Overall Engagement Model (Directional Difference Score)....	55

INTRODUCTION

In recent years, researchers have shown an increasing interest in employee engagement, the investment of one's energy into his or her work role (Kahn, 1990). This trend has been demonstrated through researchers' efforts to better understand what facilitates engagement and what positive outcomes can be derived from engaged employees (e.g., Cotter & Fouad, 2013; Menguc, Auh, Fisher, & Haddad, 2013; Petrou, Demerouti, Peeters, Schaufeli, & Hetland, 2012). As a result, researchers have shown that highly engaged employees demonstrate high job performance (Halbesleben, 2010; Salanova, Agut, & Peiro, 2005), high organizational citizenship behaviors (OCBs; Halbesleben & Wheeler, 2008; Saks, 2006), and low absence frequency (Schaufeli, Bakker, & Van Rhenen, 2009). In addition, researchers have shown that highly engaged employees report high organizational commitment (Demerouti, Bakker, de Jonge, Janssen, & Schaufeli, 2001; Karatepe, 2013) and low intentions to quit (Saks, 2006).

With these positive findings, it comes as little surprise that human resource (HR) professionals have been persuaded of the value of employee engagement. For instance, a survey of HR professionals conducted by the Society for Human Resource Management (SHRM) in 2012 revealed that 63% ($N = 767$) of organizations surveyed reported employee engagement as a very important challenge. From a more recent survey, Fallaw and Kantrowitz (2013) reported that the number one concern of a majority of HR professionals surveyed ($n = 592$) was employee engagement.

Just as employee engagement has garnered the attention of researchers and practitioners alike, so has the interpersonal context of work. The modern workplace is becoming increasingly more interdependent and team-based (Harrison, Johns, & Martocchio, 2000). Consequently, researchers have emphasized the importance of understanding the interpersonal context of work

and how it affects both the individual and his or her work (Barsade, 2002; Wharton, Rotolo, & Bird, 2000). The growing interest and focus in the interpersonal context of work is best demonstrated in the teams literature, as teams inherently contain an interpersonal element. Research on teams grew dramatically in the late 1980s through early 1990s, with scholars noting that the study of teams had come of age by the year 2000 (Cannon-Bowers & Bowers, 2010). In more recent years, research on teams has continued to flourish, as evidenced by the number of meta-analyses published to synthesize the knowledge collectively gained by the field (e.g., De Dreu & Weingart, 2003; LePine, Piccolo, Jackson, Mathieu, & Saul, 2008; Mesmer-Magnus & DeChurch, 2009).

Despite the recognition of the value of employee engagement and the interpersonal context, there is limited research examining the intersection of these two domains (Bakker, van Emmerik, & Euwema, 2006). One exception exists in the literature on leadership and engagement. Numerous researchers have studied the role of leaders in facilitating the engagement levels of their followers. For example, researchers have identified relationships between employee engagement and interpersonal (Hansen, Byrne, & Kiersch, 2014), transformational (Breevaart, Bakker, Hetland, Demerouti, Olsen, & Espevik, 2014; Kovjanic, Schuh, & Jonas, 2013), and charismatic leadership (Babcock-Roberson & Strickland, 2010). The second example of these two domains intersecting exists in the research on teams and engagement, because, as noted above, teams inherently include an interpersonal element (Kozlowski & Bell, 2003). Preliminary research on engagement in teams has demonstrated a number of positive outcomes associated with engagement aggregated to the team level. For example, studies have shown that employee engagement at the team level is positively related to

team performance (Bakker et al., 2006; Salanova, Llorens, Cifre, Martinez, & Schaufeli, 2003) and collective positive affect (Torrente, Salanova, Llorens, & Schaufeli, 2012).

Although the leadership and team approach to understanding engagement in the interpersonal context has been valuable, how individuals' engagement levels are fostered or inhibited within the interpersonal context is still largely unknown. Specifically, research is needed to better understand how an individual team member's engagement affects other team members; that is, how engagement spreads from one individual to another. Therefore, the primary focus of this study is to empirically examine how engagement is transmitted from person to person, or more broadly in the interpersonal context. Theoretically, engagement is transmitted through engagement contagion, which is comprised of three mechanisms: emotional contagion, cognitive contagion, and behavioral contagion (Byrne, 2015). The purpose of this study is to empirically examine this theoretical model by studying the role of these mechanisms in the transmission of engagement. To achieve this objective, I study individuals within teams because teams require interpersonal interaction and because they are becoming ubiquitous in today's organizations, making the contribution of this study both timely and of practical value.

Employee Engagement

Kahn (1990) defined employee engagement as "the harnessing of the organizational members' selves in their work roles" (p. 694). He explained that engagement reflects an individual's simultaneous investment of emotional, cognitive, and physical energy into his or her work role. Emotional investment in one's work is characterized by positive emotional connections to the work and to others. Cognitive investment involves having both mental awareness and focus during work activities. Lastly, physical investment refers to deliberate movement that is energetic and active on the job. Kahn (1992) additionally explained that even

though individuals can be involved in their roles emotionally, cognitively, or physically, engagement happens when these three investments occur simultaneously. That is, engagement is the synergistic and connected existence of these three components.

In addition to the components of engagement, Kahn (1990) described three main psychological conditions that are necessary antecedents for an individual to experience engagement at work. The three psychological conditions include psychological meaningfulness, psychological availability, and psychological safety. *Psychological meaningfulness* refers to a psychological state where individuals feel valuable, useful, able to give to others, and able to receive from others. This psychological condition is influenced by task characteristics, role characteristics, and work interactions. *Psychological availability* refers to a psychological state where individuals feel they are capable of bringing their physical, emotional, or cognitive resources into their work performances, without having to attend to the distractions of home or outside events. *Psychological safety* refers to a psychological state where individuals feel comfortable expressing their true selves “without fear of negative consequences to their self-image, status, or career” (Kahn, 1990, p. 708). Kahn explained the three psychological conditions are associated with three questions that individuals ask themselves, and based on the responses to these questions, an employee either engages or disengages. The three questions are: “(1) How meaningful is it for me to bring myself into this performance; (2) How safe is it do so; and (3) How available am I to do so” (Kahn, p. 703).

Each of the psychological conditions discussed above are largely influenced by interpersonal interactions (Kahn, 1990). Kahn and Heaphy (2014) equated the interpersonal context at work to the nervous system of the organization. Specifically, the interpersonal context at work serves as the source of interactions, requiring the rapid coordination of multiple systems,

and the integrated processing of simultaneously occurring signals. In addition, interpersonal interactions at work are considered a driving factor as to whether or not an individual experiences psychological meaningfulness at work (Kahn, 1990). Psychological meaningfulness can be enhanced through the deepening of purposes or the heightening of belongingness. In addition, psychological availability can also be influenced by the interpersonal context. Engagement requires physical, cognitive, and emotional resources. These resources are directly impacted, both positively and negatively, by interactions that occur at work. Interactions at work can be energizing and relieving or enervating and depleting. In addition, psychological safety is influenced by supportive and trusting coworker relationships. These relationships, characterized by positive regard, support, and trust allow individuals to attempt new behaviors or create new solutions, and even fail, without fearing ramifications (Kahn, 1990). The relationship between supportive and trusting coworker relationships and perceived psychological safety was empirically supported by May, Gilson, and Harter (2004).

Despite the theoretical supposition that interpersonal influences foster engagement, researchers have largely overlooked this perspective in their research (Kahn & Heaphy, 2014). For this reason, the same researcher who coined the term ‘employee engagement’ recently called for a closer examination of the “nature of relationships that facilitate or undermine personal engagement” (Kahn & Heaphy, 2014, p. 92). The current study answers this call by examining engagement within work teams, which present an opportunistic context for studying how interpersonal interactions relate to employee engagement. In particular, if the three main psychological condition antecedents for engagement are partially determined by interactions and relations between coworkers, a team possesses unique potential to foster individual team members’ engagement. Furthermore, examining engagement within teams allows for a better

understanding of how engagement operates in the broader interpersonal context. Although some researchers have taken advantage of this context for studying engagement, this potential has yet to be fully explored.

The Spread of Engagement

Components of engagement (i.e., dedication, vigor, absorption; Schaufeli, Salanova, González-Romá, & Bakker, 2002) at the individual level are positively related to engagement at the team level ($r = .63, .59, \text{ and } .67$, respectively; Bakker et al. 2006). Researchers have suggested that this relationship is evidence that individuals influence the engagement levels of their team members (Bakker et al., 2006). Kozlowski and Bell (2003) define a work team as:

collectives who exist to perform organizationally relevant tasks, share one or more common goals, interact socially, exhibit task interdependencies, maintain and manage boundaries, and are embedded in an organizational context that sets boundaries, constrains the team, and influences exchanges with other units in the broader entity (p. 334).

According to Kozlowski and Bell, team members interact socially, suggesting that teamwork may involve interpersonal exchanges that foster psychological meaningfulness, safety, and availability, which contribute to engagement. Still, little is known about how exactly engagement is shared between team members. Costa, Passos, and Bakker (2014) recently proposed that engagement at the team level emerges as an outcome of team processes. Despite a compelling theoretical explanation for the construct of team engagement, Costa et al.'s model does not explain how engagement moves from the individual team member to a group level construct, nor member to member.

A handful of researchers have recently speculated that engagement spreads through the psychological mechanism of emotional contagion (e.g., Bakker, Albrecht, & Leiter, 2011; Totterdell, Kellett, Teuchmann, & Briner, 1998). Although emotional contagion explains one piece of how engagement spreads, there are still two additional mechanisms that could advance the literature on how engagement is shared between team members. Specifically, these psychological mechanisms are cognitive and physical contagion, which both fall under the overall concept of *engagement contagion* (Byrne, 2015). Byrne proposed that engagement contagion is the process of catching and transmitting engagement between individuals through emotional contagion, cognitive contagion, and behavioral contagion, aligning the three contagions with Kahn's (1990) three-component conceptualization of employee engagement. Although emotional contagion as a concept already exists (Hatfield, Cacioppo, & Rapson, 1994), Byrne was the first to introduce both cognitive and behavioral contagion. Further, Byrne proposed that it was the combination of these three forms of contagion that explains why engaged employees seem to become surrounded by other engaged employees, which then contributes to a positive and competitive work climate. To understand and then explore how engagement spreads in the interpersonal context, I first explain each of the contagions within engagement contagion.

Emotional Contagion Component of Engagement Contagion

Emotional contagion refers to the automatic and unconscious transfer of emotions between individuals (Hatfield et al., 1994). This transmission takes place as a result of individuals' implicit tendency to mimic and synchronize the facial expressions, vocalizations, postures, and movements of others. Through this mimicry and synchronization, the individual is cued to experience the emotion he or she is imitating (Chartrand & Bargh, 1999). There are

multiple contexts under which emotional contagion is especially likely to occur, yet it is believed that relatedness is one of the more important contexts for emotional contagion (Hatfield et al., 1994; Petitta & Naughton, 2015). Specifically, emotions have a higher potential to be transferred through emotional contagion if individuals perceive themselves as related or similar to others. Similarly, research has found that individuals working in teams are more sensitive to the emotional states expressed by their colleagues than are employees who work independently (Bakker, Westman, & van Emmerik, 2009). Because teams foster a sense of relatedness, an important context for emotional contagion, even research concerned with how emotional contagion from coworkers impacts an individual is embedded in the team context (Petitta & Naughton, 2015). Further, it is often easier to examine how an individual relates to his or her team members than it is to examine how that individual relates to every person that he or she happens to interact with at work (Petitta & Naughton, 2015).

Like earlier studies, although the current study is primarily interested in how emotional contagion from others impacts an individual, it is embedded in the team context. Although unrelated to engagement, Torrente et al. (2012) draw heavily from emotional contagion theory to provide a framework for their investigation of collective positive affect in work teams. Other researchers have cited emotional contagion theory to explain their results. For instance, through two studies, Totterdell et al. (1998) examined how individuals' moods were impacted by the collective mood of their work team. The first study involved the examination of 65 nurses over three weeks. Totterdell et al. found a significant relationship between the nurses' individual moods and those of their team members. In their second study, they examined nine accountants, who each rated his or her own mood, as well as the moods of each of his or her team members, three times a day for four weeks. The researchers found the accountants' moods and their

perceptions of their team members' moods were highly related to the collective mood of the team. As noted above, the researchers draw from emotional contagion theory to explain this relationship.

Although the above researchers speculated about the role of emotional contagion, both Torrente et al. (2012) and Totterdell et al. (1998) did not report any evidence of transmission. Despite the lack of empirical evidence, others have suggested that these studies provide support for the mechanism of emotional contagion.

A similar assumption about the role of emotional contagion has also surfaced in the engagement literature. Namely, researchers who have studied engagement in teams have hypothesized that emotional contagion is the reason for correlations between individual and team levels of engagement. For example, Bakker et al. (2006) found a relationship (i.e., they called it "crossover") between engagement at the individual level and at the team level. Although Bakker et al. (2006) did not measure any direct or indirect indicators of a contagion effect, they concluded this crossover resulted from emotional contagion.

Despite their methodological inadequacies, the studies discussed above advance the literature on emotional contagion by highlighting a gap in the literature. Specifically, the researchers acknowledge that until emotional contagion is investigated either indirectly or directly, an inability to draw firm conclusions about the spread of engagement via emotional contagion remains.

Cognitive Contagion Component of Engagement Contagion

Byrne (2015) proposed the term *cognitive contagion*, which she defined as "the shared creation of meaning, an understanding of how to make sense of the work tasks and work environment, while drawing on compatible or shared knowledge structures" (p. 145). She rooted

the term in theories and research pertaining to social information processing, shared mental models (SMMs), and contagion. Cognitive contagion is similar to emotional contagion in that it involves “catching” something from others, but it is different in that a team member may catch or absorb the cognitive approach, attitudes/beliefs, or judgments of other team members through communication or physical cues (Byrne, 2015).

Hinsz, Tindale, and Vollrath (1997) suggested that it is critical to understand how information is shared and collectively processed in the interpersonal context. To understand how this occurs, several researchers have pointed to SMMs (e.g., Santos, Uitdewilligen, & Passos, 2015a), which may be considered an outcome of cognitive contagion. SMMs are built upon individual mental models, which are mechanisms for people to describe, explain, and predict the behavior of systems (Jonker, van Riemsdijk, & Vermeulen, 2011). In the team context, the team *itself* serves as the system. Therefore, SMMs in the team context represent knowledge about the team and the team’s objectives shared among group members (Kraiger & Wenzel, 1997).

Many researchers have subsequently questioned *what* knowledge is shared in these mental models (e.g., Maynard & Gilson, 2014; Mohammed & Dumville, 2001). Cannon-Bowers and Salas (2001) took a comprehensive approach to explaining the knowledge represented in SMMs by proposing four broad categories of information shared: task-specific knowledge, task-related knowledge, knowledge of teammates, and attitudes and beliefs. The SMMs for task-specific knowledge may include very detailed and procedural information about how to perform a specific task. SMMs for task-related knowledge concerns other information that individuals possess and use as they perform a specific task. Knowledge of teammates refers to what the team members know about each other (e.g., strengths, weaknesses, preferences, tendencies). Therefore, SMMs for knowledge of teammates can include an understanding of group member

characteristics, such as strengths or perspectives (Barsade, 2002). Lastly, SMMs for attitudes and beliefs may include a shared idea about the value of working together as a team. It is both possible and common for teams to share numerous mental models (Kraiger & Wenzel, 1997). For instance, a team may share one mental model that concerns task-specific knowledge and another that concerns attitudes and beliefs.

Within teams research, researchers have shown that SMMs have a positive impact on both the team and the organization (Cannon-Bowers & Salas, 2001; Cannon-Bowers, Salas, & Converse, 1993; Maynard & Gilson, 2014; Santos et al., 2015a; Santos, Uitdewilligen, & Passos, 2015b). Effective information processing, which is beneficial for the team itself and the organization, requires SMMs (Moreland, Argote, & Krishnan, 1996; Santos et al., 2015b). In addition, SMMs allow team members to work together in a supportive environment, with group members interpreting and encoding information in a way that allows them to see how they can compensate for and support each other without first having to discuss the information (Cannon & Edmondson, 2001). SMMs are formed through language and communication, consequently making shared cognition a more conscious process than emotional contagion, which occurs at the unconscious level (Hatfield et al., 1994; Ilgen & Klein, 1989). Therefore, SMMs provide insight into how the cognitive component of employee engagement may be transmitted between team members or the broader interpersonal context.

Behavioral Contagion Component of Engagement Contagion

Although emotional contagion includes some physical cues from others, there is another mechanism that explains how the behavioral or physical component of engagement is transmitted in teams. According to Byrne (2015), the adoption of other team members' behaviors may be explained through *behavioral contagion*, which relies on a perception-behavior link. The

perception-behavior link, or how individuals take on and emulate the behaviors of those around them, occurs through the chameleon effect (Bargh, Chen, & Burrows, 1996; Chartrand & Bargh, 1999). Specifically, the chameleon effect is the unconscious mimicry of facial expressions, mannerisms, postures, and other's behaviors. Within the interpersonal context, individuals mimic the body language and physical behaviors of those around them. Individuals do not necessarily have to be aware of others' behaviors to mimic them. Through the chameleon effect, an individual's behavior passively and unintentionally changes to match the behavior of those around him or her. Therefore, in the case of teams, the mimicry of other team members' behaviors subsequently impacts how team members interact with each other (Chartrand & Bargh, 1999).

Individuals who experience employee engagement have a tendency to display several behaviors. First, engagement behaviors include those that portray a sense of arousal, excitement, and energy (Kahn, 1990). These behaviors can be subtle (e.g., the use of hand gestures to emphasize certain points) or obvious, though the subtle forms of engagement behaviors may be more common. Through the perception-behavior link, engaged team members share their physical engagement by transmitting behaviors indicative of the physical component of engagement to other members. The other team members then experience their own physical arousal through their unconscious mimicry of pace, body language, and expression. According to Byrne (2015), the transmission of the physical component of engagement via this perception-behavior link is referred to as behavioral contagion.

For completeness, I included behavioral contagion in my overall conceptual model to illustrate how engagement is transmitted between individuals, but this aspect of the model is not tested in the current study. To accurately assess physical contagion would have been beyond the

scope of the study as it would require video recording team interactions and subsequently coding for both subtle and obvious engagement behaviors.

Current Study

Engagement contagion can occur quickly, but for noticeable changes in engagement levels, individuals most likely have to interact frequently and/or over time. To assess a contagion effect, a longitudinal or multiple time point study may be the best research design. Therefore, in the current study, I examined engagement contagion at two time points, once at the start of the semester (when teams first formed) and then again at the end of the semester (when teams completed their tasks), in teams where members were expected to interact frequently and over time given an interdependent class project. If engagement contagion occurs, participants should experience changes in their engagement levels as they mimic those of their team members; either increasing or decreasing depending on the team member and his or her starting levels of engagement. For example, it may be that individuals starting out with high levels of engagement dampen their engagement as they mimic their team members with low levels of engagement. The opposite may also occur – that initially low engaged members become highly engaged after “catching” engagement from their teammates.

When discussing how an individual’s engagement may change, it is important to consider existing research on engagement at the individual level. Existing engagement research suggests that an individual’s engagement levels should be moderately correlated over time (e.g., Brauchli, Schaufeli, Jenny, Fullemann, & Bauer, 2013; Leroy, Anseel, Dimitrova, & Sels, 2013). More specifically, researchers have speculated that an individual’s engagement levels are correlated across multiple time points because a component of engagement is stable. For instance, Brauchli et al. (2013) examined engagement over three years, with one year intervals between each

measure. Brauchli et al. then disentangled the variance of engagement scores by partitioning them into a stable component that is due to personal and or environmental characteristics (i.e., stable resources and stable demands) and a change component that is due to changes in the work environment (i.e., changing resources and changing demands). This approach revealed that over 50% of the variance in engagement was accounted for by a stable component. Although Brauchli et al. offer little clarification as to what falls within this stable component, other researchers have also investigated the stable components that influence an individual's engagement. Much of this investigation has focused on personality, which is regarded as relatively stable (Cobb-Clark & Schurer, 2012; McCrae & Costa, 1994). For example, Mostert and Rothmann (2006) found that engagement is positively correlated with conscientiousness, emotional stability, agreeableness, and extraversion. More recently, Zecca, Györkös, Becker, Massoudi, de Bruin and Rossier (2015) have provided additional support for conscientiousness, extraversion, and emotional stability being positively related to engagement. Similarly, Akhtar, Boustani, Tsivrikos, and Chamorro-Premuzic (2015) determined that conscientiousness, extraversion, and openness to experience are all predictors of engagement. That an individual's engagement is influenced by his or her personality has implications for how that individual's engagement will change over time, even in the interpersonal context. Although engagement contagion theory suggests that an individual's engagement levels may change over time due to the influence of interpersonal interactions, this change is unlikely to be drastic given the portion of variance in engagement that is accounted for by stable personal characteristics. Given the extant literature on the stability and variability of engagement over time reviewed above, I hypothesize a small to moderate correlation between an individual's engagement levels over time.

Hypothesis 1: Individuals' engagement at Time 1 is positively and small to moderately correlated with their engagement at Time 2.

Engagement contagion is composed of three parts, two of which are the focus of the current study: emotional and cognitive contagion. Although contagion may occur in the team or interpersonal context, the actual changes and outcomes occur at the individual level. Examining changes at the individual level is consistent with previous research on contagion (e.g., Barger & Grandey, 2006; Barsade, 2002; Pugh, 2001). A problem with contagion research, however, is that there are currently no measures or effective mechanisms for assessing contagion. Therefore, I examined evidence that these processes occurred by assessing changes in engagement levels between the start and end of a semester long project.

Susceptibility to emotional contagion. Some people are more susceptible to emotional mimicry than others. Applied to emotional contagion, susceptibility to emotional contagion is defined as the automatic tendency to mimic and synchronize with the expressions of others (Doherty, 1997). An individual with high susceptibility to emotional contagion is more likely to automatically and closely mimic the emotional expressions of those around him or her than someone with low susceptibility (Ilies, Wagner, & Morgeson, 2007). In support, Johnson (2008) investigated how emotional contagion, as measured through susceptibility to emotional contagion, was related to the relationship between leader and follower affect at work. Johnson found that a follower's positive and negative affect related to the leader's affect. Moreover, susceptibility moderated this relationship such that followers with high susceptibility to emotional contagion showed a stronger relationship with the leader's affect levels than those with low susceptibility.

Similarly, Ilies et al. (2007) argued that if emotional contagion has an influence on the relationship between a construct at the individual and at the team level, individual differences in emotional contagion susceptibility should moderate the strength of that relationship. They found an individual team members' emotion state was significantly related to the average emotional state of the team, and this relationship was moderated by individual differences in susceptibility to emotional contagion.

Consistent with these previous studies, I propose that emotional contagion susceptibility will help explain individuals' changes in engagement levels over time. Although I acknowledge that susceptibility is not the same as assessing the contagion itself, using the same logic as Johnson (2008) and Ilies et al. (2007), if contagion exists and some individuals are more susceptible to it than others, those higher in emotional contagion susceptibility should be more impacted by team member interactions than others.

Hypothesis 2: Change in affective engagement is dependent on levels of emotional contagion susceptibility, such that those with high emotional contagion susceptibility report significantly higher changes in affective engagement than those with low emotional contagion susceptibility.

SMM perceptions. Cognitive contagion is another mechanism by which individuals share their engagement levels with team members (Byrne, 2015). SMMs may be considered an outcome of cognitive contagion because as individuals work together over time, they share their mental models of how to achieve the task, what knowledge is required to do so, and how they perceive the task (e.g., hard or easy). In the current study, it is more important that an individual perceives the existence of SMMs within his or her team. For example, rather than having evidence that all team members have the same goal in mind, a single member believing that the

team shares a goal is enough to influence that individual's behavior. More specifically, the other team members may be striving for a range of grades on the project, however if a single member believes the team shares a goal of earning an A, it may influence that single member to be more engaged. Therefore, individual perceptions of SMMs refer to an individual team member's perception that SMMs exist within his or her team. When individual members report higher perceptions of SMMs, it may be an indication that cognitive contagion has occurred. Thus, I propose, based on Byrne's (2015) cognitive contagion, that an individual's change in engagement levels depends on his or her perceptions of SMMs.

Hypothesis 3: Change in cognitive engagement is dependent on individuals' perceptions of SMMs, such that those with high perceptions of SMMs report significantly higher changes in cognitive engagement than those with low perceptions of SMMs.

METHOD

Participants

Participants were undergraduate senior-level business students recruited at a large university in the western United States. Students were randomly assigned to teams, consisting of 3-4 members, charged with completing a semester-long team project. An invitation to participate in the study was distributed to 212 students and a total of 148 students participated in both surveys, resulting in a response rate of 69.8%. Participants were generally homogeneous in age ($M = 21.40$, $SD = 2.82$). 55.4% of participants identified as female and 44.6% of participants identified as male. Further, participants predominately identified as White or Non-Hispanic (83.1%). Other races represented in the sample include Hispanic or Latino (5.4%), Asian (4.7%), two or more races (4.1%), Black or African American (2.0%) and American Indian or Alaska Native (0.7%).

Four class sections of the same course offered by a single instructor were recruited for participation. Students who completed both surveys received five extra credit points towards their final course grade, which is equivalent to 1.4% of the total course grade. To further incentivize participants, all students who completed both surveys were entered into a random drawing for a \$50 Visa gift card. The gift card winner was selected after the close of the second survey.

Procedure

All participants completed online surveys that assessed their engagement levels at two points. The first time point occurred immediately after individuals were assigned to teams for the course project at the start of the semester, and was intended as a baseline measure of engagement. The second time point occurred at the end of the semester, and aligned with the

final project deliverable, giving reason to believe that it followed a period of increased team interaction (Gersick, 1992). Both surveys remained open for 10 days and participants were sent reminders to complete the surveys.

Instructions for each survey specified that participants should respond to the items in regards to their roles within the project. These instructions were provided to discourage participants from incorporating perceptions of their engagement levels in regard to other aspects of the course, such as individual assignments and exams. Some variables were assessed at both time points, whereas others were only included on one survey. See Appendix A for which measures were included at each time point.

A common criticism of relying only on self-report measures is that these assessments suffer from common method bias due to socially desirable responding, scales with confounding items, and lack of privacy for participants (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Therefore, to minimize the potentially negative effects of common method bias, I took actions recommended by Podsakoff et al. (2003). Specifically, to minimize the role of social desirability, I promised participants anonymity and provided additional privacy by allowing participants to complete the survey online from any location. In addition, wherever possible, I used established scales. When established scales were not available, I developed new scales attempting to avoid confounding items with existing scales and had colleagues review them for clarity. Lastly, I assessed participants at two time points, as opposed to capturing all responses on a single survey.

Measures

All variables were assessed at the individual level (see Appendix B for a full list of items).

Employee engagement. Employee engagement was assessed at two time points using the 18-item Job Engagement Scale (JES) by Rich, LePine, and Crawford (2010). The JES closely aligns with Kahn's (1990) conceptualization of engagement as the simultaneous expression of their emotional, cognitive, and physical self in their work role. Some items were modified slightly to ask about engagement towards the project, rather than towards work in general. Participants were asked to report their levels of agreement on a seven-point Likert-type scale, where 1 = *Strongly disagree* and 7 = *Strongly agree*. Sample items from the emotional, cognitive, and physical engagement subscales are "I put my emotions into what I do," "I give my full attention to my job," and "I work with high intensity," respectively. Each component was assessed with six items. Researchers have reported high internal consistencies for a single scale, where all three dimensions are averaged together ($\alpha = .95$; Rich et al., 2010). Additionally, construct validity evidence of the JES in assessing engagement is shown through the scale's distinction from other constructs such as job satisfaction, job involvement, and intrinsic motivation (Rich et al., 2010).

Although the original intent behind assessing engagement is that the three components form a single concept, in the current study each component of engagement was assessed independently to evaluate the hypothesized contagion effects. Therefore, a score for each component of engagement was calculated by averaging responses within each subscale. Consistent with previous research using the JES, reliability estimates were initially calculated for a single scale. Reliability estimates in the current sample were $\alpha = 0.95$ for Time 1 engagement and $\alpha = 0.98$ for Time 2 engagement. Because the current study also examines each component independently, reliability estimates were also calculated for each engagement subscale. For Time 1, reliability estimates in the current sample for the emotional, cognitive, and physical

engagement subscales were $\alpha = 0.93$, $\alpha = 0.90$, and $\alpha = 0.92$, respectively. For Time 2, reliability estimates were $\alpha = 0.96$, $\alpha = 0.95$, and $\alpha = 0.95$, respectively.

Emotional contagion susceptibility. Individual's emotional contagion susceptibility was assessed using the 15-item Emotional Contagion (EC) Scale developed by Doherty (1997). Example items include, "Being around happy people fills my mind with happy thoughts" and "I tense when overhearing an angry quarrel." Participants rated how often the statements applied to them with responses ranging from 1 = *Never* to 5 = *Always*. The original scale assesses five emotions: love, happiness, fear, anger, and sadness. Because love is not relevant to the current study, all items pertaining to the susceptibility of love contagion were removed. Therefore, only 12 of the 15 items for emotional contagion susceptibility were used. Convergent and discriminant validity evidence are presented in Doherty. Adequate reliability of scores has been demonstrated in past samples ($\alpha = .90$; Doherty, 1997) and was $\alpha = 0.81$ in the current sample.

Individual perceptions of SMMs. There is currently no method for assessing the process of cognitive contagion. Therefore, I examined individual perceptions of SMMs as an outcome of the cognitive contagion process. To measure individual perceptions of SMMs, I initially developed 13 items. The items were generated based on the SMMs literature and existing approaches to measuring SMMs. Although the SMMs literature was consulted in the scale development process, it should be noted that the items generated are not considered a scale for SMMs. Rather, the items generated are intended to measure whether an individual perceives that SMMs exist within his or her team. Ultimately, for individual team members to experience cognitive contagion, their perception of SMMs is more important than whether or not SMMs are equally evaluated by all team members.

An exploratory factor analysis was conducted to evaluate the 13-item scale and its psychometric properties. Two items (items 9 and 10) demonstrated considerably lower factor loadings than all other items (below 0.50). Upon analysis of these items, it became clear that items having the self as the referent (as opposed to the group) were forming a second factor. Because the intention of this scale was unidimensional and to measure individual perceptions of the team rather than of the self, I chose to proceed only with items that had the group as the referent. This decision resulted in dropping items 8, 9, 10, and 11. Therefore, the final scale used to assess an individual's perceptions of SMMs consisted of nine items that all loaded on a single factor. The factor loadings of the final nine items are reported in Table 1. Fit statistics for the individual perceptions of SMM scale were evaluated by comparing calculated values to cutoff values suggested in the literature. In particular, I examined the chi-square statistic, comparative fit index (CFI) and the root mean square error of approximation (RMSEA). When assessing the chi-square value, acceptable model fit is indicated by a chi-square probability of less than 0.05. When assessing model fit based on the CFI, a larger value indicates a better model fit and an acceptable model fit is typically indicated by a CFI value of 0.90 or greater (Hu & Bentler, 1999). For RMSEA values, a smaller value indicates a better model fit and an acceptable model fit is typically indicated by an RMSEA value of 0.06 or less (Hu & Bentler, 1999). The chi-square test of model fit (18.28, $p < .05$) was significant. Further, the CFI value was 0.94 and the RMSEA was 0.08. Given these criteria, the fit statistics for this scale were deemed acceptable. Better fit indices would be desirable, particularly a smaller RMSEA would indicate an acceptable model fit. However, because this scale was developed as a component of the current study, the scale was deemed acceptable for the use of assessing an individual's perceptions of SMMs

within their team. Reliability estimates for the individual perceptions of SMMs in the current sample was $\alpha = 0.92$.

Demographics. Gender, age, and ethnicity were assessed at Time 1. Demographic information was collected to describe the sample.

Control variables. Several variables were measured to account for alternative explanations of changes in engagement levels: goal orientation, achievement goals, friendship, and quality of team member relations. It is possible that these variables could each have an effect on the engagement levels reported throughout the course project. Specifically, because all types of achievement goals and goal orientations have a motivational component, I believe these variables will positively drive changes in engagement. Although friendship and quality of team member relations have not been investigated specifically in regards to their relationships with engagement, both constructs overlap with coworker support, which is positively related to a number of work attitudes (e.g., job satisfaction and job involvement; Chiaburu & Harrison, 2008).

Achievement goals. Achievement goals were assessed using a scale from Elliot and McGregor (2001). This scale was included to assess student motivation toward the project and was deemed appropriate as a large number of students enrolled in the sampled course were taking it to fulfill a requirement (thus not necessarily by choice). The 12-item scale measured participants' adoption of mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance achievement goals in their business course. Participants were asked to indicate the extent to which they believed each item was true for them on a seven-point Likert-type scale with responses ranging from 1 = *Not at all true of me* to 7 = *Very true of me*. Elliot and McGregor reported reliability of scores for each subscale as .87, .89, .92, and .83, respectively.

The reliability estimates for each subscale in the current sample were .85 (mastery-approach), .84 (mastery-avoidance), .81 (performance-approach), and .72 (performance-avoidance). Additional information concerning the psychometric properties of this questionnaire is presented by Finney, Pieper, and Barron (2004).

Goal orientation. Goal orientation refers to an individual's dispositional or situational goal preferences in achievement situations (Payne, Youngcourt, & Beaubien, 2007). Goal orientation was identified as a potential confounding variable, as each student may possess different goals towards the class, which in turn impact his or her goals towards the class project. Goal orientation was assessed with a 13-item scale by VandeWalle (1996). The scale has three subscales: learning, proving, and avoiding. The 4-item learning subscale assesses the individual's focus on developing his or her competence through the acquisition of new skills, the mastery of new situations, and learning from past experiences. The proving subscale consists of four items that assess the individual's focus on demonstration of his or her competence to gain favorable judgment from others. The avoiding subscale consists of five items that assess the individual's focus on avoiding negation of his or her competence and of negative judgment from others. All items are rated on a seven-point Likert-type scale with responses ranging from 1 = *Strongly disagree* to 7 = *Strongly agree*. Reliability of scores for this scale has been estimated at $\alpha = .87$ in past student samples (Church, Elliot, & Gable, 2001). The reliability estimate for the current sample was $\alpha = 0.73$. Validity evidence can be found in VandeWalle (1996, 1997).

Friendship. If a student had pre-existing friendships with other members of his or her group, the student may have interacted more frequently with those team members (e.g., outside of team meetings and in class). Therefore, friendship prevalence was assessed with items from the Workplace Friendship Scale developed by Nielsen, Jex, and Adams (2000). The 12-item

scale includes two factors, *friendship opportunity* and *friendship prevalence*, assessed using six items each. However, because friendship opportunity was considered irrelevant to the current study, only the friendship prevalence subscale was used. All items are rated on a five-point Likert-type scale with responses ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. Tse, Dasborough, and Ashkanasy (2008) used only the friendship prevalence subscale and their reported reliability of scores was $\alpha = .80$. Further, the items of this scale were modified to align them with the context of the present study. For instance, a sample item from the friendship prevalence subscale is “I have formed strong friendships at work,” whereas the modified version is “I have formed strong friendships in my project group.” The reliability estimate for the current sample was $\alpha = .89$.

Quality of team member relations. Similar to the measurement of friendships within the work team, I also assessed the quality of team member relations using May, Gilson, and Harter’s (2004) 10-item measure of rewarding coworker relations. The underlying assumption here is that high quality team member relations may influence how engagement spreads; hence, it seemed necessary to control for quality of team member relations. Each item refers to an individual team member’s perceived relationship quality with his or her team members. All items are rated on a five-point Likert-type scale with responses ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. A sample item is “My interactions with my team members are rewarding.” Reliability of this measure has been estimated in past samples at $\alpha = .93$ (May et al., 2004). In the current study, scale items were modified to reflect project teams rather than coworkers. The alpha coefficient in the current sample was $\alpha = .90$.

RESULTS

Means, standard deviations, and reliability estimates for all study variables are shown in Table 2. Correlations between main study variables and control variables are depicted in Table 3.

A confirmatory factor analysis (CFA) was performed for each of the measured variables, with the exception of individual perceptions of SMMS, to examine whether the items produced the expected number of factors and whether the individual items loaded on the expected factor. The results of the CFAs are reported in Table 4.

Change in Engagement

Results from a repeated measures t-test indicate overall engagement scores were significantly higher at Time 1 ($M = 5.16, SD = .95$) than at Time 2 ($M = 4.74, SD = 1.29, t(147) = 3.79, p < .05$). Two additional repeated measures t-tests were conducted to examine the differences between Time 1 and Time 2 scores for the affective and cognitive components of engagement, respectively. Results indicate that affective engagement scores were significantly higher at Time 1 ($M = 4.94, SD = 1.16$) than at Time 2 ($M = 4.60, SD = 1.45, t(147) = 2.80, p < .05$). Results also indicate that cognitive engagement scores were significantly higher at Time 1 ($M = 5.29, SD = .92$) than at Time 2 ($M = 4.89, SD = 1.27, t(147) = 3.63, p < .05$). Collectively, the results indicate a significant difference in overall engagement scores, as well as affective and cognitive engagement scores, from Time 1 to Time 2.

Study Hypotheses

The correlation between overall engagement at Time 1 and Time 2 was moderately strong and positive ($r = .31, p < .01$), consistent with Hypothesis 1. This demonstrates that there is some relationship between overall engagement at Time 1 and Time 2. Although this does not provide evidence of contagion, because engagement at Time 1 is not perfectly correlated with

engagement at Time 2, it suggests something is impacting individuals' engagement levels between these two time points. Further analyses will help determine if indicators of contagion are partially driving this change.

To test the second and third hypotheses, I followed the recommendations provided by Judd, Kenny, and McClelland (2001) regarding the testing of moderation in within-subject designs. Judd et al. explained that moderation is detected in within-subject designs by computing a difference score across time points and then assessing whether the moderator variable is a significant predictor of that difference. Three difference score variables were computed in the dataset: difference in affective engagement scores (i.e., $|\text{Time 1 affective engagement} - \text{Time 2 affective engagement}|$), difference in cognitive engagement scores (i.e., $|\text{Time 1 cognitive engagement} - \text{Time 2 cognitive engagement}|$), and difference in overall engagement scores (i.e., $|\text{Time 1 overall engagement} - \text{Time 2 overall engagement}|$). The absolute value was used as I was less concerned with direction of change as I was with the magnitude of change.

Although Judd et al. (2001) do not discuss how their approach relates to common criticisms of the use of difference scores, it should be noted that there are a number of substantive and methodological concerns with using difference scores as outcome variables. The greatest concern is that difference scores are typically less reliable than the individual component measures (Edwards, 1995; Johns, 1981; Zimmerman, Brotohusodo, & Williams, 1981). To offer some defense against the use of difference scores in the current study, I examined whether each computed difference score was as reliable as the related individual component measures. I used software developed by Watkins (2008), which computes the reliability of a difference score based on the reliability of each component independently and the correlation between the two components. The reliabilities of the difference scores representing the absolute difference of

affective and cognitive engagement scores were .91 and .89, respectively. The reliability of the difference score representing change in overall engagement was 0.95. Hence, in the current study the reliabilities for the focal difference scores are considered acceptable (Nunnally, 1978) and serve to alleviate some of the criticisms associated with the use of difference scores.

Although the second and third hypotheses both involve moderation, consistent with Judd et al.'s (2001) approach to examining moderation in within-subject designs, two stage hierarchical regression analyses were conducted to evaluate whether emotional contagion susceptibility and perceptions of SMMs moderated the relationship between engagement at Time 1 and Time 2. For the first analysis, stage one of the regression model included all control variables (i.e., all types of goal orientation, all types of achievement goal, friendship prevalence, and rewarding team member relations) and stage two included emotional contagion susceptibility. Results (shown in Table 5) indicate the control variables significantly predicted change in affective engagement, $F(9, 137) = 3.28, p < .01, R^2 = .18$, and explained 18% of the variance in change in affective engagement scores. Specifically, performance approach achievement goal ($\beta = .20, p < .05$) and avoiding goal orientation ($\beta = .23, p < .05$) were both significantly related to change in affective engagement. Introducing emotional contagion susceptibility into the model had no significant effect, $F(1, 136) = 3.05, p < .01, \Delta R^2 = .01$. Following Judd et al.'s recommendations for interpretation of moderator variables, the slope associated with emotional contagion susceptibility (which is equivalent to the regression weight for this variable) was assessed. This assessment does not provide support for emotional contagion susceptibility as a moderator, as the slope for emotional contagion susceptibility is not significantly different than zero, $t(136) = 1.01, p = .31$.

Similarly, the hierarchical regression model created to examine the third hypothesis included all control variables in stage one and individual perceptions of SMMs in stage two (see Table 6). The group of control variables significantly predicted change in cognitive engagement scores, $F(9, 138) = 3.74, p < .01, R^2 = .20$, explaining 20% of the variance in change in cognitive engagement scores. In this model, performance approach achievement goal ($\beta = .19, p < .05$) and quality of team member relations ($\beta = -.33, p < .01$) were the only significant predictors of change in cognitive engagement scores. Introducing individual perceptions of SMMs had a significant effect, $F(1, 137) = 3.87, p < .01, \Delta R^2 = .02$, and explained 22% of the total variance in change in cognitive engagement scores. Based on Judd et al.'s (2001) recommendations for interpretation of moderator variables, evidence for moderation was provided by a significant regression of the difference between cognitive engagement at Time 1 and cognitive engagement at Time 2 on individual perceptions of SMMs ($\beta = -.24, p < .05$). Still, these results fail to support the third hypothesis as results indicate that students who reported high perceptions of SMMs experienced smaller changes in their cognitive engagement levels than students who reported low perceptions of SMMs.

Post-hoc Analyses

Byrne (2015) proposed the concept of engagement contagion, which consists of emotional, cognitive, and physical contagion. To better represent the combination of more than one contagion operating at a time, I conducted an additional regression model with change in overall engagement score serving as the dependent variable, all control variables included in stage one, and emotional contagion susceptibility and individual perceptions of SMMs included in stage two. Results indicate that the control variables significantly predicted change in overall engagement scores, $F(9, 137) = 4.14, p < .01, R^2 = .21$. Introducing both emotional contagion

susceptibility and individual perceptions of SMMs as predictors did not explain significant variance over and above the control variables, $F(2, 135) = 3.95, p < .01, \Delta R^2 = .03$. Results indicate that performance approach achievement goal ($\beta = .20, p < .05$) and avoiding goal orientation ($\beta = .20, p < .05$) were both significantly related to change in overall engagement. In addition, quality of team member relations was a significant predictor of change in overall engagement ($\beta = -.27, p < .05$). Although introduction of both contagion indicator variables did not significantly contribute to the model, individuals' perceptions of SMMs significantly related to change in overall engagement ($\beta = -.26, p < .05$).

To further explore the data, two additional analyses were conducted. The first analysis involved linear regression excluding all control variables. Because the control variables explained a substantial amount of the variance in the initial analyses, conducting the analyses without the control variables would allow the contagion indicator variables to account for the maximum variance in each model. It is possible that in earlier analyses, the contagion indicators were not significant because they were unable to provide unique variance to the change in engagement levels, above and beyond the controls. Results in this case were consistent with results reported above. Specifically, emotional contagion susceptibility was not a significant predictor of change in affective engagement, $F(1, 145) = .81, p = .37, R^2 = .01$, whereas perceptions of SMMs was a significant predictor of change in cognitive engagement, $F(1, 146) = 23.66, p < .01, R^2 = .14, \beta = -.37, p < .01$. Further, when change in overall engagement was regressed on both contagion indicator variables, the model was significant, $F(2, 144) = 12.51, p < .01, R^2 = .15$, but only individual perceptions of SMMs significantly explained change in overall engagement ($\beta = -.39, p < .01$).

The second analysis conducted to further explore my data involved examining the relationship between contagion indicator variables and directional difference scores as the dependent variables. Namely, all analyses reported previously were conducted using absolute difference scores because I was most concerned with identifying *any* change, regardless of direction, and more importantly the magnitude of change. However, to determine whether direction of results could provide additional information about contagion, I reanalyzed the data, but this time with directional difference scores. I conducted three analyses using this approach: (1) the directional difference score representing change in affective engagement (Time 1 affective engagement – Time 2 affective engagement), (2) the directional difference score for change in cognitive engagement (Time 1 cognitive engagement – Time 2 cognitive engagement), and (3) the directional difference score for change in overall engagement (Time 1 overall engagement – Time 2 overall engagement). All control variables were included in these analyses. Although using this approach I did not find support for the second and third hypotheses, there were some meaningful differences in the results. Results indicate that the control variables significantly predicted change in affective engagement, $F(9, 137) = 9.52, p < .01, R^2 = .39$, thereby explaining more variance in change in affective engagement than the model that assessed the absolute value of the change. Introducing emotional contagion susceptibility into the model had no significant effect, $F(1, 136) = 8.84, p < .01, \Delta R^2 = .01$. Further, the control variables significantly predicted change in cognitive engagement, $F(9, 138) = 8.68, p < .01, R^2 = .36$. As was the case with affective engagement, using this approach explained more variance in change in cognitive engagement than the model that assessed the absolute value of the change. However, with this approach, introducing perceptions of SMMs into the model had no significant effect, $F(1, 137) = 8.20, p < .01, \Delta R^2 = .01$. When assessing engagement contagion holistically, the

control variables significantly predicted change in overall engagement, $F(9, 137) = 9.17, p < .01, R^2 = .38$, but introducing both contagion indicator variables (i.e., emotional contagion susceptibility and perceptions of SMMs) into the model had no significant effect, $F(2, 135) = 7.81, p < .01, \Delta R^2 = .01$. Overall, examining the change of direction rather than the magnitude only showed that the control variables account for more variance in the change of affective, cognitive, and overall engagement, than do the contagion indicators. Results are reported in Tables 8, 9, and 10, respectively.

DISCUSSION

Participants' engagement levels were assessed at the beginning of the semester (before teams were assigned) and at the end of the semester (when teams completed the course project in its entirety). Study findings show that affective, cognitive, and overall engagement scores were all significantly higher at Time 1 than at Time 2. Although one would hope that engagement contagion would have a positive effect on the engagement levels of individual team members thereby increasing rather than decreasing engagement levels, it is wrong to assume that contagion necessarily operates in the positive direction. Previous research has shown that contagion can occur in the negative direction (i.e., Rozin & Royzman, 2001), which makes sense given that contagion suggests people mimic one another. Thus, mimicking negativity may result in decreases rather than increases. In the current study, it is possible that some individuals were highly engaged at the start of the semester, before being assigned to a team in which all other members demonstrated lower levels of engagement. If the highly engaged individual recognized that he or she was exerting more energy and effort towards the project than his or her team members, the individual's engagement levels may have decreased as a result of mimicking the other team members. There is also research to suggest that team norms can dictate individual behavior. For example, in some instances, when individual team members are outperforming others, the other team members slow the outperformer down, in hopes of establishing a lower performance norm (Roethlisberger, Dickson, & Wright, 1939). In effect, team members maintain group norms through the management of others' attitudes and behaviors. I did not assess group norms and therefore cannot determine whether group norms explain the negative change in engagement levels. I recommend that future research investigate group norms as a potential explanation for rising or dropping levels of individual engagement within teams.

The second and third hypotheses were not supported. Although analyses indicated that individuals' perceptions of SMMs are a significant predictor of change in cognitive engagement levels, the results were in the opposite direction than anticipated. Rather than finding that students with high perceptions of SMMs experienced large changes in their cognitive engagement levels, those reporting high perceptions of SMMs experienced small changes in their cognitive engagement levels. These findings are not enough to rule out the role of contagion in the spread of engagement in the interpersonal context. Instead, it is possible that the variables measured as indicators of contagion were inadequate. Further, it is possible that the scale used to assess individuals' perceptions of SMMs was not the most accurate reflection of the construct of interest. Another possible explanation is that examining the affective and cognitive components independently failed to provide support for engagement contagion, as engagement contagion is considered a synergistic process (Byrne, 2015) and I did not assess a synergistic process. A final possibility is that contagion (emotional, cognitive, or engagement more generally) is not actually a factor in the transmission of engagement. If this is the case, measuring different indicators of contagion, using different scales to assess indicators, or assessing engagement contagion holistically would yield the same findings as the current study.

Although the data were unable to provide support for emotional contagion susceptibility serving as a significant predictor of the change in affective engagement scores from Time 1 to Time 2, there were two control variables that helped explain the change. Performance approach achievement goal and avoiding goal orientation were both significantly related to change in affective engagement, indicating that students higher in these constructs experienced greater changes in their affective engagement scores. To help explain the effects of these variables, it is important to consider their definitions. Performance approach achievement goal refers to

behavior that is initiated by a positive event or possibility and avoiding goal orientation refers to an individual's focus on avoiding negation of his or her competence and of negative judgment from others. The definitions of these constructs provide some clarity as to why they would influence individual engagement levels in the team context. For example, a student high in performance approach achievement goals may be motivated by the positive possibility of earning a good grade in the course and therefore increase his or her engagement levels. In addition, students high in avoiding goal orientation may be concerned about their team members questioning their competence and thus increase their engagement levels to avoid instilling this doubt in their team members.

Analyses indicated that individuals' perceptions of SMMs significantly predicted change in cognitive engagement scores from Time 1 to Time 2. However, this contagion indicator operated in the opposite direction of what was expected. As was the case above, the performance approach achievement goal was also a significant predictor of change in cognitive engagement. Also of interest was the significant effect of quality of team member relations. Although the literature suggests that quality of team member relations should be a significant predictor of engagement (Kahn, 1990; Kahn & Heaphy, 2014), I found that students reporting high quality team member relations experienced small changes in both cognitive and overall engagement levels. It is possible that the individuals reporting the highest quality of team member relations were working in teams that initially had minimal variance in individual engagement levels. If this was the case, the occurrence of engagement contagion would not lead to large changes in individual engagement levels. Unfortunately, I did not measure quality of team relations at time 1.

Study Strengths

The greatest strength of the current study is its high degree of realism. Aronson and Carlsmith (1968) identified two ways in which an experiment may achieve high external validity; through experimental realism and mundane realism. Experimental realism concerns whether or not participants feel invested in the situation, they take it seriously, and the situation has an impact on them. Because the current study incorporated a graded class project, most participants with a desire to pass the class took it seriously. The design of the class project was such that students had to be involved to get a reasonable grade; lack of participation on the team resulted in a failing project grade. Additionally, the project had an impact on participants in the form of a good or not so good grade, and they received both an individual and team grade. Thus, the situation of the class project is considered high in experimental realism. Second, mundane realism refers to whether or not the events occurring in the study are likely to occur in the participants' lives. The team project used in this study mirrored an activity or task the participants were likely to encounter in any of their business courses. Thus, the study was a typical event for the participants. Aronson, Wilson, and Akert (1994) later added a third way that an experiment can be realistic to participants: psychological realism. This form of realism refers to the extent to which the psychological processes that occur in the study are the same as those that could occur in everyday life. The current study was high in psychological realism as contagion occurs in everyday life. Because this study was high in all three forms of realism, a notable strength of this study is the high external validity of the findings.

Other strengths include the sample and the longitudinal design, as contagion cannot be assessed at a single time point. By using teams of undergraduate business students working on a course project, I had some degree of control over a number of contextual factors. For example,

all teams included in the current study had the same lifespan – the duration of the semester. Teams all formed and adjourned at the same times. Additionally, all teams worked on the same project and had the same timeline for project deliverables. With that in mind, one can assume that there was limited variability in team objectives. This likely would not be the case if I had examined actual work teams, who are more inclined to have varying timelines, resources, support, and clarity. Using a student sample allowed me to have control over a number of contextual factors that would be beyond my control in field samples.

Study Limitations

Although this study has a number of strengths, it is not without its limitations. The greatest limitation of this study was the lack of measures for two of the primary constructs of interest, emotional contagion and cognitive contagion. Because there were no existing measures to assess these mechanisms directly, I relied on related individual differences as indicators of the occurrence of contagion. Despite the fact that the measure for emotional contagion susceptibility has been used in research before, the items are not the best representation of emotions that are likely to be exhibited at work, or in this case, in the context of a team project in class. Concerning the measure for cognitive contagion, the scale developed for this study also had its weaknesses. Even though an exploratory factor analysis revealed acceptable fit statistics, more research would have to be conducted to determine whether we can appropriately derive information about cognitive contagion and SMMs from its results. This study and its findings would have been improved if stronger approaches for assessing both emotional and cognitive contagion existed or could have been created and sufficiently validated before use.

The use of difference scores as outcome variables may be seen as another study limitation. Although I determined my difference scores demonstrated relatively high reliability,

Edwards (2001) notes that the main myth about difference scores is that their sole problem is low reliability. Other problems with differences scores is that they are conceptually ambiguous, confound the effects of the independent variables on the components of the difference, and their use simplifies inherently multivariate models into univariate models (Edwards, 1995). Edwards (2001) also notes that a number of researchers use difference scores without reservation as long as they exceed conventional reliability standards (e.g., .70), even though difference scores with higher reliability are not absolved of the other methodological problems. Despite these cautions, difference scores were still used to examine my hypotheses. When asked whether the Judd et al. approach overcomes the limitations associated with difference scores, Judd and McClelland point out that their approach is essentially a repeated measures ANOVA and still remains the most appropriate method for assessing research questions concerned with how a variable changes between two time points (C. Judd & G. McClelland, personal communication, April 25, 2016).

Another limitation of this study is in the measurement of engagement. Although measuring engagement at two time points is an improvement from previous research examining engagement and contagion, two time points is still insufficient for fully understanding how engagement changes over time. By assessing engagement at more points throughout the semester, I would likely gain a better indication of the effects of contagion over time (i.e., is there a larger contagion effect in the team forming stage).

By leaving both surveys open for completion across ten days, the measurement of all variables may have been compromised. With both surveys being open for ten days, there was variability in when students participated in each survey. Although variability in and of itself is desirable, variability in when students participated in each survey can have measurement implications. Concerning the first survey, many students participated in the first survey within an

hour of it opening, whereas others completed the first survey over a week later. Although the first survey was still able to capture students' baseline engagement levels before they were assigned to or interacted with their teams, this difference in when they completed the survey is potentially meaningful. For example, students who completed the first survey towards the end of the ten-day period may have received more information about project requirements and expectations than students who completed the first survey immediately after it was opened. This could impact an individual's engagement as there is research to suggest that engagement is predicted by the availability of resources, which includes role clarity (Rothmann & Joubert, 2007). Therefore, those who completed the first survey towards the end of the ten-day period may have had greater role clarity than those who completed it earlier and subsequently reported higher engagement. Concerning the second survey, the variability in when students completed the second survey is potentially more meaningful. Many students completed the second survey immediately after completing the team project and were therefore able to reflect back on their engagement levels more accurately. Students who completed the second survey towards the end of the ten-day period may have struggled to accurately recall how engaged they were at the end of the project. It is also possible that waiting to complete the second survey had an effect on how individual's reported friendship prevalence and quality of team member relations, as those who waited longer also had additional time to bond with team members. Therefore, a limitation of this study is that surveys were open for ten days each, which may have impacted the precision of my measurement.

Results showed that overall, affective, and cognitive engagement levels relevant to the project were significantly higher at Time 1 than at Time 2. Although engagement contagion theory suggests that an individual's engagement can increase or decrease due to interpersonal

interactions, my results are still an interesting trend. One explanation for why engagement was lower on average at Time 2 relates to the limitation discussed above, that although many students completed the second survey immediately after completing the team project, other students completed the second survey several days later. It is possible that results would have been different if engagement was assessed during the final week of the project. In addition to altering the timing of the second survey, incorporating additional variables to understand an increase or decrease in engagement levels in future research is advisable, since none were included in the current study. For instance, a decrease could be explained by the heightened workload that often accompanies the end of the semester. As the workload increases, students may have to prioritize certain tasks and/or assignments over others. It is possible that some students viewed this team project as a lesser priority than other tasks and/or assignments. Future research should incorporate measures for these variables in order to explore these possibilities.

The reporting of higher levels of engagement at the start of the project versus the end may be a result of subject bias. Participants may have reported higher levels than they actually experienced because they perceived engagement as a desirable state at the start of the study. This perception could be further exaggerated by suspecting at the start of the study that the research credit was somehow tied to the engagement levels they reported (rather than completion of the two surveys). In an attempt to mitigate the negative effects of this particular limitation, participants were not informed that the primary construct of interest was their engagement levels until after completion of the second survey. Additionally, the course instructor offered clarification before each survey was opened about how credit for survey participation was earned. Although these efforts were taken to reduce the potential effects of socially desirable responding, it is possible that this still impacted the study results.

Lastly, physical contagion was not assessed in this study. Future research considering the full scope of engagement contagion should include all three forms proposed by Byrne (2015).

Future Research Directions

Results and limitations of the current study present a number of opportunities for future research, in addition to those already noted. As mentioned above, it is possible that emotional contagion susceptibility and individual perceptions of SMMs were inadequate indicators of contagion. This study was conducted on the assumption that those higher in emotional contagion susceptibility and individual perceptions of SMMs would be more susceptible to engagement contagion, and therefore demonstrate greater changes in their individual engagement scores over time. Future research should investigate other variables as indicators of contagion, such as mimicry of emotions, thoughts, and behaviors. In addition to examining individual differences that might help explain changes in engagement scores, researchers should also look at outcome variables that may indicate contagion has occurred, such as various perceptions related to the project and team shared among team members.

Although I was unable to find support for the role of my contagion indicator variables, I included several control variables that should be examined in greater detail. Specifically, in the model examining affective engagement, the performance-approach achievement goal and the avoiding goal orientation both significantly related to change in engagement. The performance-approach achievement goal was also significant in the model examining cognitive engagement, as was quality of team member relations. Given these findings, additional research should be conducted to better understand the roles of these variables in engagement. Although analyses revealed these variables have some predictive value in change in engagement levels, the data collected for the current study were insufficient for explaining the roles of these variables in

detail. It is possible that additional research would be able to establish both the performance-approach achievement goal and the avoiding goal orientation as drivers of engagement, as they are both forms of motivation. However, because the avoiding goal orientation involves an interpersonal component (i.e., avoiding negative evaluations from others), this could likely be a primary driver of engagement in teams and other interpersonal contexts. Future research should examine if these forms of motivation lead to engagement and if the role of the avoiding goal orientation driving engagement is stronger in the interpersonal context than it is in independent work scenarios.

Concerning the team process, researchers should examine teams that interact more frequently. In the current study, I examined teams that formed and adjourned in approximately three and a half months. Despite being assigned to teams early in the semester, it is possible that many teams procrastinated on the project and therefore had limited interaction until immediately before the first project deliverable was due. Examining teams that interact more frequently (e.g., once a week) would create a better context for contagion to occur, which would potentially increase the likelihood that researchers would be able to detect its occurrence.

Researchers should also examine engagement contagion in a manner that is more consistent with Byrne's (2015) model, with affective, cognitive, and physical contagion collectively contributing to the synergistic sharing of engagement. Instead of the three components of engagement being independently transferred through their respective contagion, it is possible they are transmitted together. For instance, a team member may report high cognitive engagement levels, which she shares with her team members. However, the engagement levels her team members "catch" may not all be visible cognitively. Rather, some team members may enact the engagement they caught in more affective or physical ways. By finding a way to

examine engagement contagion holistically, researchers may be able to detect the occurrence of contagion in a way that examination of emotional and cognitive contagion separately would not permit.

One approach to designing an ideal study to replicate my hypotheses is to consider what can be done with unlimited resources and without the limitations encountered in the present study. The ideal study would examine individuals completing a yearlong team project, in which teams were required to meet monthly, and would involve a mixed-methods approach. Specifically, I would still include a survey component to quantitatively assess changes in engagement levels. However, surveys would be distributed bi-weekly. Surveys would also ask participants about any team interactions that have occurred in the past two weeks (i.e., how many, quality, face-to-face versus virtual). By assessing engagement bi-weekly and obtaining detailed information regarding team interactions, I would be better able to understand how engagement changes over time and how these changes relate to team interactions. For instance, I could assess whether face-to-face team interactions led to greater changes in individuals' engagement levels than virtual team interactions. In addition, every three months participants would receive a detailed report of their engagement levels to date. This would allow individual participants to quickly recall what they have reported in the past, which would then allow them to offer personal insight about their engagement levels through a series of open-ended questions. The open-ended questions would ask participants to explain their engagement levels over the past three months. If applicable, some questions would focus on why individual participants felt their personal engagement changed. By allowing participants to provide their personal insights, I would hopefully gain a better understanding about whether fluctuations in engagement levels were attributed to increases in project motivation, approach deadlines, or interactions with team

members. The ideal study would also incorporate the physical component of engagement contagion. To assess the physical component of engagement contagion, I would video record team interactions and code for behaviors that are indicative of engagement. By coding these behaviors, I would be able to assess whether a team member exhibits certain physical displays of engagement in response to a team member conveying his or her own engagement.

CONCLUSION

Overall, the current study contributes to the engagement literature by examining how engagement spreads in an interpersonal context. Furthermore, I examined engagement within the context of teams. The combination of these two domains (i.e., engagement and teams) is particularly timely given organizations' growing interest in both topics. In addition, although some researchers have speculated that engagement is shared via contagion, this is the first study to offer an empirical examination of contagion as a mechanism for transmitting engagement. A majority of the conversation concerning contagion as a mechanism for transmitting engagement has focused on emotional contagion, which overlooks both the cognitive and physical components of engagement. Although I was unable to find empirical support for my hypotheses concerning emotional contagion susceptibility and individuals' perceptions of SMMs, the current study can still be valuable in advancing the conversation about engagement in the interpersonal context.

Table 1

Factor Loadings for Final Individual Perceptions of SMMs Scale

Item	Factor Loadings
1. My team has a shared understanding of what our goals are.	.87
2. My team has a shared understanding of our procedure.	.77
3. My team has a shared understanding of our timeline.	.79
4. My team has a shared understanding of what each of our roles is.	.84
5. My team members have developed a level of familiarity with one another (regarding this project).	.65
6. My team members have goals that are similar to my own (regarding this project).	.75
7. My team members are interdependent on one another.	.48
8. My team members have an understanding of my strengths.	.61
9. My team members have an understanding of my weaknesses.	.60

* $p < .05$

Table 2

Descriptive Statistics and Cronbach's Alpha for Main and Control Variables

Variable	<i>M</i>	<i>SD</i>	Cronbach's α
1. Engagement at Time 1	5.16	0.95	0.95
2. Engagement at Time 2	4.74	1.29	0.98
3. Emotional contagion susceptibility	4.85	0.84	0.81
4. Individual perceptions of shared mental models	3.50	0.59	0.92
5. Achievement goals: performance approach	5.20	1.11	0.81
6. Achievement goals: performance avoidance	5.04	1.30	0.72
7. Achievement goals: mastery approach	5.45	1.01	0.85
8. Achievement goals: mastery avoidance	3.78	1.35	0.84
9. Goal orientation: learning	5.45	0.84	0.84
10. Goal orientation: proving	4.01	1.09	0.73
11. Goal orientation: avoiding	3.78	1.24	0.82
12. Friendship prevalence	3.42	1.25	0.89
13. Quality of team member relations	4.75	1.19	0.90

Table 3

Correlations Among Main and Control Variables (N=148)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Engagement at Time 1	.95												
2. Engagement at Time 2	.31**	.98											
3. Emotional contagion susceptibility	.05	.16*	.81										
4. Individual perceptions of SMMs	.17*	.59**	.23**	.92									
5. Achievement goals: performance approach	.15	.01	.11	.08	.81								
6. Achievement goals: performance avoid	.02	-.02	.08	.09	.30**	.72							
7. Achievement goals: mastery approach	.64**	.22**	.03	.09	.21*	-.04	.85						
8. Achievement goals: mastery avoidance	.06	-.02	.11	-.03	.15	.32**	.08	.84					
9. Goal orientation: learning	.47**	.15	.12	.10	.05	-.02	.41**	.07	.84				
10. Goal orientation: proving	.25**	.09	.13	.07	.47**	.15	.16	.26**	.21*	.73			
11. Goal orientation: avoiding	-.09	-.15	.08	-.20*	.25**	.36**	-.09	.29**	-.31**	.35**	.82		
12. Friendship prevalence	.14	.55**	.17*	.65**	.13	.00	.10	-.02	.12	.19*	-.15	.89	
13. Quality of team member relations	.18*	.66**	.16*	.75**	.10	.11	.06	-.11	.07	.11	-.11	.76**	.90

Note. The calculated Cronbach's alpha for each scale is reported on the diagonal. * $p < .05$, ** $p < .01$

Table 4

Confirmatory Factor Analysis Results for All Study Variables

Model	χ^2	<i>df</i>	CFI	TLI	RMSEA	90% CI for RMSEA
Engagement at Time 1	2511.80**	153	.90	.88	.11	.10 - .12
Engagement at Time 2	308.77**	132	.95	.94	.10	.08 - .11
Emotional contagion susceptibility (1-factor)	119.84**	48	.85	.80	.10	.08 - .12
Achievement goals (4-factors)	92.02**	48	.94	.92	.08	.05 - .10
Goal orientation (3-factors)	73.58	62	.98	.98	.04	.00 - .06
Friendship prevalence (1-factor)	43.66**	9	.95	.91	.16	.11 - .21
Quality of team member relations (1-factor)	59.14**	5	.90	.80	.27	.21 - .33

Note. χ^2 = Chi-square; *df* = degrees of freedom; CFI = comparative fit index; TLI = Tucker- Lewis index; RMSEA = root mean square error of approximation. 90% CI for RMSEA = 90% confidence interval for RMSEA; * $p < .05$, ** $p < .01$

Table 5

Regression Results for Affective Engagement Model

Variable	β	F	R^2	ΔR^2
Step 1		3.28**	.18**	
Achievement goals: performance approach	.20*			
Achievement goals: performance avoid	-.08			
Achievement goals: mastery approach	-.01			
Achievement goals: mastery avoidance	-.08			
Goal orientation: learning	.19			
Goal orientation: proving	.00			
Goal orientation: avoiding	.23*			
Friendship prevalence	-.10			
Quality of team member relations	-.20			
Step 2		1.03**	.18**	.01
Achievement goals: performance approach	.20*			
Achievement goals: performance avoid	-.08			
Achievement goals: mastery approach	-.01			
Achievement goals: mastery avoidance	-.08			
Goal orientation: learning	.17			
Goal orientation: proving	.00			
Goal orientation: avoiding	.22*			
Friendship prevalence	-.10			
Quality of team member relations	-.21			
Emotional contagion susceptibility	.08			

* $p < .05$, ** $p < .01$

Table 6

Regression Results for Cognitive Engagement Model

Variable	β	F	R^2	ΔR^2
Step 1		3.74**	.20**	
Achievement goals: performance approach	.19*			
Achievement goals: performance avoid	-.03			
Achievement goals: mastery approach	.09			
Achievement goals: mastery avoidance	-.05			
Goal orientation: learning	.09			
Goal orientation: proving	.01			
Goal orientation: avoiding	.08			
Friendship prevalence	-.07			
Quality of team member relations	-.33**			
Step 2		4.24**	.22*	.02*
Achievement goals: performance approach	.19*			
Achievement goals: performance avoid	-.01			
Achievement goals: mastery approach	.10			
Achievement goals: mastery avoidance	-.04			
Goal orientation: learning	.08			
Goal orientation: proving	.01			
Goal orientation: avoiding	.05			
Friendship prevalence	-.02			
Quality of team member relations	-.18			
Individual perceptions of SMMs	-.24*			

* $p < .05$, ** $p < .01$

Table 7

Regression Results for Overall Engagement Model

Variable	β	F	R^2	ΔR^2
Step 1		4.14**	.21**	
Achievement goals: performance approach	.20*			
Achievement goals: performance avoid	-.05			
Achievement goals: mastery approach	.10			
Achievement goals: mastery avoidance	-.06			
Goal orientation: learning	.14			
Goal orientation: proving	-.03			
Goal orientation: avoiding	.20*			
Friendship prevalence	-.09			
Quality of team member relations	-.27*			
Step 2		2.67**	.24**	.03
Achievement goals: performance approach	.20*			
Achievement goals: performance avoid	-.04			
Achievement goals: mastery approach	.11			
Achievement goals: mastery avoidance	-.05			
Goal orientation: learning	.12			
Goal orientation: proving	-.04			
Goal orientation: avoiding	.16			
Friendship prevalence	-.05			
Quality of team member relations	-.12			
Emotional contagion susceptibility	.08			
Individual perceptions of SMMs	-.26*			

* $p < .05$, ** $p < .01$

Table 8

Regression Results for Affective Engagement Model (Directional Difference Score)

Variable	β	F	R^2	ΔR^2
Step 1		9.52**	.39**	
Achievement goals: performance approach	.02			
Achievement goals: performance avoid	.06			
Achievement goals: mastery approach	.25**			
Achievement goals: mastery avoidance	-.08			
Goal orientation: learning	.14			
Goal orientation: proving	.09			
Goal orientation: avoiding	.04			
Friendship prevalence	-.17			
Quality of team member relations	-.42**			
Step 2		8.84**	.39**	.01
Achievement goals: performance approach	.02			
Achievement goals: performance avoid	.06			
Achievement goals: mastery approach	.25**			
Achievement goals: mastery avoidance	-.08			
Goal orientation: learning	.15			
Goal orientation: proving	.09			
Goal orientation: avoiding	.05			
Friendship prevalence	-.16			
Quality of team member relations	-.41**			
Emotional contagion susceptibility	-.10			

** $p < .01$

Table 9

Regression Results for Cognitive Engagement Model (Directional Difference Score)

Variable	β	F	R^2	ΔR^2
Step 1		8.68**	.36**	
Achievement goals: performance approach	.07			
Achievement goals: performance avoid	.09			
Achievement goals: mastery approach	.18*			
Achievement goals: mastery avoidance	-.10			
Goal orientation: learning	.12			
Goal orientation: proving	.10			
Goal orientation: avoiding	-.04			
Friendship prevalence	-.11			
Quality of team member relations	-.48**			
Step 2		8.20**	.38**	.01
Achievement goals: performance approach	.07			
Achievement goals: performance avoid	.09			
Achievement goals: mastery approach	.18*			
Achievement goals: mastery avoidance	-.09			
Goal orientation: learning	.12			
Goal orientation: proving	.09			
Goal orientation: avoiding	-.07			
Friendship prevalence	-.08			
Quality of team member relations	-.38**			
Individual perceptions of SMMs	-.18			

* $p < .05$, ** $p < .01$

Table 10

Regression Results for Overall Engagement Model (Directional Difference Score)

Variable	β	F	R^2	ΔR^2
Step 1		9.17**	.38**	
Achievement goals: performance approach	.06			
Achievement goals: performance avoid	.09			
Achievement goals: mastery approach	.22**			
Achievement goals: mastery avoidance	-.08			
Goal orientation: learning	.14			
Goal orientation: proving	.08			
Goal orientation: avoiding	.02			
Friendship prevalence	-.16			
Quality of team member relations	-.43**			
Step 2		7.81**	.39**	.01
Achievement goals: performance approach	.06			
Achievement goals: performance avoid	.09			
Achievement goals: mastery approach	.22**			
Achievement goals: mastery avoidance	-.06			
Goal orientation: learning	.15			
Goal orientation: proving	.08			
Goal orientation: avoiding	.00			
Friendship prevalence	-.13			
Quality of team member relations	-.34**			
Emotional contagion susceptibility	-.05			
Individual perceptions of SMMs	-.15			

** $p < .01$

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APPENDIX A

Measures	Time 1	Time 2
Demographic variables	X	
Individual employee engagement	X	X
Susceptibility to emotional contagion	X	
Perceptions of SMMs		X
Goal orientation		X
Need for achievement		X
Friendship		X
Rewarding team member relations		X

APPENDIX B

Individual Employee Engagement (Rich, LePine, & Crawford, 2010)

Physical engagement

1. I work on this project with intensity.
2. I exert my full effort to this project.
3. I devote a lot of energy to this project.
4. I try my hardest to perform well on this project.
5. I strive as hard as I can to complete this project.
6. I exert a lot of energy on this project.

Emotional engagement

7. I am enthusiastic about this project.
8. I feel energetic when working on this project.
9. I am interested in this project.
10. I am proud of this project.
11. I feel positive about this project.
12. I am excited about this project.

Cognitive engagement

13. While working on this project, my mind is focused on the project.
14. While working on this project, I pay a lot of attention to the project.
15. While working on this project, I focus a great deal of attention on the project.
16. While working on this project, I am absorbed by the project.
17. While working on this project, I concentrate on the project.
18. While working on this project, I devote a lot of attention to the project.

Emotional Contagion Susceptibility Scale (Doherty, 1997)

1. If someone I am talking with begins to cry, I get teary-eyed.
2. Being with a happy person picks me up when I am feeling down.
3. When someone smiles warmly at me, I smile back and feel warm inside.
4. I get filled with sorrow when people talk about the death of their loved ones.
5. I clench my jaws and my shoulders get tight when I see the angry faces on the news.
6. It irritates me to be around angry people.
7. Watching the fearful faces of victims on the news makes me try to imagine how they might be feeling.
8. I tense when overhearing an angry quarrel.
9. Being around happy people fills my mind with happy thoughts.
10. I notice myself getting tense when I am around people who are stressed out.
11. I cry at sad movies.
12. Listening to the shrill screams of a terrified child in a dentist's waiting room makes me feel nervous.

Individual Perceptions of SMMs (all items generated)

1. My team has a shared understanding of what our goals are.
2. My team has a shared understanding of our procedure.
3. My team has a shared understanding of our timeline.
4. My team has a shared understanding of what each of our roles is.

5. My team members have developed a level of familiarity with one another (regarding this project).
6. My team members have goals that are similar to my own (regarding this project).
7. My team members are interdependent on one another.
8. I perceive myself as related to my team members in some way,
9. I have an understanding of my team members' strengths.
10. I have an understanding of my team members' weaknesses.
11. I can sense when my team members need help (assistance, resource, etc.).
12. My team members have an understanding of my strengths.
13. My team members have an understanding of my weaknesses.

Individual Perceptions of SMMs (final scale)

1. My team has a shared understanding of what our goals are.
2. My team has a shared understanding of our procedure.
3. My team has a shared understanding of our timeline.
4. My team has a shared understanding of what each of our roles is.
5. My team members have developed a level of familiarity with one another (regarding this project).
6. My team members have goals that are similar to my own (regarding this project).
7. My team members are interdependent on one another.
8. My team members have an understanding of my strengths.
9. My team members have an understanding of my weaknesses.

Goal Orientation (VandeWalle, 1996)

Learning goal orientation

1. I am willing to select a challenging work assignment that I can learn a lot from.
2. I often look for opportunities to develop new skills and knowledge.
3. I enjoy challenging and difficult tasks in school where I'll learn new skills.
4. For me, development of my ability is important enough to take risks.
5. I prefer to work in situations that require a high level of ability and talent.

Prove (performance goal) orientation

6. I'm concerned with showing that I can perform better than my classmates.
7. I try to figure out what it takes to prove my ability to others at school.
8. I enjoy it when others in class are aware of how well I am doing.
9. I prefer to work on projects where I can prove my ability to others.

Avoid (performance goal) orientation

10. I would avoid taking on a new task if there were a chance that I would appear rather incompetent to others.
11. Avoiding a show of low ability is more important to me than learning a new skill.
12. I'm concerned about taking on a task in class if my performance would reveal that I had low ability.
13. I prefer to avoid situations at school where I might perform poorly.

Achievement Goals (Elliot & McGregor, 2001)

Performance-approach goal

1. It is important for me to do better than other students.
2. It is important for me to do well compared to others in this class.
3. My goal in this class is to get a better grade than most of the students.

Performance-avoidance goal

1. I just want to avoid doing poorly in this class.
2. My goal for this class is to avoid performing poorly.
3. My fear of performing poorly in this class is often what motivates me.

Mastery approach

1. I want to learn as much as possible from this class.
2. It is important for me to understand the content of this course as thoroughly as possible.
3. I desire to completely master the material presented in this class.

Mastery avoidance

1. I worry that I may not learn all that I possibly could in this class.
2. Sometimes I'm afraid that I may not understand the content of this class as thoroughly as I'd like.
3. I am often concerned that I may not learn all that there is to learn in this class.

Friendship (Nielsen, Jex, & Adams, 2000)

Friendship prevalence

1. I have formed strong friendships in my project team.
2. I socialize with team members outside of the time we spend working on our project.
3. I can confide in people in my team.
4. I feel I can trust my team members a great deal.
5. Being able to see my team members is one reason why I look forward to class.
6. I do not feel that anyone in my team is a true friend. (R)

Quality of Team Member Relations (May, Gilson, & Harter, 2004)

1. My interactions with team members have been rewarding.
2. My team members listened to what I had to say.
3. I trusted the team members I interacted with.
4. My team members valued my input.
5. I sensed a real connection with my team members.

Demographics

1. Age
2. Race
3. Gender