PSYCHOLOGICAL CONTAGION WITHIN THE SUPERVISOR-SUBORDINATE DYAD: AN EXPERIENCE SAMPLING INVESTIGATION OF MOOD AND JOB ATTITUDE CONTAGION AT WORK

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Nathan J. Sestak

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PSYCHOLOGICAL CONTAGION WITHIN THE SUPERVISOR-SUBORDINATE DYAD: AN EXPERIENCE SAMPLING INVESTIGATION OF MOOD AND JOB ATTITUDE CONTAGION AT WORK

Nathan J. Sestak
Dissertation

Approved:

Advisor
Rosalie J. Hall

Committee Member
Paul E. Levy

Committee Member
Aaron M. Schmidt

Committee Member
James M. Diefendorff

Accepted:

Department Chair
Paul E. Levy

Dean of the College
Ronald F. Levant

Dean of the Graduate School
George R. Newkome

Date

Committee Member
Steven R. Ash
ABSTRACT

An experience sampling methodology (ESM) was utilized to demonstrate that emotional contagion is an important determinant of affect and attitude similarity within the supervisor-subordinate dyad. On a Friday afternoon, 41 manufacturing employees completed a series of trait-based measures (e.g., affect, job attitudes, emotional contagion susceptibility, emotional expressiveness, etc.), which served as control and moderator variables in the analyses. Beginning the following Monday, state-based measures were completed six times a day for two workweeks using personal digital assistants. Using Multilevel Random Coefficient Modeling, the current study demonstrates that all six state-based dependent variables (i.e., positive and negative affect (PA/NA), affective and cognitive job satisfaction, and affective and cognitive organizational commitment) exhibited significant within- and between-subjects variability. Second, state-based PA and NA predicted the state-based attitudes over and above trait-based versions of both affect and attitudes. There was also some indication that time-lagged state PA (i.e., collected during the previous measurement period) also significantly predicted the attitudes. More importantly, the current study offers evidence that emotional contagion continually operates, with moment-by-moment levels of supervisor affect and attitudes being passed down, which influence his or her subordinate’s concomitant affect and attitude levels. Furthermore, a number of trait/dispositional characteristics of the subordinate, supervisor and dyad moderated the strength of this relationship.
ACKNOWLEDGEMENTS

Unlike the rest of this behemoth, I will endeavor to keep this short. First, I would like to thank my parents, Dan and Linda Sestak. Without their love and support, none of this would have been possible. Throughout my life, they have provided a loving family and personally sacrificed for my schooling, sports and other activities. I only hope I have made them proud.

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CHAPTER I
OVERVIEW OF THE PROBLEM

The nature, antecedents and consequences of employee work attitudes are among
the most researched topics in Industrial/Organizational Psychology. Job satisfaction and
organizational commitment, in particular, are focal variables in literally thousands of
studies. There is also a growing realization among scientists and practitioners alike, that
affect plays an important role in the workplace. However, the majority of this research
has failed to examine the within-person, moment-to-moment variability in either affect or
attitudes, and has only begun to understand the potential relationships between the two.
The current study explores both the variability within and relationship between affect and
attitudes, and hypothesizes that emotional contagion may account for a portion of their
covariability.

More specifically, the current study rests on four propositions. First, as attitudes,
job satisfaction and organizational commitment are evaluative judgments with both
affective and cognitive components. Second, employee state positive and negative affect
(i.e., PA/NA) and state job attitudes (i.e., job satisfaction and organizational
commitment) are related and will both demonstrate meaningful intra-day, within-person
variability. Third, one source of variability in state affect and attitudes is an
asymmetrical emotional contagion process, such that the momentary affect and attitudes
of a more powerful supervisor are transmitted down, influencing the momentary affect
and attitudes of less powerful subordinates. That is, the periodic interactions between a supervisor and subordinate allow the subordinate to imitate, and converge with the emotional experience of his or her more powerful supervisor. Due to the dynamic variability in affect and attitudes, this process is expected to repeat throughout the day, with supervisor-subordinate dyads demonstrating a consistent pattern of shared affect and attitude fluctuations. Furthermore, affectively oriented job attitudes are expected to be more amenable to emotional contagion than cognitively oriented job attitudes. Finally, several factors are hypothesized to moderate the proposed emotional contagion mechanism. For example, emotional contagion is expected to occur more readily in supervisor-subordinate dyads marked by a more emotionally expressive supervisor, and in dyads with a subordinate who is more susceptible to emotional contagion, who has a longer working relationship with the supervisor, and who likes the supervisor.

The dynamic nature of the current study required that supervisor-subordinate affect and attitudes be measured multiple times per day, longitudinally. This was accomplished by utilizing an Experience Sampling Methodology (ESM) and a new survey administration technology, namely personal digital assistants (PDAs). Finally, the time demand created by repeated measurements, and the need to clearly distinguish between affectively and cognitively oriented job satisfaction and organizational commitment, required the development of four, short attitude scales, which was accomplished through three pilot tests (only two pilot studies are discussed in Chapter III). This chapter briefly reviews the broad elements of the hypotheses, and provides an overview of the three pilot tests, the research conducted, and its potential contributions.
Overview of the Current Study

The current study revolves around four meta-hypotheses. The first meta-hypothesis proposes that job attitudes possess both an affective and cognitive component. Second, affect and attitudes both demonstrate meaningful intra-day, within-person variability. Third, emotional contagion is proposed as a causal mechanism for expected shared variability between members of existing supervisor-subordinate dyads, with the contagious affect or attitude traveling down the power structure of the dyad, from supervisor to subordinate. Finally, the fourth meta-hypothesis proposes a number of variables expected to moderate and strengthen the emotional contagion mechanism.

Affectively and Cognitively Oriented Job Attitudes

Although the conceptual link between affective variables such as positive and negative affect and emotional contagion is clear, the present research also proposes that attitudes will be influenced by the contagion mechanism. This argument is based on research conceptualizing attitudes as evaluative judgments with affective, cognitive and behavioral components (e.g., Eagly & Chaiken, 1993). The current research focuses specifically on the affective and cognitive components of organizationally relevant attitudes, a view consistent with historical definitions of job satisfaction (e.g., see Locke, 1969). However, most existing job attitude measures have primarily focused on the cognitive component of these attitudes (e.g., Moorman, 1993; Organ & Near, 1985). This represents a significant incongruence in the research literature between the definition of job attitudes as evaluative judgments with affective and cognitive components, and how they are operationalized and measured. This incongruence has caused confusion in the research literature, exemplified by research demonstrating that
different measures of job satisfaction (e.g., Brief & Roberson, 1989; Fisher, 2000; Williams, 1988) and organizational commitment (e.g., Cropanzano, James & Konovsky, 1993) vary in the extent to which they relate to affect or cognition. Therefore, an initial aim of the current research was to identify a sub-set of affectively and cognitively oriented job satisfaction and organizational commitment items. By separating the variance in satisfaction and commitment attributed to affect and cognition, the present research sought to demonstrate that positive and negative affect is more strongly related to affectively, rather than cognitively oriented attitudes, and that affectively oriented attitudes are more amenable to contagion.

Intraday, Within-Person Variability in Affect and Attitudes

Next, the research literature has consistently found that job attitudes, such as job satisfaction and organizational commitment, are related to both positive and negative affect. This research has typically examined the bivariate and multivariate relationships between these attitudes and affect (e.g., Ko, Price & Mueller, 1997; Thoresen, Kaplan, Barsky, Warren & de Chermont, 2003; Watson & Slack, 1993). Furthermore, the majority of this work attitude-affect research has focused on the stable, trait-like aspects of affect and attitudes, rather than their more variable, state-like aspects. This overlooks research demonstrating significant, within-person variability in daily levels of both affect and attitudes (e.g., Judge & Ilies, 2004; Stone, Smyth, Pickering & Schwartz, 1996), and evidence that state affect predicts state attitudes (e.g., Niklas & Dormann, 2005). Furthermore, the majority of attitudinal research has focused almost exclusively on the attitudes of a single individual, while the current study seeks to expand our knowledge to the next level of aggregation, the dyad. Therefore, the current study sought to confirm
the existence of both within- and between-subjects variability in state-based measures of affect and attitudes, and to demonstrate that state affect predicts state attitudes over and above trait-based affect and attitudes.

*An Asymmetrical Emotional Contagion Mechanism*

The measurement of state- and trait-based versions of these affective and attitudinal variables allows the theoretical emotional contagion process to be tested, which underlies many of the current study’s hypotheses. In general, contagion involves the unconscious and unintentional proliferation of similar attitudes, affect, and/or behavior among members of a group (Levy & Nail, 1993). This study focuses on the effects of a specific form of contagion, emotional contagion, which can occur when group members imitate each others’ emotional expressions, movements, postures, and vocalizations (Hatfield, Cacioppo, & Rapson, 1994). This imitation often results in a shared emotional experience, consistent with the originator’s emotions. The research literature has demonstrated that this emotional originator is typically the most powerful member of the group (e.g., Savell, Teague & Tremble, 1995; Sy, Cote & Saavedra, 2005). In the context of the supervisor-subordinate dyad, this suggests that affect and attitudes will be transmitted down from supervisors to less powerful subordinates, rather than contagion moving in the opposite direction.

However, an inherent difficulty in studying emotional contagion is caused by its unconscious and unintentional nature, making it difficult to directly assess its effects. Thus, the majority of existing contagion research is based on inferential evidence. Poor methodological decisions, including the failure to include control variables in models, and the failure to control for potential confounding variables (e.g., contextual
information), makes the evidence from existing studies even less conclusive. Most troubling, is the consistent use of cross-sectional studies, which examine bivariate relationships and mean differences at one point in time. As a result, previous research may grossly under- or over-estimate the true influence of contagion by ignoring the demonstrable intraday, within-person variability in affect and attitudes just discussed (e.g., Eid & Diener, 1999; Niklas & Dormann, 2005). Therefore, the current research attempts to overcome this deficiency in the contagion literature by longitudinally measuring affect and attitudes within the supervisor-subordinate dyad. The result is a demonstration that contagion continually operates, creating and updating convergence within the dyad.

**Contagion Moderators**

As mentioned earlier, emotional contagion cannot be directly assessed. However, if certain conditions are met, it would strengthen the inference that an emotional contagion mechanism caused affective and attitudinal congruence within the supervisor-subordinate dyad. One of these conditions, is that contagion will be more likely to occur when the supervisor and subordinate have been interacting. A second condition, is that moderators specifically relevant to emotions and emotional contagion operate as expected. The available research literature suggests several potential moderators that might influence the strength of the contagion mechanism. For example, a highly emotionally expressive supervisor (e.g., Sullins, 1991) or a subordinate more susceptible to emotional contagion (e.g., Doherty, 1997) will likely result in greater congruence between dyad members. Other research suggests that the more a subordinate likes his or her supervisor (e.g., Chartrand & Bargh, 1999) and the longer the dyad has been together
(e.g., Savell et al., 1995) will also moderate the contagion process and result in stronger affective and attitudinal congruence. For exploratory purposes, the current research also examined dyadic levels of leader-member exchange (LMX), subordinate self-concept (individual vs. relational vs. collective), and the level of interpersonal power attributed to the supervisor, as potential moderator variables. These proposed relationships are summarized in Figure 1.

Figure 1. Hypothesized operation of the contagion mechanism within the supervisor-subordinate dyad, controlling for subordinate trait-based affect and attitudes.

Thus, the current study seeks to expand our understanding of the relationship between affect and attitudes and the dynamic nature of each. Furthermore, these relationships will be examined at the dyadic level of analysis. More specifically, the current study examines emotional contagion as a causal mechanism for expected similarities between the affect and job attitudes of a subordinate and his or her supervisor,
potentially expanding our understanding of attitudinal variables to a more aggregate level.

Rationale for the Use of an Experience Sampling Methodology

To capture the expected variability in momentary affect and job attitudes, an experience sampling methodology (ESM) was used during the state-based measurement period (e.g., Beal & Weiss, 2003; Bolger, Davis & Rafaeli, 2003; Reis & Gable, 2000). The use of an ESM methodology to repeatedly measure both affect and attitudes as they occur allowed contagion to be studied as a dynamic process, rather than a static state event. However, the literature highlights a number of methodological issues which must be addressed when conducting an ESM study. Therefore, the seven ESM reporting guidelines recommended by Stone and Shiffman (2002) were used as a framework in designing the current study.

For example, an interval-contingent sampling schedule was used for three reasons (e.g., Wheeler & Reis, 1991). First, testing for contagion within the supervisor-subordinate dyad requires measuring each member of the dyad at approximately the same time, which is best accomplished by measuring these variables at fixed intervals. Second, it was necessary to design the intervals to accommodate the ebb and flow of daily work (e.g., no measurements were scheduled during the lunch hour). Third, the decision to strategically place measurement intervals throughout the day allowed the researcher to balance the need to measure affect and attitude variability, with the need to accommodate participants’ work schedules. (Note that time was considered as a potential covariate in relevant hypothesis tests due to evidence that it impacts the biological cycles of affect (e.g., Stone et al., 1996).)
Data collection was conducted electronically, using Personal Digital Assistants (PDAs) programmed with the Purdue Momentary Assessment Tool (PMAT; Weiss, Beal, Lucy & MacDermid, 2004). Electronic data collection was chosen over a more traditional pencil-and-paper format for two reasons (Tennen, Affleck, Coyne, Larsen & DeLongis, 2006). First, electronic data collection methods produce superior data when the researcher is interested in the dynamic variability of a focal variable within the day. Second, electronic data collection is preferable when substantiating the cause and effect relationship depends on verifying the exact time of each measurement. Testing the causal nature of the contagion hypotheses in the current study rests heavily on the ability to electronically verify the exact time at which data was entered. To verify these goals were met, participant compliance data are reported (Stone & Shiffman, 2002). The next section provides a more detailed description of the methods, procedures and measures used in the Pilot and Primary studies.

Description of Pilot Studies

Three pilot studies were conducted in order to create four short scales of affectively and cognitively oriented job satisfaction and organizational commitment that could be given frequently, without overburdening respondents (Chapter III provides a full description for two of the three pilot studies). In order to increase the construct validity of these scales, existing satisfaction and commitment items were retained as much as possible. In the first pilot study, 19 Master’s and Ph.D. level Industrial/Organizational Psychology graduate students acted as subject matter experts, rating 146 published job satisfaction and organizational commitment items for content. A total of 33 items consistently rated as either more affective or cognitive were retained.
In the second and third pilot studies, these items, and a number of additional satisfaction and commitment items written for the study, were administered to employed undergraduate and graduate students (Pilot2 N = 162; Pilot3 N = 157). To help empirically establish the convergent and discriminant validity of the items, participants also completed a battery of affective and cognitive semantic differentials (Crites, Fabrigar & Petty, 1994), the PANAS (Watson, Clark & Tellegen, 1988) and a VIE-based measure of job cognitions (Weiss, Nicholas & Daus, 1999). Reliability, factor analysis, and correlational analyses resulted in the eventual construction of four, 3-item scales of affective job satisfaction, cognitive job satisfaction, affective organizational commitment, and cognitive organizational commitment. All four scales demonstrated acceptable internal consistency, adequate factor structures and the expected pattern of relationships with the affect and cognition convergent/discriminant validity measures. These four scales were used in the Primary Study, described next.

Description of Primary Study

The four attitude scales developed during the pilot studies were used to conduct a two-week ESM study of affect and attitude contagion in existing supervisor-subordinate dyads. Following a short training session in which trait-based data was collected, participants provided state-based affect, attitude and contextual information using PDAs six times a day for 10 work days.

Overview of Participants, Setting, and Procedure

In the Primary Study, data was collected from 41 individuals representing 20 pre-existing, interacting supervisor-subordinate dyads (Note: one triad participated. Data from all three individuals either was, or was not used in the analyses, depending on the
hypothesis being tested). Participants consisted of first-line and middle managers and their subordinates, performing their regular work tasks at a Fortune 500 manufacturing organization. Trait-based measures were collected from the participants during an initial training session, which also served to familiarize participants with the data collection methodology. Following the initial session, occurring on a Friday afternoon, both dyad members were asked to provide a brief report of their state-based affect and attitudes at six pre-arranged times a day, over the course of two weeks (i.e., 10 work days). These state-based measures were collected via PDAs.

*Procedure for Initial Training Session*

During the training session, participants received a brief orientation to the study and completed the trait-based affect and attitude measures, as well as contextual and moderator variable measures. Next, participants were provided with step-by-step instructions and a visual demonstration on how to operate the PDAs used to collect the state-based measures. Participants were allowed to practice responding in a ‘demonstration’ mode, asked questions, and received feedback on the proper use of the system. Although participant reactions to the training session or actual data collection were not assessed, anecdotal evidence suggests participants were engaged in the study.

*Measures collected during the initial training session.* Trait measures included positive and negative affect (i.e., PANAS; Watson et al., 1988), job cognitions (i.e., Weiss, Nicholas & Daus, 1999), as well as the measures of affectively and cognitively oriented job satisfaction and organizational commitment developed during pilot testing. All trait measures requested participants respond based on how they “feel in general.”
In order to test the proposed moderator effects, supervisors additionally completed a measure of emotional expressivity (Berkeley Expressivity Questionnaire; Gross & John, 1995, 1997) and subordinates completed a measure of emotional contagion susceptibility (Emotional Contagion Scale; Doherty, 1997), as well as supervisor liking (Byrne, 1971). Both supervisors and subordinates also completed the following scales assessing exploratory moderator variables: (a) leader-member exchange (LMX-7; Graen & Uhl-Bien, 1995), (b) power (Interpersonal Power Questionnaire; Shaffer, Percy & Tepper, 1997), and (c) work-self concept (The Levels of Self-Concept Scale; Selenta & Lord, 2005). For the current study, only subordinate responses were of interest.

Repeated-Measures Experience Sampling Sessions

On the Monday following the initial training session, participants began providing state-based measurements using their assigned PDA. Data collection occurred three times during the morning (i.e., 9:00, 10:00, and 11:00 a.m.), and three times during the afternoon (i.e., 2:00, 3:00, and 4:00 p.m.), for 10 workdays. This resulted in a total of 60 measurement periods per participant (6 measurements/day x 5 days/week x 2 weeks), each potentially matched to their supervisor’s or subordinate’s data. Furthermore, participants were only allowed to enter data during a 20 minute window of opportunity, such that the original signal for each interval (e.g., 9:00 a.m.) occurred 10 minutes before the hour (i.e., 8:50 a.m.) and allowed participants to initiate an electronic survey up to 10 minutes after the hour (i.e., 9:10 a.m.). This time frame was chosen in an attempt to accommodate participant schedules, and to maximize the data collected. The pilot
studies were invaluable in helping to create short, yet reliable measures, limiting the time demands of each survey session to 2-4 minutes.

*Measures collected during experience sampling sessions.* Participants completed the same affect and job attitude measures described earlier, using state-based instructions to respond “based on how you feel right now.” They also completed a number of items describing the work context in which they were currently operating. These include multiple items assessing: (a) tasks recently completed, (b) with whom they had recently interacted and to what extent (especially, recent interactions with the supervisor/subordinate); and (c) the occurrence of particularly meaningful events (positive or negative). This information was collected repeatedly, and serves as both control variables while examining the study’s hypotheses, and to explore the relationship between work-place events and affective reactions (i.e., Weiss & Cropanzano, 1996).

*Data Analytic Considerations*

The repeated and dyadically nested nature of the data collected via the Experience Sampling methodology required the use of multi-level random coefficient modeling (MRCM; also referred to as hierarchical linear modeling, HLM) techniques to analyze the data. MRCM allowed for the estimation of structural parameters and variance components at both the individual and dyadic level (e.g., Raudenbush & Bryk, 2002; Singer & Willett, 2003). Importantly, these techniques can account for the non-independence of the dyadic, repeated observations.

Potential Contributions of the Proposed Study

The proposed study offers a number of theoretical and practical contributions to the field of Industrial/Organizational Psychology. First, the study informs theory by
adding to a developing portion of the literature to establish the existence of predictable variability in affect and job attitudes while working. More importantly, it extends trait-based studies that have demonstrated an affect-attitude relationship, by examining the co-variation between state-based measures of affect and attitudes. By studying the contagion process, this study informs theory about a potential source of this variability, the relationship between a subordinate and supervisor.

By examining attitudes within the dyad, the current study also addresses the overlooked interactional aspect of job attitudes. Measuring specific events and activities as they occur during the working day also allows the current study to explore several tenants of the Affective Events Theory. The proposed ESM methodology is also relatively new to the field and the current study will serve to familiarize researchers with the potential of these methods. Finally, along with the pilot studies conducted prior to the main study, this study informs researchers about the psychometric aspects of cognitively vs. affectively oriented attitude measures, developed new scales, and demonstrated differential prediction of various outcomes based on the measures used.

The current study also offers a number of practical implications. The foremost of these is a greater understanding of the supervisor-subordinate work relationship. By extrapolation, these results can inform team researchers on a relatively unstudied aspect of the team environment, contagion. This research could directly influence programs designed to promote different aspects of emotional regulation and emotional labor within employees. Finally, this research could bring the influence of affective and contextual variables on attitude formation to the attention of organizational researchers, and inform the practice of data collection.
To further examine these avenues, Chapter II provides a more in-depth analysis of the affective nature of job attitudes and the proposed contagion mechanism. Chapter III provides a detailed discussion of the aforementioned pilot studies, and their results. Chapter IV describes the rationale for several important decisions made when designing the ESM methodology used in the Primary Study, and provides a detail examination of the results. Finally, Chapter V discusses the implications of the current study for the field of Industrial/Organizational Psychology.
CHAPTER II

REVIEW OF THE LITERATURE

Overview of the Literature

Social contagion is the often spontaneous, unconscious proliferation of similar affect, attitudes and behavior among members of a group. Furthermore, contagion is often a top-down process in which higher status individuals within a group initiate the affect, attitude or behavior, which spreads to other, lower status group members (Levy & Nail, 1993). Unfortunately, the Industrial/Organizational Psychology literature is just beginning to examine the effects of contagion within the workplace (e.g., see Barger & Grandey, 2006; Bono & Ilies, 2006; Ilies, Wagner & Morgeson, 2007 for research moving in this direction), and little is known about the potential effects of various moderator variables.

The current chapter reviews literature supporting an argument that both affect (i.e., positive and negative affect) and organizationally relevant attitudes (i.e., job satisfaction and organizational commitment), transfer from supervisor to subordinate through an emotional contagion mechanism. More specifically, it is predicted that momentary (i.e., state) levels of supervisor affect and attitudes will predict subordinate levels of the same affect and attitudes, measured at the same time. This is based on research demonstrating that both affect and attitudes fluctuate within the day and over time. Literature will also be presented supporting the potential moderating effects of
several variables on the relationship between a supervisor’s job attitudes and mood and
his or her subordinate’s job attitudes and mood, including supervisor emotional
expressiveness and subordinate emotional contagion susceptibility.

Affect and Attitudes

However, prior to discussing contagion’s potential impact on the supervisor-
subordinate dyad, it is necessary to briefly draw an important distinction between affect
and attitudes. Affect has been studied in the workplace since the 1930s, but only during
the past 20 years has affect re-emerged as a focal variable in the I/O literature (Weiss,
2002a). In general, the term affect can be used to refer to two broad classifications of
affective experiences, emotions and mood. Emotions such as happy, sad, or angry, refer
to intense, short-term reactions to specific stimuli. This is compared to moods, which are
generally considered diffuse, long-term reactions not associated with a specific stimuli
(Frijda, 1993). Although the term ‘emotional’ contagion is used in the current study to
coincide with the majority of the existing literature, it should be understood that shared
moods are actually the focal affective variables.

The most appropriate method of measuring affect is another important distinction
made in the literature. Although the hedonic tone/pleasantness and activation dimensions
along the affect circumplex are more effective at capturing moment-by-moment variation
in affect (a focus of the current study; e.g., Russell & Carroll, 1999), the current study
will accept the more commonly used Positive Affect/Negative Affect (PA/NA)
distinction. This decision primarily revolves around the availability of a highly
researched measure (i.e., the PANAS; Watson, Clark & Tellegen, 1988), which will be
used to collect both state- and trait-based versions of positive and negative affect.
In contrast, work-related attitudes, such as job satisfaction and organizational commitment, have historically been among the most commonly studied phenomena in Industrial/Organizational (I/O) Psychology. However, the conceptualization of job attitudes has changed over time. More recent attitude discussions define them as the “psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly & Chaiken, 1993, p. 1). In essence, Eagly and Chaiken argue that attitudes are evaluative judgments directed at and entity or object, such as one’s job or organization. Furthermore, they argue that attitudes can be formed and enacted through affective, cognitive or behavioral channels.

The current study focuses specifically on the affectively and cognitively oriented components of job satisfaction and organizational commitment. In general, an attitude’s affective component consists of the positive and negative feelings or emotions directed toward an object, while its cognitive component refers to the beliefs and thoughts an individual possesses for that object (Schleicher, Watt & Greguras, 2004). Interestingly, and what blurs the distinction between affect and attitudes, is that this attitude definition includes an affective component. Finally, this multi-component conceptualization has infiltrated current definitions of important organizational attitudes, such as job satisfaction. For example, Weiss (2002b) defined job satisfaction as “a positive (or negative) evaluative judgment one makes about one’s job or job situation” (p. 175). Furthermore, Brief (1998) defined job satisfaction as “an internal state that is expressed by affectively and/or cognitively evaluating an experienced job with some degree of favor or disfavor” (p. 86). Although no explicit statement could be found in the
literature, similar definitions of organizational commitment as an evaluative judgment could also be written.

**Affectively and Cognitively Oriented Job Attitudes**

Defining job attitudes as evaluative judgments with both affective and cognitive components suggests several avenues of research. For example, to what extent does the literature suggest job satisfaction and organizational commitment are affectively or cognitively oriented? Second, how does the measurement of attitudes impact the affective vs. cognitive nature of the attitudes? Finally, if these attitudes have an affective component, to what extent does emotional contagion play in supporting similar supervisor-subordinate attitudes? To answer these questions, one must better understand the affective nature of job satisfaction and organizational commitment first.

**Affective nature of job satisfaction.** To answer the first question, much of the early research on the affective nature of job satisfaction arose from studying its dispositional nature (e.g., Arvey, Bouchard, Segal & Abraham, 1989; Gerhart, 1987; Staw, Bell & Clausen, 1986; Staw & Ross, 1985; Steel & Rentsch, 1997; but also see Cropanzano & James, 1990 for a criticism of this research). However, more recent research (e.g., Judge & Larsen, 2001) proposes that individual differences in characteristic positive affect (PA) and negative affect (NA) may underlie the apparent dispositional nature of job satisfaction. For example, Watson and Slack (1993) demonstrated that trait PA and NA make significant and independent contributions to the prediction of job satisfaction, both concurrently and longitudinally. More specifically, their results suggest that when measured 27 months apart (i.e., Time 1, Time 2), both trait PA (retest $r = .74$) and NA (retest $r = .63$) were stable over time, and predicted job
satisfaction at Time 2. Furthermore, Time 1 PA and NA predicted Time 2 job satisfaction, above and beyond situational factors (i.e., job changes and occupational quality) measured concurrently with job satisfaction. Agho, Price and Mueller (1992) similarly found that both PA and NA predicted job satisfaction, even after controlling for situational variables such as autonomy, routinization and work group cohesion. This suggests that even after controlling for momentary situational effects, an individual’s characteristic positive and negative affect will predict his or her current job satisfaction.

Meta-analytic work also supports the affective nature of job satisfaction. In separate analyses of the affect-job satisfaction relationship, Connolly and Viswesvaran (2000) and Thoresen, Kaplan, Barsky, Warren and de Chermont (2003) respectively, found corrected correlation estimates of .49 and .33 between PA and job satisfaction and estimates of -.33 and -.34 between NA and job satisfaction. Furthermore, Thoresen et al.’s (2003) results suggest the affect-job satisfaction relationship was stronger when affect was measured in its state rather than trait form; however, these differences were non-significant. This research suggests that regardless of whether state or trait affect is measured, it can be expected to consistently relate with job satisfaction. However, it is important to note that although job satisfaction and dispositional affect are related, they are not redundant. For example, factor analytic evidence suggests a three-factor solution best fits the data, with job satisfaction and positive and negative affect remaining distinct, but related constructs (e.g., Agho et al., 1992).

Beyond the simple bivariate relationships just described, positive and negative affect have also been included in several multivariate studies of job satisfaction. Some relevant examples include using PA and NA as antecedents (e.g., Brief, Butcher, &
Roberson, 1995) and outcomes of job satisfaction (Shoenfelt & Battista, 2004), in the Affective Events Theory (AET) framework (e.g., Fisher, 2002; Grandey, Tam & Brauburger, 2002), as a moderator of the job satisfaction-performance relationship (Hochwarter, Perrewé, Ferris & Brymer, 1999), and temporally in conjunction with fluctuations in job satisfaction (e.g., Ilies & Judge, 2002, 2004; Judge & Ilies, 2004; Weiss, Nicholas & Daus, 1999). For example, Fisher (2000) used an experience sampling methodology (ESM) to measure emotions and moods five times daily for 10 working days. Dispositional or Trait PA/NA and job satisfaction (job satisfaction data were collected using four scales, two were cognitively oriented, one affectively oriented and one at the facet level) were also collected. Fisher’s results indicate that all three affect variables, that is, positive emotions at work (r’s = .29 - .46), negative emotions at work (r’s = -.19 - -.52) and mood at work (r’s = .24 - .54, all p’s < .05) were significantly related to the three measures of overall job satisfaction. When entered simultaneously into a regression equation, positive and negative emotions at work both added significant unique variance in the prediction of all three overall job satisfaction measures. Finally, Fisher’s results suggest that positive emotions at work were able to predict all three overall job satisfaction measures above and beyond the five Job Descriptive Index (JDI) facet scales, and that all three, mood, and positive and negative emotion at work predicted the Faces Scale of satisfaction above and beyond the JDI facet scales. This demonstrates the importance of affect in the prediction of job satisfaction, especially when job satisfaction is measured using a more emotionally laden scale, such as the Faces Scale.
By manipulating hospital employees’ moods to be either more positive or neutral, and then assessing their job satisfaction, Brief et al. (1995) also demonstrated that PA and NA can act as antecedents to job satisfaction. To manipulate affect, employees were given cookies, a drink and a token gift to put them in a positive mood prior to completing measures of negative affect and job satisfaction (employees in the control condition simply completed the negative affect and job satisfaction measures). Results of their study suggested a significant main effect for the mood inducing event, such that those who received the cookies and gift rated their jobs more satisfying than those in the control condition. Interestingly, these authors also found a significant trait negative affect x positive mood induction interaction, suggesting that high Trait NA individuals may be less responsive to positive events at work (Brief et al., 1995). Additionally, Woodward and Chen (1994) found that a sample of pharmacists who reported having a ‘good day’ were significantly more satisfied with their jobs and careers than pharmacists having a ‘typical day.’ That transient situational characteristics, such as receiving a gift, or having a good day, can significantly alter participants’ self-reported job satisfaction, suggests that moment-to-moment job satisfaction is not as stable as the dispositional theorists (e.g., Staw & Ross, 1985) would have us believe, a theme discussed shortly.

_Affective nature of organizational commitment._ Together, this research clearly demonstrates a consistent link between affect and job satisfaction. Although limited in comparison, the available research demonstrates a similar relationship between affect and organizational commitment. However, this research has only looked at the relationship between organizational commitment and positive and negative affect, rather than examining a possible commitment-mood relationship. For example, in their meta-
analytic review, Thoresen et al. (2003) found evidence for mean estimated population correlations of .35 and -.27 for the relationship between affective commitment and PA and NA respectively. Research by Ko, Price and Mueller (1997) supports these results, demonstrating significant correlations between affective commitment and both PA ($r = .16, .38$) and NA ($r = -.27, -.23$; Samples 1 and 2 respectively) in a South Korea sample. Given the demonstrated relationship between affect and both job satisfaction and organizational commitment, and the similarity between their affective and cognitive attitudinal components, both attitudes can be expected to operate according to similar processes. The next sections explore one such process, the measurement of job satisfaction and organizational commitment’s affective and cognitive components.

*Cognitive vs. affective measurement of job satisfaction.* Although Locke (1969) defined job satisfaction in terms of both cognitions (appraisals of one’s job) and affect (emotional reactions to the work) over three decades ago, research comparing the affective vs. cognitive measurement of job satisfaction and organizational commitment is limited. Until recently, the measurement of job satisfaction was thought to be almost entirely cognitive in nature (e.g., Organ & Near, 1985). However, the emerging research supports the contention (e.g., Eagly & Chaiken, 1993; Weiss, 2002b) that job attitudes have both an affective and cognitive component. In fact, Weiss et al. (1999) argued that as evaluative judgments, attitudes are assessed with “different measures tapping into affective or belief-based causes to greater or lesser degrees” (p. 19). A number of studies support this argument.

For example, several researchers have directly investigated the extent to which different job satisfaction measures reflect affect vs. cognition. In their study, Brief and
Roberson (1989) compared the Minnesota Satisfaction Questionnaire (MSQ; Weiss, Dawis, England & Lofquist, 1967), Job Description Index (JDI; Smith, Kendall & Hulin, 1969) and Faces Scales (Kunin, 1955) to scores on the Job Affect Scale (Brief, Burke, George, Robinson & Webster, 1988) and a job cognitions scale developed for the study. Of the scales studied, the MSQ was the most cognitively loaded measure of job satisfaction. When placed simultaneously into a regression equation predicting MSQ scale scores, job cognitions were strong predictors of MSQ scores ($\beta = .64, p < .001; R^2 = .58, p < .001$), while neither Positive ($\beta = .14, p > .05$) nor Negative Affect ($\beta = -.09, p > .05$) significantly predicted job satisfaction.

The Faces Scale represented the most balanced measure of job satisfaction. Although job cognitions remained a significant predictor ($\beta = .42, p < .001$), both Positive ($\beta = .26, p < .01$) and Negative Affect ($\beta = -.27, p < .001$) were significant predictors of job satisfaction measured using the Faces Scale ($R^2 = .52, p < .001$). Finally, the JDI represented a middle ground, being neither as cognitively oriented as the MSQ ($\beta = .55, p < .001$), nor as affectively oriented as the Faces Scale (PA: $\beta = .12, p > .05$; NA: $\beta = -.20, p < .01$). The conclusion that the MSQ is more cognitively oriented than the JDI was also supported by Connolly and Viswesvaran (2000) who found that the scale used to measure job satisfaction was the only moderator of the negative affect-job satisfaction relationship in their meta-analysis. More specifically, the negative affect-job satisfaction relationship was stronger when job satisfaction was measured using the more affectively oriented JDI than with the MSQ ($r = -.33$ vs $-.24$ respectively).

Additional research by Williams (1988) found similar differentiation among another set of job satisfaction measures. He partitioned the variance of the Facet Free Job
Satisfaction Scale (Quinn & Staines, 1979), Job Diagnostic Survey’s satisfaction scale (Hackman & Oldham, 1975) and the Brayfield-Rothe Satisfaction Scale (1951) into the proportions attributable to either affect or cognition. His results indicate that the Facet Free Job Satisfaction Scale was the most cognitively loaded measure with 27% of the variance attributable to cognition and only 10% to affect, while the Brayfield-Rothe was the most affectively oriented measure with affect accounting for 22% of its variance and cognition only 16%. Finally, Fisher (2000) found that when measured using the Faces Scale, job satisfaction had the strongest relationships with not only positive ($r = .45, p < .01$) and negative emotions at work ($r = -.52, p < .01$), but also mood at work ($r = .54, p < .01$). These correlations were significantly stronger than when job satisfaction was measured using either the Job in General (Ironson, Smith, Brannick, Gibson, & Paul, 1989), Facet-Free (Quinn & Staines, 1979), or JDI satisfaction scales.

Research by Niklas and Dormann (2005) also supports the differential relationship between state affect and job satisfaction measures. Their results suggest that after controlling for the effects of trait PA, NA, and trait job satisfaction, state PA and NA were stronger predictors of state job satisfaction when measured using the Faces scales than when measured using a more cognitively oriented facet job satisfaction scale. According to Moorman (1993), these results make sense conceptually, as the MSQ for example, asks respondents to indicate the extent to which they are satisfied with job conditions such as pay, supervision, and the working conditions. The Faces Scale and Brayfield-Rothe Satisfaction scales on the other hand, are more clearly related to the respondents’ emotional response to work. For example, the Faces Scale asks respondents to indicate which face, from extremely sad to extremely happy, most closely resembles
their face at work, while the Brayfield-Rothe asks emotion related questions, such as the extent to which the respondent is happy, interested, disappointed or bored.

An additional method of demonstrating the affective vs. cognitive orientation of existing job attitude measures is to demonstrate that the same job attitude differentially predicts important work related behaviors, depending on the scale used. This is precisely the hypothesis tested by Moorman (1993). Based on previous research indicating that a greater proportion of the variance in OCBs could be attributed to job cognitions than affect, he hypothesized that job satisfaction would have a stronger relationship with organizational citizenship behaviors (OCBs) when measured using a more cognitively oriented job satisfaction measure. Although his results are neither clear nor strong, Moorman’s results generally support this hypothesis. He found that the more cognitive MSQ accounted for variance in OCB dimensions above and beyond the more affective Brayfield-Rothe scale, more often than the Brayfield-Rothe accounted for variance above and beyond the MSQ. That is, cognitive job satisfaction tended to predict OCBs more strongly than job satisfaction measured affectively.

In a similar vein, Schleicher et al. (2004) demonstrated the strength of the highly debated job satisfaction-job performance relationship is moderated by the measurement of job satisfaction. More specifically, Schleicher et al. argue that the Affective-Cognitive Consistency (ACC) of an attitude, operationalized as the absolute value of the rank order difference between an individual’s scores on an affectively and cognitively oriented attitude measure, will moderate the attitude-behavior relationship. This is because the similarity between affectively and cognitively oriented attitudes (i.e., ACC) is an indication of an attitude’s strength. The more similarity between affectively and
cognitively oriented attitudes, the more accessible the attitude should be from memory, and the greater the attitude’s impact on behavior, irrespective of the favorability of the attitude (e.g., scale score; Schleicher et al., 2004). For example, using a median split on ACC scores between the Brayfield-Rothe (i.e., affectively oriented job satisfaction) and MSQ (i.e., cognitively oriented job satisfaction) in two samples, Schleicher et al. found that High ACC individuals were significantly more consistent in their attitudes ($r$'s = .93, .91; sample 1 and 2 respectively) than Low ACC individuals ($r$’s = .26, .15). Furthermore, ACC scores moderated the job satisfaction-job performance relationship with High ACC employees demonstrating significantly stronger relationships ($r$’s = .57, .54; sample 1 and 2 respectively) than Low ACC individuals ($r$’s = -.03, -.11).

**Cognitive vs. affective measurement of organizational commitment.** There is also some research examining the potential differential relationships between organizational commitment measures and affect and cognition. Since the early 1990s, the primary method of studying organizational commitment has been through the use of Allen and Meyer’s (1990) three commitment measures; the Affective Commitment Scale (ACS), Continuance Commitment Scale (CCS) and the Normative Commitment Scale (NCS). According to several authors (e.g., Cropanzano, James and Konovsky, 1993; Allen & Meyer, 1996), affective commitment measured with the ACS should exhibit stronger relationships with affect than continuance commitment measured using the CCS. This expectation stems from the definition of these terms.

Organizational commitment has historically been viewed as a bond between an individual and his or her organization that reduces the likelihood the individual will voluntarily leave the organization (Mathieu & Zajac, 1990). However, since the early
1990’s, commitment has been viewed primarily as a multidimensional construct (e.g., Allen & Meyer, 1990), comprised of affective, continuance and normative commitments. Affective commitment has been defined as the “identification with, involvement in, and emotional [italics added] attachment to the organization” (Allen & Meyer, 1996, p. 253). Continuance commitment is the attachment formed to an organization based on the perceived cost of leaving (a more cognitive form of commitment); and normative commitment is operationalized as the felt obligation to remain with the organization (Allen & Meyer, 1990).

Based on the definition of affective commitment as an emotional bond to the organization, Cropanzano et al. (1993) argued affective organizational commitment should relate to both positive and negative affect. However, continuance commitment represents a “rational weighting of costs and benefits,” and was not expected to relate significantly to either form of affect (p. 600). Their results supported this distinction, replicating the significant bivariate relationship between affective commitment and affect. In Study 1, both PA ($\beta = .52, p < .01$) and NA ($\beta = -.19, p < .05$) significantly predicted affective commitment (measured with the OCQ) when entered simultaneously into a multiple regression equation, and together accounted for 34% of the variance in organizational commitment. In Study 2, Cropanzano et al. found partial support for their hypothesis, with only PA ($\beta = .27, p < .01$), and not NA predicting affective commitment. More importantly, neither PA nor NA were related to continuance commitment. Similarly, Reilly and Orsak (1991) found that affective commitment was significantly correlated with both PA ($r = .31, p < .05$) and NA ($r = -.17, p < .05$), with continuance commitment only significantly correlated with positive affect ($r = -.11, p < .05$; NA, $r =$
.08, \( p > .05 \)). More importantly, the affect-commitment correlations were significantly different, with affective commitment being more strongly related to the affective traits.

Unfortunately, this research only demonstrates that PA and NA are more strongly related to affective than continuance commitment; however, the research does not address the extent to which continuance commitment is related to cognition. Although continuance commitment is defined in terms of cognitive reasoning, a PsychInfo search failed to return literature directly assessing the continuance commitment-cognition relationship. One related exception were meta-analytic reports of the relationship between the CCS and withdrawal cognitions (e.g., Meyer, Stanley, Herscovitch & Topolnytsky, 2002). However, affective commitment (measured using the ACS) demonstrated a stronger relationship with withdrawal cognitions (\( \rho = -.58 \) vs. -.20 for the CCS). A possible explanation for the failure of the CCS to demonstrate a stronger relationship with the cognitively oriented withdrawal cognitions construct, is the nature of the CCS. Almost since its inception, the CCS has been criticized for its dimensionality, with a consensus in the literature that the CCS measures two related but distinct dimensions; low alternatives and high personal sacrifice (e.g., Allen & Meyer, 1996). High correlations between the ACS and OCQ, and near zero correlations between the CCS and these scales, further obscures what is precisely measured by the CCS.

Cognitive vs. affective measurement in the current study. To further complicate the issue, there is no guarantee that every item contained within an attitude scale is affectively or cognitively oriented. In fact, most of the scales previously studied demonstrate relationships of varying degree to both affect and cognition (e.g., Brief & Roberson, 1989). However, given the nature of the current research, it is imperative that
a highly succinct set of divergent affectively and cognitively oriented job satisfaction and organizational commitment items be identified. One method of rectifying this situation would be to assess the affective and cognitive orientation of job attitudes not at the scale, but at the item level.

The affective and cognitive semantic differential scales developed by Crites, Fabrigar and Petty (1994), provide a practical method for addressing this issue by effectively differentiating between the affective and cognitive components of attitudes. These scales can be applied to any attitude object, and consist of bipolar word pairs along a continuum, which ask participants to indicate the position that describes their feelings toward the attitude object (i.e., affective evaluation), or traits that described the attitude object (i.e., cognitive evaluation). Across six attitude objects (i.e., literature class, math class, capital punishment, birth control, church and snakes), these scales demonstrated high internal consistencies, and good convergent and discriminant validity, with the affective and cognitive scales loading on separate factors. Finally, a series of structural equation models suggested that both the affective and cognitive scales significantly predicted attitudes toward each attitude object, and differentially predicted attitudes manipulated to be more affective or cognitive.

Therefore, one of the aims of this study will be to use Crites et al.’s (1994) semantic differentials to identify a subset of job satisfaction and organizational commitment items with the most divergent affective and cognitive orientations. This will be done at the item level, drawing from multiple published job satisfaction and organizational commitment scales, as well as items written for the purpose of this research. By drawing from several sources, the methodological and measurement issues
encountered in previous research may be overcome (e.g., Brief & Roberson, 1989; Williams, 1988). As it applies to this study, doing so will have three additional benefits. First, it will facilitate a much shorter measure; that is, divergent affective vs. cognitive measures will likely correlate more strongly within a scale (e.g., the subset of affective job satisfaction items should be more strongly correlated with one another than they are with items on the cognitive job satisfaction measure), improving internal consistency reliability, and facilitating a shorter set of measures. Due to the methodology used in this study, described later, the shortest set of measures possible is ideal. Second, identifying a divergent set of affective vs. cognitive job satisfaction and organizational commitment measures is analogous to using an extreme groups design in a laboratory setting, which improves the power for detecting an interaction among the focal variables (e.g., McClelland, 1997), while still allowing the relative importance of affect and cognition to be computed (e.g., Cortina & DeShon, 1998). A third consideration is that affectively oriented job attitudes may be more likely to demonstrate contagion than cognitively oriented job attitudes, a possibility discussed shortly.

**Intraday, Within-Person Variability in Affect and Attitudes**

Just like the measurement of affectively and cognitively oriented attitudes, a second overlooked issue in the I/O literature is the extent to which affect and attitudes fluctuate. The focus of this debate is the distinction between State and Trait measurement. Briefly, state-based measurement focuses on the variability within an individual, captured by repeatedly measuring the affect or attitude over time. In contrast, by measuring an affect or attitude once, trait-based measurement assumes stability and focuses on the variability between individuals. “For example, one’s mood at 10 a.m. on
Tuesday is probably not the same as one’s mood at 5 p.m. on Friday (within-person variation) and the mean of all mood observations across days of the week is different for different people (between-person variation)” (Miner, Glomb & Hulin, 2005, p. 172).

Arguably, the trait-based perspective has dominated the I/O literature; yet remains a simplistic view of reality and overlooks evidence that individual’s moods, emotions and attitudes fluctuate. Furthermore, the predominant use of trait-based research has likely obscured the moment-by-moment relationship among variables, prompting several authors (e.g., Eaton & Funder, 2001) to for more research on the variability of mood and emotion.

For example, there is evidence that within person variability in mood is a stable individual difference variable which can be reliably measured using intraindividual standard deviations (e.g., Eid & Diener, 1999; similar to other measures of reliability, the reliability of mood variability estimates can be increased by either increasing the number of measurement occasions, or the number of indicators for a particular emotion). Miner, Glomb and Hulin (2005) demonstrated that over half of the variability in participant mood occurred within-subjects. Additional research by Stone et al. (1996) suggests that of the ten moods they measured (four times per hour throughout the day), anxious, happy, rushed and tired moods demonstrated significant linear or curvilinear patterns with the time of day. The temporal pattern of these, as well as the other measured moods, also varied when controlling for the locations and activities the participants were engaged in. In fact, Stone et al. (1996) argue that their data suggests, “that there is a strong influence of environmental changes on mood…this has clear implications for the measurement of mood: A subject’s current (and perhaps recent) activities need to be factored into their
evaluation of current mood” (p. 1303). From a purely exploratory perspective, this suggests that the many environmental conditions (i.e., affective events in the AET) an employed individual experiences throughout the workday may alter their moods. This is precisely what Miner et al. (2005) found, as both positive and negative events at work (related to supervisors, coworkers, and the work itself) significantly predicted mood measured concurrently.

*The relationship between affect and transient variability in job satisfaction.*

Although brief, these studies demonstrate the importance of accounting for momentary fluctuations in affect and attitudes. More importantly, several of the studies discussed earlier clearly suggest that job satisfaction is not entirely stable, and can fluctuate with participant mood. Examining these fluctuations in moment-to-moment or daily job satisfaction has become increasingly popular in the research literature and is one of the main foci of this paper. This section further examines the relationship between state affect and the short-term fluctuations in job satisfaction.

In one of the first papers to explore this topic, Weiss et al. (1999) compared daily moods (i.e., state-based) against trait-based job cognitions in the prediction of trait-based job satisfaction. Rather than measuring trait positive and negative affect, Weiss et al. opted to measure participant dispositional happiness and affect intensity at Time 1, followed by an intensive 16-day diary assessment of mood at work, measured four times a day. Finally, at the end of the 16-day mood assessment, participant VIE beliefs about the job (i.e., job cognitions) and job satisfaction were measured. Their results indicate that participant mood at work fluctuated cyclically, starting low in the morning and rising to a plateau mid-afternoon. Although this cyclical activity in mood did not predict job
satisfaction, Weiss et al. found that an aggregated composite of the 64 mood measurements predicted job satisfaction, with those who experienced a more pleasant mood on average reporting greater job satisfaction ($r = .64, p < .01$; in a simultaneous regression, pleasantness remained a significant predictor of job satisfaction $\beta = .58, p < .01$, while affect intensity/activation was not, $\beta = .17, p > .05$). They also found that although average pleasant mood at work (i.e., state affect) and dispositional happiness (i.e., trait affect) were significantly correlated ($r = .52, p < .01$), average pleasant mood at work predicted job satisfaction above and beyond dispositional happiness. They argue these results support the AET and that due to its proximity, daily mood (i.e., state affect) mediates the effect of dispositional (i.e., trait) affect on job satisfaction (also see Weiss, 2002b). Just as important however, was Weiss et al.’s finding that average daily positive mood at work also predicted job satisfaction above and beyond VIE beliefs about the job, supporting the affect-cognition distinction among attitudes.

The importance of state affect in determining job satisfaction was further solidified in more recent research by Niklas and Dormann (2005), who asked 91 office workers to complete a survey four times a day for two weeks. The first survey each day was composed of a trait affect and trait job satisfaction measure (Time 1), followed by three state affect and job satisfaction measurements throughout the day (Time 2-4, within the same day). In both measurement conditions (trait vs. state) the same three measures were used; facet job satisfaction (Warr, Cook & Wall, 1979), overall faces job satisfaction (German translation similar to Kunin, 1955), and the PANAS (Watson, Clark & Tellegen, 1988). The only difference between the two measurement conditions were the instructions participants read prior to completing the measures. In the trait condition
(Time 1 each morning), participants rated their affect and job satisfaction based on how they usually felt, compared to how they felt ‘right now’ in the state affect and state job satisfaction condition (Time 2-4).

The results of this study supported two conclusions. First, Niklas and Dormann (2005) found that aggregated state job satisfaction, averaged over Time 2-4, was significantly and highly correlated with trait job satisfaction (Faces scale: $r = .60, p < .01$; Facet satisfaction: $r = .92, p < .01$). Second, using multilevel modeling to statistically accommodate the nested data structure, they found that both state PA and state NA predicted state job satisfaction above and beyond the effects of trait affect and trait job satisfaction. In other words, an individual’s current emotional experience predicted their simultaneous level of job satisfaction (for both the faces and facet scales), above and beyond the combined effect of their dispositional level on both variables. That trait and state affect and job satisfaction were both measured within the same day, makes the apparent impact of state affect on state job satisfaction even more striking.

There is also evidence that due to their stronger relationships with state PA and NA, affectively oriented job satisfaction measures (i.e., the Faces scale) will demonstrate greater within-person variability (e.g., Niklas & Dormann, 2005). That is, affectively oriented attitudinal measures should demonstrate greater moment-by-moment fluctuations than cognitively oriented measures. What sets these results apart from those of Weiss et al. (1999), is that state affect and job satisfaction were measured simultaneously, and demonstrated a significant relationship even after controlling for trait affect and job satisfaction. This relationship suggests that state affect and job satisfaction fluctuate together within the same day.
Additional research by Ilies and Judge (2002) and Judge and Ilies (2004) further extends our understanding of the longitudinal impact of affect on job satisfaction. In these papers, Ilies and Judge measured both positive and negative mood and job satisfaction multiple times per day, allowing these researchers to examine the within individual, moment-to-moment relationship between affect and job satisfaction. Using an ESM methodology, Ilies and Judge (2002) measured momentary job satisfaction (e.g., “at this very moment I am very satisfied with my job” (p. 1126)), and momentary mood, four times a day for 19 working days, as well as measuring the personality variables extraversion and neuroticism twice. They found that momentary positive and negative mood predicted momentary job satisfaction, jointly accounting for 37% of the variance in between-subjects satisfaction. Positive and negative mood also significantly predicted 29% of the within-subjects job satisfaction variability. Ilies and Judge also correlated the standard deviations (i.e., ‘variability’) of the within-subjects measures of mood and job satisfaction, and found the variability in negative momentary mood was strongly related to variability in job satisfaction ($r = .60, p < .001$; within person variability in positive mood was unrelated to variability in job satisfaction, $r = .29, p > .05$).

These results suggest that employees’ momentary mood and job satisfaction vary over time, and that the variability in these constructs may also be related. Judge and Ilies (2004) extended this research by including measures of mood after work. Using a similar ESM methodology, they found positive mood at work partially mediated the effect of trait positive affect on job satisfaction, while negative mood at work fully mediated the effect of trait negative affect on job satisfaction. In this study, within-individual variability in both negative ($\beta = -.40, p < .01$), and positive mood at work ($\beta = .45, p <$
.01) predicted concurrent job satisfaction. These results support the Affective Events Theory (Weiss & Cropanzano, 1996), suggesting that state mood acts as an affective reaction, mediating the effect of affective events on attitudes, such as job satisfaction (see also Weiss et al., 1999; Niklas & Dormann, 2005 for similar conclusions). In fact, Weiss and Cropanzano (1996) argue that:

Fundamental to the theory [AET] is the idea that affect levels fluctuate over time and that the causes of these patterns of affect can be examined in terms of endogenous components, such as known cycles in mood or affective dispositions, and exogenous components, such as affectively relevant events which constitute shocks to existing patterns. Dispositions can also influence the way events produce affective reactions. (p. 12)

However, Judge and Ilies’ (2004) most interesting finding may be that as the time lag between the measurement of momentary mood at work and job satisfaction increased, the mood at work-job satisfaction relationship disappeared. The inability of mood at work to predict future job satisfaction occurred quickly, with only negative mood at work significantly predicting job satisfaction three hours later, and after six hours (within the same day), neither positive nor negative mood at work measured that morning, significantly predicted job satisfaction.

The research discussed thus far supports a number of predictions. First, repeatedly collected, state-based measures of mood, job satisfaction and organizational commitment at work will fluctuate. Second, the systematic fluctuations of mood, job satisfaction and organizational commitment will be related at both the within- (i.e., state) and between-subjects (i.e., trait) levels of analysis. Third, based on the definition of
attitudes as evaluative judgments with both affective and cognitive components, mood will demonstrate stronger relationships with affectively oriented measures of satisfaction and commitment. Fourth, these affectively oriented attitudinal measures should demonstrate greater within-subjects variability than their cognitively oriented counterparts. Finally, state-based measures of mood will predict state-based measures of these attitudes above and beyond both trait-based affect and attitudes. As discussed in Chapter III, this has implications for the study’s design and analysis, requiring the use of an experience sampling methodology and multilevel modeling. It also suggests the need to strategically control for dispositional affect and attitudes.

An Asymmetrical Emotional Contagion Mechanism

General contagion. It is likely that a number of contextual events/variables influence the demonstrated systematic fluctuations in both affect and attitudes at work (e.g., Weiss & Cropanzano, 1996). The research by Miner et al. (2005) suggests that interactions between a supervisor and his or her subordinate are one such event/variable. While some research suggests that charismatic leadership drives the relationship between the mood of supervisor and subordinate (e.g., Bono & Ilies, 2006), the current study argues for a simpler interactional phenomenon, emotional contagion. Although the focus of this paper is the impact of emotional contagion on the relationship between supervisor and subordinate attitudes and affect, it is simply one aspect of a more general category of social contagion. Due to the paucity of relevant research in the I/O literature, the following section will attempt to familiarize readers with the general contagion mechanism. A number of studies will be reviewed to demonstrate the types of methods, populations and hypotheses being tested in the contagion literature. The goal is to
demonstrate that contagion can be the catalyst for similarities in many types of attitudes, affect or behaviors, and that it typically flows from higher to lower status group members.

In general, contagion has been defined as the proliferation of similar attitudes, affect, and behavior among members of a group. This process occurs unintentionally, with the similar attitudes, affect and behaviors being passed from one individual to the next, often spontaneously and without conscious awareness (Levy & Nail, 1993). Social contagion can be differentiated from obedience, compliance, and other forms of social learning in which individuals may also converge, but due to the social influence attempts of others. Each of the studies reviewed in the following section demonstrate that contagion occurs unintentionally, and demonstrates the variety of attitudes, affect and behaviors studied under the contagion rubric. For example, product attitudes (Howard & Gengler, 2001); customer service ratings (Pugh, 2001; Barger & Grandey, 2006); facial expressions, physical posturing, moods and emotions (Hatfield, Cacioppo & Rapson, 1993, 1994); depressive symptoms (Joiner & Katz, 1999); false memories (even when warned against the possibility of being influenced by a confederate; Meade & Roediger, 2002); and goal pursuits (Aarts, Gollwitzer & Hassin, 2004) have all been studied.

As an example of attitudinal contagion, Howard and Gengler (2001) randomly assigned members of 60 dyads to one of two roles, sender and receiver. The mood of the sender was manipulated through a prize drawing (i.e., happy vs. neutral), while the extent to which the receiver liked the sender was manipulated by telling the receiver that the sender either had or had not given them something (i.e., liking vs. neutral). Their results indicate that a happy sender, who was liked by the receiver, resulted in greater receiver
smiling and a convergence in happiness over time. Furthermore, the sender’s affect predicted the receiver’s affect, and a happy, liked sender resulted in the most positive product attitudes in the receiver (Howard & Gengler, 2001). Pugh (2001) and Barger and Grandey (2006) found similar results in the service relationship. Within a bank setting, Pugh found that customer service representatives who displayed positive emotions had customers who felt more positive (i.e., contagion occurred); moreover, these customers also rated the bank’s service quality more positively. Contagion effects on such important organizational outcomes as customer satisfaction and product preferences, suggests that contagion may also influence other important organizational phenomenon such as commitment, or job satisfaction.

Several examples of behavioral contagion also exist. For example, Aarts et al. (2004; see Aarts & Hassin (2005) for a general discussion of goal contagion) found that when participants read vignettes in which the main characters’ goals were implied by their behavior, but never explicitly stated, participants automatically caught and enacted the goal, with the contagious goal continuing to influence subsequent behavior over time. In a controlled laboratory experiment, Chartrand and Bargh (1999; Study 1) had participants interact with two confederates in back to back conditions. In the first session the confederate either rubbed their face or shook their foot, and either smiled or had a neutral expression on their face. In the second session, the new confederate did whichever two behaviors the previous confederate had not done; for example, in the first session the confederate rubbed their face and smiled, while in the second session the confederate shook their foot and had a neutral expression (these behaviors and the confederate’s genders were counterbalanced across sessions). Their results support
behavioral mimicry, with participants smiling, shaking their feet and rubbing their faces more often in the presence of a confederate engaged in the same behaviors. Furthermore, participants changed their behavior across the two sessions to more closely resemble the confederate they were currently with.

Although emotional contagion will be discussed in greater detail, these examples of attitudinal and behavioral contagion research highlight the variety of settings (i.e., real world and lab), populations (i.e., students, employees and customers), and methods (i.e., vignettes, observations and questionnaires) which have all verified the impact of contagion in shaping individuals’ attitudes and behaviors. Given evidence for the existence of contagion, a clearer understanding must be developed for how contagion is expected to operate at the focal level of analysis in the current study, the supervisor-subordinate dyad. Levy and Nail (1993) conclude their review of the social contagion literature by suggesting that in most instances, the contagious affect, attitude or behavior will be passed down from a higher status individual to lower status group members. They propose that this occurs either because high status individuals have more discretion over their own behavior, or because lower status group members can increase their own status by imitating the affect, attitudes and behavior of high status individuals. In fact, several recent studies have demonstrated the effects of status on contagion in a wide variety of settings, including pre-existing student groups (Sy, Cote & Saavedra, 2005), Army squad leaders and squad members (Savell, Teague & Tremble Jr., 1995), in romantic relationships and with college roommates (Anderson, Keltner & John, 2003). Together, these studies highlight the possibility of top-down attitudinal and affective contagion within the supervisor-subordinate dyad.
Using 56 intact student groups, Sy et al. (2005) assessed the impact of changes in a leader’s mood on his or her group members’ moods. Prior to completing a blindfolded tent construction task as a group, each group leader’s mood was manipulated to be either more positive or more negative by watching an eight-minute videotape. Sy et al. found that contagion occurred top-down, from leader to group member. More specifically, group members’ moods converged with the leader’s mood over time (at both an individual and group level of analysis). To highlight the importance of leader mood, Sy et al. also found that the leader’s mood had significant direct and indirect effects on group effort and cooperation. Groups exerted significantly more effort when their leader was in a bad mood and exhibited greater cooperation when their leader was in a positive mood.

Savell et al. (1995) demonstrated top-down contagious effects using a real-world military sample of U.S. Army squad leaders and squad members who rated their level of job involvement twice (i.e., Time 1, Time 2) during a 3 1/2 month combat training exercise. Over time, squad leader’s and squad member’s job involvement ratings converged. At Time 1, the correlation between squad leader and squad member job involvement was non-significant ($r = .10$), but their job involvement ratings became significantly correlated by the end of the training period ($r = .34, p < .01$). To demonstrate that contagion, and not similar experiences among the squads was the source of convergence, Savell et al. correlated squad leader job involvement with the job involvement of randomly selected squad members. These correlations were non-significant at both Time 1 and Time 2, suggesting that squad member job involvement only converged with the squad leader they reported to, and that convergence was the
result of something within the squad leader-member dyad (i.e., contagion) other than the training experiences shared by all squad leaders and members.

Additional research outside of the contagion literature has also demonstrated this top-down directionality. For example, Tepper and Taylor (2003) found support for a supervisor to subordinate ‘trickle-down’ model of procedural justice using a military sample. Specifically, Tepper and Taylor found that a supervisor’s perceptions of procedural justice influenced their organizational citizenship behaviors (OCBs), operationalized as mentoring subordinates. Furthermore, being mentored by one’s supervisor influenced subordinates’ perceptions of procedural justice, which in turn influenced their own level of OCBs. In essence, these results suggest that a supervisor’s attitudes (e.g., procedural justice perceptions) and behavior (e.g., OCBs) are related to the same attitudes and behavior in their subordinates (also see Masterson, 2001).

Further support for the effect of status on contagion can be found in a series of three studies conducted by Anderson et al. (2003). Anderson et al. examined, 1) the presence of emotional convergence over time in existing romantic and roommate relationships, 2) whether relational power or gender influenced which partner was more likely to converge, and 3) the benefits of emotional similarity. In study 1, Anderson et al. examined the personality, relational power, relationship satisfaction, and the positive and negative emotional reactions of romantic partners during two laboratory discussions, six months apart. Their results suggest that the romantic partners significantly converged in their emotional responses over the course of the study (Time 1 $r = .30, p < .05$ vs. Time 2 $r = .56, p < .01$; $z = 3.06, p < .01$), and that this convergence was not due to personality similarities. More importantly, Anderson et al. found that emotional convergence was
asymmetrical, with the less powerful partner changing more. In fact, the correlation between the powerful partner’s Time 1 emotional response and their less powerful partner’s Time 2 emotional response was .69 ($p < .01$). These results were also replicated in two studies using same-sex college roommates.

Together, these studies represent strong support for the influence of power within a relationship to determine the direction of contagious attitudes, affect and behaviors, with the less powerful dyad member being more likely to converge.¹ Specifically, these results suggest that 1) a leader’s mood (Sy et al., 2005) and job attitudes (Savell et al., 1995; Tepper & Taylor, 2003) are contagious at both the individual and group levels of analysis; 2) that convergence occurs asymmetrically, with the subordinate converging to

¹ One article in the relevant literature (i.e., Hsee, Hatfield, Carlson and Chemtob, 1990) was found that contradicted the general finding that contagion is asymmetrical, flowing from those with greater to less power within a dyad or group. However, for several methodological reasons, and the author’s own admonition, their results should be disregarded. Briefly, Hsee et al. manipulated power in a highly contrived Milgram–esq study by informing the “teachers” that they had the ability to punish the “learner” by administering an electric shock, and vice versa. Prior to beginning the learning phase, participants were informed that each would be interviewed, and watched as the “other” participant described his happiest and saddest memories over a closed-circuit television monitor (the other participant was actually a pre-recorded confederate). Participants’ facial expressions were videotaped and independently rated for emotional contagion. Before being interviewed, actual participants were asked to retrospectively rate his or her emotional responses to both memories. Contrary to their hypotheses, the judges’ ratings suggested that the more powerful participants (i.e., teachers) were more likely to converge emotionally (there were no significant differences in the participants’ subjective self-ratings). These contradictory results can be questioned for at least two reasons. First, retrospective memory biases may have altered self-rated reactions. However, the judges’ ratings were conducted while the participants actually viewed the memories. Second, is the manipulation of power. The powerful teachers expected to shock the learner, which due to empathy, could have resulted in the teachers being highly attuned to the learner’s emotions. Also, the powerless learners were likely experiencing a considerable amount of stress, which could have reduced their ability to pay attention to the other’s emotions.
the more powerful supervisor; and 3) that convergence occurs specifically within the leader-follower dyad, and not with randomly selected leaders. Within the supervisor-subordinate dyad, this suggests that the mood and attitudes (e.g., job satisfaction and organizational commitment) of the more powerful (i.e., higher status) supervisor will be contagious and flow to the less powerful subordinate. The result will be the affective and attitudinal convergence of the dyad.

*Emotional contagion.* Although the research reviewed thus far has alluded to emotional contagion, its centrality to the hypotheses proposed in the current research requires a more in-depth discussion. Therefore, the following section addresses the contagion of emotions and moods more specifically, and eventually to the possible contagion of emotionally laden job attitudes.

As a specific form of social contagion, emotional contagion is the tendency for members of a group to automatically imitate the emotional expressions of other group members. The result is a shared emotional experience (Hatfield, Cacioppo & Rapson, 1994). Hatfield et al. (1993, 1994) present research supporting three propositions. They suggest that emotional contagion is a multiply determined, multi-level process in which people 1) continuously and unconsciously imitate the bodily movements, postures, vocalizations and facial expressions of others in daily interactions; 2) based on the facial feedback hypothesis, the activation and/or mimicry of these facial expressions, vocalizations and movements provides feedback which continuously alters the individual’s subjective experience; 3) resulting in a shared emotional experience, or emotional contagion.
As evidence for the first proposition, numerous studies have found that individuals are able to mimic others. For example, Wallbott (1991) found that individuals consistently mimic the primary emotions of happiness, surprise, anger, fear, sadness and disgust. Although highly criticized, the study by Hsee, Hatfield, Carlson and Chemtob (1990) supported facial mimicry with the participants’ facial expressions being rated as congruent with the happy and sad emotions conveyed by a confederate. Using a facial electromyographic (EMG) procedure, Lundqvist and Dimberg (1995) found that exposure to faces expressing the six major emotions (happiness, surprise, anger, fear, sadness, disgust, and a neutral face) resulted in congruent facial activation in participants. For example, viewing a happy individual resulted in significantly increased activation of the M. zygomaticus muscle, which is responsible for the smile, and viewing a sad or angry individual resulted in increased activation of the M. corrugator supercilii muscle, which is responsible for furrowing the brow. In support of emotional contagion, Lundqvist and Dimberg also found that for every emotion, except surprise, viewing an emotional face resulted in a congruent subjective emotional experience by the participant. Together, these results suggest that individuals mimic the facial expressions of others and converge emotionally.

However, multiple emotional behaviors and not just facial expressions are mimicked. For example, Laird et al. (1994) demonstrated that individuals consistently mimicked the fear/startled response of an actor by jumping in their seat while watching a video. Neumann and Strack (2000) have also demonstrated that vocal information alone (i.e., the emotional tone in others’ voices) is mimicked and is enough to illicit emotional contagion. What sets the Neumann and Strack (2000) article apart, is the methodological
rigor of their study. Neumann and Strack argue that the methodologies used in many emotional contagion studies, such as Hsee et al. (1990) and Laird et al. (1994), provide participants with too many cues to accurately determine whether or not it is another’s emotion alone that causes emotional contagion, versus the content or context in which the emotion was presented.

To circumscribe these methodological difficulties, Neumann and Strack devised a series of studies in which participants were told they would be tested for text comprehension. Participants were read a philosophical text in either a slightly happy, sad or neutral emotional tone, which was subtle enough that most participants did not consciously register the affective tone of the reading. The results of the first three studies indicated that the emotional tone in which the text was presented, significantly influenced participant’s self-rated mood and only mood (e.g., a happy voice resulted in more positive moods). Furthermore, Neumann and Strack demonstrated that when participants were asked to repeat the content of the text, they did so with an affective tone similar to the tone in which they heard the text (i.e., participants repeated the text with a happier emotional tone after hearing the text recited by a happy individual). That is, independent judges, blind to the emotional tone participants heard the text in, rated the participants’ recitation of the text as having the same emotional tone as the original passage.

What is interesting about these findings, is that in each study there were no significant effects on the specific emotions measured (i.e., cheerfulness, happiness, anger, anxiousness, sadness or boredom). Recall that mood is differentiated from emotion in that mood is not associated with a direct cause (e.g., Weiss, 2002a). In Study 4, Neumann and Strack (2000) assessed whether providing participants with a salient source
for their mood would result in emotional, rather than mood contagion. Using a similar methodology, half of the participants were instructed to take the perspective of the speaker. Their results indicate that while mood contagion still occurred, taking the speaker’s perspective also resulted in the emotional contagion of discrete emotions. According to Neumann and Strack, this suggests that whereas mood contagion occurs automatically, emotional contagion requires intention. By taking the speaker’s perspective, participants were able to identify a source for their own affect, which resulted in converging discrete emotions. During everyday supervisor-subordinate interactions, it is unlikely the subordinate will continuously exert his or her limited cognitive resources to empathize with, or take the supervisor’s perspective (e.g., Bargh, Chen & Burrows, 1996; Chartrand & Bargh, 1999), suggesting mood rather than discrete emotions will be contagious.

Together, this research supports Hatfield et al.’s (1994) arguments that people 1) imitate others, 2) which alters their subjective experience, 3) resulting in emotional (and/or mood) contagion. However, the existence of emotional contagion only matters to the extent to which it has an important impact on our daily lives. New research has suggested that emotional contagion may play an important role in many social situations. However, the review shall focus on research demonstrating the impact of emotional contagion on the workplace. For example, Doherty, Orimoto, Singelis, Hatfield, and Hebb (1995) found evidence of significant occupational differences in the susceptibility to emotional contagion with Marines less susceptible to emotional contagion (in general and specifically to the negative emotions of anger and sadness) than a group of physicians.
As a real-world example of emotional contagion’s impact in the workplace, Le Blanc, Bakker, Peeters, van Heesch and Schaufeli (2001) demonstrated with a sample of oncology care providers, that the susceptibility to emotional contagion moderated the relationship between working with dying patients and both emotional exhaustion and depersonalization. That is, care providers who were working with near death patients and more susceptible to emotional contagion were more likely to experience these two forms of burnout. In a similar study of burnout among general practitioners, Bakker, Schaufeli, Sixma and Bosveld (2001) report results indicating that susceptibility to emotional contagion moderated the relationship between burnout complaints by co-workers and emotional exhaustion, with highly susceptible general practitioners being more likely to experience burnout. The authors suggest that while talking to their co-workers and trying to understand their patients, these highly susceptible general practitioners caught the expressed anxiety, fear, or depression, and over time, this led to emotional exhaustion and burnout (Bakker et al., 2001).

In an applied study of salespersons from 27 companies, Verbeke (1997) found that dichotomizing individual differences in the ability to infect others through facial expressiveness, or to be infected by another’s emotions (measured via an emotional contagion scale), created a fourfold typology that predicted differences in both performance and burnout. Specifically, salesperson performance benefited from high levels of both the ability to infect and to be infected with other’s emotions (for example, being able to excite a customer about a product, or to sympathize with the needs of a customer). However, Verbeke also found that the ability to be infected by another’s emotions, that is, being predisposed to emotional contagion, was a liability, leaving these
salespersons at a greater risk of experiencing job burnout. Both of these variables, emotional expressiveness and emotional contagion susceptibility will be discussed shortly as potential moderators of the expected supervisor-subordinate contagion effect.

Finally, in a set of independent laboratory studies, Lewis (2000) and Bono and Ilies (2006) demonstrated that the emotional displays of a superior can directly impact the felt emotions of his or her followers. For example, using a 2(Gender of CEO actor: M, F) x 3(CEO displayed emotion: Neutral, Sad, Angry) factorial design, Lewis (2000) had undergraduate participants view a videotaped speech by a fictitious CEO demonstrating one of the three emotions. In all six scenarios, the same script was read, indicating that their fictitious company was struggling financially, requesting greater effort on the part of all employees. Following the video, participants rated the CEO’s effectiveness and their own emotions. Results indicated that the CEO’s emotional display had a significant impact on the emotions of their followers, who reported similar emotions (however, no emotional pre-test was conducted). Taking a different perspective, Bono and Ilies (2006) demonstrated that charismatic leaders exhibit greater positive emotionality in their written and verbal messages, and that these positive expressed emotions lead to more positive mood states in their followers. Furthermore, leaders who expressed more positive emotions in both studies were rated as more effective leaders.

These studies have demonstrated the potential impact of emotional contagion on the workplace. However, these studies share a number of methodological deficiencies. For example, with the exception of Neumann and Strack (2000), the research described thus far fails to convincingly demonstrate that shared emotional states are the result of contagion, rather than the possible result of similar cognitive appraisals or interpretations.
of the same events. However, a longitudinal field study by Totterdell, Kellet, Teuchmann and Briner (1998) suggests that contagion, rather than a shared cognitive appraisal was the cause of similar emotions among a group of nurses. This conclusion is appropriate given that 1) nurses’ emotions were more similar to the emotions of members of their own work-group than they were to the emotions in other work-groups, 2) the similarity of work-group members’ emotion was not contingent upon the occurrence of shared negative events, and 3) emotional similarity did not depend on the amount of time the nurses spent together.

A second methodological issue is that in the two studies directly assessing leader-follower relationships (i.e., Bono & Ilies, 2006; Lewis, 2000), leaders and followers failed to actually interact. Instead, video-taped presentations of fictitious leaders were presented. This raises the concern that similar contagion effects will be found in existing supervisor-subordinate dyads that interact on a daily basis. However, the most damaging methodological flaw is that with a few exceptions (e.g., Ilies, Wagner & Morgeson, 2007; Totterdell et al., 1998), the emotional contagion literature has relied on traditional laboratory studies (e.g., observations, pre-post designs), which at best, quantify the extent to which two individuals converge at a single point in time. This overlooks a growing body of research, which has demonstrated that within person affect and attitudes fluctuates throughout the day (e.g., Stone, Smyth, Pickering & Schwartz, 1996), and week (e.g., Larsen & Kasimatis, 1990), often in a predictable pattern.

This leads to one of the current study’s main hypotheses. First, the literature reviewed has demonstrated a consistent pattern of within-subjects, moment-by-moment variability in affect and attitudes. Second, both affect and attitudes are contagious, and
typically flow from a more powerful group member, to less powerful group member. Moreover, this contagious process occurs quickly, usually within 500-ms (Wild, Erb & Bartels, 2001). Therefore, it follows that the affect and attitudes of a supervisor should be contagious, and due to their variability, should continuously operate to influence subordinate affect and attitudes. Finally, due to their structural similar to affect, affectively oriented attitudes should demonstrate a stronger contagious effect. Therefore, one of the primary goals of the current research is to examine the dynamic nature of the contagion mechanism within the supervisor-subordinate dyad using an emerging set of techniques referred to as Ecological Momentary Assessment or Experience Sampling Methods, to demonstrate that within the dyad, supervisor and subordinate affect and attitudes vary together.

*Emotional Contagion Moderators*

The research examined thus far provides a strong foundation for understanding what emotional contagion is, how it occurs, and what some of the potential outcomes of emotional contagion may be. However, three questions remain. First, who is most likely to elicit or cause emotional contagion to occur in others, second, who is most likely to catch others’ emotions, and third, what situational or contextual factors surrounding the supervisor-subordinate dyad make contagion more likely to occur? The work by Verbeke (1997) provided a likely answer to the first two questions. Therefore, the next two sections will focus on two individual difference variables specifically proposed to moderate the emotional contagion process; the supervisor’s emotional expressiveness and subordinate’s emotional contagion susceptibility. Three additional subordinate-level moderators will also be discussed, the extent to which subordinates like their supervisor,
the dyad’s relationship quality, and their work-self concept. The final section will
address two contextual variables proposed to moderate the emotional contagion
mechanism, the duration and power differential within the supervisor-subordinate dyad.

*The ability to infect others with emotion.* In their book, Hatfield et al. (1994)
delineate several characteristics which should make an individual more capable of
infecting others with their emotions. Among these characteristics are that the individual
must experience, or at least give the impression that they are experiencing strong
emotions. Second, the individual must be able to express these strong emotions through
different modalities, including their face, voice and physical posturing. Finally, Hatfield
et al. suggest that those individuals most likely to infect others with their emotions will
demonstrate an insensitivity to the emotions of others, especially when those emotions
contradict their own.

Related to these characteristics, Hatfield et al. (1994) suggest that the ability or
inability to infect others with emotion may covary with the Extraversion – Introversion
continuum. According to Eysenck (1990), extraverts are outgoing because they have a
higher threshold or tolerance for activation, while introverts require less stimulation from
the environment and are thus more withdrawn from social situations. Due to these
physiological differences, Hatfield et al. argue that extraverts should be more adept at
infecting others with emotions, and cite research by Buck, Miller, and Caul (1974) to
support this argument. Buck et al. recorded the facial expressions and physiological
reactions of participants as they discussed emotion-inducing pictures. Using these
recordings, Buck et al. were able to classify participants as either strong or weak
emotional senders. Strong senders were more likely to be extraverted individuals with
highly expressive facial features and the ability to verbalize their feelings, but
demonstrated limited physiological reactivity to the slides. Those who were classified as
weak senders differed in that they were introverts who failed to express their emotions
either through their facial expressions or vocally, but rather demonstrated powerful
physiological reactions to the slides (e.g., elevated heart rates). In other words, extroverts
were more adept at demonstrably expressing their emotional reactions outwardly in ways
others could detect, than their introverted counterparts. This suggests that supervisor
extraversion may moderate the strength of the relationship between supervisor and
subordinate affect and organizational commitment and job satisfaction.

Friedman and Riggio (1981), and later Sullins (1991), have also provided
evidence that individuals differ in their ability to express emotions and that these
differences are reliably related to the ability to infect others with their emotions. Using
the Affective Communication Test (ACT; Friedman, Prince, Riggio, & DiMatteo, 1980),
Friedman and Riggio (1981) were able to distinguish non-verbally expressive from non-
expressive individuals, and demonstrated a positive correlation between non-verbal
expressiveness (i.e., high ACT scores) and extraversion, dominance, affiliation and
exhibition. Furthermore, they found that even in the absence of conversation with one
another, that non-verbally expressive individuals’ moods influenced, but were not
themselves influenced, by non-expressive individuals’ moods (Friedman & Riggio,
1981). In other words, a highly extraverted, emotionally expressive individual could
potentially sit across from an introverted, non-expressive individual, and without saying a
word, influence the other individual’s mood.
Extending this research, Sullins (1991) used the ACT to pre-screen her sample into a subset of non-verbally expressive and non-expressive individuals. Participants were randomly assigned into one of six conditions in a 3(Comparison: relevant other, irrelevant other, control) x 3(Expressiveness: H-H, H-L, L-L) independent groups design. Participants were brought into the lab and asked to sit in silence with another individual who was either waiting to complete the same experiment (i.e., relevant other), or waiting to take a make-up exam (i.e., irrelevant other condition; in the control condition, participants sat in silence by themselves). Before and after a 5-minute period of silence, participants were asked to complete a mood scale. Sullins’ results indicate that the participants’ moods were more likely to converge when they were paired with a partner experiencing a similar situation (participants in the irrelevant and control conditions did not show any significant differences in their pre-post mood scores). Interestingly, Sullins suggests these results support social comparison theory, which could have important implications in the workplace. Individuals only converged in their moods when they expected to share a similar experience with one another, making the other individual relevant for social comparisons. This suggests that the extent to which subordinates view their supervisors as relevant referent others could increase the likelihood of emotional contagion within the dyad.

More importantly, Sullins’ (1991) results indicate that like the effect of power on emotional contagion, the extent to which the individuals in an interaction are emotionally expressive determines the direction in which emotional contagion occurs. Specifically, when a non-expressive individual was paired with a highly expressive individual (i.e., H-L pairs), the non-expressive individual was more likely to converge to the mood of the
expressive partner, but not vice versa. This suggests that those who are naturally more expressive will convey more information for others to use when decoding their emotions, which could also cause these senders to more readily foster emotional contagion in others.

More recently, Gross and John (1997) have replicated a hierarchical conception of emotional expressiveness in both self and peer ratings that indicates emotional expressiveness is comprised of three subdimensions; impulse strength, positive expressivity and negative expressivity. According to Gross and John, impulse strength is an indication of how strong an individual’s emotional responses tend to be in general, while positive and negative expressivity represent the extent to which an individual’s positive and negative emotional responses are expressed behaviorally, through facial, postural and vocal channels. Even after partialling out the effects of trait emotional reactions (i.e., PANAS scale scores) and gender differences, Gross and John still found moderate to strong relationships between the self and peer ratings of an individual’s emotional expressiveness (\(r\)’s ranged from .40 - .58, \(p\)’s < .05). These results suggest that emotional expressiveness is a self-evident individual difference variable; people know which individuals clearly express their emotions.

More importantly, Gross and John (1997) demonstrated that self-ratings on their Berkeley Expressivity Questionnaire (BEQ) predicted emotionally expressive behavior two months later. Using a video based mood induction task, Gross and John had blind judges rate the physically displayed emotional expressiveness of participants as they viewed four films designed to elicit different emotional reactions. Gross and John also collected self-rated emotional experiences to the film along seven emotions (i.e.,
amusement, contentment, anger, disgust, fear, sadness and surprise), and physiological responses to the films through heart rate and skin conductance. Their results suggest that once again, independent judges, like peers, were able to reliably rate an individual’s level of expressiveness. More specifically, the independent judges’ ratings of facial expressivity were significantly related to self-ratings of positive and negative expressivity. Self-rated expressivity also predicted the amount of expressive behavior an individual engaged in while watching the films. Specifically, positive expressivity \((r = .32)\) and negative expressivity \((r = .30)\) predicted amusement and sadness expressions respectively, even after partialling out the effects of the subjective emotional and physiological reactions to the films. Due to its direct measurement of emotional expressiveness, the BEQ, rather than a measure of Extraversion, was used in the current study.

In the workplace, these results suggest a potential moderating effect. Based on the discussion of emotional contagion and power’s impact on the contagion process, affective and attitudinal contagion is expected to occur within the supervisor-subordinate dyad. Moreover, a supervisor’s emotional expressiveness is expected to moderate and strengthen the supervisor-subordinate affect and attitude relationship. Specifically, a highly emotionally expressive supervisor, who provides a strong facial, vocal and postural display of his or her emotions, provides his or her subordinate with more information to unintentionally mimic and converge with. While emotional expressivity by the supervisor could lead to greater contagion within the dyad, certain subordinates may also be more or less susceptible to contagion, suggesting other potential moderating variables.
Susceptibility to emotional contagion. A growing body of research suggests that individuals also reliably differ in the extent to which they are susceptible to emotional contagion. For example, research by James Laird and his colleagues (e.g., Laird et al., 1994) suggests that individuals differ in the extent to which they use self-generated versus situationally-generated emotional cues in determining their emotional reactions. Laird et al. hypothesized that those individuals who mimic another person are more influenced by self-generated cues (i.e., the facial, vocal and physical actions they are mimicking) and are therefore more likely to experience emotional contagion. Those who do not mimic (i.e., those responsive to situational cues), were expected to be less susceptible to emotional contagion. To test this hypothesis, Laird et al. created an index of self/situational cue responsiveness by having participants smile and rate how happy they felt, and then frown and rate how angry they felt. A difference score was calculated and artificially dichotomized at the median with those above the median being responsive to self-generated cues (i.e., those that rated themselves happier and angrier after smiling and frowning respectively, suggesting they responded emotionally to the emotional cues they created themselves). Participants were observed while they watched a number of video clips, and Laird et al.’s results suggest that people were consistent in the extent to which they mimicked the actors’ behavior. More importantly, those who mimicked were significantly more likely to be responsive to self-generated cues.

Interestingly, Laird et al. (1994) also found that inhibiting facial reactions resulted in less enjoyment/happiness when watching the film clips, but this effect was stronger for the self-generated cue responsive group. That is, for those individuals whose emotional reaction was dependent upon their facial, vocal and postural reactions to an emotion
eliciting event, inhibiting those reactions reduced the strength of their emotional reaction to the event. These studies support Hatfield et al.’s (1994) hypothesis that people who are aware of, and respond to their facial, vocal and postural reactions should be more likely to experience emotional contagion. When individuals mimicked another’s behavior (e.g., laughing), and were responsive to this self-generated information, they caught the actor’s emotion and reported being happier.

Unfortunately, these results only tentatively support emotional contagion susceptibility as the videos used in the study provide a great deal of contextual information to participants (see Neumann and Strack (2000) for a similar criticism of the emotional contagion literature). However, research by Nakamura, Buck and Kenny (1990) suggests that individuals are in fact more likely to use a sender’s facial expressions than the context or situation when attempting to determine the sender’s emotions. Hatfield et al. hypothesize that individuals vulnerable to emotional contagion will be more adept at reading and mimicking others’ emotions, and due to the facial-feedback hypothesis, will be more aware of their own emotional reactions, whether expressed facially, vocally or through body postures, than individuals low on these characteristics. Interestingly, research suggests this could be directly related to an individual’s status within a group.

For example, research by Snodgrass, Hecht and Ploutz-Snyder (1998; Snodgrass, 1992) demonstrated that “interpersonal sensitivity” is tied to group status and may influence emotional contagion susceptibility. They defined interpersonal sensitivity as a combination of accurately perceiving the impression one is portraying to another and being sensitive to how the other individual feels about himself or herself. In their
research, Snodgrass et al. directly manipulated role status to reflect the relationship between a supervisor and subordinate or leader and follower (two groups of participants existed, those acting out the relationship and observers). When viewing the supervisors/leaders, participants (actors and observers) were more aware of how the supervisor/leader felt about a dyad partner than about himself or herself. The exact opposite pattern was observed when the subordinate/follower was the target; participants focused on how these individuals felt about themselves. These results suggest that individuals in lower status roles are highly attuned to information signifying how others perceive them and use this information internally to determine how they feel about themselves. These results support the contention that individuals in lower power and status positions, such as subordinates, will be more susceptible to emotional contagion due to the type of information they pay attention to.

Furthermore, while developing the Emotional Contagion Scale (ECS), Doherty (1997) found that susceptibility to emotional contagion was positively correlated with emotional reactivity, emotionality, the use of affect as information, sensitivity to others’ emotions, social functioning and self-esteem. Hatfield et al. (1994) hypothesized several factors which could account for these relationships and inter-individual differences in susceptibility. For example, Hatfield et al. argue that how the self is defined should moderate an individual’s susceptibility to emotional contagion. Specifically, they argue that individuals whose self-concepts are defined in terms of their interrelationship with others should be more susceptible to emotional contagion than those who define themselves as independent of others.
This is exactly what was found in a recent study by Ilies, Wagner and Morgeson (2007) who not only found that the affective tone of a group predicted the affective reactions of individual group members, but that emotional contagion susceptibility and individualism-collectivism moderated these relationships. More specifically, Ilies et al. (2007) longitudinally assessed the affective states (i.e., PA/NA) from members of 43 student teams at three points during the semester as the teams competed in a computer simulation. Their results suggest that the aggregate team PA (\(\beta = .43, p < .01\)) and NA (\(\beta = .50, p < .01\)) predicted individual members’ PA and NA respectively, supporting emotional contagion. More importantly, both susceptibility to emotional contagion (PA: \(\beta = .32\); NA: \(\beta = .26, p’s < .01\)) and individualism-collectivism (PA: \(\beta = .18, p < .05\); NA: \(\beta = .38, p < .01\)) moderated this effect. Individual team members who were more susceptible to emotional contagion and who possessed a more collectivistic self-concept demonstrated a stronger relationship between their own, and the affect of their teammates. Given this evidence, both subordinate emotional contagion susceptibility and work self-concept (i.e., independent, relational and collective work self-concepts) were measured as moderators in the current study.

The results of Anderson et al. (2003) and Chartrand and Bargh (1999) also suggest the importance of dyadic liking and similarity. In the romantic relationship pairs, Anderson et al. found that the more satisfied couples were at Time 1, the more emotional similarity they showed. This suggests that in a supervisor-subordinate pair, the closer, more satisfying the relationship, the greater the possibility for shared emotions. These results are also supported by work from Chartrand and Bargh (1999; Study 2) who found that when a confederate mimicked a participant’s behavior, it resulted in greater
interpersonal liking and perceived smoothness of the interaction. These results suggest that in the work relationship, the extent to which a subordinate likes his or her supervisor should moderate the contagion process, with dyads demonstrating greater liking also experiencing greater contagion. As a direct extension, leader-member exchange (i.e., LMX) was selected from the I/O literature as an index of relationship quality and was expected to moderate the emotional contagion mechanism, similar to supervisor liking.

*Contextual moderators.* Thus far, moderators from the supervisor’s (i.e., emotional expressiveness) and subordinates’ perspective (i.e., emotional contagion susceptibility, supervisor liking, LMX, and the work self-concept) have been proposed as potential moderators of the emotional contagion mechanism. However, to what extent can contextual or situational factors surrounding the supervisor-subordinate dyad be expected to moderate this relationship? The literature discussed thus far has suggested three potential moderators. The strongest of these is likely the power differential between supervisor and subordinate. For example, the work of Anderson et al. (2003), Savell et al. (1995), and Sy et al. (2005) convincingly demonstrated that emotional contagion is more likely to occur in top-down fashion, from the most-to-least powerful group member. As supervisor-subordinate dyads will likely demonstrate varying power differentials between the dyad members, the level of power ascribed by the subordinate to his or her supervisor will be measured as a potential moderator of the emotional contagion mechanism. Dyads in which the supervisor is ascribed more power are expected to demonstrate a stronger relationship between the affect and attitudes of the supervisor and those of his or her subordinate.
The work by Savell et al. (1995) suggests another potential moderator; supervisor-subordinate tenure. More specifically, their work found that convergence increased the longer a squad leader and squad member had worked together. For example, when squad leaders and members had only been together an average of 2.8 months, their job involvement correlation was a non-significant $r = -.23$; however, when they had served together for an average of 13.1 months, their job involvement correlations surged to $r = +.59$ ($p < .01$). Savell et al. (1995) also found that when using a median split on Time 1 squad leader job involvement ratings, the stronger the squad leader job involvement at Time 1, the stronger the squad leader-member job involvement correlation at Time 2 (Time 2 $r$’s = .20, ns and .51, $p < .01$ for squad leaders below and above the median respectively). Therefore, dyadic tenure will be tested as a potential moderator of the emotional contagion mechanism, with dyad working together longer expected to demonstrate greater convergence (supervisor affect and attitude strength will be tested in a more exploratory sense).

Finally, the research by Ilies et al. (2007) and Neumann and Strack (2000) suggests that the context or situation surrounding the supervisor-subordinate dyad may itself be an important moderator. In their study, Ilies et al. controlled for the team’s performance on the simulation exercise. Their argument was that in AET terms, the team’s performance would act as a shared affective event, resulting in similar affective reactions regardless of emotional contagion. In support of this argument, Ilies et al. found that the relationship between individual and team affect (i.e., emotional contagion) was reduced by controlling for the team’s performance (i.e., shared experiences). Although a similar objective criteria for shared experiences does not exist in the current
study, the amount of time the supervisor and subordinate spent together between measurement periods was collected and served as a control variable. Dyads who spend more time together should accumulate a greater number of shared experiences. Although social interaction is a necessary precondition for emotional contagion to occur, emotional contagion can only be a viable conclusion for shared affective and attitudinal states if those similarities are not caused by shared contextual experiences.

Together, this research suggests several variables related to emotional contagion that may moderate the strength of the relationship between a supervisor’s and subordinate’s levels of affect and attitudes. From the supervisor’s perspective, research has been reviewed suggesting that a more extroverted, emotionally expressive supervisor will be more likely to engender emotional contagion in his or her subordinates. From the subordinate’s perspective, research suggests that subordinates vary in their susceptibility to emotional contagion. The extent to which the subordinate likes the supervisor, the quality of the relationship he or she has with the supervisor, and the subordinate’s work self-concept will also likely moderate the emotional contagion mechanism. Finally, three contextual factors will also likely moderate the emotional contagion mechanism. These include the amount of power the subordinate ascribes to his or her supervisor, how long the dyad has worked together and shared contextual experiences.

Hypotheses

The main premise of this study is to demonstrate contagion effects within the supervisor-subordinate dyad. Contagion is a process by which members of a group come to share similar attitudes, affect and behaviors. Literature reviewed in this chapter suggests a wide variety of attitudes, affect and behaviors are susceptible to the contagion
mechanism, and that these attitudes, affect and behaviors typically travel from higher to lower power individuals within the group. Research has also been reviewed which suggests that as attitudes, job satisfaction and organizational commitment are evaluative judgments with both an affective and cognitive component. The relationship between this affective component of the attitudes and more traditional conceptualizations of affect, suggests that the supervisor-subordinate dyad may be subject to a specific form of contagion, emotional contagion. Several moderators of the emotional contagion process have also been discussed, including supervisory emotional expressiveness and subordinate emotional contagion susceptibility. Finally, due to the established intraindividual variability of both affect and attitudes within days, it has been suggested that a new method of data collection be utilized. Based on this review of the literature, a number of hypotheses can be made. These hypotheses are grouped under two headings, depending on whether they posit within-person or dyad effects or whether they posit effects at a higher level of analysis, typically interaction effects. Note that Hypothesis 1 is a necessary pre-condition for the remaining hypotheses.

Level 1 Hypotheses (Focus on Within-Person or Within-Dyad Variability)

H1: Both supervisors and subordinates will demonstrate non-zero within-subjects variability in: (a) state mood (PA and NA); (b) state affective job satisfaction; and (c) state affective organizational commitment. That is, mood, job satisfaction and organizational commitment will fluctuate within the work day, and over time.

Based on previous research demonstrating the relationship between mood and time of day (e.g., Stone et al., 1996; Weiss et al., 1999), the relationship between time of
day and these DV’s will be investigated and controlled for in the remaining analyses, if necessary.

H2: (a) State affective job satisfaction will demonstrate a stronger relationship with state mood than will state cognitive job satisfaction. (b) Due to the demonstrated variability in mood, this will result in greater variability in state affective than state cognitive job satisfaction.

H3: (a) State affective organizational commitment will demonstrate a stronger relationship with state mood than will state cognitive organizational commitment. (b) Due to the demonstrated variability in mood, this will result in greater variability in state affective than state cognitive organizational commitment.

H4: (a) State PA will predict state affective job satisfaction above and beyond the effects of trait affective job satisfaction and trait PA; and (b) state NA will predict state affective job satisfaction above and beyond the effects of trait affective job satisfaction and trait NA.

H5: (a) State PA will predict state affective organizational commitment above and beyond the effects of trait affective organizational commitment and trait PA; and (b) state NA will predict state affective organizational commitment above and beyond the effects of trait affective organizational commitment and trait NA.

H6: A pattern of relationships consistent with Emotional Contagion effects on mood, job satisfaction and organizational commitment within the supervisor-subordinate dyad will be found, as indicated by: (a) Significant prediction of subordinate state mood from supervisor state mood; (b) Significant prediction of subordinate state affective job satisfaction from supervisor state affective job satisfaction; (c) Significant
prediction of subordinate state affective organizational commitment from supervisor state affective organizational commitment; (d) State cognitive job satisfaction and state cognitive organizational commitment will demonstrate weaker contagion effects.

For Hypothesis 6, both linear and quadratic models will be tested in order to explore whether more extreme moods and attitudes are more likely to be mimicked. In addition, since the appropriate lag between the measurement of the supervisor’s state and the subordinate’s state affect and attitudes is not known, the models will be estimated twice, once pairing supervisor and subordinate data from the same measurement period, and once with subordinate data measured one time period later than the supervisor’s. Support for the second model will support the assumed directionality of the contagion mechanism, from supervisor to subordinate.

**Level 2 Hypotheses (Focus on Cross-Level Interactions)**

H7: Supervisor emotional expressiveness will moderate the emotional contagion process, such that dyads with a more emotionally expressive supervisor will demonstrate greater contagion in (a) state mood, (b) state affective job satisfaction, and (c) state affective organizational commitment (see Figure 2 for the hypothesized relationship).
Figure 2. Hypothesized moderating effects of subordinate emotional contagion susceptibility, and supervisor emotional expressiveness on the contagion process.

H₈: Subordinate emotional contagion susceptibility will moderate the contagion process, such that dyads with a more susceptible subordinate will demonstrate greater contagion in (a) state mood, (b) state affective job satisfaction, and (c) state affective organizational commitment (see Figure 2 for the hypothesized relationship).

H₉: Tenure with the supervisor will moderate the contagion process, such that supervisor-subordinate dyads that have been together longer, will demonstrate greater convergence in (a) state mood, (b) state affective job satisfaction, and (c) state affective organizational commitment.

H₁₀: Subordinate liking of the supervisor will moderate the contagion process, such that supervisor-subordinate dyads with stronger initial levels of supervisor liking by
subordinates will demonstrate greater convergence in (a) state mood, (b) state affective job satisfaction, and (c) state affective organizational commitment.

Exploratory Analyses

An additional series of three exploratory analyses will also be conducted. Each of the constructs explored is well researched in the Industrial/Organizational Psychology literature. However, little, if any, research literature has tied these constructs to the contagion process. Due to their theoretical relevance, they will be studied as potential moderators of the contagion process.

E1: Interpersonal Power will moderate the contagion process, such that supervisor-subordinate dyads marked by a supervisor attributed with greater power will demonstrate greater convergence in (a) state mood, (b) state affective job satisfaction, and (c) state affective organizational commitment.

E2: Work Self-Concept will moderate the contagion process. The exact nature of this relationship is unclear; however, subordinates holding a more individualistic self-concept should be less likely to exhibit emotional contagion than subordinates with a more collective self-concept. It is also unclear whether differences between the self-concepts of supervisors and subordinates will affect the contagion process.

E3: Leader-Member Exchange (LMX) will moderate the contagion process, such that supervisor-subordinate dyads with a stronger relationship will demonstrate greater convergence in (a) state mood, (b) state affective job satisfaction, and (c) state affective organizational commitment.
CHAPTER III

METHOD AND RESULTS OF THE PILOT STUDIES

Overview of the Study

The current study was conducted in three phases, including two pilot studies. As mentioned earlier, there is evidence suggesting the MSQ and JDI are more cognitively oriented (e.g., Brief & Roberson, 1989), and that the Faces, Brayfield-Rothe, and ACS are more affectively oriented scales (e.g., Cropanzano et al., 1993; Fisher, 2000; Williams, 1988). However, the existing literature has failed to demonstrate that these measures unidimensionally capture only affectively or cognitively oriented job attitudes. Also recall that there are several concerns around the dimensionality and orientation (i.e., affective vs. cognitive) of the CCS. Furthermore, the length of these measures is prohibitive for the experience sampling methodology (ESM) used in the Primary Study. Therefore, steps were taken to identify the shortest set of divergent affectively and cognitively oriented job satisfaction and organizational commitment items.

This was accomplished through the first two pilot studies which identified a subset of cognitively and affectively oriented job satisfaction and organizational commitment items from the existing literature. In Pilot Study 1, a large sample of existing job satisfaction and organizational commitment items were rated by current Industrial/Organizational Psychology graduate students on the extent to which they capture a more cognitive or affective evaluation. This allowed testing a smaller subset of
the most bipolar (i.e., cognitive vs. affective) job satisfaction and organizational commitment items for selection into the Primary Study. In the second pilot study, a sample of employed undergraduate students responded to the subset of job satisfaction and organizational commitment items identified in Pilot Study 1, as well as a number of items developed as part of the current study. Participants also responded to a set of affective and cognitive scales. This step was used to establish the convergent and discriminant validity of the item set. An additional item reduction was made, arriving at a set of four, 3-item scales (i.e., affective job satisfaction, cognitive job satisfaction, affective organizational commitment and cognitive organizational commitment).

Finally, the main research study attempted to verify the proposed hypotheses by studying supervisor-subordinate dyads longitudinally, through a diary-based ESM. Both dyad members provided ratings of their momentary mood, job satisfaction, organizational commitment, and the affective events they experienced, six times a day for two work weeks. During a training session prior to data collection, participants also provided ratings of their trait level positive and negative affect, and trait level job attitudes. In addition, supervisors rated their emotional expressiveness and subordinates rated their susceptibility to emotional contagion, and the extent to which they liked their supervisor. Both participants also provided ratings on a number of additional exploratory moderator variables, including power, leader-member exchange and work self-concept (see Chapter IV).

Pilot Study 1

Pilot Study 1 was conducted as an initial attempt to develop a series of four, short attitude scales. Graduate students were provided item stems and rating scales and were
asked to rate the affective vs. cognitive orientation of 146 published job satisfaction and organizational commitment items. Chi-square analyses were used to select 33 items representing a more affective or cognitive orientation. These items were further refined in Pilot Study 2.

Participants

Data were collected from 19 Master’s and Ph.D. level graduate students in the Industrial/Organizational Psychology program at a large Midwestern university. Of the 19 graduate students who rated the affective or cognitive nature of the job satisfaction and organizational commitment items, ten were male and nine were female. The graduate students possessed from 1 to 5 years of Industrial/Organizational Psychology graduate education, with 3.21 (SD = 1.32) years of graduate education on average.

Measures and Procedure

Although previous research has examined the affective vs. cognitive nature of job satisfaction scales as a whole (e.g., Brief & Roberson, 1989; Williams, 1988), less evidence exists for organizational commitment scales. However, no known study has expressly examined the affective vs. cognitive measurement properties of individual items. Pilot Study 1 represents a first step in discriminating between affective and cognitive job satisfaction and organizational commitment items. Ph.D. and Master’s level Industrial/Organizational Psychology graduate students served as subject matter experts (SMEs), in order to identify a subset of the most cognitively and affectively oriented job satisfaction and organizational commitment items (i.e., four scales total).

Graduate student SMEs viewed the item stems and rating scales from nine published job satisfaction measures (104 items) and three organizational commitment
measures (42 items) selected from those listed in Fields’ (2002) compilation of organizational surveys. Items were selected to represent a variety of rating foci, such as satisfaction with the work itself, supervision, and coworkers, as well as different rating formats, including Likert and bipolar rating scales. Redundant items and those with no apparent cognitive or affective orientation were removed from the item pool to limit the demands placed on raters. Finally, measures were presented in random order, in an attempt to counterbalance the job satisfaction vs. organizational commitment content and expected affective vs. cognitive orientations. A detailed rationale for each measure’s inclusion in the study, and a list of the items included can be found in Appendix A-L (scales are described in the order they were presented to participants).

The 146 items were presented to participants using an Internet-based survey program that presented each published measure in its entirety. Each measure was presented to participants on a separate web-page, preceded by a description of the rating scale respondents would use in conjunction with the items. Items from each published study were also presented serially, in the same order respondents would receive the items if they completed the entire scale. Given this information, SMEs were asked to rate the extent to which the item stem and rating scale were either: (1) “A more affective evaluation of the job” (2) “A relatively equal emotional and cognitive evaluation of the job,” or (3) “A more cognitive evaluation of the job.”

As an exploratory study, no specific hypotheses were made; however, some general patterns in the data were expected. For example, SME raters were expected to categorize the majority of the 146 items as involving a relatively equal emotional and cognitive evaluation. Due to previous research (e.g., Organ & Near, 1985), suggesting
the majority of job satisfaction items are cognitively oriented, job satisfaction and
organizational commitment items and scales expected to have an affective orientation
were oversampled in Study 1 (see Appendix A-L). Only items demonstrating a clear
affective or cognitive orientation were retained for further investigation in Pilot Study 2.

Results

Chi-square analyses of the SME ratings for each item were used to identify a
subset of the most divergent affectively and cognitively oriented job satisfaction and
organizational commitment items. The distribution of SME ratings for each item (i.e.,
item content rated as more affective, more cognitive, or a relatively equal mix) was
compared against a hypothetical distribution in which the ratings were evenly divided
among the three rating categories. Four item lists were created, one for each attitude (i.e.,
job satisfaction vs. organizational commitment) x orientation (i.e., affective vs. cognitive)
combination. Only items with a significant chi-square value, and a distribution pattern in
which “A relatively equal emotional and cognitive evaluation of the job” was not the
most commonly endorsed option, were retained. Researcher judgment was then used to
identify four groups of items that (a) evaluated the most commonly measured satisfaction
or commitment dimensions, (b) used varied rating scales, and (c) balanced positive and
negatively worded items. The remaining job satisfaction and organizational commitment
items are listed in Tables 1 and 2 respectively.

As can be seen in Table 1, a total of 11 affectively oriented and 10 cognitively
oriented job satisfaction items were retained for inclusion in Pilot Study 2. At the scale
level, items from Brayfield and Rothe’s (1951) measure were consistently categorized as
affective in nature while items from the MSQ (Weiss et al., 1967) were categorized as
cognitively oriented. These results replicate, at an item level, the results of Williams (1988), and Brief and Roberson (1989). Also as expected, items from Meyer and Allen’s (1997) Affective Commitment Scale were consistently rated as more affectively oriented, while items from their Continuance Commitment Scale were consistently rated as more cognitively oriented. It is also important to note that for the job satisfaction items, there was no cross-categorization among the items within a scale. That is, items within the same scale were consistently rated as either more affectively or more cognitively oriented. This was not the case with the commitment items, where different items on the OCQ were rated as both more affectively and more cognitively oriented (see Table 2).

This pattern of consistent categorization was also generally replicated at the item level of analysis. For example, only 4 of the 33 items retained for further analysis in Pilot Study 2 received votes for all three categories (i.e., more affective, cognitive, and an equal mix). Additionally, the SME raters made a clear conceptual distinction among the items. The affective job satisfaction items had a pronounced tendency to assess overall evaluations of the job, and were more diverse in terms of the item and rating formats.

The cognitive job satisfaction items on the other hand, consistently tapped the traditionally studied facets of job satisfaction (e.g., pay, promotion, supervision, working conditions, etc), and were more consistent in format. A similar, but less pronounced distinction was made by the SME raters on the commitment items. For example, the affective commitment items all contained emotionally laden terms (e.g., care, happy, guilty), while the cognitive commitment items required comparing employment options, and were grammatically and syntactically more complex. Together, these results would
suggest that overall evaluations of the job rely on a more affective appraisal, while evaluating specific aspects of the job requires a more involved cognitive appraisal.
Table 1
Affective and Cognitive Job Satisfaction Items Selected for Inclusion in Pilot Study 2: Item Stems, Rating Scales, and SME Categorization Frequencies

<table>
<thead>
<tr>
<th>Affective Job Satisfaction</th>
<th>Categorization Frequency</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Item Stem</td>
<td>Mostly Affective</td>
<td>Relatively Equal</td>
</tr>
<tr>
<td>I consider my job rather unpleasant.(^1)</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>I definitely dislike my work.(^1)</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>Most days I am enthusiastic about my work.(^1)</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>I find real enjoyment in my work.(^1)</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>In general, I don’t like my job.(^2)</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>In general, I like working here.(^2)</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>How do you feel about your job overall?(^3)</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>How do you feel about the people you work with-your co-workers?(^4)</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Pleasant/Unpleasant (^5)</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Satisfying/Unsatisfying (^5)</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Friendly/Unfriendly (^5)</td>
<td>13</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cognitive Job Satisfaction</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The way my job provides for steady employment.(^6)</td>
<td>0</td>
</tr>
<tr>
<td>The chance to do something that makes use of my abilities.(^6)</td>
<td>0</td>
</tr>
<tr>
<td>The way the company policies are put into practice.(^6)</td>
<td>1</td>
</tr>
<tr>
<td>The pay for the amount of work that I do.(^6)</td>
<td>0</td>
</tr>
<tr>
<td>The chance for advancement on this job.(^6)</td>
<td>0</td>
</tr>
<tr>
<td>The working conditions.(^6)</td>
<td>0</td>
</tr>
<tr>
<td>The amount of responsibility you are given.(^7)</td>
<td>0</td>
</tr>
<tr>
<td>The way your firm is managed.(^7)</td>
<td>0</td>
</tr>
<tr>
<td>Your hours of work.(^7)</td>
<td>0</td>
</tr>
<tr>
<td>The amount of variety in your job.(^7)</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^1\) Brayfield & Rothe (1951); 7-point Likert Scale: Strongly Disagree-Strongly Agree
\(^2\) Cammann et al. (1983); 7-point Likert Scale: Strongly Disagree-Strongly Agree
\(^3\) Rice, Gentile & McFarlin (1991); 7-point Likert Scale: Terrible-Delighted
\(^4\) Andrews & Withey (1976); 7-point Likert Scale: Terrible-Delighted
\(^5\) Hatfield et al. (1985); 7-point Bipolar Scale: word pair as anchors
\(^6\) Weiss, Dawis, England & Lofquist (1967); 7-point Likert Scale: I’m extremely dissatisfied/satisfied with this aspect of my job
\(^7\) Warr et al. (1979); 7-point Likert Scale: I’m extremely dissatisfied/satisfied with this aspect of my job

† df = 2. * \(p < .05\). ** \(p < .01\).
Table 2
Affective and Cognitive Organizational Commitment Items Selected for Inclusion in Pilot Study 2: Item Stems, Rating Scales, and SME Categorization Frequencies

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>Affective Commitment</th>
<th>Categorization Frequency</th>
<th>( \chi^2 )†</th>
</tr>
</thead>
<tbody>
<tr>
<td>I really care about the fate of this organization. ¹</td>
<td>11</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>I would be very happy to spend the rest of my career with this organization. ²</td>
<td>14</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>I do not feel “emotionally attached” to this organization. ²</td>
<td>18</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>I would feel guilty if I left my organization now. ³</td>
<td>16</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>I am quite proud to be able to tell people who it is I work for. ⁴</td>
<td>17</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>I feel like I am a part of the organization. ⁴</td>
<td>12</td>
<td>7</td>
<td>0</td>
</tr>
</tbody>
</table>

| Cognitive Commitment                                                                                                              |                     |                          |               |
| I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful. ¹             | 2                   | 3                        | 14            | 6.33*         |
| I could just as well be working for a different organization as long as the type of work was similar. ¹                                                                                   | 0                   | 6                        | 13            | 8.64*         |
| There’s not too much to be gained by sticking with this organization indefinitely. ¹                                                                                                              | 0                   | 7                        | 12            | 8.12*         |
| Often, I find it difficult to agree with this organization’s policies on important matters relating to its employees. ¹                                                                   | 0                   | 0                        | 19            | 18.99**       |
| I feel that I have too few options to consider leaving this organization. ⁵                                                                                                                     | 0                   | 2                        | 17            | 13.46**       |
| One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice-another organization may not match the overall benefits that I have here. ⁵ | 0                   | 3                        | 16            | 11.71**       |

⁴ Mowday, Steers & Porter (1979) – OCQ; 7-point Likert Scale: Strongly Disagree-Strongly Agree
⁵ Meyer & Allen (1997) – ACS; 7-point Likert Scale: Strongly Disagree-Strongly Agree
³ Meyer & Allen (1997) – NCS; 7-point Likert Scale: Strongly Disagree-Strongly Agree
⁴ Cook & Wall (1980) – Org. Commitment; 7-point Likert Scale: Strongly Disagree-Strongly Agree
⁵ Meyer & Allen (1997) – CCS; 7-point Likert Scale: Strongly Disagree-Strongly Agree
† df = 2. *p < .05. **p < .01.
Pilot Study 2

Additional pilot testing not described here, indicated the four job attitude scales identified by SMEs in Pilot Study 1 failed to demonstrate the expected evidence for unidimensionality, or convergent and discriminant validity. It is unclear whether the different item foci (i.e., overall vs. facet-level), the cross-categorization among OCQ items, or some other factor, caused SMEs and participants to interpret the items differently. This necessitated the development of an additional item set, and Pilot Study 2 described next.

Participants

To further refine the item pool developed in Pilot Study 1, participants were solicited from currently enrolled students in a variety of undergraduate Psychology courses. At each instructor’s discretion, the majority were compensated for their time through class extra credit. As a pre-requisite of participation in Pilot Study 2, students were required to be employed and able to rate their current level of job satisfaction and organizational commitment. This resulted in a convenience sample of 157 undergraduates, with an average age of 20.60 ($SD = 3.99$). Of these, 39 identified themselves as male and 117 as female (one individual chose not to indicate his or her gender). Their jobs represented a variety of occupations (see Table 3).
Table 3

<table>
<thead>
<tr>
<th>Occupation</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Service</td>
<td>44</td>
<td>25.9%</td>
</tr>
<tr>
<td>Retail</td>
<td>36</td>
<td>21.2%</td>
</tr>
<tr>
<td>Service (non-food)</td>
<td>18</td>
<td>10.6%</td>
</tr>
<tr>
<td>Professional</td>
<td>16</td>
<td>9.4%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>4</td>
<td>2.4%</td>
</tr>
<tr>
<td>Other</td>
<td>39</td>
<td>22.9%</td>
</tr>
</tbody>
</table>

**Measures and Procedure**

Using the same Internet-based surveying program, participants completed a survey containing four subsets of cognitive and affective job satisfaction and organizational commitment items. Participants responded to 59 job attitude items (i.e., 13 affective job satisfaction, 27 cognitive job satisfaction, 7 affective organizational commitment, and 12 cognitive organizational commitment items), representing a combination of the items identified in Pilot Study 1 (see Tables 1 and 2), as well as a number of items developed for the purposes of the current research (a pilot study, not reported here, based solely on the items listed in Tables 1 and 2 failed to identify four coherent job attitude scales, requiring the development of additional items). However, unlike the SMEs in Study 1, these participants rated the extent to which the items did or did not reflect their own experiences with their current job and organization.

To establish the convergent and discriminant validity of these items as either affectively or cognitively oriented, participants also completed the affective and cognitive semantic differential scales developed by Crites et al. (1994). These scales were selected due to their established ability to discriminate between the affective and cognitive
evaluative components of various attitudes. Participants completed four semantic differentials; an affective and cognitive semantic differential with the job as the focal attitudinal object and an affective and cognitive semantic differential with the organization as the focal attitudinal object. To further establish the validity of the job attitude items, participants also completed the Positive Affect Negative Affect Schedule (PANAS; Watson et al., 1988) and a Valence-Instrumentality-Expectancy (VIE) based measure of job cognitions (Weiss et al., 1999). Job attitude items were selected to maximize the expected relationships with these scales (i.e., semantic differentials, PANAS and job cognitions). For example, affective job satisfaction items were selected if they demonstrated stronger relationships with the affective semantic differentials and the PANAS.

Interested participants were sent an email invitation including a link to the survey. The survey was divided into three sections labeled Job Attitudes, Organizational Attitudes, and Demographics for the participants. For example, the first section included the affectively and cognitively oriented job satisfaction items, followed by the affective and cognitive semantic differentials with the job as the focal attitude object. Each block of items was presented on a separate web-page. Participants were instructed to complete the attitude measures based on how they felt or were thinking “right now,” rather than in general, to more closely mimic the momentary attitude measurement used in the Primary Study. A similar format was used to measure organizational commitment.

Affective and cognitive semantic differentials. To determine the convergent and discriminant validity of the 59 job satisfaction and organizational commitment items, participants completed a series of four semantic differential (i.e., bipolar) rating scales
(Crites et al., 1994). Crites et al. developed three rating scale formats (i.e., semantic differentials, multiresponse checklists and dichotomous checklists) to quantify the affective or cognitive attitudes toward an attitudinal object. Although Crites et al. demonstrated equivalent reliability and factor structures for the three formats, the semantic differential scales were selected for use in the current study due to their greater variability (7 vs. 5 vs. 3 point scales respectively). In the current study, participants completed two affective and two cognitive semantic differential scales, one set of affective and cognitive semantic differentials with the job, and the other with the employing organization as the focal attitude object. The affective semantic differential consisted of eight affective word pairs (see Appendix M), while the cognitive scale consisted of seven cognitive word pairs (see Appendix N). Each semantic differential was defined by an unnumbered 7-point bipolar scale, anchored on either end by the affective or cognitive word pairs. Participants were asked to indicate the location along the scale which most closely resembled their feelings toward their job or employing organization (i.e., affective semantic differentials), or the traits or characteristics they attributed to their job or employing organization (i.e., cognitive semantic differentials). Items were scored from +3 to –3 along the continuum.

In the current study, all four scales demonstrated acceptable internal consistency reliability (affective semantic differential-job (ASD-job): $\alpha = .926$; cognitive semantic differential-job (CSD-job): $\alpha = .889$; affective semantic differential-organization (ASD-org): $\alpha = .943$; cognitive semantic differential-organization (CSD-org): $\alpha = .923$). Subsequent analyses using the semantic differentials are based solely on the organizationally oriented affective and cognitive semantic differentials (i.e., ASD-org and
The organizationally oriented semantic differentials were selected based on
(1) an assumption that organizationally oriented semantic differentials were more
encompassing of attitudes at work, (2) the higher internal consistency reliability (α) of
the organizationally oriented scales, and (3) the high redundancy between identical scales
(e.g., ASD-job vs. ASD-org), suggesting participants did not distinguish among their
attitudes directed at their job compared to their employing organization. Additional
exploratory and confirmatory factor analyses confirmed this decision (see below), with
nearly every pair of identical items cross-loading (e.g., item 1 of the ASD-job, which is
identical to item 1 of the ASD-org, loaded on both the affective-job and affective-
organization latent factors).

PANAS. State affect was assessed using the Positive Affect Negative Affect
Schedule (PANAS; Watson et al., 1988). The PANAS is a 20-item scale designed to
measure the two most commonly studied dimensions of affect (see Appendix O). Results
suggest that both the PA and NA scales have high internal consistency reliabilities, with
high test-retest reliabilities, demonstrate good convergent and discriminant validities and
are orthogonal factors (Watson et al., 1988). State affect was assessed to more closely
mimic the instructions used during the experience sampling (i.e., state-based)
measurement period in the Primary Study. State affect was assessed using the original
instructions asking participants to “Indicate to what extent you feel this way right now,
that is, at the present moment” (Watson et al., 1988, p.1070).

In the current study, both the PA (α = .899) and NA (α = .861) subscales
demonstrated adequate internal consistency reliability. To account for the orthogonal
nature of the PA and NA subscales, while remaining parsimonious, all subsequent
analyses are based on a model including PA and NA factors, encompassed by a higher-order ‘Affect’ latent factor. This was done, so that an equal number of affective and cognitive latent factors were present during model testing. Confirmatory factor analyses support this conclusion ($\chi^2_{159} = 253.149, p < .01; \text{CFI} = 0.958, \text{RMSEA} = 0.059$)

*Job cognitions.* Job cognitions were assessed using a 12-item scale developed by Weiss et al. (1999), based on the Valence-Instrumentality-Expectancy theory (see Appendix P). This scale requires participants to indicate the instrumentality, or opportunity provided by their current job to achieve twelve desirable outcomes using a 5-point Likert scale (Strongly Agree-Strongly Disagree). In the current study, the job cognitions scale demonstrated acceptable internal consistency reliability ($\alpha = .926$), and a 1-factor solution.

*Results*

The purpose of the pilot studies was to develop a set of four short scales measuring affectively and cognitively oriented job satisfaction and organizational commitment. This was accomplished through a series of three major sets of analyses. The first step was to establish the factor structures of the ASD-org, CSD-org, PANAS and job cognitions scales. This was conducted through a number of exploratory and confirmatory factor analyses. Second, all 59 job satisfaction and organizational commitment items were regressed on each affect/cognition pair of latent factors (i.e., two multiple regression analyses were run for each item, one with the ASD-org/CSD-org pair of latent factors, and the other with the PANAS/job cognitions pair of latent factors as the independent variables). Items were retained at this step only if the observed standardized regression weights for at least one affect/cognition pair (e.g., ASD-org/CSD-org or
PANAS/job cognitions) demonstrated the expected pattern. For example, affective job satisfaction items were retained if the standardized regression weight for the ASD-org was larger than the CSD-org’s, or if the regression weight for the PANAS was larger than the job cognitions scale’s. Finally, in the third step, three items for each of the four job attitude scales were selected using a series of exploratory and confirmatory factor analyses, internal consistency reliabilities were estimated, and the convergent and discriminant validity of the newly developed scales was established against the four ASD-org/CSD-org and PANAS/job cognitions latent factors.

*Exploratory and confirmatory analyses of the ASD-org, CSD-org, PANAS and job cognitions scales.* The first step in the analysis of Pilot 2 data was to verify the factor structure of the affective and cognitive latent factors used throughout the remaining analyses. This entailed conducting a series of exploratory (i.e., EFA) and confirmatory (i.e., CFA) factor analyses (e.g., Fabrigar, Wegener, MacCallum & Strahan, 1999). The following analyses were conducted using a maximum likelihood (i.e., ML) estimation procedure with a promax rotation. EFAs were conducted using ML in Mplus due to the fit statistics it provides (similar to a CFA), while an oblique promax rotation was used to more closely represent the intercorrelated nature of individuals’ psychological experience. Where possible, Hu and Bentler’s (1999) 2-index reporting strategy was followed in selecting the appropriate model. According to Hu and Bentler, it is advisable to include two indices of model fit when using ML estimation, with for example, CFI values greater than .95, SRMR values less than .08 and RMSEA values less than .06 indicating good fit.
The first set of analyses was conducted to establish the factor structure of the four affective and cognitive semantic differentials (i.e., ASD-job, CSD-job, ASD-org, CSD-org). An EFA of the 30 items comprising the four a priori scales indicated a two or four factor solution was appropriate (eigenvalues = 17.14, 2.36, 1.59, 0.95, with the first four factors accounting for 73.46% of the total variance). While the RMSEA criteria for neither the 2-factor ($\chi^2_{376} = 1474.78, p < .01; \text{RMSEA} = 0.13$), nor 4-factor solution ($\chi^2_{321} = 1050.78, p < .01; \text{RMSEA} = 0.12$) indicated a well fitting model, both make sense conceptually. In the 2-factor solution, the ASD-job and ASD-org combined to form one factor, while the CSD-job and CSD-org formed the second factor. The 4-factor solution created a model with a combined ASD-job – ASD-org factor, with separate CSD-job and CSD-org factors. The fourth factor was comprised of an identical set of ASD-job and ASD-org items (i.e., items 4 and 6).

Using this information, a series of nested CFA models were tested. The first model tested the a priori, ASD-job, CSD-job, ASD-org, CSD-org model. This model failed to meet the criteria for a well fitting model ($\chi^2_{399} = 1429.49, p < .01; \text{CFI} = 0.81; \text{RMSEA} = 0.12; \text{SRMR} = 0.07$). This was compared against a nested model including intercorrelations between the uniquenesses of all 15 sets of identical items (e.g., ASD-job1 and ASD-org1). This model fit significantly better than the a prior four factor model ($\chi^2_{384} = 864.63, p < .01; \Delta\chi^2_{15} = 564.86, p < .01$), and more closely approximated the criteria of a well fitting model (CFI = 0.91; RMSEA = 0.09; SRMR = 0.07). In addition, the factor correlation between the ASD-job and ASD-org was 0.94 ($p < .01$), while the CSD-job – CSD-org intercorrelation was 0.84 ($p < .01$) in this second model. Given the highly redundant nature of the job-organization distinction, along with the higher internal
consistency reliability of the organizationally relevant scales, the decision was made to proceed with only the ASD-org and CSD-org. A final CFA of these two scales, with theoretically plausible modifications, resulted in a well fitting model ($\chi^2_{82} = 175.74$, $p < .01$; CFI = 0.96; RMSEA = 0.08; SRMR = 0.06; see Figure 3).

---

2 EFA and CFA analyses were conducted using the Mplus statistical software package, which provides modification indices. These indices reflect the improvement in model fit expected by freely estimating various parameters within the model (e.g., correlated errors). Modifications were accepted through multiple model estimation iterations, with modifications accepted only if the item stem from two items was similar in content or wording. Furthermore, modifications were only accepted in CFAs of existing measures (e.g., the PANAS) to replicate theoretical models presented in the literature. To increase replicability, modifications were not conducted with the four affectively and cognitively oriented, job satisfaction and organizational commitment scales developed as part of the current study.
Figure 3. CFA results of the ASD-org and CSD-org scales, with modifications.
The next set of analyses was conducted to establish the factor structure of the VIE based job cognitions scale. An EFA of the 12-item scale indicated a strong first factor accounting for 67.1% of the total variance (eigenvalue = 8.05), while the second factor accounted for an additional 6.3% of the total variance (eigenvalue = 0.76). While neither the 1-factor ($\chi^2_{54} = 167.80, p < .01; \text{RMSEA} = 0.11$), nor 2-factor models ($\chi^2_{43} = 102.87, p < .01; \text{RMSEA} = 0.09$) fit the data well, the 2-factor solution fit significantly better ($\Delta\chi^2_{11} = 64.93, p < .01$), but was less interpretable. A CFA of the 1-factor job cognitions scale indicated it fit the data well ($\chi^2_{49} = 90.88, p < .01; \text{CFI} = 0.98; \text{RMSEA} = 0.07; \text{SRMR} = 0.03$), with minor modifications (see Figure 4).
Figure 4. CFA results of the Job Cognitions scale, with modifications.
An EFA of the 20-item PANAS suggested a two-factor solution matching the a priori PA/NA distinction fit the data better than a one-factor solution. The first factor extracted accounted for 41.11% of the total variance (eigenvalue = 8.22), while the second extracted factor accounted for an additional 20.24% of the total variance (eigenvalue = 4.05). Although the two-factor model did not meet the criteria of a well fitting model ($\chi^2_{151} = 372.09, p < .01; \text{RMSEA} = 0.09$), it fit significantly better than a one-factor solution ($\chi^2_{170} = 1061.40, p < .01; \text{RMSEA} = 0.18; \Delta \chi^2_{19} = 689.31, p < .01$), and was selected for theoretical reasons. This model was tested in a CFA with two latent factors representing State PA and NA. Following several theoretically plausible modifications, this model fit the data well ($\chi^2_{160} = 253.15, p < .01; \text{CFI} = 0.96; \text{RMSEA} = 0.06; \text{SRMR} = 0.06$), with the PA and NA factors being significantly correlated ($\text{.37, p < .01}$). Although this model matches the historical conceptualization of PA and NA, a more parsimonious model with a higher-order ‘Affect’ factor was desirable to match the factor structures of the ASD-org, CSD-org and job cognitions scales. By creating a higher-order affect latent variable, affect and cognition would be represented by an equal number of factors for future comparisons (i.e., Affect/Job Cognition; ASD-org/CSD-org). This higher-order model fit the data equally well ($\Delta \chi^2_{1} = 0.00, p > .05$), and will be used in the remaining analyses (see Figure 5).
Figure 5. CFA results of the PANAS scale, with modifications.
As a final step in the development of the four affective (i.e., ASD-org, PANAS) and cognitive (i.e., CSD-org, job cognitions) scales, the scales were subjected to an EFA and CFA. As expected, an EFA of the 47 items comprising the four latent variables indicated that a five-factor solution fit the data significantly better than a four-factor solution ($\Delta \chi^2_{43} = 361.99, p < .01$). While the five-factor model did not meet the criteria of a well-fitting model ($\chi^2_{856} = 1595.96, p < .01$; RMSEA = 0.07), the first five factors accounted for 68.26% of the total variance (see Table 4 for promax rotated factor loadings). The five-factor solution was also more interpretable as PA and NA emerged as identifiable factors. Using modifications identical to the measurement models tested independently for each scale, the structural model for the four affective and cognitive latent factors was tested in a CFA (i.e., PA and NA were modeled with a higher-order overall ‘Affect’ latent variable). The RMSEA and SRMR criteria for this model indicate that it is a well fitting model ($\chi^2_{1005} = 1607.75, p < .01$; CFI = 0.91; RMSEA = 0.06; SRMR = 0.08).
### Table 4
Exploratory Factor Analytic Evidence for the Four Affect and Cognition Latent Variables; Promax Rotated Factor Loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>ASD-org 1</td>
<td>0.895</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
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<tr>
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<td>-</td>
<td>-</td>
<td>0.746</td>
</tr>
</tbody>
</table>

Note: Factor loadings < .30 are not reported; Factor 3 = PA; Factor 4 = NA
**Item level regression analyses.** The next step was to establish the affective and cognitive nomological network for each job satisfaction and organizational commitment item. This was accomplished by examining two sets of multiple regression equations for each item. In the first set of regression analyses, satisfaction and commitment items were regressed on the latent affect and cognition factors created by the ASD-org and CSD-org scales, while in the second set of analyses, each item was regressed on the PANAS/job cognitions pair of latent factors. The observed affect/cognition standardized regression coefficients from each set of analyses were examined, and items were selected for further analysis only if at least one pair of regression weights demonstrated the expected pattern.

For example, cognitive job satisfaction items were selected for further analysis only if the standardized regression coefficient for the CSD-org was larger than the ASD-org’s, or if the job cognitions scale’s regression coefficient was larger than the PANAS’. Heuristic results for all 59 items can be found in Tables 5, 6, 7 and 8, where a check mark indicates the expected pattern of results was observed (for affective job satisfaction, cognitive job satisfaction, affective organizational commitment and cognitive organizational commitment respectively; see Appendix V, W, X and Y respectively for standardized regression coefficients). As can be seen in these tables, the affectively oriented job attitude scales (i.e., affective job satisfaction and affective organizational commitment) consistently demonstrated the expected pattern of regression coefficients with the affective and cognitive latent factors. For example, affect (i.e., ASD-org and the PANAS) accounted for a greater proportion of the variance in both regression analyses for 9 of the 13 affective job satisfaction, and 5 of the 7 affective organizational commitment items assessed. Furthermore, every affective attitudinal item assessed was
more strongly predicted by at least one affective latent variable (i.e., either the ASD-org or PANAS).

The multiple regression analyses for the cognitive job satisfaction and organizational commitment items were much less supportive of a cognitive orientation. For example, only 4 of the 27 cognitive job satisfaction, and 0 of the 12 cognitive organizational commitment items assessed demonstrated the expected standardized regression weights in both sets of analyses (i.e., larger standardized regression coefficients for the CSD-org and job cognitions scales). Moreover, 14 of the 27 cognitive job satisfaction and 8 of the 12 cognitive organizational commitment items failed to demonstrate larger standardized regression weights for either cognitive latent factor. In general, this would suggest that affectively oriented attitudinal items were more clearly related to affective latent factors, and that affective attitudinal scales can be developed more easily. This contradicts previous research suggesting the majority of existing job satisfaction scales are cognitively oriented (e.g., Brief & Roberson, 1989; Organ & Near, 1985). For all four scales, items were retained if at least one set of regression coefficients demonstrated the desired pattern.
Table 5
Convergent and Discriminant Validity Evidence for the Affective Job Satisfaction Items
– Heuristic Results of Regressing Items on Affective and Cognitive Latent Factors

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, I like working here.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2. In general, I don’t like my job.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3. <strong>I find real enjoyment in my work.</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4. I consider my job rather unpleasant.</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>5. Most days I am enthusiastic about my work.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6. I definitely dislike my work.</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>7. <strong>Pleasant-Unpleasant</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8. Satisfying-Unsatisfying</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>9. How do you feel about the people you work with - your co-workers?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>10. How do you feel about the work you do on your job - the work itself?</td>
<td>✓</td>
<td>–</td>
</tr>
<tr>
<td>11. How do you feel about where you work - the physical surroundings, the hours, the amount of work you are asked to do?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>12. How do you feel about what you have available for doing your job - the equipment, information, supervision, etc.?</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>13. How do you feel about your job overall?</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Note: Bold-faced items were selected for the final scale.
ASD = Affective Semantic Differential; CSD = Cognitive Semantic Differential;
PANAS = Positive Affect Negative Affect Schedule; VIE = Valence-Instrumentality-Expectancy Job Cognitions.
Table 6
Convergent and Discriminant Validity Evidence for the Cognitive Job Satisfaction Items
– Heuristic Results of Regressing Items on Affective and Cognitive Latent Factors

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The chance to work alone on the job.</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>2. The chance to do different things from time to time.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. The chance to be &quot;somebody&quot; in the community.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. The way my boss handles his or her subordinates.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. The competence of my supervisor in making decisions.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>6. The way my job provides for steady employment.</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>7. The chance to do things for other people.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>8. The chance to tell people what to do.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. The chance to do something that makes use of my abilities.</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>10. The way the company policies are put into practice.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11. The pay for the amount of work that I do.</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>12. The chance for advancement on this job.</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>13. The freedom to use my own judgment.</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>14. The chance to try my own methods of doing the job.</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>15. The working conditions.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16. The way my co-workers get along with each other.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>17. Being able to keep busy all the time.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18. Compared to previous co-workers, how satisfied are you with your</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>current co-workers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Compared to previous supervisors, how satisfied are you with your</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>current supervisor?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Compared to previous jobs, how satisfied are you with your current</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>job?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Bold-faced items were selected for the final scale.

ASD = Affective Semantic Differential; CSD = Cognitive Semantic Differential;
PANAS = Positive Affect Negative Affect Schedule; VIE = Valence-Instrumentality-Expectancy Job Cognitions
Table 6 (cont.)
Convergent and Discriminant Validity Evidence for the Cognitive Job Satisfaction Items
– Heuristic Results of Regressing Items on Affective and Cognitive Latent Factors

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Compared to previous organizations you have worked for, how satisfied are you with the organization you currently work for?</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>22. Based on your skills and the amount of effort you put into your work, how satisfied are you with your pay?</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>23. If you had to decide all over again whether to take the job you have now, what would you decide?</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>24. <strong>How does your job compare with your ideal job?</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>25. <strong>How does your job measure up to the sort of job you wanted when you took it?</strong></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>26. I know I am satisfied with my job.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>27. After thinking about it, I am satisfied with my job.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Bold-faced items were selected for the final scale.
ASD = Affective Semantic Differential; CSD = Cognitive Semantic Differential; PANAS = Positive Affect Negative Affect Schedule; VIE = Valence-Instrumentality-Expectancy Job Cognitions
Table 7
Convergent and Discriminant Validity Evidence for the Affective Organizational Commitment Items – Heuristic Results of Regressing Items on Affective and Cognitive Latent Factors

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I really care about the fate of this organization.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>2. I would be very happy to spend the rest of my career with this</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>organization.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I feel &quot;emotionally attached&quot; to this organization.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>4. I am very proud when I tell people what company I work for.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>5. I would feel guilty if I left my organization now.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6. I feel like I am a part of the organization.</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>7. I would feel a sense of loss if I left the organization.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Note: Bold-faced items were selected for the final scale.
ASD = Affective Semantic Differential; CSD = Cognitive Semantic Differential; PANAS = Positive Affect Negative Affect Schedule; VIE = Valence-Instrumentality-Expectancy Job Cognitions
Table 8
Convergent and Discriminant Validity Evidence for the Cognitive Organizational Commitment Items – Heuristic Results of Regressing Items on Affective and Cognitive Latent Factors

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am willing to work long hours to help this organization be successful.</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>2. If offered a job at a different organization, doing similar work, I would decline the offer.</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>3. If asked to weigh the pros and cons of working for this organization, I would chose to remain.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. When I weigh my available employment options, I believe my best option is to remain with this organization.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. I could list several reasons for my decision to remain with this organization.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. I would lose too much if I left this organization.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. I agree with the policies and procedures this organization operates by.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>8. I know I am committed to my organization.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>9. The costs of leaving my current job would outweigh the benefits of taking another job.</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>10. I can think of many reasons why I should remain with this organization.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>11. I rarely think about leaving this organization.</strong></td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>12. Leaving this organization would require considerable personal sacrifice—another organization may not match the benefits I have here.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: Bold-faced items were selected for the final scale.
ASD = Affective Semantic Differential; CSD = Cognitive Semantic Differential; PANAS = Positive Affect Negative Affect Schedule; VIE = Valence-Instrumentality-Expectancy Job Cognitions
Final scale development. The third and final step in the analyses conducted to develop the affective and cognitive attitude scales was a series of exploratory and confirmatory factor analyses. Factor analyses were conducted on the attitudinal items more strongly predicted by the appropriate affect or cognition latent variables when regressed on the ASD-org/CSD-org and PANAS/job cognitions latent factors. An EFA of the 13 original affective job satisfaction items indicated a 2-factor solution fit the data best ($\chi^2_{53} = 107.83, p < .01; \text{RMSEA} = 0.08$), which was a significantly better fit than a 1-factor solution ($\chi^2_{65} = 205.75, p < .01; \text{RMSEA} = 0.11; \Delta \chi^2_{12} = 97.92, p < .01$).

Inspection of the 2-factor solution indicated a strong negative wording factor (items 2, 4 and 6). As these were the only negatively valenced items across the four attitude scales, these items were dropped. An EFA of the remaining 10 items indicated a 1-factor solution fit the data ($\chi^2_{35} = 70.20, p < .01; \text{RMSEA} = 0.08$) and was interpretable. The three highest loading items (3, 7 and 13) were selected for inclusion in the final scale.

Next, an EFA was conducted on the four cognitive job satisfaction items (i.e., 6, 7, 24 and 25) that were more strongly predicted by both the CSD-org and the job cognitions latent factors. This resulted in a 1-factor solution ($\chi^2_{2} = 3.22, p > .05; \text{RMSEA} = 0.06$). Of these items, only item 7 discussed other individuals and was dropped, leaving items 6, 24 and 25 to comprise the cognitive job satisfaction scale.

The seven affective organizational commitment items presented an interpretable 1-factor solution in an EFA framework, accounting for 70.71% of the total variance. However, the available fit statistics did not indicate this was a well fitting model ($\chi^2_{14} = 45.49, p < .01; \text{RMSEA} = 0.12$), and a 2-factor solution failed to converge. In the 1-factor solution, all seven items demonstrated strong factor loadings; however, items 3, 4
and 7 were selected as they were among the highest loading items and represented a full spectrum of affective wording.

As previously discussed, only four cognitive organizational commitment items (i.e., 1, 2, 9 and 11) demonstrated the expected pattern of relationships with the affective and cognitive latent variables. An EFA of these four items indicated a 1-factor solution fit the data well ($\chi^2 = 0.267, p > .05; \text{RMSEA} = 0.00$). Items 1, 2 and 11 had the strongest factor loadings and were selected for use in the final scales.

Next, the remaining 12 affective and cognitive job satisfaction and organizational commitment items were subjected to an EFA. Results of this factor analysis indicated a significant decrease in the $\chi^2$ value for each successively extracted factor up to the fourth factor (see Table 9). This matches the a priori factor solution, with separate factors extracted for affective job satisfaction, cognitive job satisfaction, affective organizational commitment, and cognitive organizational commitment. Furthermore, for each of the four attitude scales, the three items comprising each scale loaded above .30 on their a priori scale, with no cross loadings above .30 (see Table 10; see Table 11 for the final scales with item stems and response options).
Table 9  
Exploratory Factor Analytic Evidence Supporting Four Affective and Cognitive Job Satisfaction and Organizational Commitment Scales  

<table>
<thead>
<tr>
<th>No. of Factors</th>
<th>Extracted Eigenvalue</th>
<th>$\chi^2$ (df, $p$ value)</th>
<th>RMSEA</th>
<th>$\Delta\chi^2$ ($\Delta$df, $p$ value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.54</td>
<td>245.47 (54, $p &lt; .01$)</td>
<td>0.15</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>1.35</td>
<td>81.81 (43, $p &lt; .01$)</td>
<td>0.07</td>
<td>163.66 (11, $p &lt; .01$)</td>
</tr>
<tr>
<td>3</td>
<td>0.80</td>
<td>56.77 (33, $p &lt; .01$)</td>
<td>0.07</td>
<td>25.04 (10, $p &lt; .01$)</td>
</tr>
<tr>
<td>4</td>
<td>0.60</td>
<td>31.77 (24, $p &gt; .05$)</td>
<td>0.04</td>
<td>25.00 (9, $p &lt; .01$)</td>
</tr>
</tbody>
</table>

Again, the results of the EFA suggest affectively oriented attitude scales are simpler to develop. For example, items comprising the affective job satisfaction and organizational commitment scales load more highly on their respective scales than items forming the cognitively oriented scales. This was also evident in the coefficient alpha reliabilities for each scale. In general, alpha values greater than .70 are considered acceptable; however, scale length and scale reliability are positively correlated and the shortened length of each developed scale (i.e., 3 items) could be expected to truncate
their reliability. This was not the case with the affectively oriented scales, where both the affective job satisfaction ($\alpha = .893$) and organizational commitment scales ($\alpha = .818$) demonstrated acceptable reliability. However, the reliability of the cognitive job satisfaction ($\alpha = .595$) and organizational commitment ($\alpha = .738$) scales were much lower. Given the existing literature, these results are somewhat counterintuitive (e.g., one would expect greater variability in affect), and likely reflect greater differences in the semantics and wording used in the cognitively oriented scales. For example, cognitive job satisfaction item 6 uses different language, and asks a different style of question compared to items 24 and 25. Unfortunately, given the limited number of cognitively oriented items to select from, this represents the best-case scenario for the existing data.

With the items for each scale selected, the items were subjected to a CFA based on the a priori 4-factor model. Results of this analysis suggest the data fit the model well ($\chi^2_{48} = 87.328$, $p < .01$; RMSEA = 0.07; SRMR = 0.05; see Figure 6). In general, the modeled pattern of relationships match the expected relationships among the items and between the scales. For example, all 12 items demonstrated strong factor loadings on their respective latent factors, with only one cross loading and one correlated residual among items suggested by the modification indices. However, the model demonstrated adequate fit and these modifications were not accepted on theoretical grounds. It is also interesting to point out that all relationships among the latent variables representing the four scales were significant. The majority of these relationships were expected, and support the convergent and discriminant validity of the developed scales. For example, cognitive organizational commitment demonstrated the strongest relationship with affective organizational commitment, both being measures of the same construct. This
was followed by a weaker relationship with cognitive job satisfaction, which was expected, as both scales were measures of cognitively oriented attitudes. Finally, cognitive organizational commitment had the weakest relationship with affective job satisfaction, a scale measuring both a different construct and a different attitudinal orientation.

Unfortunately, not all scales demonstrated the expected pattern of relationships. Most troubling of these were the affective and cognitive job satisfaction scales. For example, affective job satisfaction had the strongest relationship with cognitive organizational commitment. Similarly, cognitive job satisfaction had the strongest relationship with affective organizational commitment. Given the nature of the desired constructs, neither set of relationships is explainable on theoretical grounds. Again, this is likely the result of the limited number of cognitively oriented attitude items available following the second step in the analyses.

In an attempted to control for these relationships, the a priori model was tested against a nested model with higher-order job satisfaction and organizational commitment latent variables. This model failed to fit significantly better ($\Delta \chi^2 = 0.270$, $p > .05$), and resulted in a very strong relationship between the higher-order satisfaction and commitment latent variables ($\beta = .998; p < .01$). As a result, this model was dropped in favor of the original.
Figure 6. CFA results of the Affective and Cognitive Job Satisfaction and Organizational Commitment scales.
As a final step in demonstrating the convergent and discriminant validity of the developed scales, the four attitudinal scales and the four affective and cognitive latent variables were subjected to a CFA (see Figure 7). This step verifies that the affectively oriented attitude scales are in fact more strongly related to affect, and that vice versa, the cognitively oriented attitude scales are more strongly related to cognition. When replicating the previous modifications for the ASD-org, CSD-org, PANAS and job cognitions scales, the evidence for model fit was mixed ($\chi^2_{1601} = 2519.679, p < .01; \text{CFI} = 0.896; \text{RMSEA} = 0.058; \text{SRMR} = 0.076$). While neither the chi-square nor CFI indicated adequate model fit, the RMSEA and SRMR indicated a well fitting model. Furthermore, no available modifications were theoretically plausible and as a result, the model was accepted.
Figure 7. Convergent and discriminant validity evidence for the Affective and Cognitive Job Satisfaction and Organizational Commitment scales.
First, it must be mentioned that all four comparison factors (i.e., ASD-org, CSD-org, Affect and Job Cognitions) demonstrated the expected pattern of relationships. While all factor correlations were significant, their pattern suggests that the affective factors were more strongly related and the cognitive factors were more strongly related with each other than across the distinction (i.e., affect with cognition). The exception to this rule was for similarly measured scales, suggesting a measurement effect. For example, the ASD-org and CSD-org were more strongly related than their relationships with the remaining scales. Alternative nested models with higher-order measurement factors were tested, but did not significantly improve model fit.

Finally, the pattern of relationships between each attitude scale (e.g., affective job satisfaction) and the four comparison latent variables were examined. Similar to the regression analyses, the comparison latent variables were examined as pairs (i.e., ASD-org with CSD-org, and Affect with Job Cognitions). Three of the attitude scales, affective job satisfaction, cognitive job satisfaction and affective organizational commitment demonstrated the expected pattern of relationships. For example, affective job satisfaction had a stronger relationship with the ASD-org than the CSD-org and with the Affect latent variable than Job Cognitions. The only attitude scale to fail this final set of comparisons was the cognitive organizational commitment scale which demonstrated a stronger relationship with the ASD-org than the CSD-org. Again, this is likely the result of the limited number of cognitively oriented attitudinal items available. An examination of Table 8 indicates that two of the cognitive commitment items demonstrated the expected pattern of beta-weights with the Affect/Job Cognitions latent variables, while only one item demonstrated the expected pattern with the ASD-org/CSD-org pair. Given
time restrictions, and support for the scales by the majority of the evidence, the four attitude scales were accepted and incorporated into the Primary Study (see Table 11).
<table>
<thead>
<tr>
<th>Affective Job Satisfaction</th>
<th>Cognitive Job Satisfaction</th>
<th>Affective Organizational Commitment</th>
<th>Cognitive Organizational Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How do you feel about your job overall?</td>
<td>1. This job is ______ what I wanted when I took it.</td>
<td>1. I feel “emotionally attached” to this organization.</td>
<td>1. I am willing to work long hours to help this organization be successful.</td>
</tr>
<tr>
<td>o Delighted</td>
<td>o Extremely close to</td>
<td>o Strongly Agree</td>
<td>o Strongly Agree</td>
</tr>
<tr>
<td>o Pleased</td>
<td>o Close to</td>
<td>o Moderately Agree</td>
<td>o Moderately Agree</td>
</tr>
<tr>
<td>o Mostly Satisfied</td>
<td>o Relatively close to</td>
<td>o Slightly Agree</td>
<td>o Slightly Agree</td>
</tr>
<tr>
<td>o Mixed (equally satisfied and dissatisfied)</td>
<td>o Neither close to nor far from</td>
<td>o Neither Disagree nor Agree</td>
<td>o Neither Disagree nor Agree</td>
</tr>
<tr>
<td>o Mostly Dissatisfied</td>
<td>o Relatively far from</td>
<td>o Slightly Disagree</td>
<td>o Slightly Disagree</td>
</tr>
<tr>
<td>o Unhappy</td>
<td>o Far from</td>
<td>o Moderately Disagree</td>
<td>o Moderately Disagree</td>
</tr>
<tr>
<td>o Terrible</td>
<td>o Extremely far from</td>
<td>o Strongly Disagree</td>
<td>o Strongly Disagree</td>
</tr>
</tbody>
</table>

| 2. I find real enjoyment in my work. | 2. How does your job compare with your ideal job? | 2. I am very proud when I tell people what company I work for. | 2. If offered a job at a different organization, doing similar work, I would decline the offer. |
| o Strongly Agree | o Extremely close to ideal | o Strongly Agree | o Strongly Agree |
| o Moderately Agree | o Close to ideal | o Moderately Agree | o Moderately Agree |
| o Slightly Agree | o Relatively close to ideal | o Slightly Agree | o Slightly Agree |
| o Neither Disagree nor Agree | o Neither “close to” nor “far from” ideal | o Neither Disagree nor Agree | o Neither Disagree nor Agree |
| o Moderately Disagree | o Far from ideal | o Slightly Disagree | o Slightly Disagree |
| o Strongly Disagree | o Extremely far from ideal | o Moderately Disagree | o Moderately Disagree |

| 3. Select a point along the continuum that most closely represents your job. | 3. The way my job provides for steady employment. | 3. I would feel a sense of loss if I left this organization. | 3. I rarely think about leaving this organization. |
| o | o | o Strongly Agree | o Strongly Agree |
| o Pleasant | o I’m extremely satisfied | o Moderately Agree | o Moderately Agree |
| o x | o I’m very satisfied | o Slightly Agree | o Slightly Agree |
| o | o I’m moderately satisfied | o Neither Disagree nor Agree | o Neither Disagree nor Agree |
| o -x- | o I’m not sure if I’m satisfied or dissatisfied | o Slightly Disagree | o Slightly Disagree |
| o -x | o I’m moderately dissatisfied | o Moderately Disagree | o Moderately Disagree |
| o x | o I’m very dissatisfied | o Strongly Disagree | o Strongly Disagree |
| o | o I’m extremely dissatisfied | | |

Note: Cognitive Job Satisfaction items 1 and 2 were modified from a 5 to a 7-point Likert scale following Pilot Study 2.
Note: A technical error in the Primary Study resulted in Affective Job Satisfaction item 3 being removed from further analyses.
CHAPTER IV

METHOD AND RESULTS OF THE PRIMARY STUDY

Method

The Primary Study was conducted in two phases. During the first phase, 20 pre-existing supervisor-subordinate dyads provided trait-based data during an hour long training session. This was followed by a two week ESM period during which participants provided state-based data six times a day, via PDAs. To clarify the Primary Study’s design, Stone and Shiffman’s (2002) ESM reporting guidelines are followed throughout the Method section.

Participants

Data were collected from 41 individuals, representing 20 supervisor-subordinate dyads at a global manufacturing company headquartered in the Midwest. The supervisor-subordinate dyads were selected for participation by working with corporate HR personnel to identify a sample representative of the organization’s demographic makeup, including race, gender, organizational level and business unit. A combination of both salaried (e.g., Human Resources) and non-salaried (e.g., Production) employees were selected for inclusion in the study. Once a representative sample of supervisor-subordinate pairs was identified, every contacted dyad agreed to participate.

Two additional criteria were used to select participants in the current study. First, dyad members were required to interact on a daily basis, as personal interaction is a
pre-requisite for contagion to occur. Second, to reduce the complexity of an already nested data structure (i.e., observations nested within individuals, nested within dyads), every attempt was made to limit participation to supervisor-subordinate dyads where any one supervisor participated with only one subordinate in the current study. However, while working with corporate HR personnel, one triad emerged. Rather than excluding one subordinate from participation, data were collected from both individuals. During the data analysis process, all 41 individuals were included when testing hypotheses at the individual level of analysis (i.e., Hypothesis 1-5). When testing hypotheses at the dyadic level of analysis (i.e., Hypothesis 6-10; Exploratory Analysis 1-3), only 40 individuals, representing the 20 dyads were included. The third triad member was dropped from these analyses based on fewer paired observations with his or her supervisor.

*Time 1 Measures: Collection of Trait Data*

Data was collected from all 41 participants during a training session (i.e., Time 1 measures), and during a two week ESM period (i.e., Repeated measures). Data collected during Time 1 represent participants’ dispositional or trait-based perspective, while data collected during the two week ESM period represent their moment-by-moment, state-based perspective. At Time 1, indicators for six latent affect and attitude variables were measured: positive and negative affect, affective and cognitive job satisfaction, and affective and cognitive organizational commitment. The same scales were collected six times a day during the ESM measurement period. The only difference between the Time 1 and ESM presentation of these scales were the instructions participants received. At Time 1, participants were asked to respond based on how they felt in general, while asked
to respond based on how they felt at that very moment during the ESM period. The following measures were collected at Time 1.

*Trait affective job satisfaction, cognitive job satisfaction, affective organizational commitment, and cognitive organizational commitment.* Affective and cognitive job satisfaction and organizational commitment were assessed using the four 3-item scales developed in Pilot Study 1 and 2 (see Table 11 for item content are response scales). To measure the trait-like aspect of these attitudes, participants were asked to respond to these questions based on how they felt (i.e., affective job satisfaction and organizational commitment), or thought (i.e., cognitive job satisfaction and organizational commitment) about their job or organization “in general, that is, on the average.” These directions were selected to mimic the trait-based version of the PANAS (Watson et al., 1988).

*Trait affect.* Trait and state affect were assessed using the Positive Affect Negative Affect Schedule (PANAS; Watson et al., 1988), used in Pilot 2 (see Appendix O). Trait affect was assessed using the original instructions asking participants to “Indicate to what extent you generally feel this way, that is, how you feel on the average” (Watson et al., 1988, p.1070). Responses were provided using a 5-point Likert scale ranging from ‘Extremely’ to ‘Very slightly or not at all’.

*Trait stress.* To further our understanding of the relationship between workplace stress and mood, participants were asked to complete a 1-item measure of generalized, or trait-based stress at work. The item asked participants to rate “How stressful is your job in general, that is, on the average?” Responses were made along a 7-point bipolar rating scale with ‘Extremely Stressful’ and ‘Extremely Unstressful’ as the anchors (the midpoint was labeled ‘Moderately Stressful’). This measure of stress was selected to match,
and provide a baseline against which to compare momentary stress levels assessed during the ESM period (see below).

*Job cognitions.* A scale identical to the 12-item job cognitions scale used in Pilot Study 2 was used as a baseline measure of trait-based cognitive job attitudes (see Appendix P). The scale requires participants to indicate the instrumentality, or opportunity, their current job provides to achieve twelve desirable outcomes using a 5-point Likert scale (Strongly Agree-Strongly Disagree), and is based on the scale used by Weiss et al. (1999) in their ESM study.

*Ability to infect others with emotion.* Supervisors completed the Berkeley Expressivity Questionnaire at Time 1 to measure their ability to infect others with emotion (Gross & John, 1995, 1997; see Appendix Q). The Berkeley Expressivity Questionnaire is a 16-item, self-report measure of the three dimensions of emotional expressiveness identified by Gross and John (1995): impulse strength, positive expressivity, and negative expressivity. Supervisors indicated their level of agreement with 16 statements using a 7-point Likert scale (1: strongly disagree – 7: strongly agree), with ratings combined to form an overall expressiveness index ($\alpha = .86$, Gross & John, 1997).

*Emotional contagion susceptibility.* The extent to which subordinates are susceptible to the influences of emotional contagion was measured using a 15-item scale developed by Doherty (1997; see Appendix R). Doherty demonstrated adequate psychometric qualities for the scale ($\alpha = .90$), that a unidimensional factor structure fits the data best (factor loadings ranged from .46 to .69), and provided evidence for convergent and discriminant validity. The 15-item measure taps the extent to which
individuals mimic five basic emotions; love, happiness, fear, anger, and sadness. Each item presents a situation in which another individual expressed one of these five emotions and the participant is asked to rate the extent to which they would demonstrate a similar emotion in the situation (i.e., never, rarely, often or always).

**Self-concept.** Participants’ chronic self-concept was measured using a portion of the Levels of Self-Concept Scale (Selenta & Lord, 2005; Appendix S). The Levels of Self-Concept Scale contains several subscales for each level of the self-concept; individual, relational, collective. However, due to space constraints, only the first subscale for each level was measured (15 items total). Responses were provided using a 5-point Likert scale (Strongly Agree-Strongly Disagree).

**Interpersonal power.** The five traditional bases of interpersonal power identified by French and Raven (1959) were measured using Hinkin and Schriesheim’s (1989) 20-item Interpersonal Power Questionnaire (Appendix T). A reanalysis of the scale in two separate samples by Shaffer, Percy and Tepper (1997) confirmed an oblique five-factor model best fit the data. These five-factors represented the coercive, reward, legitimate, referent and expert power individuals attribute to their supervisor. In the current study, both supervisors and subordinates completed the scale; however, only subordinate perceptions are of interest. Responses were provided using a 5-point Likert scale (Strongly Agree-Strongly Disagree).

**Leader-Member Exchange (LMX).** The LMX-7 (Graen & Uhl-Bien, 1995; see Appendix U) has demonstrated greater internal consistency reliability (α) and stronger correlations with relevant variables compared to other LMX measures (Gerstner & Day, 1997). Therefore, based on the recommendations of Gerstner and Day, the LMX-7 was
used to measure leader-member exchange in the current study. The LMX-7 requires participants to respond to seven items which describe the quality of the relationship they have with their ‘leader’ using a 5-point Likert scale.

The self-concept, interpersonal power and leader-member exchange perceptions of both supervisors and subordinates were measured in the current study to maintain a consistent time requirement for all participants. However, in each case, the current study is interested in only the subordinates’ perceptions and how they may impact the contagion process.

_**Liking.**_ At Time 1 subordinates were also asked to indicate the extent to which they like their supervisor. Liking was assessed using two items based on Byrne’s (1971) affective attraction measure. Subordinates responded to the items using a 7-point Likert scale (1 = not at all; 7 = very much). The two items are, “How much do you like your supervisor?” and “How much do you like working for him/her?”

_**Tenure with the supervisor.**_ Supervisors were also asked to indicate the number of months they had worked with the subordinate they were participating with.

_Time 1 Procedures_

Trait-based variables were collected during one of two hour-long training sessions (i.e., Time 1) conducted on the Friday afternoon preceding the two week ESM measurement period, which began the following Monday. Participating dyads were instructed to attend one of the training sessions together, which were held in an auditorium at the host organization’s corporate headquarters (Note: due to scheduling conflicts, three groups were unable to attend the Friday afternoon training session and were trained early the following week. Although this may have shifted the ESM period,
all dyads completed the same number of measurements. These differences were statistically controlled for. Once they arrived, dyads were instructed to sit together and the primary researcher provided a brief introduction to the study, including the purpose of the study, an explanation of the data collection method, and the importance of providing accurate and complete data. This included an explanation of the need to link supervisor and subordinate data collected at the same time and that participants should not feel obligated to appear consistent in their responses (i.e., variability was expected).

Following the presentation, manila envelopes were handed out to each participant. Each envelope contained an informed consent form, trait-based survey packet, PDA, and desktop survey reminder of survey times. The materials contained in each envelope were labeled with a unique identifier (e.g., Supervisor1, Subordinate1) that identified the participant’s organizational level and dyad. This unique identifier served to link participant state and trait data (Note: to ensure accuracy, each PDA was both physically labeled externally and electronically labeled internally within the data collection software).

Next, participants were instructed to complete the survey packet, which took most participants less than 30 minutes. At Time 1, the supervisors’ survey packet included an informed consent form, and the following scales; trait affective and cognitive job satisfaction, trait affective and cognitive organizational commitment, trait affect, trait job stress, job cognitions, the Berkeley Expressivity Questionnaire, work self-concept, supervisor power, LMX, demographics and a question on his or her tenure with the subordinate they were participating with. The subordinates’ Time 1 survey included the same scales except that the Berkley Expressivity Questionnaire was replaced by the
emotional contagion susceptibility scale, and the subordinate indicated the extent to which they liked their supervisor, rather than their tenure with the supervisor. If either member of the dyad chose not to participate, both members would have been allowed to leave; however, none chose to do so. Following completion of the survey packet, participants were trained on the use of their PDAs. The content of this training session will be discussed shortly.

Repeated Measures: Collection of State Data

State affective job satisfaction, cognitive job satisfaction, affective organizational commitment, and cognitive organizational commitment. The same attitudinal scales assessed at Time 1 were reassessed during each experience sampling measurement period. Participants were asked to complete the scales from a state perspective by responding based on how they felt or thought “right now” (see Table 11 for item content are response scales).

State affect. The same 20-item version of the PANAS used at Time 1 was used to measure state affect during the ESM procedure (see Appendix O). The primary difference is that the directions were reworded to reflect the momentary nature of the mood they were currently experiencing. Participants were asked to, “Indicate to what extent you feel this way right now, that is, at the present moment” (Watson et al., 1988, p. 1070). Responses were provided using a 5-point Likert scale ranging from ‘Extremely’ to ‘Very slightly or not at all’.

Affective Events. For exploratory purposes, a number of items also asked participants to indicate the activities they had engaged in since the previous measurement period (or since the beginning of the day) and the individuals they had interacted with. In
the current study, a number of these items served as control variables, and in future analyses, these items will serve as an initial assessment of the AET in an ESM framework (i.e., Weiss & Cropanzano, 1996). The first two sets of items asked participants to mentally divide up their time since the previous measurement period (or since starting work that morning), and to indicate the amount of time spent interacting with certain individuals or the time engaged in certain activities. The PMAT program does not allow a running total to be displayed on the screen, so participants were asked to do their best to total their percentage of time to 100%. Participants were able to indicate the percentage of time associated with each category using a sliding bar with values from 0 to 100% in 5% increments.

The first set of items asked participants to indicate the percentage of time they had spent interacting with the following individuals during the previous measurement period: (1) Supervisor, (2) Co-workers, (3) Direct Reports, (4) Customers, or (5) Solitary work. The second set of items asked participants to indicate the percentage of time spent engaged in four activities. These activities represented: (1) counterproductive work behaviors (i.e., CWBs; “Doing something to avoid my work tasks (ex. taking a break, talking to friends).”); (2) organizational citizenship behaviors directed at the organization (i.e., OCBo; “Doing something not required by my job that will benefit the organization (ex. volunteering).”); (3) organizational citizenship behaviors directed at fellow co-workers (i.e., OCBi; “Doing something to help a co-worker.”); and (4) engaging in actual task behaviors (“Doing a work task required by my job.”). These items were based on the ESM study conducted by Miner, Glomb and Hulin (2005), and were measured for exploratory purposes only.
A state-based measure of job stress was assessed next. This item is similar to that asked of participants in the trait-based assessment period and asks, “How stressful has your work been since your last entry (or since you started work this morning)?” This scale was assessed using a 7-point Likert scale from Extremely Stressful to Extremely Unstressful (Moderately Stressful served as the midpoint). Although stress is typically viewed as a multi-dimensional construct, particularly with respect to the variety of stressors and individual can experience, a 1-item scale was selected based on the recommendations of Eckenrode and Bolger (1997). When space is limited and stress is not the focal variable, they suggest that a 1-item measure provides a practical summary of an individual’s perceived stress.

Next, participants were asked to, “Please rate the extent to which a particularly good or bad event occurred since your last entry (or since you started work this morning).” This item was measured using a 7-point Likert scale from “Particularly Bad” to “Particularly Good” with “Average/Typical” as the midpoint. Again, this was measured for exploratory purposes to examine the extent to which these particularly good or bad ‘affective events’ resulted in more or less positive ‘affective reactions’ in the AET model. This item was followed with, “Who if anyone, was most involved with this event? This individual may have been the cause, or may have also been affected by the event.” The available response options mimicked the previous interaction options, and participants were allowed to select one of the following: (1) Supervisor, (2) Co-workers, (3) Direct Reports, (4) Customers, or (5) No one else involved.

A necessary condition for emotional contagion to occur is that the supervisor and his or her subordinate interact. To verify that these individuals had interacted recently,
participants were asked to respond “Yes” or “No” to the final item asking, “In the last 5 minutes, have you interacted with your supervisor/subordinate?” During the training session, participants were instructed to interpret this question as referring only to the individual they were participating in the study with.

ESM Procedures

The nature of the relationship under investigation in the Primary Study, namely the contagion of similar mood and job attitudes within the supervisor-subordinate pair, requires a unique method of data collection. This stems from the dynamic variability of both mood and attitudes, which the more traditional observational, experimental and survey methods employed in contagion research have failed to account for thus far. One set of measurement methods gaining popularity in the Industrial/Organizational Psychology literature that allow researchers to gather this type of data are referred to as Ecological Momentary Assessment (EMA) or Experience Sampling Methods (ESM) (e.g., Ilies & Judge, 2002; Judge & Ilies, 2004; Weiss et al., 1999; for an excellent review of these methods see Reis & Gable, 2000; Bolger, Davis & Rafaeli, 2003).

EMA/ESM methodologies flexibly allow researchers to longitudinally collect data from participants’ everyday experiences over varying time frames, in their natural environment (Hormuth, 1986). According to Beal and Weiss (2003), there are three primary reasons for the recent interest in the EMA/ESM methodologies. The first of these has been the realization among researchers that many of the psychological processes under investigation vary over time. Second, these methods are based on the in-depth measurement of psychological processes as they occur in the natural environment. Also, the within-subjects, repeated measurement of these processes, allows researchers to
answer questions typical between-subjects designs are unable to address. Third, measuring psychological states as they occur limits the potential for memory biases, which can cause inaccurate representations of the psychological states under investigation.

The EMA/ESM paradigm, hereafter simply referred to as ESM methodologies, was used in this research for a number of reasons. The primary reason is that several of the hypotheses proposed in this study required the momentary measurement of state-based affect and attitudes; that is, the repeated measurement of affect and attitudes within a supervisor-subordinate dyad throughout a day. Using ESM methodologies to repeatedly measure both affect and attitudes as they occur, allowed for the study of contagion as a dynamic process, rather than a static state event. However, there are a number of methodological issues which must be addressed when conducting an ESM study. Therefore, the seven ESM reporting guidelines recommended by Stone and Shiffman (2002) were used as a framework while designing the current study, and address the rationale for the current study’s design (see Table 12 for an overview of these decisions).

*Momentary sampling design.* The sampling schedule used during data collection is one of the most critical decisions a researcher faces when conducting an ESM study. ESM data is typically collected via one of three measurement schedules (Alliger & Williams, 1993; see also Wheeler & Reis, 1991). The first method, *interval-contingent* sampling is particularly relevant when the researcher is interested in the prevalence of particular events, behaviors, or attitudes, or to draw conclusions about general experiences across a meaningful period of time. This method involves the systematic
measurement of the focal variables at pre-specified time periods throughout the day; for example, every two hours at 8:00 a.m., 10:00 a.m., 12:00 p.m., etc.

*Signal-contingent* sampling is also a time-based ESM measurement strategy; however, participants are asked to complete the survey or provide ratings following a random signal (e.g., a beep from a pager or other electronic device) rather than at a specified time period. It is also possible to create stratified, or hybrid time-based sampling schedules. For example, participants could be sampled randomly within fixed blocks of time, such as randomly within two hour blocks of time (e.g., randomly between 8:00 a.m. and 10:00 a.m., and again at a randomly generated time between 10:00 a.m. and 12:00 p.m., etc). Finally, researchers can also use an *event-contingent* schedule, in which participants only provide data following the occurrence of a specific event. Event-contingent recording is particularly relevant when the focal experience is rare. For example, a researcher interested in women’s reactions toward workplace sexual harassment, would be better off surveying the participants following a harassing event, rather than sampling participants at fixed or random times (i.e., interval- and signal-contingent schedules).
<table>
<thead>
<tr>
<th>Design Issue</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Momentary sampling design</td>
<td>Interval-contingent sampling at 9:00, 10:00, 11:00, 2:00, 3:00, and 4:00 p.m. for two work weeks. Resulting in 60 measurement periods per participant.</td>
</tr>
<tr>
<td>Data acquisition interface</td>
<td>Data were collected electronically using PDAs programmed with the Purdue Momentary Assessment Tool (PMAT).</td>
</tr>
<tr>
<td>Momentary procedures</td>
<td>Each measurement was designed to take 2-4 minutes to complete. Data entry was permitted during a 20-minute window surrounding each interval (e.g., 8:50-9:10 a.m.).</td>
</tr>
<tr>
<td>Participant compliance</td>
<td>Electronic data collection using PMAT allowed the exact time and date of each entry to be verified, a requirement for demonstrating contagion. An audible reminder and directions to report how they felt at that moment were designed to reduce participant memory biases. PMAT prevents responding outside each specified interval, preventing survey hoarding. Participant training and reminder emails each Monday morning were also used. Compliance data are reported.</td>
</tr>
<tr>
<td>Training procedures</td>
<td>Participants were trained to use the PDA and PMAT through an example entry. They were informed of interval timing and the importance of compliant responding.</td>
</tr>
<tr>
<td>Data management</td>
<td>Data were restructured into a person-period format for analysis. Two data sets were constructed; one for Hypothesis 1-5 and one for Hypothesis 6-10 and Exploratory Analysis 1-3.</td>
</tr>
<tr>
<td>Data analysis</td>
<td>Data were analyzed using multilevel random coefficient modeling.</td>
</tr>
</tbody>
</table>
However, each data collection scheme has its disadvantages (Beal & Weiss, 2003). For example, one disadvantage of using the interval-contingent data collection method is that participants easily learn when to expect to complete a survey, and can alter their behavior or schedule to make it more convenient, thereby potentially altering the occurrence of the variable being measured. This may systematically bias the data collected. One disadvantage of the signal-contingent pattern is that the use of randomly presented signals can catch participants unaware, potentially leading to the failure to complete the survey at the appropriate time (i.e., noncompliance). Thus, researchers conducting either an interval-, or signal-contingent study, must be aware of the cyclical pattern of focal behaviors in participants’ lives, and attempt to sample them at the most appropriate times.

Finally, event-contingent surveys require a very clear operational definition of the focal event. Any uncertainty as to what constitutes an event, or an inability to accurately identify an event each time it occurs, jeopardizes the validity of the data collected (Beal & Weiss, 2003). Event-contingent responding can also increase the likelihood of demand characteristics influencing the data (Beal & Weiss, 2003). For example, in this study, asking supervisor-subordinate dyads to complete a survey following each interaction could make the participants aware of the study’s goals and artificially inflate their mood and attitude rating similarity. Ultimately, the decision of whether to use an interval-, signal-, or event-contingent format depends on theory and logistical considerations (Beal & Weiss, 2003). That is, what does the existing research suggest is the most appropriate time frame for measuring the focal variables?
In the current study, an interval-contingent sampling schedule was used for two reasons. First, several hypotheses address mood and attitude contagion within the supervisor-subordinate dyad. Testing these hypotheses requires measuring each member of the dyad at approximately the same time. Controlling and verifying equivalent measurement occasions is best accomplished by measuring these variables at fixed intervals. Second, due to the work schedule of these individuals, it was necessary to design the intervals to accommodate the ebb and flow of daily work (e.g., no measurements were scheduled during the lunch hour which is the participants’ personal time, as well as a time period the dyad is less likely to be together).

Because the study’s focus is contagion within the supervisor-subordinate dyad, intervals were scheduled to occur only during the work day. More specifically, collection of momentary mood and job attitude data was scheduled to occur three times during the morning (i.e., 9:00, 10:00, and 11:00 a.m.), and three times during the afternoon (i.e., 2:00, 3:00, and 4:00 p.m.). For both the morning and afternoon sessions, data collection was scheduled to occur one hour after work began (i.e., after the start of the work day, and after lunch) to increase the likelihood of supervisor-subordinate interaction. Hourly data collection was selected in an attempt to balance the need to measure mood and attitude variability with the need to accommodate participants’ work schedules. Other researchers have also struggled with this issue. For example, Stone et al. (1996) measured participants’ moods, activities and location every fifteen minutes during a work day, while Judge and Ilies (2004) only collected mood and job satisfaction data three times during the work day. These decisions make sense when one considers the fact that
the Stone et al. study only lasted one day while the Judge and Ilies study lasted several weeks.

Furthermore, the study was conducted over the course of two work weeks. That is, each participant provided data 6 times a day on 10 work days, for a total of 60 possible observations. Each of these observations was then potentially paired with those of his or her supervisor or subordinate. Assuming an 80% response rate similar to that found in other electronic ESM studies (e.g., Stone, Shiffman, Schwartz, Broderick & Hufford, 2002), 60 possible observations per participant was expected to provide adequate within-subjects power to test the study’s main hypotheses. Unfortunately, calculating multilevel power is complicated, and so the impact of only 20 dyads on the between-subjects power is unclear (Hox, 2002; also see Maas & Hox, 2005; Raudenbush, 1997).

It should also be noted that a stronger causal argument for contagious affect and attitudes being transmitted down from the supervisor to subordinate could be made by collecting subordinate data after a time lag, rather than at the same time (i.e., using an interval- or event-contingent sampling schedule). For example, supervisor mood and attitudes measured at 9:00 a.m. could be used to predict subordinate mood and attitudes measured at 9:15 a.m. However, this line of research was not pursued for theoretical reasons. For example, research suggests contagion is a rapid process (500-ms; Wild et al., 2001), and the available research failed to offer a clear operationalization of an alternative time lag within which contagion could be expected to occur. Instead, due to the theoretical support for top-down directionality in the contagion process (e.g., Sy et al., 2005; Savell et al., 1995), this effect was examined statistically using a time lag of the next available measurement period. Finally, although a randomized signal-contingent
sampling design would provide the most representative picture of the variability in mood and attitudes at work, an interval-contingent sampling design was chosen for its relative statistical simplicity (e.g., Nezlek, 2001). Although the time period between each measurement is not equal in this study, precluding the use of time-series analyses, other data-analytic methods such as multilevel random coefficients models, or hierarchical linear modeling are flexible enough to model variability in both mood and attitudes within the dyads. These issues will be addressed later.

*Data acquisition interface.* A second major consideration for a researcher interested in conducting an ESM study is the modality through which the research will be conducted. The two most commonly used data collection methods currently in use are traditional pencil-and-paper surveys, and the more technologically advanced use of personal digital assistants (i.e., PDAs). Pencil-and-paper ESM studies often use pocket-sized survey packets with a programmable watch or beeper to provide audible cues in interval and signal-contingent survey designs. One issue with pencil-and-paper methods is that participants are required to indicate the time at which they completed each survey. This becomes an important consideration in ESM studies, where signal compliance is a primary determinant of the validity of a study’s conclusions (see below for a more detailed discussion of compliance).

Electronic ESM procedures use a PDA or other electronic device to both signal and record data. The PDA or other device can be programmed to automatically record the exact time and date of each survey’s completion, greatly increasing the accuracy of compliance data. These devices provide a number of other exciting options, including the ability to prevent surveys from being completed outside of the specified timeframe,
reminder signals, providing interactive and randomly generated surveys, collecting reaction times, video presentation, and GPS capabilities (Feldman Barrett & Barrett, 2001). Another benefit of electronic data collection is that it reduces possible sources of researcher error in data management (i.e., the researcher does not have to enter paper survey data by hand). Although ESM data can be collected electronically via internet survey tools, a PDA is easily transportable, better allowing participants to complete the survey in their natural environment.

Evidence suggests participants equally prefer paper vs. electronic data collection methods (e.g., Green, Rafaeli, Bolger, Shrout & Reis, 2006; Study 3). Therefore, the decision to use either modality must be based on other factors, including participant signal compliance, the financial burden for the researcher, and the ease of use for participants. Data equivalence is one such factor. However, like compliance (discussed later), this issue is far from solved. For example, in Green et al.’s (2006) Study 2 and 3, paper and electronic methods demonstrated equivalent coefficient alphas, scale means, inter-item correlations, and little evidence of between-person variance differences across several measures. However, within-person variability was greater for the paper sample in Study 2, but greater for the electronic sample in Study 3. Any conclusions based on these data are likely premature (e.g., Broderick & Stone, 2006), and biased toward the use of traditional paper data collection (see also Weiler, 2005 for an examination of these issues in the medical research literature).

The research on compliance and data equivalence offers no definitive answer for whether paper or electronic data collection methods are preferable. The decision to use either method should therefore be based on the theoretical aims of the research study.
The study characteristics which make either paper or electronic data collection preferable, or equivalent are discussed by Tennen, Affleck, Coyne, Larsen and DeLongis (2006). These authors suggest paper data collection is superior only when the researcher is interested in collecting data from either very young or elderly populations, or from less affluent populations where theft of the electronic device would be more likely. In contrast, Tennen et al. describe four situations equally addressed by paper and electronic data collection methods: (1) when the goal of the research is to examine relationships within a single day; (2) when the focal attitude, behavior or cognition is discrete (e.g., an end-of-day paper diary entry could capture the presence or absence of an argument with one’s supervisor as accurately as an electronic diary); (3) when theory predicts a cross-day, or weekday-weekend carryover effect; and (4) when the goal is to predict one day’s thoughts and behavior from the previous day’s experiences.

Tennen et al. (2006) also argue that at least two research situations favor the use of electronic data collection methods. The first of these occurs when the researcher is interested in dynamic variability of a focal variable within the day, especially when the exact time of each measurement must be verified to ensure the causal nature within a time series. In the current research, the exact times at which data is entered must be verified to ensure the causal nature of the contagion hypotheses are captured by the data. This will also limit potential memory biases caused by hoarding data entries until the end of the day when mood from earlier in the day can no longer be accurately recalled. Second, electronic data collection methods will produce superior data when the variable of interest is highly variable. Due to the operationalization of state mood and job attitudes in the current study, it is important to capture their variability through frequent
measurements, without overburdening the participant. These arguments help solidify the research necessity of collecting data via an electronic medium (i.e., PDAs).

To achieve the benefits of an electronic data collection method, PDAs programmed with the Purdue Momentary Assessment Tool (PMAT; Weiss, Beal, Lucy & MacDermid, 2004) were used in the current research. PMAT is a freely available ESM program with an accompanying desktop application that allows researchers to access the program’s source code for customization purposes. The PMAT program flexibly accommodates interval, signal, and event-contingent designs, as well as combinations of the three into one study. PMAT is also capable of presenting items in a variety of formats, including Likert scales as either check-boxes or sliding scales, multi-response check-lists, and percentage scales. The specific format of each item’s presentation in the current study was determined based on the number of options visible on the PDA’s screen. For example, with seven response options, the entirety of each job satisfaction and organizational commitment item would not be visible on one screen using the check-box option, requiring the participant to scroll through the available options. To save participants’ time, and reduce the possibility of forgetting to scroll through all available options, these questions took advantage of the sliding bar presentation.

Momentary procedures. According to Stone and Shiffman (2002), an ESM researcher should also document a number of additional study features. The first of these is participant discretion for when to respond to signals. PMAT allows the researcher to specify a window of opportunity for responses (Weiss et al., 2004). In the current study, this was set for 20 minutes, such that the original signal for each interval (e.g., 9:00 a.m.) occurred 10 minutes before the hour (i.e., 8:50 a.m.) and allowed participants to initiate
an electronic survey up to 10 minutes after the hour (i.e., 9:10 a.m.). This option also allowed a maximum of 20 minutes of inactivity on the PDA before PMAT closed the data entry window. This time frame was chosen in an attempt to accommodate participant schedules; for example, a participant may wish to complete a survey directly before entering a meeting that begins, or directly follow a meeting that ends on the hour.

A second procedural consideration a researcher must address is the issue of missing data (Stone & Shiffman, 2002). In the current study, several measures were taken to limit missing data. For example, short 2-4 minute surveys and the 20 minute window of opportunity surrounding each measurement period were selected to limit time demands and increase participant flexibility in when they responded to each survey. However, additional measures were also taken to limit missing data. For example, during the Friday afternoon training session, discussed shortly, the primary researcher impressed upon participants the importance of providing accurate and complete ratings. The linear nature of the PMAT program also prevented participants from skipping questions during the survey. Participants were also provided a desktop reminder card with the times of each survey and window of opportunity clearly listed. Finally, participants were periodically sent reminder emails from the primary researcher and incited to provide responses with a monetary prize (awarded to both members of the three dyads with the most paired surveys). The result was a high overall response rate (discussed later) and only 9 of 1,876 completed surveys (0.48%) where the participant failed to complete the full survey.

*Participant compliance.* As alluded to earlier, participant compliance is one of the major issues a researcher must resolve when deciding to use the ESM methods, and is
one of the primary reasons an electronic data collection method was used in the current research. Compliance research has focused primarily on two themes (e.g., Stone, Shiffman, Schwartz, Broderick & Hufford, 2002; Green et al., 2006). First, do participants complete the survey at the prescribed time, or following the appropriate event? The major contention is that if a participant fails to complete the survey at the designated time, the validity of that data is questionable. For example, participants may repeatedly fail to comply with a signal or interval under specific circumstances, such as during a regularly scheduled meeting, introducing systematic bias into the data.

In terms of complying with survey requests, the majority of the available literature has demonstrated the superiority of electronic ESM data collection methods. This primarily stems from two characteristics of electronic ESM studies. First, the use of alarms and beepers reduces the memory demands placed on participants for when to complete a survey (Takarangi, Garry & Loftus, 2006), especially when multiple surveys are completed per day. Second, electronic data collection methods have the ability to encode the data with an electronic date/time stamp that verifies the exact time the survey was completed, whereas pencil-and-paper participants must self-report compliance in their diary. PMAT for example, also limits participants with the ability to only complete surveys within a predetermined time period. Pencil-and-paper participants on the other hand, are able to record the correct time in their diary, while ‘hoarding’ surveys to complete at a later time, introducing retrospective memory biases, which are discussed shortly.

Although a number of methodological issues plague this research, the evidence confirms that pencil-and-paper participants over-estimate the extent to which they
comply with predetermined survey completion times. In one study for example, Stone et al. (2002) found that although paper-and-pencil participants reported compliance an impressive 90% of the time, only 11% of their entries were in fact compliant (a light sensitive electrode was implanted into the paper-and-pencil diaries, allowing the researchers to confirm the exact time the diary was opened). This was in stark contrast with an electronic survey group who recorded a 94% compliance rate. Litt, Cooney and Morse (1998) also found that although pencil-and-paper participants reported being 81% compliant to random signals, debriefing uncovered a 70% majority who admitted to recording the correct signal time in their diary, but completed the survey some time later (see also Gable, Reis & Elliot, 2000; Green et al., 2006).

A second major concern with compliance is the extent to which surveys completed at a later point in time introduce retrospective memory biases, such as when a participant hoards multiple daily survey entries until the end of the day. ESM procedures were designed to limit memory biases by measuring attitudes and behaviors more closely in time with their actual occurrence. Delaying data input could cause participants to rely upon biases such as the peak-end rule, whereby a participant’s ratings are more influence by the most intense (i.e., peak), or most recent (i.e., end) attitude or emotion (e.g., Takarangi et al., 2006). For example, Hedges, Jandorf and Stone (1985) compared the within-day, repeated measurement of mood (measured four times daily at 9:00 a.m., 1:00, 4:00, and 7:00 p.m.), with end-of-day reports of daily mood provided at 10:00 p.m. Their results suggest the end-of-day positive and negative mood reports were significantly higher (i.e., more positive and more negative) than the within-day momentary mood reports. More importantly, end-of-day mood reports were biased toward the peak within-
day momentary mood, which was a better predictor of end-of-day mood reports than was a person’s averaged daily mood. In other words, participants based their end-of-day mood reports more heavily on the most intense, or otherwise most memorable mood throughout the day, rather than averaging their mood over the day.

Additional research suggests that individuals are particularly inaccurate in recalling mood, and that momentary mood should be measured repeatedly throughout the day. In two studies on the recalled accuracy of both the intensity and relative frequency of positive and negative mood, Thomas and Diener (1990) found that “retrospective reports of one’s emotional experiences over time tend not to be extremely accurate” (p. 295, emphasis added). In general, individuals tended to overestimate the intensity of the positive and negative emotions they experience over the course of the study, while underestimating the frequency of positive emotions. That is, recall was biased toward the most salient emotional experiences, rather than the general or average emotional experience. Other research suggests the recollection of mood may be biased toward the self-concept. For example, Feldman Barrett (1997) found that mood recollections were based in part on both, actual previous moods and personality based beliefs. That is, in a study where participants provided momentary reports of positive and negative affect three times daily for three months, mood recollections at the end of the study contained accurate ratings of the participants’ momentary positive and negative moods. However, self-reported personality biased the mood recollections, such that those who rated themselves high on extraversion (neuroticism) also overestimated their recollected positive (negative) emotional experiences (Feldman Barrett, 1997). For these reasons, every foreseeable method of reducing memory biases was put into practice. For example,
mood and attitudes were measured six times daily, with the instruction to report “How you feel right now” rather than a recollection of the average mood or attitude during the proceeding interval.

As suggested by Takarangi et al. (2006) and others (e.g., Tennen, Affleck, Coyne, Larson & DeLongis, 2006), this research supports the value of the ESM procedure in measuring a dynamic state such as mood, by reducing memory biases. The momentary assessment of mood not only allowed within-individual fluctuations in mood to be modeled (e.g., Weiss et al., 1999), but also reduced the systematic bias attributable to memory. In addition, to remove the possibility of other sources of systematic bias influencing the data, trait job attitudes and positive and negative affect were statistically controlled (i.e., Feldman Barrett, 1997). However, for the benefit of reduced memory bias to be actualized, two actions must occur. First, the researcher must acknowledge that compliance does not necessarily ensure accuracy, and second, steps must be put into place to ensure participants comply with signals to complete momentary assessments.

Beyond the use of an electronic ESM data collection, two additional methods of increasing compliant responding were used in the current research. The first was the use of a thorough training session, described next. The second method designed to increase compliance, was the use of reminder emails sent each Monday morning of the study, with a brief description of the directions and a request to complete as many measurement periods as possible. Unfortunately, these steps do not guarantee compliant responding. Therefore, the average and range of compliant responding are documented in the results, along with analyses to determine if compliance covaried with the participant’s organizational level (i.e., supervisor vs. subordinate).
Training procedures. In an attempt to increase compliance and the quality of the data collected, participants were trained on how to use their PDA as well as the PMAT interface. Training occurred during the aforementioned Friday afternoon session when Time 1 data was collected. To facilitate learning, the PDAs were programmed with an event-contingent “Training Session” that replicated the system participants used during the ESM measurement period. Using a digital video projector that allowed participants to view the primary researcher’s PDA and screen taps, the researcher visually demonstrated the system interface (e.g., scrolling, selecting responses and proceeding to the next question). Participants were instructed that future data input would occur following auditory beeps at the pre-specified intervals (i.e., 9:00, 10:00, 11:00, 2:00, 3:00, and 4:00 p.m.), which would occur daily for the next two weeks.

This practice session familiarized participants with the PMAT interface, instructions and questions, and allowed the researcher to provide corrective feedback. One indirect benefit of the training session was that by increasing participant familiarity, response times were kept to 2-4 minutes and few issues arose during the two week ESM period. Participants were also asked to not complete their surveys in the presence of their supervisor/subordinate. Based on the previous discussion of event-contingent sampling, this should reduce the likelihood of demand characteristics to answer similarly. Finally, the importance of accurate and timely ratings were explained to participants, as was the impact of missing data (i.e., the contagion hypotheses can only be tested when both supervisors and subordinates provide data).

Data management. Using PMAT to electronically collect ESM study data resulted in an extremely large amount of data which needed to be managed. Not only
were responses to each item collected, but compliance, reaction time and a number of other variables were also collected (e.g., date, time, item number). For example, the data file for a participant who completed every item on all 60 measurement occasions would contain 40,500 cells of data. The first step in managing this data was to individually download the datasets from all 41 participant’s PDAs. Each dataset was then individually cleaned and nuisance variables were deleted prior to merging the datasets (this limited each individual’s dataset to a maximum of 18,900 cells of data).

Once the datasets were merged, the data was restructured into the person-period format recommend by Singer and Willett (2003) for analyzing multilevel data (see also, Singer, 1998, 2002). This data was then merged with a dataset containing the trait-level data for each individual. However, this original dataset only allowed Hypotheses 1-5 to be tested. To test the remaining hypotheses and exploratory analyses, the data were reorganized such that the state and trait data for both dyad members (i.e., supervisor and subordinate), measured at the same time, appeared on the same line of data within the dataset.

Data analysis. Once the datasets were created, the hypotheses were tested using multilevel random coefficient modeling (MRCM) with the mixed program in SPSS (see also Singer, 2002; Singer, 1998 for using SAS PROC MIXED). Previous research (e.g., Nezlek, 2001) has set the precedent for using MRCM in the analysis of interval-contingent data. The primary benefit of these techniques, is the ability to simultaneously model relationships in nested data at both the within-subjects (i.e., Level-1) and between-subjects levels (i.e., Level-2; Singer & Willett, 2003).
The current study offers several levels of nesting, with 60 measurement occasions nested within individuals, nested within supervisor-subordinate dyads. To simultaneously model the relationships among these data, Level-1 equations modeled relationships between state-based measurements, which were collected repeatedly over time, and represent variables expected to fluctuate in value. At Level-2, trait based measures which describe the stable characteristics of an individual were included as control variables and cross-level moderators. As previously mentioned, collecting data on 60 occasions from 20 dyads (or 41 individuals) was believed to provide adequate power to test hypotheses at both the within- and between-subjects levels respectively (e.g., Hox, 2002; Maas & Hox, 2005; Raudenbush, 1997).

The current study’s hypotheses required a multilevel examination of six dependent variables: State Affective Job Satisfaction (AFFJS); State Cognitive Job Satisfaction (COGJS); State Affective Organizational Commitment (AFFOC); State Cognitive Organizational Commitment (COGOC); State Positive Affect (PA); and State Negative Affect (NA). Based on the recommendations of methodologists such as Singer and Willett (2003), each of these dependent variables was subjected to a series of unconditional means and unconditional growth models prior to testing the hypotheses. These models were used to determine the availability of unexplained variance at Level-1 and Level-2, controlling for the effects of time (i.e., unconditional means model) and by modeling interindividual variability in rates of change over time (i.e., unconditional growth model). Once the amount of within- and between-subjects variability was estimated using the unconditional means and growth models, additional Level-1 and Level-2 predictors were added to each dependent variable’s multilevel model to account
for the remaining variability. With the addition of these variables, an important consideration was the type of centering option to invoke (i.e., raw scores, group-mean or grand-mean centering). This choice influences the interpretation of both Level-1 and Level-2 parameter estimates, particularly the interpretation of intercepts, and varied depending on the hypothesis being tested (e.g., Hofmann & Gavin, 1998; Kreft, de Leeuw & Aiken, 1995).

In general, state-based Level-1 predictors were group-mean centered while trait-based Level-2 predictors were grand-mean centered. For example, testing the contagion hypotheses requires using supervisor state-based affect and attitudes to predict subordinate state-based affect and attitudes at Level-1, while trait-based moderators are added at Level-2. At Level-1, group-mean centering required removing each individual supervisor’s state-based average for each predictor, across all 60 measurement periods. The resulting interpretation of the supervisor’s state-based affect or attitude parameter estimate is the extent to which the subordinate’s state-based affect or attitude increases for every 1-unit the supervisor is above his or her personal mean. Grand-mean centering the Level-2 moderators required removing each variable’s overall average, across the full sample. The parameter estimates for these grand-mean centered variables represent the extent to which a 1-unit increase above the grand-mean in an individual’s trait-based affect, attitude or other variable, influenced the Level-1 parameter it predicts.

Hypothesis 1. As indicated earlier, tests of the first six hypotheses involve estimating parameters at the lowest level of analysis, Level-1, or the within-subjects equation. For example, Hypothesis 1 states that there will be non-zero within-subjects variability in state mood and state affective attitudes. To test this hypothesis, a series of
unconditional means models were estimated, one for each dependent variable. The
defining feature of the unconditional means model is the absence of predictors at Level-1
and Level-2. With no Level-1 or -2 predictors, means rather than change are modeled.
Equation 1.1 demonstrates the general form of this model (see Equation 1.2 for the
composite, or algebraically solved equation with fixed and random effects separated by
brackets). Equation 1.1 indicates that the observed value of the dependent variable $Y_{ij}$ for
person $i$ at occasion $j$ (i.e., StateAFFJS, StateCOGJS; StateAFFOC; StateCOGOC;
StatePA or StateNA), is best represented by a horizontal line with a value of $\beta_{0i}$. At
Level-2, the person-specific mean (i.e., $\beta_{0i}$) is predicted as a function of the grand mean
($\gamma_{00}$).

$$\begin{align*}
Y_{ij} & = \beta_{0i} + r_{ij} \\
\text{Where:} & \\
\beta_{0i} & = \gamma_{00} + u_{0i}
\end{align*}$$

(1.1)

$$Y_{ij} = [\gamma_{00}] + [u_{0i} + r_{ij}]$$

(1.2)

The observed value of $Y_{ij}$ typically deviates from both the estimated person-
specific and the grand means, and this “error” can be partitioned into within- and
between-subjects sources. The Level-1 residual or error term (i.e., $r_{ij}$) represents the
deviation between the observed $Y_{ij}$ score for person $i$ at occasion $j$, and his or her person-
specific mean across all measurement occasions (i.e., $\beta_{0i}$). At Level-1, the squared
residuals can be averaged to create a variance term representing the extent of within-
subjects error. If this variance is large, it indicates substantial fluctuations over time from an individual’s mean. The Level-2 residual or error term (i.e., \( u_{0i} \)), represents between-subjects error and is the extent to which the person-specific mean (i.e., \( \beta_{0i} \)) for person \( i \) deviates from the grand mean (i.e., \( \gamma_{00} \)). A variance constructed from these squared residuals, if it is substantial, will thus indicate that individuals tend to differ systematically from each other in their mean levels of the dependent variable. Therefore, the purpose of fitting the unconditional means model is to estimate the within- (i.e., \( \sigma^2 = \text{variance in the Level-1 residual, } r_{ij} \)) and between-subjects variance components (i.e., \( \tau_{00} = \text{variance in the Level-2 residual, } u_{0i} \)). The aim of subsequent model fitting is to predict within- or between-subjects variability through the inclusion of additional Level-1 or 2 independent variables respectively, which is warranted only if there is significant, non-zero variability at that level.

Although not directly related to hypothesis testing in the current study, Singer and Willett (2003) also recommend fitting unconditional growth models to estimate the influence of time on the dependent variables. The general two-level computational formula for the unconditional growth model appears in Equation 2.1 (see Equation 2.2 for the composite, algebraically solved model).

\[
Y_{ij} = \beta_{0i} + \beta_{1i} Time_{ij} + r_{ij}
\]

Where:
\[
\begin{align*}
\beta_{0i} &= \gamma_{00} + u_{0i} \\
\beta_{1i} &= \gamma_{10} + u_{1i}
\end{align*}
\]

\[
Y_{ij} = [\gamma_{00} + \gamma_{10} Time_{ij}] + [u_{0i} + u_{1i} Time_{ij} + r_{ij}]
\]
The unconditional growth model is marked by the inclusion of time as the only predictor at Level-1. Compared to the unconditional means model, including time as a predictor at Level-1 in the unconditional growth model alters the meaning of the remaining model parameters. For example, the formula now models the extent to which the observed dependent variable (i.e., $Y_{ij}$) for person $i$ at occasion $j$ deviates by $r_{ij}$ from his or her “true change trajectory” (Singer & Willett, 2003, p. 97), rather than the person-specific mean. Furthermore, a second Level-2 parameter ($\beta_{ii}$) is estimated, representing interindividual variability in the rate of change. Note that the Level-2 equations stipulate that an individual’s $\beta_{0i}$ and $\beta_{1i}$ are now each predicted by a population parameter. $\beta_{0i}$ is predicted by the population average initial status (i.e., $\gamma_{00}$), and $\beta_{1i}$ is predicted by the population rate of change (i.e., $\gamma_{10}$). As a direct result, the level-2 residuals ($u_{0i}$ and $u_{1i}$) now represent the proportion of unexplained Level-2 variation around initial status and rate of change, respectively. This also changes the interpretation of the variance components. The Level-1 variance component (i.e., $\sigma^2$) now summarizes the within-subjects variability around each individual’s linear change trajectory, and the Level-2 variance components (i.e., $\tau_{00}$ and $\tau_{11}$) now allow between-subjects variance to be decomposed into that attributed to variability in initial status and rate of change. Finally, these models allow the computation of a covariance parameter (i.e., $\tau_{10}$) which examines the sign and magnitude of the relationship between initial status and rate of change. For example, it is not uncommon for individuals with a higher initial status to increase at a slower rate of change.

**Model comparisons.** Once the unconditional means and growth models have been estimated, Singer and Willett (2003) recommend the computation of several pseudo
$R^2$ and goodness-of-fit statistics to facilitate model comparisons. Similar to $R^2$ in a multiple regression context, the pseudo $R^2$ statistics described below quantify the proportion of variance accounted for. However, unlike traditional multiple regression equations, the multilevel model partitions variance into both within- and between-subjects variance components (e.g., $\sigma^2$, $\tau_{00}$, $\tau_{11}$). This requires the computation of multiple pseudo $R^2$ statistics.

The first such pseudo $R^2$ statistic, $R^2_{\gamma, \delta}$, is calculated by squaring the sample correlation between the observed and predicted values of the dependent variable for each model. This value reflects the total variability in each dependent variable explained by the set of included predictors. For the unconditional growth models, this reflects the proportion of variance in each dependent variable explained by the inclusion of time (Note: $R^2_{\gamma, \delta}$ cannot be calculated for the unconditional means model as its predicted value is a constant). As successive models are estimated, significant time-varying and time-invariant predictors are retained at Level-1 and Level-2 respectively. The inclusion of these predictors reduces the proportion of unexplained or residual variance remaining at each level. The next set of pseudo $R^2$ statistics, (i.e., $R^2_r$, $R^2_0$, $R^2_1$ … $R^2_k$ where $k =$ the number of estimated parameters), quantify the extent to which this residual variance is reduced, with larger values reflecting a greater improvement in model fit (Note: Negative values indicate that variance surrounding the parameter estimate increased). For example, for the unconditional growth models, $R^2_r$ represents the proportion of within-subjects variance (i.e., $\sigma^2$) explained by the inclusion of time (i.e., the only difference between the unconditional means and unconditional growth models). For the remaining
models, $R^2$ represents the proportion of within-subjects variance explained over and above the unconditional means model, or other comparison model. The remaining $R^2$ values, one for each Level-2 variance component, compute the extent to which the residual variance in each parameter is reduced. For example, $R_0^2$ and $R_1^2$ represent the proportional reduction in variability surrounding the intercept (i.e., $\tau_{00}$) and slope estimates (i.e., $\tau_{11}$) respectively.

Goodness-of-fit statistics can also facilitate model comparisons. Deviance is the most commonly used fit statistic, and is generally preferred over single-parameter significance tests due to its statistical properties and the fact that it allows multiple parameters to be tested simultaneously (Singer & Willett, 2003). The Deviance statistic is based on sample log-likelihood (LL) calculations computed via Maximum Likelihood (ML) estimation during model fitting (see Equation 3).

$$\text{Deviance} = -2\text{LL}_{\text{current model}} \tag{3}$$

With a known distribution, the Deviance statistic facilitates model comparisons; however, its use requires two criteria be met. First, the two models under consideration must be estimated using identical data sets, and second, they must be nested models (e.g., fixing the parameters of one model functionally replicates the second). A second consideration when employing deviance statistics is the model estimation method used. More specifically, the use of full vs. restricted ML estimation alters the interpretations that can be made using the deviance statistic. Restricted ML only maximizes the model’s random effects and as a result, hypothesis tests using the deviance statistic can only be
performed on variance components. In contrast, full ML maximizes both fixed and random effects of the model, allowing the researcher to test hypotheses about any combination of fixed effects and variance components (Singer & Willett, 2003). All models presented in the current study were estimated using full ML methods, allowing both fixed and random effects to be tested.

The remaining goodness-of-fit statistics presented in the current study, the AIC and BIC, have an important benefit compared to the deviance statistic, in that they allow model comparisons without requiring the models be nested. Similar to the deviance statistic, both are based on the log-likelihood; however, each penalizes this value using different criteria. Because adding model parameters automatically improves model fit, both statistics penalize the log-likelihood based on the number of parameters in the model. The BIC additionally penalizes based on the sample size, requiring a larger improvement in fit for larger samples. However, caution is warranted in the use of the AIC and BIC criteria as clear guidelines for their interpretation are not available (Singer & Willett, 2003). In general, models with smaller values of both are preferred.

Compared to the AIC and BIC, the benefit of the deviance statistic is that it follows a known $\chi^2$ distribution, allowing researchers to statistically compare deviance statistics on nested models. For models estimated using full ML, the statistical significance of differences in model fit between nested models caused by the inclusion of a set of fixed and random effects can be calculated by comparing the change in deviance against the $\chi^2$ distribution. This value is compared against the critical value for the degrees of freedom equal to the number parameters constrained. Models with $\Delta D$ values larger than the critical value demonstrate a significant improvement in model fit, but as
with most methods, the various pieces of information should be examined together when selecting a final model.

*Hypotheses 2 & 3.* Next, Hypotheses 2 and 3 propose that state affective attitudes should have a stronger relationship with state mood than will state cognitive attitudes, resulting in the state affective attitudes possessing greater variability. These hypotheses were tested by regressing each attitudinal variable (i.e., State AFFJS, COGJS, AFFOC, COGOC) on the combined effects of State PA and NA at Level-1. To determine if the expected pattern of relationships between affectively-oriented attitudes and State PA and NA exists, parameter estimates, the total variance accounted for and within-subjects variance estimates were examined. In general, no method of statistically testing differences in these indices exists; instead, the relative magnitudes of each index from various equations were compared.

*Hypotheses 4 & 5.* Hypothesis 4 and 5 argued that State PA and NA will predict state affective job satisfaction and organizational commitment above and beyond the effects of trait affect and attitudes. To test these hypotheses, separate equations were tested in which an individual’s State PA and NA were used to predict their state affective job satisfaction and organizational commitment at Level-1. Trait level attitudes and Trait PA and NA were included as Level-2 intercept predictors to control for their influence.

*Hypothesis 6.* The final Level 1 hypothesis, Hypothesis 6, tested for contagion effects by using supervisor mood and affective job attitudes to predict identical subordinate mood and attitudes. Additionally, a quadratic (e.g., state PA^2; recoded –2 - +2) term for each mood and affective job attitude was modeled to determine if the strength of supervisor’s mood or attitude influences the contagion process. Finally, the
effect of time lags on the contagion process were also tested. One set of models predicted subordinate mood and affective attitudes using supervisor mood and affective attitudes measured at the same time. The second set of models used supervisor mood and affective attitudes to predict subordinate mood and affective attitudes measured at a time lag of one measurement period. Hypothesis 6 and the remaining model tests required the use of the second dataset, which paired supervisor and subordinate state and trait data.

**Hypotheses 7-10; Exploratory Analyses 1-3.** The final set of hypotheses (H7 – H10) and exploratory analyses (EA1-EA3) tested the extent to which the hypothesized variables (e.g., supervisor emotional expressiveness and subordinate emotional contagion susceptibility) moderate the relationships described in the previous analyses. In each analysis, the hypothesized moderator was included in the Level-2 equation. That is, the cross-level interactions of these variables were tested for the extent to which they moderated the Level-1 intercept and slope parameters. Additional exploratory analyses were also conducted in the Level-1 equations. These tested the extent to which other variables, such as the amount of time spent in close proximity moderate the relationship between supervisor and subordinate affect and attitudes.

**Results**

In the current study, a pencil-and-paper survey was used to collect trait-based information during a short training session, then over the course of a two week ESM period, state-based information was collected via PDAs. These data were primarily analyzed with MRCM techniques whereby state-based affect and attitudes were predicted using some combination of other state-based and trait-based measures. The trait-based measures, such as trait cognitive job satisfaction and supervisor emotional
expressiveness, typically served as control or moderator variables in the analyses. The nature of these multilevel analyses supersedes basic descriptive statistics; however, a brief overview of descriptive statistics is warranted.

**Descriptive Statistics**

As can be seen in Table 13, participants were primarily middle-aged (Age: $M = 44.30$) white (Race: $M = 0.95$; coded 1 = Caucasian, 0 = Other) men (Gender: $M = 0.56$; coded 1 = Male, 0 = Female) who worked in the corporate business unit (Business Unit: $M = 0.59$; coded 1 = Corporate, 0 = Other). Overall, participants were employed by the organization an average of 15.07 years, while the average supervisor-subordinate dyad had worked together for 32.75 months (approximately 2.7 years). Because social interaction is a necessary precondition for emotional contagion to occur, the percentage of each measurement period spent interacting and the occurrence of interactions immediately before survey completion are potentially important state-based control variables. The results indicate that supervisor-subordinate dyads spent little time interacting during each measurement period ($M = 9.36\%$ of each hour long measurement period; approximately 5.6 minutes) and interacted during the five minutes prior to completing the survey less than 25% of the time ($M = 0.22$). Finally, although subordinates consistently reported lower state- and trait-based affect and attitude levels (see Table 13), only Trait COGOC demonstrated a marginally significant difference between the supervisor and subordinate samples, with supervisors reporting slightly higher trait-based cognitive organizational commitment levels. A lack of significant differences between the supervisor and subordinate samples verifies the appropriateness of testing the first five hypotheses with a combined sample.
Table 13  
Descriptive Statistics – Means and Standard Deviations for the Combined, Supervisor and Subordinate Samples

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Combined Mean (SD)</th>
<th>Supervisor Mean (SD)</th>
<th>Subordinate Mean (SD)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of Surveys Completed</td>
<td>45.76 (10.24)</td>
<td>45.30 (10.94)</td>
<td>46.19 (9.78)</td>
<td>-0.275</td>
</tr>
<tr>
<td>2. Age</td>
<td>44.30 (8.66)</td>
<td>46.47 (5.91)</td>
<td>42.33 (10.31)</td>
<td>1.54</td>
</tr>
<tr>
<td>3. Gender</td>
<td>0.56 (0.50)</td>
<td>0.65 (0.49)</td>
<td>0.48 (0.51)</td>
<td>1.11</td>
</tr>
<tr>
<td>4. Race</td>
<td>0.95 (0.22)</td>
<td>0.95 (0.22)</td>
<td>0.95 (0.22)</td>
<td>-0.04</td>
</tr>
<tr>
<td>5. Business Unit</td>
<td>0.59 (0.50)</td>
<td>0.60 (0.50)</td>
<td>0.57 (0.51)</td>
<td>0.18</td>
</tr>
<tr>
<td>6. Organizational Tenure (Years)</td>
<td>15.07 (12.40)</td>
<td>17.93 (12.96)</td>
<td>12.36 (11.50)</td>
<td>1.46</td>
</tr>
<tr>
<td>7. Tenure with Supervisor (Months)a</td>
<td>NA</td>
<td>32.75 (51.33)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>8. Number Supervised</td>
<td>NA</td>
<td>6.00 (3.49)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>State-based Affect &amp; Attitudes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. State AFFJS</td>
<td>5.04 (0.99)</td>
<td>5.14 (0.82)</td>
<td>4.95 (1.14)</td>
<td>0.63</td>
</tr>
<tr>
<td>10. State COGJS</td>
<td>5.21 (0.96)</td>
<td>5.34 (0.74)</td>
<td>5.08 (1.13)</td>
<td>0.86</td>
</tr>
<tr>
<td>11. State AFFOC</td>
<td>5.02 (1.45)</td>
<td>5.08 (1.38)</td>
<td>4.96 (1.55)</td>
<td>0.26</td>
</tr>
<tr>
<td>12. State COGOC</td>
<td>4.78 (1.32)</td>
<td>4.92 (0.98)</td>
<td>4.64 (1.59)</td>
<td>0.68</td>
</tr>
<tr>
<td>13. State PA</td>
<td>3.38 (0.77)</td>
<td>3.56 (0.62)</td>
<td>3.21 (0.88)</td>
<td>1.46</td>
</tr>
<tr>
<td>14. State NA</td>
<td>1.20 (0.25)</td>
<td>1.21 (0.22)</td>
<td>1.19 (0.28)</td>
<td>0.24</td>
</tr>
<tr>
<td>Trait-based Affect &amp; Attitudes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Trait AFFJS</td>
<td>5.63 (0.94)</td>
<td>5.68 (0.50)</td>
<td>5.59 (1.24)</td>
<td>0.32</td>
</tr>
<tr>
<td>16. Trait COGJS</td>
<td>5.54 (0.78)</td>
<td>5.60 (0.54)</td>
<td>5.49 (0.98)</td>
<td>0.44</td>
</tr>
<tr>
<td>17. Trait AFFOC</td>
<td>5.75 (1.25)</td>
<td>5.93 (1.06)</td>
<td>5.57 (1.42)</td>
<td>0.92</td>
</tr>
<tr>
<td>18. Trait COGOC</td>
<td>5.33 (1.12)</td>
<td>5.65 (0.95)</td>
<td>5.03 (1.21)</td>
<td>1.82†</td>
</tr>
<tr>
<td>19. Trait PA</td>
<td>3.85 (0.61)</td>
<td>3.98 (0.48)</td>
<td>3.73 (0.71)</td>
<td>1.30</td>
</tr>
<tr>
<td>20. Trait NA</td>
<td>1.54 (0.48)</td>
<td>1.55 (0.37)</td>
<td>1.54 (0.58)</td>
<td>0.08</td>
</tr>
</tbody>
</table>
Table 13 (Cont.)
Descriptive Statistics – Means and Standard Deviations for the Combined, Supervisor and Subordinate Samples

<table>
<thead>
<tr>
<th>Moderator Variables</th>
<th>Combined Mean (SD)</th>
<th>Supervisor Mean (SD)</th>
<th>Subordinate Mean (SD)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>21. Emotional Expressiveness</td>
<td>NA</td>
<td>4.45 (0.57)</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>22. Emotional Contagion Susceptibility</td>
<td>NA</td>
<td>NA</td>
<td>2.74 (0.32)</td>
<td>NA</td>
</tr>
<tr>
<td>23. Supervisor Liking</td>
<td>NA</td>
<td>NA</td>
<td>6.05 (1.36)</td>
<td>NA</td>
</tr>
<tr>
<td>24. Interpersonal Power</td>
<td>NA</td>
<td>NA</td>
<td>4.02 (0.42)</td>
<td>NA</td>
</tr>
<tr>
<td>25. Independent WSC</td>
<td>NA</td>
<td>NA</td>
<td>3.30 (0.71)</td>
<td>NA</td>
</tr>
<tr>
<td>26. Relational WSC</td>
<td>NA</td>
<td>NA</td>
<td>4.47 (0.33)</td>
<td>NA</td>
</tr>
<tr>
<td>27. Collective WSC</td>
<td>NA</td>
<td>NA</td>
<td>4.17 (0.48)</td>
<td>NA</td>
</tr>
<tr>
<td>28. LMX</td>
<td>NA</td>
<td>NA</td>
<td>3.97 (0.76)</td>
<td>NA</td>
</tr>
<tr>
<td>Interaction Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. % of measurement period interacting with Supervisor</td>
<td>NA</td>
<td>NA</td>
<td>9.36 (6.43)</td>
<td>NA</td>
</tr>
<tr>
<td>30. Interacted with Supervisor in last 5 minutes (Y/N)</td>
<td>NA</td>
<td>NA</td>
<td>0.22 (0.13)</td>
<td>NA</td>
</tr>
</tbody>
</table>

* Listed in the supervisor column because data was provided by supervisors

Note. Demographic codes: Race (1 = Caucasian, 0 = Other); Gender (1 = Male, 0 = Female); Business Unit (1 = Corporate, 0 = Other).

Note. Variables were measured using the following scales: 4-point Likert (Emotional Contagion Susceptibility); 5-point Likert (State and Trait PA/NA, Interpersonal Power, WSC, LMX); 7-point Likert (State and Trait Attitudes, Emotional Expressiveness, Supervisor Liking)
Next, simple bivariate correlations indicate that few demographic variables had significant relationships with the focal variables (see Appendix Z). A few notable exclusions include age, which demonstrated significant positive correlations with State PA \( (r = .50, p < .01) \) and with Trait COGJS \( (r = .41, p < .01) \). Participants who had worked for the employing organization longer also demonstrated stronger levels of Trait AFFOC \( (r = .42, p < .01) \). In general, the state- and trait-based affective and attitudinal variables demonstrated an expected pattern of relationships. For example, State AFFJS demonstrated a stronger correlation with State COGJS \( (r = .88, p < .01) \) than the remaining state-based variables, while State AFFOC was most highly correlated with its cognitive counterpart (State COGOC; \( r = .86, p < .01 \)), and State PA and NA were independent \( (r = -.09, p > .05) \).

The intercorrelations between state- and trait-based affect and attitudes were also as expected, with state- and trait-based versions of the same affect or attitude generally demonstrating the highest correlations (e.g., State AFFJS with Trait AFFJS). Both state- and trait-based versions of the affective and attitudinal variables also demonstrated a number of intercorrelations with the remaining variables. For example, supervisor liking and LMX both demonstrated significant positive correlations with the majority of the state- and trait-based versions of all four attitudes. Finally, of the two supervisor-subordinate interaction indices, a greater incidence of interacting with the supervisor in the five minutes preceding survey completion was related to lower State \( (r = -.51, p < .05) \) and Trait COGJS \( (r = -.55, p < .05) \), but also related to a stronger Relational WSC \( (r = .45, p < .05) \). This last correlation suggests that subordinates who value their
relationships with others were more likely to have interacted with their supervisor prior to completing the survey.

**Participant Compliance**

According to Stone and Shiffman (2002), participant compliance is one of the seven major considerations a researcher must make when conducting an ESM study. Also, recall that PDAs were selected as the data collection medium in part, due to their ability to electronically verify the exact time data were recorded. The strong response rate data for supervisors and subordinates, as well as anecdotal evidence, suggests that participants were highly interested in the Primary Study and eager to respond. For example, in a personal communication with the primary researcher, one participant confided to completing a survey while in the dentist chair. Still more participants completed surveys while working from home during a massive winter storm that blanketed the region in snow. This is even after being notified by the primary researcher that responding under those circumstances was optional.

Statistical evidence also indicates a strong response rate among the participants. For example, the full sample of supervisors and subordinates \( N = 41 \) demonstrated a response rate of approximately 76% across the 60 measurement occasions (see Table 14). For Hypothesis 1-5, this translates into a total of 1,876 within-subjects observations (i.e., completed surveys), divided among 41 between-subjects observations (i.e., individuals). More importantly, both dyad members concomitantly reported state-based data over 60% of the time \( (M = 36.80 \text{ paired surveys per dyad}; \text{Note: Dyad 11 was removed due to a redundant supervisor}) \). This is extremely important, as paired supervisor-subordinate state-based affect and attitude ratings made during the same measurement period are
necessary to statistically model the emotional contagion mechanism (i.e., 736 within- and 20 between-subjects observations are available for testing Hypotheses 6-10 and Exploratory Analyses 1-3). Interestingly, the correlations in Appendix Z also suggest that the number of surveys a participant completed was related to a few of the remaining variables. Men were less likely to complete the surveys ($r = -.32, p < .05$), while those with stronger cognitive job attitudes (State COGJS: $r = .37, p < .05$; Trait COGJS: $r = .36, p < .05$; Trait COGOC: $r = .43, p < .01$), supervisor liking ($r = .60, p < .01$) and LMX ($r = .58, p < .01$) were all more likely to complete the surveys.

Having identified, confirmed and paired supervisor and subordinate data collected during the same measurement period, the data affords testing the emotional contagion mechanism’s existence (i.e., Hypothesis 6) and its potential moderators (i.e., Hypotheses 7-10; Exploratory Analyses 1-3). However, prior to testing these hypotheses, a number of prerequisites must be tested (i.e., Hypotheses 1-5). These hypotheses examine the nature and location of variability in the focal variables, and the extent to which these variables are related in a Multilevel Random Coefficient Modeling (MRCM) framework.
Table 14
Number of Completed Surveys per Dyad (out of 60 possible surveys); Completed Surveys for each Individual Subordinate, Supervisor, and the number of Paired Surveys

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Subordinate</th>
<th>Supervisor</th>
<th>Paired Surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56</td>
<td>56</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>59</td>
<td>47</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>49</td>
<td>53</td>
<td>44</td>
</tr>
<tr>
<td>5</td>
<td>47</td>
<td>31</td>
<td>28</td>
</tr>
<tr>
<td>6</td>
<td>57</td>
<td>51</td>
<td>49</td>
</tr>
<tr>
<td>7</td>
<td>52</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>8</td>
<td>39</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>9</td>
<td>43</td>
<td>41</td>
<td>33</td>
</tr>
<tr>
<td>10</td>
<td>58</td>
<td>58</td>
<td>56</td>
</tr>
<tr>
<td>11</td>
<td>54</td>
<td>NA</td>
<td>52</td>
</tr>
<tr>
<td>12</td>
<td>45</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>13</td>
<td>40</td>
<td>34</td>
<td>27</td>
</tr>
<tr>
<td>14</td>
<td>35</td>
<td>39</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>25</td>
<td>30</td>
<td>14</td>
</tr>
<tr>
<td>16</td>
<td>45</td>
<td>51</td>
<td>42</td>
</tr>
<tr>
<td>17</td>
<td>45</td>
<td>59</td>
<td>45</td>
</tr>
<tr>
<td>18</td>
<td>45</td>
<td>60</td>
<td>45</td>
</tr>
<tr>
<td>19</td>
<td>59</td>
<td>60</td>
<td>59</td>
</tr>
<tr>
<td>20</td>
<td>41</td>
<td>42</td>
<td>30</td>
</tr>
<tr>
<td>21</td>
<td>26</td>
<td>39</td>
<td>18</td>
</tr>
</tbody>
</table>

**Full Sample**

<table>
<thead>
<tr>
<th>Total</th>
<th>Subordinate</th>
<th>Supervisor</th>
<th>Paired Surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>970</td>
<td>906</td>
<td>788</td>
<td></td>
</tr>
<tr>
<td>% of Surveys</td>
<td>Completed</td>
<td>76.98%</td>
<td>75.5%</td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>46.19 (9.78)</td>
<td>45.30 (10.94)</td>
</tr>
</tbody>
</table>

**Dropping Dyad 11**

<table>
<thead>
<tr>
<th>Total</th>
<th>Subordinate</th>
<th>Supervisor</th>
<th>Paired Surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>916</td>
<td>906</td>
<td>736</td>
<td></td>
</tr>
<tr>
<td>% of Surveys</td>
<td>Completed</td>
<td>76.33%</td>
<td>75.5%</td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>45.80 (9.87)</td>
<td>45.30 (10.94)</td>
</tr>
</tbody>
</table>

---

* Dyad 10 and 11 share a supervisor; his/her data were not counted twice.
Note. Hypotheses 1-5: N = 41 individuals (i.e., the subordinate in dyad 11 was included). Hypotheses 6-10, Exploratory Analyses 1-3: N = 20 dyads (i.e., dyad 11 was dropped entirely).
**Hypothesis 1**

Singer and Willett (2003) recommend first testing the *unconditional means* and *unconditional growth models* when conducting a series of MRCM models. The unconditional means model is the most basic multilevel model and partitions total outcome variance into that attributable to between- and within-subjects sources, ignoring the effects of time. The unconditional growth model extends this by additionally modeling the effects of time, thereby specifically testing for interindividual variability in rates of change. These two models serve an important purpose. They quantify the extent to which meaningful variability exists in the dependent variable(s), determine whether that variability is between or within-subjects, and provide an important baseline for comparing subsequent models. In the current study, estimating these models provides information relevant to Hypothesis 1. Recall that Hypothesis 1 states:

$H_1$: Both supervisors and subordinates will demonstrate non-zero within-subjects variability in: (a) state mood (PA and NA); (b) state affective job satisfaction; and (c) state affective organizational commitment. That is, mood, job satisfaction and organizational commitment will fluctuate within the work day, and over time.

*Unconditional means models.* This hypothesis was first tested by estimating an unconditional means models for each dependent variable. Based on the nonsignificant differences in Table 13, no differentiation was made between supervisors and subordinates, resulting in a larger number of between-subject units (i.e., 41 participants), with up to 60 observations per participant. Table 15 depicts the results of fitting these unconditional means models.
Table 15
Model 1.1 - Unconditional Means Models for the Combined Sample; Coefficients and Variance Components

<table>
<thead>
<tr>
<th>Model (No. / DV)</th>
<th>Coefficient (95%CI)</th>
<th>Variance Components (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.1) State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS&lt;sub&gt;ij&lt;/sub&gt; = β&lt;sub&gt;0i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;0i&lt;/sub&gt; = γ&lt;sub&gt;00&lt;/sub&gt; + u&lt;sub&gt;0i&lt;/sub&gt;</td>
<td>5.042** (4.735 - 5.350)</td>
<td>.942** (1.608 – 1.459)</td>
</tr>
<tr>
<td>L1: StateCOGJS&lt;sub&gt;ij&lt;/sub&gt; = β&lt;sub&gt;0i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;0i&lt;/sub&gt; = γ&lt;sub&gt;00&lt;/sub&gt; + u&lt;sub&gt;0i&lt;/sub&gt;</td>
<td>5.206** (4.908 - 5.504)</td>
<td>.888** (.575 – 1.372)</td>
</tr>
<tr>
<td>(1.1) State Affective Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOC&lt;sub&gt;ij&lt;/sub&gt; = β&lt;sub&gt;0i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;0i&lt;/sub&gt; = γ&lt;sub&gt;00&lt;/sub&gt; + u&lt;sub&gt;0i&lt;/sub&gt;</td>
<td>4.779** (4.368 - 5.191)</td>
<td>1.699** (1.101 – 2.622)</td>
</tr>
<tr>
<td>(1.1) State Positive Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StatePA&lt;sub&gt;ij&lt;/sub&gt; = β&lt;sub&gt;0i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;0i&lt;/sub&gt; = γ&lt;sub&gt;00&lt;/sub&gt; + u&lt;sub&gt;0i&lt;/sub&gt;</td>
<td>3.381** (3.140 - 3.623)</td>
<td>.581** (.375 - .898)</td>
</tr>
<tr>
<td>(1.1) State Negative Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateNA&lt;sub&gt;ij&lt;/sub&gt; = β&lt;sub&gt;0i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;0i&lt;/sub&gt; = γ&lt;sub&gt;00&lt;/sub&gt; + u&lt;sub&gt;0i&lt;/sub&gt;</td>
<td>1.204** (1.126 - 1.282)</td>
<td>.060** (.039 - .093)</td>
</tr>
</tbody>
</table>

Note: State AFFJS, COGJS, AFFOC and COGOC had a 7-point response format; State PA and NA had a 5-point response format.

Note: 95% CI = 95% Confidence Interval; L1 = level-1; L2 = level-2; γ<sub>00</sub> = intercept of level-2 model predicting β<sub>0i</sub>; σ<sup>2</sup> = within-subjects variance in level-1 residual (i.e., variance in r<sub>ij</sub>); τ<sub>00</sub> = between-subjects variance in level-2 residual for models predicting β<sub>0i</sub> (i.e., variance in u<sub>0i</sub>).  
* p < .05.  **p < .01.
Fitting this series of unconditional means models yields an estimated grand mean (i.e., $\gamma_{00}$) for each dependent variable. For example, State Affective Job Satisfaction has an estimated grand mean of 5.04 ($p < .01$; Note: these values are identical to the means listed in Table 13 for the combined sample). The significance test (or CI) for this parameter estimate simply indicates whether $\gamma_{00}$ deviates significantly from zero. Since these models were estimated with the DVs in their raw metric (i.e., a 1-5 or 1-7 response scale), zero is an impossible value and the statistical significance of $\gamma_{00}$ is not of great interest here.

What is of interest, are the significant within- (i.e., Level-1, or $\sigma^2$) and between-subjects (i.e., Level-2, or $\tau_{00}$) variance components for all six state-based dependent variables. Significant within-subjects variability (i.e., $\sigma^2$) for each dependent variable indicates that individuals fluctuated over time and directly supports H1(a), (b) and (c). Just as important, the significant within- and between-subjects variance components imply that in subsequent models, independent variables may be added to predict variability at both levels. That is, in an attempt to account for a significant portion of this variance, additional time-varying (i.e., state-based) variables can be added to the prediction of each dependent variable at Level-1, and time-invariant (i.e., trait-based) variables can be added at Level-2. For example, to account for a portion of State AFFJS’ significant within-subjects variance (i.e., $\sigma^2 = .422, p < .01$), state-based variables (e.g., $\beta_{ij}StateX_{ij}$, where ‘X’ can be replaced with any state-based variable) can be added to the Level-1 equation. The significant between-subjects variance (i.e., $\tau_{00} = .942, p < .01$) surrounding the State AFFJS intercept estimate, indicates that additional trait-based
variables can be added to the Level-2 model predicting $\beta_{0i}$ (e.g., $\gamma_{0i} TraitX_i$, where ‘X’ can be replaced with any trait-based variable). As subsequent models are fit, the significance of these variance components indicates where additional variables may be added to the model predicting each dependent variable.

The variance components from each unconditional means model can also be used to compute the intraclass correlation coefficient (ICC). The ICC is an index of the proportion of total outcome variance that is attributable to between-subjects effects, and can be estimated using Equation 4.

$$ICC = \frac{\tau_{00}}{\left(\tau_{00} + \sigma^2\right)} \tag{4}$$

Table 16 depicts the computed ICC for each dependent variable. These results suggest that the majority of the variability in each dependent variable, from 58.8 to 91.4%, is located at the between-subjects level of analysis. This was especially evident in both commitment variables. With the majority of DV variability at the between-subjects level, these ICCs conceptually indicate that momentary levels of each dependent variable were more consistent within an individual participant, than they were across participants. Another way of conceptualizing this is that participants were more similar to themselves over time, than they were with other participants at any particular time-period.
Table 16
Model 1.1 - Unconditional Means Models for the Combined Sample: Intraclass Correlation Coefficients

<table>
<thead>
<tr>
<th>Model Model</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1.1) State Affective Job Satisfaction</td>
<td>.691</td>
</tr>
<tr>
<td>(1.1) State Cognitive Job Satisfaction</td>
<td>.823</td>
</tr>
<tr>
<td>(1.1) State Affective Organizational Commitment</td>
<td>.914</td>
</tr>
<tr>
<td>(1.1) State Cognitive Organizational Commitment</td>
<td>.899</td>
</tr>
<tr>
<td>(1.1) State Positive Affect</td>
<td>.768</td>
</tr>
<tr>
<td>(1.1) State Negative Affect</td>
<td>.588</td>
</tr>
</tbody>
</table>

Unconditional growth models. Although not directly related to testing the current study’s hypotheses, Singer and Willett (2003) recommend fitting an unconditional growth model as the second step in building the multilevel model for change. The unconditional growth model supplements the unconditional means model as a baseline comparison by quantifying the extent to which time influences the dependent variable(s) of interest. In the present study, two methods of conceptualizing time exist. State-level data were collected from participants six times a day for two workweeks. This suggests the construction of two separate unconditional growth models for each dependent variable, one modeling day of the week effects, and a second modeling time of day effects. Note that additional time variables exist in the current study. For example, the cumulative number of completed surveys (i.e., 1-60) could function as a third time marker; however, this method has less conceptual appeal for two reasons. First, it collapses time across both day of the week and time of day, and potentially confounds both as several dyads started on different days of the week. Second, the available
literature supports daily and weekly fluctuations in mood and attitudes (e.g., Larsen & Kasimatis, 1990; Stone et al., 1996).

The unconditional growth model is marked by the inclusion of time as the only predictor at Level-1, which in the current study, will be replaced by either a day of the week or a time of day variable. To facilitate the interpretation of these variables, both time indices were centered to create a meaningful intercept (e.g., Kreft, de Leeuw & Aiken, 1995; Hofmann & Gavin, 1998). More specifically, in Model 1.2A a centered day of the week variable (i.e., CentDay) was created such that Monday was at the intercept (i.e., Monday = 0, Friday = 4). In Model 1.2B, a centered time of day variable (i.e., CentTime) was created such that the start of the workday (i.e., 8:00 a.m.) was at the intercept (e.g., 9:00 a.m. = 1; 4:00 p.m. = 8).

Tables 17 – 19 summarize the results of the unconditional growth models; however, these were not the only models estimated. Multiple time-based models not reported here were examined for each dependent variable. These models included an examination of CentDay and CentTime as factors (in an ANOVA framework), as well as their combined effects, interactions and quadratic effects. In general, these more complex models offered no additional information (i.e., non-significant parameter estimates), failed to converge, or resulted in out of bounds parameter estimates (e.g., a negative variance component).
Table 17
Models 1.2A & 1.2B - Unconditional Growth Models for the Combined Sample: Effects of Centered Day of Week and Centered Time of Day on State Job Satisfaction

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients (95%CI)</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₀₁</td>
</tr>
<tr>
<td>State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS(_j) = β₀ + β₁CentDay(_ij) + r(_ij)</td>
<td>5.023** (4.709 - 5.337)</td>
<td></td>
</tr>
<tr>
<td>(1.2A) L2: β₀ = γ₀₀ + u₀ (_i)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β₁ = γ₀₁ + u₁ (_i)</td>
<td>.009 (-.026 -.044)</td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS(_j) = β₀ + β₁CentTime(_ij) + r(_ij)</td>
<td></td>
<td>.410**</td>
</tr>
<tr>
<td>(1.2B) L2: β₀ = γ₀₀ + u₀ (_i)</td>
<td>5.065** (4.751 - 5.379)</td>
<td></td>
</tr>
<tr>
<td>L2: β₁ = γ₀₁ + u₁ (_i)</td>
<td>-.005 (-.023 -.012)</td>
<td></td>
</tr>
<tr>
<td>State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGJS(_j) = β₀ + β₁CentDay(_ij) + r(_ij)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.2A) L2: β₀ = γ₀₀ + u₀ (_i)</td>
<td>5.177** (4.890 - 5.464)</td>
<td></td>
</tr>
<tr>
<td>L2: β₁ = γ₀₁ + u₁ (_i)</td>
<td>.014 (-.011 -.039)</td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGJS(_j) = β₀ + β₁CentTime(_ij) + r(_ij)</td>
<td></td>
<td>.190**</td>
</tr>
<tr>
<td>(1.2B) L2: β₀ = γ₀₀ + u₀ (_i)</td>
<td>5.207** (4.915 - 5.499)</td>
<td></td>
</tr>
<tr>
<td>L2: β₁ = γ₀₁ + u₁ (_i)</td>
<td>&lt;.001 (-.008 -.008)</td>
<td></td>
</tr>
</tbody>
</table>

Note: 95%CI = 95% Confidence Interval; L1 = Level-1; L2 = Level-2; CentDay = Day of week centered so that Monday = 0; CentTime = Time of day centered so that 8:00 a.m. = 0; γ₀₀ = intercept of Level-2 model predicting β₀; γ₀₁ = intercept of Level-2 model predicting β₁; σ² = within-subjects variance in Level-1 residual (i.e., variance in r\(_ij\)); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ (i.e., variance in u₀\(_i\)); τ₁₁ = variance in Level-2 residual for models predicting β₁ (i.e., variance in u₁\(_i\)).

Note: Variance components (i.e., σ², τ₀₀, τ₁₁) are listed on the diagonal; τ₀₁, the estimated covariance between τ₀₀ and τ₁₁, is listed off the diagonal. †p < .10. *p < .05. **p < .01
Table 18
Models 1.2A & 1.2B - Unconditional Growth Models for the Combined Sample: Effects of Centered Day of Week and Centered Time of Day on State Organizational Commitment

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients (95%CI)</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₀₁</td>
</tr>
<tr>
<td>State Affective Organizational Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOCᵢⱼ = β₀ᵢ + β₁ᵢ CentDayᵢⱼ + rᵢⱼ</td>
<td></td>
<td>.185**</td>
</tr>
<tr>
<td>(1.2A) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>5.051** (4.610 – 5.492)</td>
<td>1.943**</td>
</tr>
<tr>
<td>L2: β₁ᵢ = γ₁₀ + u₁ᵢ</td>
<td>-.017 (-.042 - .008)</td>
<td>.022</td>
</tr>
<tr>
<td>L1: StateAFFOCᵢⱼ = β₀ᵢ + β₁ᵢ CentTimeᵢⱼ + rᵢⱼ</td>
<td></td>
<td>.190**</td>
</tr>
<tr>
<td>(1.2B) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>5.042** (4.598 – 5.486)</td>
<td>1.967**</td>
</tr>
<tr>
<td>L2: β₁ᵢ = γ₁₀ + u₁ᵢ</td>
<td>-.005 (-.016 - .005)</td>
<td>.008</td>
</tr>
<tr>
<td>State Cognitive Organizational Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGOCᵢⱼ = β₀ᵢ + β₁ᵢ CentDayᵢⱼ + rᵢⱼ</td>
<td></td>
<td>.182**</td>
</tr>
<tr>
<td>(1.2A) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>4.795** (4.400 – 5.191)</td>
<td>1.561**</td>
</tr>
<tr>
<td>L2: β₁ᵢ = γ₁₀ + u₁ᵢ</td>
<td>-.007 (-.033 - .018)</td>
<td>.029†</td>
</tr>
<tr>
<td>L1: StateCOGOCᵢⱼ = β₀ᵢ + β₁ᵢ CentTimeᵢⱼ + rᵢⱼ</td>
<td></td>
<td>.187**</td>
</tr>
<tr>
<td>(1.2B) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>4.761** (4.357 – 5.166)</td>
<td>1.626**</td>
</tr>
<tr>
<td>L2: β₁ᵢ = γ₁₀ + u₁ᵢ</td>
<td>.004 (-.007 - .015)</td>
<td>.007</td>
</tr>
</tbody>
</table>

Note: 95%CI = 95% Confidence Interval; L1 = Level-1; L2 = Level-2; CentDay = Day of week centered so that Monday = 0; CentTime = Time of day centered so that 8:00a.m. = 0; γ₀ᵢ = intercept of Level-2 model predicting β₀ᵢ; γ₁₀ = intercept of Level-2 model predicting β₁ᵢ; σ² = within-subjects variance in Level-1 residual (i.e., variance in rᵢⱼ); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ᵢ (i.e., variance in u₀ᵢ); τ₁₁ = variance in Level-2 residual for models predicting β₁ᵢ (i.e., variance in u₁ᵢ).

Notes: Variance components (i.e., σ², τ₀₀, τ₁₁) are listed on the diagonal; τ₀₁, the estimated covariance between τ₀₀ and τ₁₁ is listed off the diagonal. †p < .10; *p < .05; **p < .01
Table 19
Models 1.2A & 1.2B - Unconditional Growth Models for the Combined Sample: Effects of Centered Day of Week and Centered Time of Day on State Affect

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients (95%CI)</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₀₁</td>
</tr>
<tr>
<td>State Positive Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StatePAᵢⱼ = β₀ᵢ + βᵢCentDayᵢⱼ + rᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.2A) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>3.404** (3.172 - 3.637)</td>
<td>.166**</td>
</tr>
<tr>
<td>L2: βᵢ = γ₁₀ + u₁ᵢ</td>
<td>- .009 (- .036 - .017)</td>
<td>.532**</td>
</tr>
<tr>
<td>L1: StatePAᵢⱼ = β₀ᵢ + βᵢCentTimeᵢⱼ + rᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.2B) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>3.447** (3.204 - 3.690)</td>
<td>.168**</td>
</tr>
<tr>
<td>L2: βᵢ = γ₁₀ + u₁ᵢ</td>
<td>- .015* (- .027 - .003)</td>
<td>579**</td>
</tr>
<tr>
<td>State Negative Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateNAᵢⱼ = βᵢ + βᵢCentDayᵢⱼ + rᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.2A) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>1.236** (1.147 - 1.325)</td>
<td>.041**</td>
</tr>
<tr>
<td>L2: βᵢ = γ₁₀ + u₁ᵢ</td>
<td>- .016** (- .026 - .007)</td>
<td>.076**</td>
</tr>
<tr>
<td>L1: StateNAᵢⱼ = β₀ᵢ + βᵢCentTimeᵢⱼ + rᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1.2B) L2: β₀ᵢ = γ₀₀ + u₀ᵢ</td>
<td>1.227** (1.131 - 1.322)</td>
<td>.040**</td>
</tr>
<tr>
<td>L2: βᵢ = γ₁₀ + u₁ᵢ</td>
<td>- .005 (- .011 - .001)</td>
<td>.088**</td>
</tr>
</tbody>
</table>

Note: 95%CI = 95% Confidence Interval; L1 = Level-1; L2 = Level-2; CentDay = Day of week centered so that Monday = 0; CentTime = Time of day centered so that 8:00a.m. = 0; γ₀₀ = intercept of Level-2 model predicting β₀ᵢ; γ₁₀ = intercept of Level-2 model predicting β₁ᵢ; σ² = within-subjects variance in Level-1 residual (i.e., variance in rᵢⱼ); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ᵢ (i.e., variance in u₀ᵢ); τ₁₁ = variance in Level-2 residual for models predicting β₁ᵢ (i.e., variance in u₁ᵢ).

Note: Variance components (i.e., σ², τ₀₀, τ₁₁) are listed on the diagonal; τ₀₁, the estimated covariance between τ₀₀ and τ₁₁ is listed off the diagonal.

†p < .10.  *p < .05.  **p < .01
As the tested models share a number of similarities, it is not necessary to explain the specifics of each model; however, it is important to understand the interpretation of these models. Singer and Willett (2003) differentiate between two types of predictors: question predictors and control predictors. The current study is primarily concerned with the extent to which supervisor mood and attitudes predict similar mood and attitudinal variables in subordinates. Therefore, the ‘question’ variables focus on the measurement of mood and attitudes. As no hypotheses directly examine the influence of time, it’s desirable to either control for, or remove time’s effects on the dependent variables. The results presented in Tables 17 – 19 facilitate this decision.

Specifically, fitting a multilevel random coefficient model provides two essential pieces of information about the magnitudes of model parameters: estimated fixed effects and variance components. In addition, significance tests for the fixed effects (e.g., $\gamma_{00}, \gamma_{10}$) are used to identify which variables to retain as more complex models are estimated. Non-significant predictors can be removed, allowing a researcher to trim the multilevel model. The significance of the variance components (e.g., $\sigma^2, \tau_{00}, \tau_{11}$) also identifies the location (i.e., Level-1 or Level-2) of remaining variance that additional predictors could explain. In practice, these pieces of information facilitate model building by informing the researcher which variables to retain, and the level(s) at which additional predictor variables could be included to account for remaining variance.

An examination of the fixed effects for both time variables suggests that none of the attitudinal variables (i.e., State AFFJS, COGJS, AFFOC or COGOC) demonstrated a significant linear effect for either the time of day or day of the week (see Table 17 and 18). That is, the average slope coefficient across subjects (i.e., $\gamma_{10s}$), for time of day and
day of week effects were not statistically significant. Therefore, the linear effects of time can be removed from the prediction of these dependent variables, simplifying further model estimation and interpretation. Furthermore, although significant Level-1 and 2 variance components would generally permit the inclusion of additional within- and between-subjects predictors, the absence of significant linear effects of time in these analyses negates these results. For the attitudinal variables, there was also little indication of covariation between initial status and rate of change (i.e. $\tau_{10}$; see State COGOC Model 1.2A for a marginally significant exception, where those with a higher initial status on COGOC decreased over the work week at a slightly faster pace).

In contrast to the nonsignificant effects of time on the attitudinal variables, both State PA and NA demonstrated systematic variability over time (i.e., significant $\gamma_{10s}$). More specifically, State PA demonstrated a significant negative linear trend across the workday (Model 1.2B; $\gamma_{10} = -.015, p < .05$), such that the average State PA slightly decreased over the course of the workday. In a similar pattern, State NA demonstrated a significant negative linear trend across the workweek (Model 1.2A; $\gamma_{10} = -.016, p < .01$), such that State NA was the highest on Monday, decreasing from Monday to Friday. Therefore, future models will need to control for the effects of time on state-based measures of mood. This will be accomplished by residualizing both affective dependent variables on the appropriate time variable.

Furthermore, all four models predicting the state-based mood variables demonstrated significant within- and between-subjects variance components (e.g., $\sigma^2$, $\tau_{00}$, $\tau_{11}$), permitting the inclusion of additional time-invariant and time-varying predictors. Finally, it is interesting to note that for State NA, both models demonstrated a significant
covariance component ($\tau_{10} = -.004, p < .01$). For the significant CentDay variable, this suggests that the rate at which State NA decreased over the course of the workweek depended on each individual participant’s initial level of State NA on Monday, such that participants with a higher initial status on State NA decreased at a slower rate over the course of the workweek.

Model Comparisons

Recall that Singer and Willett (2003) recommend the computation of pseudo $R^2$ and goodness-of-fit statistics to facilitate the interpretation and comparison of the estimated models. Tables 20 (AFFJS), 21 (COGJS), 22 (AFFOC), 23 (COGOC), 24 (PA), and 25 (NA) summarize the results of these computations for each estimated model. For example, Table 20 confirms that the inclusion of CentDay and CentTime in the unconditional growth models added little to the prediction of State AFFJS. Both models (i.e., Model 1.2A and Model 1.2B) fail to account for more than 0.1% of the total variance in State AFFJS (Model 1.2A: $R^2_{y} = .0007$; Model 1.2B: $R^2_{y} = .0008$), and only reduce within-subjects variance by 3-4% (Model 1.2A: $R^2_{r} = .0379$; Model 1.2B: $R^2_{r} = .0284$). Additionally, the inclusion of time in both models reduced the amount of between-subjects intercept variance accounted for (Model 1.2A: $R^2_{0} = -.0223$; Model 1.2B: $R^2_{0} = -.0106$).

Compared to the unconditional means model, the inclusion of time as a Level-1 predictor in both unconditional growth models (i.e., CentDay and CentTime) required the calculation of three additional parameter and variance/covariance terms. When constrained, both time effects models are nested within the unconditional means model, and the statistically significant improvement in model fit compared to the unconditional
means model can be calculated using the deviance statistic. With 3 degrees of freedom, the critical $\chi^2$ value is 7.81 ($p < .05$; or 11.34, $p < .01$). In Table 20, both models surpass the critical value, suggesting a significant improvement in total model fit. This is supported by lower AICs for both models, and a lower BIC for Model 1.2A; however, Model 1.2B demonstrates a slight elevation in the BIC statistic, suggesting the inclusion of CentTime actually decreased model fit. Although adding time as a Level-1 predictor was supported by the goodness-of-fit indices, the pseudo $R^2$ and nonsignificant parameter estimates for both time-based variables suggest that time can be eliminated from future models predicting State AFFJS.
Table 20  
State Affective Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics Across Models used to Test Hypotheses 1-3

<table>
<thead>
<tr>
<th>Model 1.1</th>
<th>Model 1.2A</th>
<th>Model 1.2B</th>
<th>Model 2&amp;3A</th>
<th>Model 2&amp;3B</th>
<th>Model 2&amp;3C</th>
<th>Model 2&amp;3D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconditional Means</td>
<td>Unconditional Growth (CentDay)</td>
<td>Unconditional Growth (CentTime)</td>
<td>State Affect</td>
<td>Lagged State Affect</td>
<td>Residualized State Affect</td>
<td>Lagged Residualized State Affect</td>
</tr>
<tr>
<td>$R^2_{\gamma,\delta}$</td>
<td>.0007$^a$</td>
<td>.0008$^a$</td>
<td>.0600$^a$</td>
<td>.0586$^a$</td>
<td>.0484$^a$</td>
<td>.0557$^a$</td>
</tr>
<tr>
<td>$R^2_r$</td>
<td>.0379$^a$</td>
<td>.0284$^a$</td>
<td>.3531$^a$</td>
<td>.4147$^a$ / .0952$^b$</td>
<td>.2915$^a$</td>
<td>.3626$^a$ / .1003$^b$</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>-.0223$^a$</td>
<td>-.0106$^a$</td>
<td>-.0021$^a$</td>
<td>-.0117$^a$ / -.0095$^b$</td>
<td>.0425$^a$</td>
<td>.0042$^a$ / -.0399$^c$</td>
</tr>
<tr>
<td>$R^2_1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Deviance (-2LL) 3907.73 3875.66 3885.70 3231.69 2251.79 3094.38 2155.78
AIC 3913.73 3887.66 3897.70 3251.69 2281.79 3114.38 2185.78
BIC 3930.35 3920.90 3930.94 3307.06 2359.90 3168.77 2262.38
No. of parameters 3 6 6 10 15 10 15

Note. $R^2_{\gamma,\delta}$ = Proportion of total DV variability explained; $R^2_r$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained; $R^2_2$ = Proportion of between-subjects slope/IV2 variance (i.e., $\tau_{22}$) explained.

$^a$ compared to Model 1

$^b$ compared to Model 2&3A

$^c$ compared to Model 2&3C
### Table 21
State Cognitive Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics Across Models used to Test Hypotheses 1-3

<table>
<thead>
<tr>
<th></th>
<th>Model 1.1</th>
<th>Model 1.2A</th>
<th>Model 1.2B</th>
<th>Model 2&amp;3A</th>
<th>Model 2&amp;3B</th>
<th>Model 2&amp;3C</th>
<th>Model 2&amp;3D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unconditional Means</td>
<td>Unconditional Growth (CentDay)</td>
<td>Unconditional Growth (CentTime)</td>
<td>State Affect</td>
<td>Lagged State Affect</td>
<td>Residualized State Affect</td>
<td>Lagged Residualized State Affect</td>
</tr>
<tr>
<td>$R_{y,\delta}^2$</td>
<td>.0017(^a)</td>
<td>&lt;.0000(^a,,d)</td>
<td>.0177(^a)</td>
<td>.0177(^a)</td>
<td>.0144(^a)</td>
<td>.0193(^a)</td>
<td></td>
</tr>
<tr>
<td>$R_r^2$</td>
<td>.0471(^a)</td>
<td>.0052(^a)</td>
<td>.1990(^a)</td>
<td>.2670(^b) / .0850(^b)</td>
<td>.1361(^a)</td>
<td>.2094(^b) / .0848(^c)</td>
<td></td>
</tr>
<tr>
<td>$R_{00}^2$</td>
<td>.0800(^a)</td>
<td>.0529(^a)</td>
<td>.0011(^a)</td>
<td>-.0090(^b) / -.0101(^b)</td>
<td>.0372(^a)</td>
<td>.0304(^b) / -.0070(^c)</td>
<td></td>
</tr>
<tr>
<td>$R_{11}^2$</td>
<td></td>
<td></td>
<td></td>
<td>.1500(^b)</td>
<td></td>
<td>.1818(^c)</td>
<td></td>
</tr>
<tr>
<td>$R_{22}^2$</td>
<td></td>
<td></td>
<td></td>
<td>-.1541(^b)</td>
<td></td>
<td>-.3636(^c)</td>
<td></td>
</tr>
</tbody>
</table>

Deviance (-2LL) 2438.99 2394.35 2437.18 2119.09 1500.12 2066.55 1453.21
AIC 2444.99 2406.35 2449.18 2139.09 1530.12 2086.55 1483.21
BIC 2461.61 2439.58 2482.42 2194.47 1608.24 2140.94 1559.82
No. of parameters 3 6 6 10 15 10 15

Note. $R_{y,\delta}^2 = $ Proportion of total DV variability explained; $R_r^2 = $ Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R_{00}^2 = $ Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R_{11}^2 = $ Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained; $R_{22}^2 = $ Proportion of between-subjects slope/IV2 variance (i.e., $\tau_{22}$) explained.

\(^a\) compared to Model 1
\(^b\) compared to Model 2&3A
\(^c\) compared to Model 2&3C
\(^d\) Value cannot be computed
Table 22
State Affective Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics Across Models used to Test Hypotheses 1-3

<table>
<thead>
<tr>
<th></th>
<th>Model 1.1</th>
<th>Model 1.2A</th>
<th>Model 1.2B</th>
<th>Model 2&amp;3A</th>
<th>Model 2&amp;3B</th>
<th>Model 2&amp;3C</th>
<th>Model 2&amp;3D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unconditional Means</td>
<td>Unconditional Growth (CentDay)</td>
<td>Unconditional Growth (CentTime)</td>
<td>State Affect</td>
<td>Lagged State Affect</td>
<td>Residualized State Affect</td>
<td>Lagged Residualized State Affect</td>
</tr>
<tr>
<td>$R^2_{y,y}$</td>
<td>.0000&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0001&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0086&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0128&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0055&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0102&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>$R_r^2$</td>
<td>.0464&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0206&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.2216&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.2835&lt;sup&gt;a&lt;/sup&gt; / .0795&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.1804&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.2474&lt;sup&gt;a&lt;/sup&gt; / .0818&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>$R_0^2$</td>
<td>.0517&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.0400&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.0010&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.0161&lt;sup&gt;a&lt;/sup&gt; / -.0151&lt;sup&gt;b&lt;/sup&gt;</td>
<td>-.0713&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.0820&lt;sup&gt;a&lt;/sup&gt; / -.0100&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>$R_1^2$</td>
<td>.3333&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.3200&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>$R_2^2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Deviance (-2LL) 2501.72 2459.52 2489.48 2134.90 1510.33 2050.47 1423.54
AIC 2507.72 2471.52 2501.48 2154.90 1540.33 2070.47 1453.54
BIC 2524.34 2504.76 2534.71 2210.27 1618.44 2124.86 1530.15
No. of parameters 3 6 6 10 15 10 15

Note. $R^2_{y,y}$ = Proportion of total DV variability explained; $R_r^2$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R_0^2$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R_1^2$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained; $R_2^2$ = Proportion of between-subjects slope/IV2 variance (i.e., $\tau_{22}$) explained.

<sup>a</sup> Failed to converge
<sup>b</sup> compared to Model 1
<sup>c</sup> compared to Model 2&3A
<sup>c</sup> compared to Model 2&3C
## Table 23
State Cognitive Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics Across Models used to Test Hypotheses 1-3

<table>
<thead>
<tr>
<th>Model 1.1</th>
<th>Model 1.2A</th>
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<tr>
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<td>Unconditional Growth (CentTime)</td>
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<td>Lagged State Affect</td>
<td>Residualized State Affect</td>
<td>Lagged Residualized State Affect</td>
</tr>
<tr>
<td>$R^2_{y,\hat{y}}$</td>
<td>.0000 $^a$</td>
<td>.0000 $^a$</td>
<td>.0104 $^a$</td>
<td>.0123 $^a$</td>
<td>.0062 $^a$</td>
<td>.0092 $^a$</td>
</tr>
<tr>
<td>$R^2_r$</td>
<td>.0471 $^a$</td>
<td>.0209 $^a$</td>
<td>.2199 $^a$</td>
<td>.2984 $^a$ / .1007 $^b$</td>
<td>.1623 $^a$</td>
<td>.2827 $^a$ / .1437 $^c$</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>.0812 $^a$</td>
<td>.0430 $^a$</td>
<td>-.0006 $^a$</td>
<td>-.0188 $^a$ / -.0182 $^b$</td>
<td>-.0594 $^a$</td>
<td>-.0006 $^a$ / .0556 $^c$</td>
</tr>
<tr>
<td>$R^2_1$</td>
<td></td>
<td></td>
<td></td>
<td>.2000 $^b$</td>
<td></td>
<td>.2941 $^c$</td>
</tr>
<tr>
<td>$R^2_2$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Deviance (-2LL) 2468.00 2419.27 2454.96 2098.56 1424.55 2054.56 1455.04
AIC 2474.00 2431.27 2466.96 2118.56 1444.55 2074.56 1475.04
BIC 2490.62 2464.50 2500.19 2173.93 1496.62 2128.95 1527.06
No. of parameters 3 6 6 10 10 10 10

Note. $R^2_{y,\hat{y}}$ = Proportion of total DV variability explained; $R^2_r$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained; $R^2_2$ = Proportion of between-subjects slope/IV2 variance (i.e., $\tau_{22}$) explained.

$^a$ Failed to converge
$^b$ compared to Model 1
$^c$ compared to Model 2&3A
$^d$ compared to Model 2&3C
$^e$ cannot be computed
### Table 24
State Positive Affect: Pseudo R² and Goodness-of-fit Statistics Across Models used to Test Hypotheses 1-3

<table>
<thead>
<tr>
<th></th>
<th>Model 1.1 Unconditional Means</th>
<th>Model 1.2A Unconditional Growth (CentDay)</th>
<th>Model 1.2B Unconditional Growth (CentTime)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R^2_{\gamma,\hat{\gamma}} )</td>
<td>0.0011</td>
<td>0.0037</td>
<td></td>
</tr>
<tr>
<td>( R^2_r )</td>
<td>0.0568</td>
<td>0.0455</td>
<td></td>
</tr>
<tr>
<td>( R^2_0 )</td>
<td>0.0843</td>
<td>0.0034</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>2273.91</td>
<td>2212.78</td>
<td>2224.07</td>
</tr>
<tr>
<td>AIC</td>
<td>2279.91</td>
<td>2224.78</td>
<td>2236.07</td>
</tr>
<tr>
<td>BIC</td>
<td>2296.52</td>
<td>2258.01</td>
<td>2269.30</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. \( R^2_{\gamma,\hat{\gamma}} \) = Proportion of total DV variability explained; \( R^2_r \) = Proportion of within-subjects variance (i.e., \( \sigma^2 \)) explained; \( R^2_0 \) = Proportion of between-subjects intercept variance (i.e., \( \tau_{00} \)) explained.

### Table 25
State Negative Affect: Pseudo R² and Goodness-of-fit Statistics Across Models used to Test Hypotheses 1-3

<table>
<thead>
<tr>
<th></th>
<th>Model 1.1 Unconditional Means</th>
<th>Model 1.2A Unconditional Growth (CentDay)</th>
<th>Model 1.2B Unconditional Growth (CentTime)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( R^2_{\gamma,\hat{\gamma}} )</td>
<td>0.0041</td>
<td>0.0004</td>
<td></td>
</tr>
<tr>
<td>( R^2_r )</td>
<td>0.0238</td>
<td>0.0476</td>
<td></td>
</tr>
<tr>
<td>( R^2_0 )</td>
<td>-0.2667</td>
<td>-0.4667</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>-449.96</td>
<td>-495.13</td>
<td>-500.44</td>
</tr>
<tr>
<td>AIC</td>
<td>-443.96</td>
<td>-483.13</td>
<td>-488.44</td>
</tr>
<tr>
<td>BIC</td>
<td>-427.35</td>
<td>-449.90</td>
<td>-455.22</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

Note. \( R^2_{\gamma,\hat{\gamma}} \) = Proportion of total DV variability explained; \( R^2_r \) = Proportion of within-subjects variance (i.e., \( \sigma^2 \)) explained; \( R^2_0 \) = Proportion of between-subjects intercept variance (i.e., \( \tau_{00} \)) explained.
The absence of significant parameter estimates for either CentDay or CentTime for the three remaining attitudinal variables (i.e., State COGJS, AFFOC, COGOC) implies a similar conclusion to remove the effects of time on these variables. Furthermore, excluding time from each attitudinal variable’s model simplifies further data analyses, as future analyses position the attitudinal variables as dependent variables. However, a brief examination of the pseudo $R^2$ and goodness-of-fit statistics is warranted. For example, Table 21 supports the decision to remove CentDay and CentTime from the prediction of State COGJS. In addition to nonsignificant parameter estimates (see Table 17), the inclusion of both time related variables also resulted in less than 0.20% of the total COGJS variability being accounted for. However, CentDay in Model 1.2A accounted for a slight improvement in the within-subjects COGJS variance, an improvement in the between-subjects intercept variance accounted for ($R_0^2 = .0800$), and an improvement in the deviance statistic ($\Delta D_3 = 44.64, p < .01$). However, the inclusion of CentTime in Model 1.2B demonstrated much weaker effects ($\Delta D_3 = 1.81, p > .05$).

Similarly, the decision was made to remove CentDay and CentTime from the prediction of both organizational commitment variables due to nonsignificant parameter estimates (see Table 18). This conclusion is generally supported by the pseudo $R^2$ and goodness-of-fit indices in Table 22 and 23. Most importantly, less than 0.01% of the total AFFOC and COGOC variability was accounted for in all four models when including time at Level-1. However, the $R^2$ and $R_0^2$ statistic for each model suggests moderate improvements in the within- and between-subjects intercept variance accounted for. Interestingly, both dependent variables demonstrate a pattern of deviance statistics which suggest improved model fit with the inclusion of the time variables (AFFOC:
Model 1.2A, $\Delta D_3 = 42.2, p < .01$; Model 1.2B, $\Delta D_3 = 12.24, p < .01$ (COGOC: Model 1.2A, $\Delta D_3 = 48.73, p < .01$; Model 1.2B, $\Delta D_3 = 13.04, p < .01$). For both commitment variables, the AIC confirms the improvement in model fit; however, Model 1.2B for both variables demonstrates an increase in the BIC statistic when CentTime is included, indicating poorer model fit when considering the number of parameters and participants included in model fitting.

Together, this evidence suggests the appropriateness of removing time of day and day of week effects on the attitudinal variables. However, the parameter estimates for the time-based variables were significant when predicting State PA and NA. Specifically, State PA demonstrated a significant linear effect for the time of day in Model 1.2B. Table 24 demonstrates that little total variance in State PA is accounted for (Model 1.2A: $R^2_{y,y} = .0011$; Model 1.2B: $R^2_{y,y} = .0037$), but that a more substantial proportion of within-subjects variance is accounted for (Model 1.2A: $R^2_r = .0568$; Model 1.2B: $R^2_r = .0455$). What is interesting about these results is that CentTime in Model 1.2B accounts for a larger proportion of total variance, but less within-subjects and between-subjects intercept variance than CentDay does in Model 1.2A. Furthermore, all three goodness-of-fit indices for Model 1.2B demonstrate an improvement in model fit ($\Delta D_3 = 49.84, p < .01$), supporting the need to control for the effects of CentTime on State PA in future models.

State NA demonstrates a similar pattern of relationships in Table 25, but for the effects of its significant linear effect, CentDay. Here, a larger amount of total variance was accounted for when CentDay was included in Model 1.2A, but less within-subjects and between-subjects intercept variance. Furthermore, all three goodness-of-fit statistics
confirmed the superiority of the Model 1.2A over the unconditional means model ($\Delta D_3 = 45.17, p < .01$). Combined with the significant slope estimate for CentDay in Model 1.2A, these results confirm the need to control for day of the week effects on State NA.

*Hypotheses 2 & 3*

Due to time’s effects on State PA and NA, multiple models must be fit when testing Hypothesis 2 thru 5. This reflects the fact that State PA and NA become time-varying, Level-1 predictors of the attitudinal variables. For example, Hypotheses 2 and 3 argue that:

**H_2:**
(a) State affective job satisfaction will demonstrate a stronger relationship with state mood than will state cognitive job satisfaction. (b) Due to the demonstrated variability in mood, this will result in greater variability in state affective than state cognitive job satisfaction.

**H_3:**
(a) State affective organizational commitment will demonstrate a stronger relationship with state mood than will state cognitive organizational commitment. (b) Due to the demonstrated variability in mood, this will result in greater variability in state affective than state cognitive organizational commitment.

To test these hypotheses, a series of models were fit regressing each state-based attitudinal variable (i.e., State AFFJS, COGJS, AFFOC, and COGOC) on the combined effects of State PA and NA at Level-1. Equation 5.1 demonstrates the general form of the models fit when testing Hypotheses 2 and 3 (see Equation 5.2 for the algebraically solved equation). In these analyses, each attitudinal variable (i.e., $Y_{ij}$) is predicted as the outcome of an intercept and the combined linear effects of the affective variables. Also,
recall that when conducting multilevel modeling, a researcher has three scaling options, raw scores, group-mean centered scores and grand-mean centered scores (Hofmann & Gavin, 1998; Kreft, de Leeuw & Aiken, 1995). In the current set of analyses, State PA and NA were group-centered on each individual participant’s mean. That is, the mean State PA and NA score for each individual participant, across the 60 measurement occasions, was subtracted from each of his or her individual observations (i.e., GrpCentStatePA and GrpCentStateNA). Group-mean centering these variables simplifies model interpretations. For example, the coefficient representing initial status on each attitudinal variable (i.e., $\gamma_{00}$), now represents the individual’s level of that attitude when his or her State PA and NA levels are at his or her respective means.

\[
Y_{ij} = \beta_{0i} + \beta_{1i}(\text{GrpCentStatePA}_{ij}) + \beta_{2i}(\text{GrpCentStateNA}_{ij}) + r_{ij}
\]

Where:
\[
\beta_{0i} = \gamma_{00} + u_{0i}
\]
\[
\beta_{1i} = \gamma_{10} + u_{1i}
\]
\[
\beta_{2i} = \gamma_{20} + u_{2i}
\]

\[
Y_{ij} = \left[\gamma_{00} + \gamma_{10}(\text{GrpCentStatePA}_{ij}) + \gamma_{20}(\text{GrpCentStateNA}_{ij})\right] + \left[u_{0i} + u_{1i}(\text{GrpCentStatePA}_{ij}) + u_{2i}(\text{GrpCentStateNA}_{ij}) + r_{ij}\right]
\]

Initial attempts to fit these models can be found in Table 26, where each attitude’s model is labeled “2&3A.” In general, three consistent patterns emerge across the attitudinal variables. First, deviance, AIC and BIC statistics indicate that all four models fit the data significantly better than the unconditional means models (see fit indices in
Tables 20, 21, 22, 23; State AFFJS, $\Delta D_7 = 676.04, p < .01$; COGJS, $\Delta D_7 = 319.90, p < .01$; AFFOC, $\Delta D_7 = 366.82, p < .01$; COGOC, $\Delta D_7 = 369.44, p < .01$). Second, for each dependent variable, all three Level-2 parameter estimates were significant (i.e., average initial status ($\gamma_{00}$) and the rates of change for State PA ($\gamma_{10}$) and State NA ($\gamma_{20}$)), and demonstrated a similar pattern (see Table 26). That is, State PA demonstrated a significant positive effect, and State NA demonstrated a significant negative effect on state-levels of the affectively and cognitively oriented job satisfaction and organizational commitment DVs (note that State NA was only a marginally significant negative predictor of COGOC). For example, the grand mean for State AFFJS across time and individuals is 5.042 when State PA and NA are at each individuals’ mean. A 1-unit increase in State PA from an individual’s mean results in a .404-unit increase in State AFFJS, controlling for the effects of State NA. Likewise, a 1-unit increase in State NA above an individual’s mean results in a .910-unit decrease in his or her level of State AFFJS, controlling for the effects of State PA.

A third consideration is that the within-subjects and three between-subjects variance components were significant in all four models predicting state attitude levels. Combined, this information suggests that State PA and NA are significantly related to, and predict state-based levels of each job attitude, and should be retained in models predicting these variables. However, as significant within- and between-subjects variance remains in all four models, additional predictors can be included at each level. This issue will be addressed shortly.
Table 26
Model 2&3A – Effects of Concomitantly Measured State Affect on State Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients (95%CI)</th>
<th>Variance &amp; Covariance Components (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₁₀</td>
</tr>
<tr>
<td>(2&amp;3A) State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS = β₀ + β₁GrpCentStatePA + β₂GrpCentStateNA + r_j</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β₀ = γ₀₀ + u₀_i</td>
<td>5.042**</td>
<td>(.26 -.29)</td>
</tr>
<tr>
<td></td>
<td>(4.73 - 5.35)</td>
<td></td>
</tr>
<tr>
<td>L2: β₁ = γ₁₀ + u₁_i</td>
<td>.404**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.25 -.56)</td>
<td></td>
</tr>
<tr>
<td>L2: β₂ = γ₂₀ + u₂_i</td>
<td>-910**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-1.40 -.42)</td>
<td></td>
</tr>
<tr>
<td>(2&amp;3A) State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGJS = β₀ + β₁GrpCentStatePA + β₂GrpCentStateNA + r_j</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β₀ = γ₀₀ + u₀_i</td>
<td>5.206**</td>
<td>(.14 -.16)</td>
</tr>
<tr>
<td></td>
<td>(4.91 - 5.50)</td>
<td></td>
</tr>
<tr>
<td>L2: β₁ = γ₁₀ + u₁_i</td>
<td>.256**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.16 -.35)</td>
<td></td>
</tr>
<tr>
<td>L2: β₂ = γ₂₀ + u₂_i</td>
<td>-389**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-.62 -.16)</td>
<td></td>
</tr>
</tbody>
</table>

Note: 95%CI = 95% Confidence Interval; L1 = Level-1; L2 = Level-2; γ₀₀ = intercept of Level-2 model predicting β₀; γ₁₀ = intercept of Level-2 model predicting β₁; γ₂₀ = intercept of Level-2 model predicting β₂; σ² = within-subjects variance in Level-1 residual (i.e., variance in r_j); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ (i.e., variance in u₀_i); τ₁₁ = variance in Level-2 residual for models predicting β₁ (i.e., variance in u₁_i); τ₂₂ = variance in Level-2 residual for models predicting β₂ (i.e., variance in u₂_i).

Note: Variance components (i.e., σ², τ₀₀, τ₁₁, τ₂₂) are listed on the diagonal; τ₀₁, τ₀₂, and τ₁₂, the estimated covariances between τ₀₀, τ₁₁ and τ₂₂ are listed off the diagonal.

†p < .10. * p < .05. **p < .01
<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients (95%CI)</th>
<th>Variance &amp; Covariance Components (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(2&amp;3A) State Affective Org. Commitment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOC = ( \beta_0 + \beta_1 \text{GrpCentStatePA}_j + \beta_2 \text{GrpCentStateNA}_j + \epsilon_j )</td>
<td>( \gamma_{00} )</td>
<td>( \gamma_{10} )</td>
</tr>
<tr>
<td>L2: ( \beta_0 = \gamma_{00} + u_0 )</td>
<td>5.018**</td>
<td></td>
</tr>
<tr>
<td>L2: ( \beta_1 = \gamma_{10} + u_1 )</td>
<td></td>
<td>.252**</td>
</tr>
<tr>
<td>L2: ( \beta_2 = \gamma_{20} + u_2 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(2&amp;3A) State Cognitive Org. Commitment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGOC = ( \beta_0 + \beta_1 \text{GrpCentStatePA}_j + \beta_2 \text{GrpCentStateNA}_j + \epsilon_j )</td>
<td>( \gamma_{00} )</td>
<td>( \gamma_{10} )</td>
</tr>
<tr>
<td>L2: ( \beta_0 = \gamma_{00} + u_0 )</td>
<td>4.780**</td>
<td></td>
</tr>
<tr>
<td>L2: ( \beta_1 = \gamma_{10} + u_1 )</td>
<td></td>
<td>.226**</td>
</tr>
<tr>
<td>L2: ( \beta_2 = \gamma_{20} + u_2 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** 95%CI = 95% Confidence Interval; L1 = Level-1; L2 = Level-2; \( \gamma_{00} \) = intercept of Level-2 model predicting \( \beta_0 \); \( \gamma_{10} \) = intercept of Level-2 model predicting \( \beta_1 \); \( \gamma_{20} \) = intercept of Level-2 model predicting \( \beta_2 \); \( \sigma^2 \) = within-subjects variance in Level-1 residual (i.e., variance in \( \epsilon_j \)); \( \tau_{00} \) = between-subjects variance in Level-2 residual for models predicting \( \beta_0 \) (i.e., variance in \( u_0 \)); \( \tau_{11} \) = variance in Level-2 residual for models predicting \( \beta_1 \) (i.e., variance in \( u_1 \)); \( \tau_{22} \) = variance in Level-2 residual for models predicting \( \beta_2 \) (i.e., variance in \( u_2 \)).

**Note:** Variance components (i.e., \( \sigma^2 \), \( \tau_{00} \), \( \tau_{11} \), \( \tau_{22} \)) are listed on the diagonal; \( \tau_{01} \), \( \tau_{02} \), and \( \tau_{12} \), the estimated covariances between \( \tau_{00} \), \( \tau_{11} \) and \( \tau_{22} \) are listed off the diagonal.

† \( p < .10 \). * \( p < .05 \). ** \( p < .01 \)
More pertinent is the extent to which these results support Hypothesis 2 and 3. For example, Hypothesis 2(a) and 3(a) argue that the affectively-oriented attitudes (i.e., State AFFJS, AFFOC) will demonstrate a stronger relationship with State PA and NA than will the cognitively-oriented attitudes (i.e., State COGJS, COGOC). Support for these hypotheses can come from three sources. First, the combined effects of adding State PA and NA to the multilevel models predicting the job attitudes will account for a greater amount of the affectively oriented attitudes’ total variance (i.e., $R_y^2$). Second, the addition of State PA and NA will result in a greater decrease in the within-subjects variance (i.e., $R_r^2$) for the affectively oriented job attitudes. Finally, the actual parameter estimates (i.e., $\gamma_{10}$ and $\gamma_{20}$) for State PA and NA will likely demonstrate stronger relationships for the affectively oriented job attitudes. Unfortunately, significance tests for these hypotheses cannot be directly estimated, and the pattern of relationships across the three sources of information must be assessed instead.

In general, the evidence supporting job satisfaction’s Hypothesis 2(a) is stronger than that supporting organizational commitment’s Hypothesis 3(a). Specifically, a comparison of the pseudo $R^2$ values in Table 20 and 21 indicates that for job satisfaction, the inclusion of State PA and NA in the multilevel model accounts for both a greater proportion of total and within-subjects State AFFJS variance ($R_{y\delta}^2 = .0600$, $R_r^2 = .3531$) than State COGJS variance ($R_{y\delta}^2 = .0177$, $R_r^2 = .1990$). This clearly supports Hypothesis 2(a). Additional, albeit weaker, support for Hypothesis 2(a) comes from Table 26. Although overlapping confidence intervals indicate the differences are not significant, the pattern of parameter estimates for State PA and NA across the two job satisfaction
models also supports Hypothesis 2(a). More specifically, both State PA ($\gamma_{10} = .404$ vs. $\gamma_{10} = .256$) and State NA ($\gamma_{20} = -.910$ vs. $\gamma_{20} = -.389$) demonstrate stronger effects in the prediction of State AFFJS than State COGJS respectively.

Hypothesis 3(a), proposing an analogous effect of State PA and NA on organizational commitment received weaker support (see Table 22 and 23). Specifically, the inclusion of State PA and NA as Level-1 predictors resulted in a greater proportion of the total State COGOC variance ($R^2_{\gamma_{10}} = .0104$) than State AFFOC variance ($R^2_{\gamma_{10}} = .0086$) being accounted for. This directly contradicts Hypothesis 3(a). Second, if State AFFOC was more strongly related to state affect, one should expect the addition of State PA and NA to the multilevel model to result in a greater proportion of State AFFOC than State COGOC within-subjects variance being accounted for. While this pattern was observed, differences in the amount of within-subjects variance accounted for were quite small (State AFFOC: $R^2 = .2216$; State COGOC: $R^2 = .2199$). Finally, an examination of the actual parameter estimates in Table 26 indicates that State AFFOC demonstrated a stronger relationship with state affect (State PA: $\gamma_{10} = .252$ vs. $\gamma_{10} = .226$; State NA: $\gamma_{20} = -.203$ vs. $\gamma_{20} = -.184$ for State AFFOC and State COGOC respectively); however, overlapping confidence intervals suggest these differences were not significant.

These results directly influence the tests of Hypotheses 2(b) and 3(b), which argue that the expected stronger relationship between the affectively oriented attitudes (i.e., State AFFJS and AFFOC) and State PA and NA will be related to greater within-subjects variability in State AFFJS and AFFOC. The within-subjects variance components (i.e., $\sigma^2$) from the unconditional means models in Table 15 directly address these hypotheses.
First, the available evidence supports Hypothesis 2(b) for job satisfaction. Specifically, the 95% confidence intervals for the estimated within-subjects variance components fail to overlap between State AFFJS and COGJS. State AFFJS has a significantly larger within-subjects variance component ($\sigma^2 = .422, p < .01; 95\% \text{ CI} = .396 - .451$), than State COGJS ($\sigma^2 = .191, p < .01; 95\% \text{ CI} = .179 - .203$). This is in contrast with evidence that fails to support Hypothesis 3(b) for organizational commitment. From their unconditional means models, it is evident that State AFFOC ($\sigma^2 = .194, p < .01; 95\% \text{ CI} = .182 - .207$) and COGOC ($\sigma^2 = .191, p < .01; 95\% \text{ CI} = .179 - .204$) have nearly identical levels of within-subjects variance. Furthermore, the overlap between their confidence intervals indicates that the differences are non-significant, disconfirming Hypothesis 3(b). When combined, the results of Hypotheses 2 and 3 indicate that for job satisfaction only, an affectively oriented attitude measure (i.e., State AFFJS) demonstrated stronger relationships with concomitantly measured State PA and NA than a cognitively oriented attitude (i.e., State COGJS). Furthermore, there is evidence that this affect-affectively oriented attitude relationship was related to greater within-subjects, moment-by-moment, variability in the affectively oriented attitude.

Next, although Hypothesis 3 was not supported for organizational commitment, both job satisfaction and organizational commitment demonstrated significant within- and between-subjects variance components in Model 2&3A (see Table 26), suggesting that additional Level-1 and Level-2 predictors can be added to the model in Equation 5.1. Hypotheses 4 and 5 directly address the addition of time invariant Level-2 predictors; therefore, time varying Level-1 predictors will be addressed here. This was accomplished by examining alternative conceptualizations of State PA and NA. First, the
potential carryover or residual effects of State PA and NA on these job attitudes were tested using State PA and NA from an earlier time period in the day to predict satisfaction or commitment at a later period (e.g., Judge & Ilies, 2004). Second, given the previous demonstration that both State PA and NA are cyclically varying, time dependent predictors, models were tested controlling for the effect of time on these predictors.

The first set of analyses examined the influence of time-lagged State PA and NA. These analyses were conducted by predicting each job attitude using a combination of concomitantly measured State PA and NA, identical to Model 2&3A, and adding time-lagged versions of State PA and NA collected during the previous measurement occasion. For example, State AFFJS measured at 10:00 a.m. was predicted using the combination of State PA and NA measured at 10:00 a.m., and time-lagged versions of these variables measured at 9:00 a.m. (i.e., Lag1GrpCentStatePA, Lag1GrpCentStateNA). In effect, these models examine the autocorrelation among successive state affect measurements, and the extent to which State PA and NA have carryover or residual effects on levels of the job attitudes.

Results of fitting these multilevel models, labeled Model 2&3B, can be found in Table 27, along with their goodness-of-fit and pseudo $R^2$ values in Tables 20, 21, 22, and 23. A number of conclusions can be made based on these results. First, Model 2&3B for each attitudinal variable fits significantly better than Model 1, its unconditional means model ((a) State AFFJS, $\Delta D_{12} = 1655.94, p < .01$; (b) COGJS, $\Delta D_{12} = 938.87, p < .01$; (c) AFFOC, $\Delta D_{12} = 991.39, p < .01$; (d) COGOC, $\Delta D_{12} = 1043.45, p < .01$). Model 2&3B also fit significantly better than each attitude’s Model 2&3A ((a) State AFFJS, $\Delta D_5 = 979.90, p < .01$; (b) COGJS, $\Delta D_5 = 618.97, p < .01$; (c) AFFOC, $\Delta D_5 = 624.57, p < .01$; (d) COGOC, $\Delta D_5 = 653.31, p < .01$).
(d) COGOC, $\Delta D_0 = 674.01, p < .01$). Second, the final 2&3B model for each attitude accounted for an approximately equal amount of total attitudinal variance as Model 2&3A (i.e., $R^2_{x,y}$), but accounted for 7.95% to 10.07% more within-subjects variance in each attitude (i.e., $R^2_c$). Third, time-lagged State PA, but not time-lagged State NA was a significant predictor in each model. In fact, the addition of time-lagged State PA into the multilevel model predicting State COGOC resulted in the removal of State NA, measured concomitantly. Fourth, the linear effect of time-lagged State PA was always smaller than that of State PA measured concomitantly with the attitude.
Table 27
Model 2&3B – Effects of Concomitantly Measured and Time Lagged State Affect on State Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{10}$</td>
</tr>
<tr>
<td>(2&amp;3B) State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$y = \beta_0 + \beta_1GrpCentStatePAy + \beta_2GrpCentStateNAy + \beta_3Lag1GrpCentStatePAy + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>5.030**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td>.344**</td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_{2j}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_3 = \gamma_{30} + u_{3j}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2&3B) State Cognitive Job Satisfaction

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{10}$</td>
</tr>
<tr>
<td>L1: StateCOGJS$y = \beta_0 + \beta_1GrpCentStatePAy + \beta_2GrpCentStateNAy + \beta_3Lag1GrpCentStatePAy + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>5.199**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td>.200**</td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_{2j}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_3 = \gamma_{30} + u_{3j}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00} =$ intercept of Level-2 model predicting $\beta_0$; $\gamma_{10} =$ intercept of Level-2 model predicting $\beta_1$; $\gamma_{20} =$ intercept of Level-2 model predicting $\beta_2$; $\gamma_{30} =$ intercept of Level-2 model predicting $\beta_3$; $\sigma^2 =$ within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00} =$ between-subjects variance in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_{0i}$); $\tau_{11} =$ variance in Level-2 residual for models predicting $\beta_1$ (i.e., variance in $u_{1i}$); $\tau_{22} =$ variance in Level-2 residual for models predicting $\beta_2$ (i.e., variance in $u_{2j}$); $\tau_{33} =$ variance in Level-2 residual for models predicting $\beta_3$ (i.e., variance in $u_{3j}$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$, $\tau_{22}$, $\tau_{33}$) are listed on the diagonal; $\tau_{01}$, $\tau_{02}$, $\tau_{03}$, $\tau_{12}$, $\tau_{13}$, and $\tau_{23}$, the estimated covariances between $\tau_{00}$, $\tau_{11}$, $\tau_{22}$ and $\tau_{33}$ are listed off the diagonal.

† $p < .10$. * $p < .05$. ** $p < .01$
Table 27 (cont.)
Model 2&3B – Effects of Concomitantly Measured and Time Lagged State Affect on State Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2&amp;3B) State Affective Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: State AFFOC&lt;sub&gt;i&lt;/sub&gt; = β&lt;sub&gt;0&lt;/sub&gt; + β&lt;sub&gt;1&lt;/sub&gt;GrpCentStatePA&lt;sub&gt;i&lt;/sub&gt; + β&lt;sub&gt;2&lt;/sub&gt;GrpCentStateNA&lt;sub&gt;i&lt;/sub&gt; + β&lt;sub&gt;3&lt;/sub&gt;Lag1GrpCentStatePA&lt;sub&gt;i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td>γ&lt;sub&gt;0&lt;/sub&gt; = 1.39**</td>
<td>σ&lt;sup&gt;2&lt;/sup&gt; = 0.139**</td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;1&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;0&lt;/sub&gt;</td>
<td>γ&lt;sub&gt;1&lt;/sub&gt; = 0.166**</td>
<td>τ&lt;sub&gt;00&lt;/sub&gt; = 2.082**</td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;2&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;1&lt;/sub&gt;</td>
<td>τ&lt;sub&gt;11&lt;/sub&gt; = -0.075</td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;3&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;2&lt;/sub&gt;</td>
<td>τ&lt;sub&gt;12&lt;/sub&gt; = 0.062**</td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;4&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;3&lt;/sub&gt;</td>
<td>τ&lt;sub&gt;13&lt;/sub&gt; = -0.236*</td>
<td></td>
</tr>
<tr>
<td>(2&amp;3B) State Cognitive Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGOC&lt;sub&gt;i&lt;/sub&gt; = β&lt;sub&gt;0&lt;/sub&gt; + β&lt;sub&gt;1&lt;/sub&gt;GrpCentStatePA&lt;sub&gt;i&lt;/sub&gt; + β&lt;sub&gt;2&lt;/sub&gt;Lag1GrpCentStatePA&lt;sub&gt;i&lt;/sub&gt; + r&lt;sub&gt;ij&lt;/sub&gt;</td>
<td>γ&lt;sub&gt;0&lt;/sub&gt; = 1.34**</td>
<td>σ&lt;sup&gt;2&lt;/sup&gt; = 0.134**</td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;1&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;0&lt;/sub&gt;</td>
<td>γ&lt;sub&gt;1&lt;/sub&gt; = 0.249**</td>
<td>τ&lt;sub&gt;00&lt;/sub&gt; = 1.731**</td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;2&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;1&lt;/sub&gt;</td>
<td>τ&lt;sub&gt;11&lt;/sub&gt; = -0.051</td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;3&lt;/sub&gt; = γ&lt;sub&gt;0&lt;/sub&gt; + u&lt;sub&gt;2&lt;/sub&gt;</td>
<td>τ&lt;sub&gt;12&lt;/sub&gt; = 0.048*</td>
<td></td>
</tr>
</tbody>
</table>
| Note: L1 = Level-1; L2 = Level-2; γ<sub>0</sub> = intercept of Level-2 model predicting β<sub>0</sub>; γ<sub>1</sub> = intercept of Level-2 model predicting β<sub>1</sub>; γ<sub>2</sub> = intercept of Level-2 model predicting β<sub>2</sub>; γ<sub>3</sub> = intercept of Level-2 model predicting β<sub>3</sub>; σ<sup>2</sup> = within-subjects variance in Level-1 residual (i.e., variance in r<sub>ij</sub>); τ<sub>00</sub> = between-subjects variance in Level-2 residual for models predicting β<sub>0</sub> (i.e., variance in u<sub>0</sub>); τ<sub>11</sub> = variance in Level-2 residual for models predicting β<sub>1</sub> (i.e., variance in u<sub>1</sub>); τ<sub>22</sub> = variance in Level-2 residual for models predicting β<sub>2</sub> (i.e., variance in u<sub>2</sub>); τ<sub>33</sub> = variance in Level-2 residual for models predicting β<sub>3</sub> (i.e., variance in u<sub>3</sub>). Variances are listed on the diagonal; covariances between τ<sub>00</sub>, τ<sub>11</sub>, τ<sub>22</sub>, and τ<sub>33</sub> are listed off the diagonal. *p < .10. **p < .05. ***p < .01.
Finally, the inclusion of time-lagged State PA in each model altered the amount of between-subjects variance accounted for in each parameter estimate compared to Model 2&3A. For example, the addition of time-lagged State PA to each multilevel model resulted in a slight increase, from 0.95% to 1.82%, in the variability surrounding each models’ intercept estimate (i.e., $R^2_0$) compared to Model 2&3A. This was generally paired with a 10 to 15% increase in variability surrounding the estimated linear effect of State NA (i.e., $R^2_2$). However, this effect is more difficult to interpret as the between-subjects variance in the State NA parameter estimate decreased by 42.42% for the State AFFJS model, and could not be estimated for the COGOC model where State NA was removed.

More important however, was the consistent finding that including time-lagged State PA decreased the variability surrounding the State PA parameter estimate (i.e., $R^2_1$) by 15.00% to 59.63%. For example, when predicting State AFFJS, the inclusion of time-lagged State PA decreased the variability surrounding the State PA parameter estimate by 59.63%, accounting for enough variance in State PA to make its variance component non-significant (i.e., $\tau_{11} = .065, p > .05$). By accounting for the variance in the linear effect of State PA on State AFFJS, this suggests that additional variables need not be added at Level-2 to account for State PA variance. However, State PA and NA in the remaining Model 2&3B analyses all continue to possess significant between-subjects variance. Attempts to account for this variance directly reflect Hypothesis 4 and 5, discussed next.

Together, these analyses generally suggest that not only do concurrent State PA and NA predict state-based levels of the four attitudes, but that a time-lagged version of
State PA is also predictive. However, it is important to briefly mention a set of analyses designed to examine the question of whether or not controlling for time effects on State PA and NA impacts their ability to predict the attitudes. To examine this question, a series of analyses identical to Model 2&3A and 2&3B for each attitude variable was conducted using variables which controlled for the effects of time on State PA and NA (i.e., CentTime and CentDay respectively). These time independent affect variables were created by residualizing State PA and NA on the appropriate time variable (i.e., ResidGrpCentStatePA and ResidGrpCentStateNA).

State PA and NA were residualized using the results of a series of multilevel analyses not presented here. These analyses modeled CentTime and CentDay as factors, similar to an ANOVA framework and indicated that CentTime had a significant influence on State PA and CentDay had a significant influence on State NA. More specifically, these analyses indicated that State PA at 9:00, 10:00 and 11:00 a.m. was significantly higher than State PA at 4:00 p.m., and that State NA was significantly higher on Monday and Tuesday than on Friday. Participant by participant, State PA and NA were then regressed on dummy coded versions of CentTime and CentDay respectively (i.e., listed values = 1, all other values = 0), with the studentized residual saved to the dataset. Using these newly created variables (i.e., ResidGrpCentStatePA and ResidGrpCentStateNA) alters the interpretation of the remaining Hypothesis 2 and 3 analyses, with the parameter estimates indicating the influence of State PA and NA controlling for the effects of time of day and day of the week respectively.

In general, controlling for the influence of time on State PA and NA resulted in a set of conclusions similar to those made for Models 2&3A and 2&3B with residualized
State PA, NA and time-lagged PA all contributing independently. The primary
difference was that by controlling for the influence of time in these models (i.e., Models
2&3C and 2&3D respectively), parameter estimates were smaller in absolute value and
more precise, evidenced by smaller between-subjects error variances (see Appendix AA).
Furthermore, a comparison of pseudo $R^2$ statistics suggests that Models 2&3C and 2&3D
have nearly identical effects on the variance components as Models 2&3A and 2&3B
(see Table 20, 21, 22, and 23). Finally, although the models are not nested and deviance
statistics cannot be compared, the AIC and BIC statistics generally support the superior
fit of Models 2&3C and 2&3D for each attitude.

Together, these results support Hypotheses 2(a) and 2(b), suggesting that at least
for job satisfaction, an affectively oriented attitude (i.e., State AFFJS) was more strongly
related to affect (i.e., State PA and NA) than a cognitively oriented attitude (i.e., State
COGJS), which was related to greater within-subjects, moment-by-moment State AFFJS
variability. Although Hypotheses 3(a) and 3(b) were not supported for organizational
commitment, their results indicate that State PA and NA both demonstrated a significant
predictive influence on all four state-based attitudinal variables modeled (i.e., State
AFFJS, COGJS, AFFOC, and COGOC). Moreover, these effects occurred regardless of
whether the effects of time were or were not removed from State PA and NA. Due to the
similarity between analyses modeling and not modeling residualized State PA and NA,
and due to their greater ease of interpretation, only non-residualized versions of State PA
and NA will be examined in future analyses. Finally, it is interesting to note that only
State PA demonstrated a lagged effect on the attitudes. That is, a participant’s state-
based positive affect from the previous measurement period had a carry-over effect and
influenced his or her state-based attitudes later in the day, above and beyond the effects of State PA and NA measured concomitantly with the attitude.

*Hypotheses 4 & 5*

While Hypotheses 2 and 3 were not fully supported by the models tested, these tests convincingly demonstrated the existence of a relationship between state-based affect and attitudes. Across the tested models, even when controlling for the effects of the time of day and day of the week on State PA and NA respectively, state affect consistently predicted state attitudes. More specifically, an increase in each individual’s State PA above his or her personal mean resulted in an elevation of his or her state job satisfaction and organizational commitment, regardless of whether the measurement was more affective or cognitive in nature. Similarly, increased levels of State NA resulted in decreased levels of each state-based attitude. Moreover, State PA from the previous hour (i.e., Lag1GrpCentStatePA) also had a significant positive effect in each analysis conducted. While intriguing in their own right, Hypothesis 4 and 5 seek to expand these results by demonstrating that state-based affect can predict the state-based affectively oriented attitudes above and beyond the effects of trait-based affect and attitudes. More specifically:

**H4:** (a) State PA will predict state affective job satisfaction above and beyond the effects of trait affective job satisfaction and trait PA; and

(b) state NA will predict state affective job satisfaction above and beyond the effects of trait affective job satisfaction and trait NA.

**H5:** (a) State PA will predict state affective organizational commitment above and beyond the effects of trait affective organizational
commitment and trait PA; and (b) state NA will predict state affective organizational commitment above and beyond the effects of trait affective organizational commitment and trait NA.

*General model used to test Hypotheses 4 and 5.* To test the validity of these hypotheses, a number of model iterations were fit to the available data. These models took the general form found in Equation 6.1 which depicts the full model used to test Hypothesis 4(a) (see Equation 6.2 for an algebraically solved model).

\[
\text{StateAFFJS}_{ij} = \beta_{0i} + \beta_{1i}(\text{GrpCentStatePA}_{ij}) + r_{ij}
\]

Where:
\[
\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{GMCentTraitAFFJS}_{i}) + \gamma_{02}(\text{GMCentTraitPA}_{i}) + u_{0i}
\]
\[
\beta_{1i} = \gamma_{10} + u_{1i}
\]

\[
\text{StateAFFJS}_{ij} = \gamma_{00} + \gamma_{01}(\text{GMCentTraitAFFJS}_{i}) + \gamma_{02}(\text{GMCentTraitPA}_{i}) + \gamma_{10}(\text{GrpCentStatePA}_{ij}) + u_{0i} + u_{1i}(\text{GrpCentStatePA}_{ij}) + r_{ij}
\] (6.2)

As evident in these equations, the within-subjects variability found in state-based affect (e.g., GrpCentStatePA) is used to predict state-based attitudes (e.g., StateAFFJS) at Level-1. At Level-2, the between-subjects effects of the trait-based attitude (e.g., GMCentTraitAFFJS) and affect (e.g., GMCentTraitPA) are included to control for their influence on between-subjects variability in the intercept value. However, two important observations about trait-based affect and attitudes in the models must be noted. First, both trait-based terms in the following models are grand mean centered (i.e., GMCent...)

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by subtracting the average trait-based affect and attitude score for the combined sample of 41 individuals (e.g., Hofmann & Gavin, 1998; Kreft, de Leeuw & Aiken, 1995). Recall that the trait-based measures were taken once, on the Friday afternoon before the state-based measurement period, and represent how participants think or feel in general. Second, note that trait-based affect and attitudes were allowed to predict the initial status (i.e., $\beta_0$) for the state-based attitude in this initial model. Trait-based levels of the affective and attitudinal variables theoretically make sense as predictors of the initial status on a state-based attitude measure, as they reflect an individual’s general disposition.

Specification of baseline comparison models. Next, recall that Hypotheses 4 and 5 argue state affect will predict state attitudes above and beyond the effects of trait affect and trait attitudes. Although the unconditional growth models are typically used to compare the fit of successive models, the unconditional growth models for both attitudinal variables modeled here (i.e., State AFFJS, AFFOC) failed to demonstrate significant linear effects for time, and do not serve as useful reference points for the models tested here. Therefore, to statistically demonstrate the incremental increase in variance accounted for by the addition of state affect over and above the effects of trait affect and attitudes, it was necessary to construct a series of comparison models. Two comparison models were constructed for each state-based affective attitude. Equation 7.1 and 7.2 demonstrate the general form of these comparison models (depicted for Hypothesis 4(a)).
\[ \text{StateAFFJS}_y = \beta_{0i} + r_y \]
Where:
\[ \beta_{0i} = \gamma_{00} + \gamma_{01}(\text{GMCentTraitAFFJS}_i) + \gamma_{02}(\text{GMCentTraitPA}_i) + u_{0i} \] (7.1)

\[ \text{StateAFFJS}_y = [\gamma_{00} + \gamma_{01}(\text{GMCentTraitAFFJS}_i) + \gamma_{02}(\text{GMCentTraitPA}_i)] + [u_{0i} + r_y] \] (7.2)

Similar to the unconditional means models, these comparison models are marked by an absence of predictors at Level-1. At Level-2, each state-based attitude is predicted by the combination of its trait-based counterpart and a trait-based affective term (i.e., PA or NA). Note, these trait-based terms only predict between–subjects variability in the intercept (i.e., \( \beta_{0i} \)). The use of these comparison models has two major benefits over the unconditional means models. First, they more closely approximate the models implied by the hypotheses and second, allow the use of the deviance statistic to statistically compare the model fit of successive nested models.

**Results of estimated comparison models.** The results of fitting the comparison models for State AFFJS and AFFOC can be found in Tables 28 and 29 respectively. A number of general observations can be made from fitting these models. First, as expected, trait-based measures of both affective job satisfaction and organizational commitment predict state-based measures of these attitudes. Second, similar to the previously fit models, predictors with nonsignificant parameter estimates were systematically removed from the models, resulting in the removal of Trait NA from the prediction of both State AFFJS and AFFOC. That is, trait-based PA, but not NA predicted state-based attitudes. Third, for all four comparison models tested, significant
within- and between-subjects variance remains at both Level-1 and 2 respectively, permitting the inclusion of additional state- and trait-based predictors. Also, note that the variance estimate surrounding the intercept term (i.e., $\tau_{00}$) is smaller in the comparison models including trait-based PA, suggesting these models more precisely model the intercept term.
Table 28  
Models 4A.1 and 4B.1 – Comparison Models of State Affective Job Satisfaction with Trait Affect and Attitudes at Level-2

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{01}$</td>
</tr>
<tr>
<td><strong>(4A.1) State Affective Job Satisfaction – Trait AFFJS &amp; PA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$_i$ = $\beta_0$ + $r_y$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0$ = $\gamma_{00}$ + $\gamma_{01}$GMCentTraitAFFJS$<em>i$ + $\gamma</em>{02}$GMCentTraitPA$_i$ + $u_0$</td>
<td>5.042**</td>
<td>.589**</td>
</tr>
<tr>
<td><strong>(4B.1) State Affective Job Satisfaction – Trait AFFJS &amp; NA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$_i$ = $\beta_0$ + $r_y$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0$ = $\gamma_{00}$ + $\gamma_{01}$GMCentTraitAFFJS$_i$ + $u_0$</td>
<td>5.042**</td>
<td>.754**</td>
</tr>
</tbody>
</table>

Note: GMCentTraitNA$_i$ was non-significant and dropped from Model 4B.1.

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_0$; $\gamma_{01}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{02}$ = slope of Level-2 model predicting $\beta_0$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_y$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_0$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$) are listed on the diagonal.

†p < .10.  *p < .05.  **p < .01
Table 29
Models 5A.1 and 5B.1 – Comparison Models of State Affective Organizational Commitment with Trait Affect and Attitudes at Level-2

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₀₁</td>
</tr>
<tr>
<td>(5A.1) State Affective Org. Commitment – Trait AFFOC &amp; PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOCᵢᵣ = βᵢ₀ + rᵢᵣ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: βᵢ₀ = γ₀₀ + γ₀₁GMCentTraitAFFOCᵢ + γ₀₂GMCentTraitPAᵢ + uᵢ₀</td>
<td>5.017**</td>
<td>.823**</td>
</tr>
<tr>
<td>(5B.1) State Affective Org. Commitment – Trait AFFOC &amp; NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOCᵢᵣ = βᵢ₀ + rᵢᵣ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: βᵢ₀ = γ₀₀ + γ₀₁GMCentTraitAFFOCᵢ + uᵢ₀</td>
<td>5.017**</td>
<td>.975**</td>
</tr>
</tbody>
</table>

Note: GMCentTraitNA, was non-significant and dropped from Model 5B.1.
Note: L1 = Level-1; L2 = Level-2; γ₀₀ = intercept of Level-2 model predicting β₀ᵢ; γ₀₁ = slope of Level-2 model predicting β₀ᵢ; γ₀₂ = slope of Level-2 model predicting β₀ᵢ; σ² = within-subjects variance in Level-1 residual (i.e., variance in rᵢᵣ); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ᵢ (i.e., variance in uᵢ₀).
Note: Variance components (i.e., σ², τ₀₀) are listed on the diagonal.
†p < .10.  *p < .05.  **p < .01
For example, Model 4A.1 demonstrates that State AFFJS can be predicted using the combination of grand mean centered Trait AFFJS and Trait PA. An individual’s State AFFJS is predicted to be 5.042 ($p < .01$) when the individual is at the grand mean of both Trait AFFJS and Trait PA, while a 1-unit increase in Trait AFFJS above the grand mean results in a .589 ($p < .01$) unit increase in State AFFJS, holding Trait PA constant. Conversely, a 1-unit increase in Trait PA, holding Trait AFFJS at the grand mean, results in a .395 ($p < .10$) unit increase in State AFFJS. Note that the effect of Trait PA on State AFFJS is only marginally significant, while Trait PA achieves a more conventional level of significance as a predictor of State AFFOC (Model 5A.1; $\gamma_{02} = .503, p < .05$). Trait NA failed to achieve even marginal significance in the prediction of either State AFFJS (i.e., Model 4B.1), or State AFFOC (i.e., Model 5B.1).

Additional models were fit including the non-significant Trait NA parameters. However, these models were dropped in favor of those presented above for three reasons. First, including the non-significant terms had a minimal effect, only altering the parameter and variance component estimates of the remaining terms at the 100th’s or 1,000th’s decimal place. Second, models including the non-significant Trait NA term, which are not reported here, required an additional degree of freedom that failed to account for a significant increment in total variance (State AFFJS: $\Delta D_1 = -0.027, p > .05$; State AFFOC: $\Delta D_1 = -0.05, p > .05$). Third and most importantly, Trait NA remained a non-significant predictor in the remaining models used to test Hypothesis 4 and 5. Therefore, to facilitate model comparisons using the deviance statistic, it was necessary to create a series of nested models that all dropped the Trait NA term.
Table 30 and 31 delineate the pseudo $R^2$ and goodness-of-fit statistics for the comparison, as well as remaining models fit for Hypotheses 4 and 5 respectively. For ease of comparison, both tables repeat the unconditional means models’ goodness-of-fit statistics (i.e., Model 1.1) for State AFFJS (Table 30) and State AFFOC (Table 31). A closer examination of the goodness-of-fit statistics in Table 30 indicates that both affective job satisfaction comparison models fit significantly better than the unconditional means model. For example, Model 4A.1, which includes both Trait AFFJS and Trait PA at Level-2, fits significantly better than Model 1.1 ($\Delta D_2 = 32.82, p < .01$), and Model 4B.1, which only includes the Trait AFFJS term also fits significantly better than the unconditional means model ($\Delta D_1 = 29.72, p < .01$). Similarly, Table 31 effectively demonstrates that both affective organizational commitment comparison models also fit significantly better than the State AFFOC unconditional means model. More specifically, Model 5A.1 includes Trait AFFOC and PA at Level-2 in the prediction of State AFFOC, and fits significantly better than Model 1.1 ($\Delta D_2 = 54.86, p < .01$). Likewise, Model 5B.1, which drops the Trait NA term and only includes Trait AFFOC, also fits significantly better than Model 1.1 ($\Delta D_1 = 50.71, p < .01$). By excluding Trait NA, Models 4B.1 and 5B.1 demonstrate the ability of trait-based attitudes to independently predict initial levels of state-based attitudes.

Coincidentally, these models also allow a test of the statistical significance of Trait PA’s ability to account for significant State AFFJS and AFFOC variance, above and beyond their trait-based counterparts, by examining deviance statistics for the nested comparison models, 4B.1-4A.1, and 5B.1-5A.1. This test suggests that like its parameter estimate, Trait PA’s effect on State AFFJS, above and beyond Trait AFFJS, is marginally
significant ($\Delta D_1 = 3.10, p < .10$). That is, the majority of State AFFJS’ prediction in Model 4A.1 comes from Trait AFFJS. This is in contrast with the significant improvement in model fit derived from in the inclusion of Trait PA above and beyond Trait AFFOC in the prediction of State AFFOC ($\Delta D_1 = 4.15, p < .05$).

Table 30 and 31 also provide the pseudo $R^2$ values for the comparison, as well as the remaining models tested. First, and most importantly, it is evident that the inclusion of trait attitudes and affect across the four comparison models resulted in a dramatic increase in the amount of total DV variability accounted for. For example, the inclusion of Trait AFFJS and Trait PA in Model 4A.1 accounted for 38.32% of the total variability in State AFFJS ($R^2_{y,y} = .3832$; Model 4B.1, $R^2_{y,y} = .3576$). The impact of including trait-based affect and attitude terms to the prediction of State AFFOC was even more pronounced, accounting for more than 60% of State AFFOC’s total variability (Model 5A.1, $R^2_{y,y} = .6561$; Model 5B.1, $R^2_{y,y} = .6273$).

Second, notice that all four comparison models (i.e., 4A.1, 4B.1, 5A.1, and 5B.1) possess an $R^2_c$ value of 0.00. Recall that $R^2_c$ represents the proportion of within-subjects variance accounted for, above and beyond the unconditional means model (i.e., Model 1.1). All four comparison models tested are marked by the absence of predictors at Level-1, and without within-subjects predictors, these models fail to account for additional within-subjects variance. In contrast, all four comparison models demonstrate a marked reduction in the proportion of variability surrounding the intercept estimate (i.e., $R^2_0$). Here $R^2_0$ represents the extent to which intercept variability in the unconditional means model was reduced by including trait-based affect and attitudes at
Level-2 of the comparison models. Although all four comparison models demonstrated a reduction in the variability surrounding the intercept estimate, State AFFOC models demonstrated the largest reductions. For example, Model 5A.1 and 5B.1 demonstrated a 73.94% and 71.11% decrease in the variability surrounding the State AFFOC intercept estimate compared to the State AFFOC unconditional means model. Similarly, variability surrounding the State AFFJS estimate was reduced by 55.73% and 52.12% in Model 4A.1 and 4B.1 respectively. Together, these results indicate that Models 4A.1, 4B.1, 5A.1 and 5B.1 represent adequate comparison models for the remaining Hypothesis 4 and 5 tests. Furthermore, the results indicate that Trait AFFJS, AFFOC and PA account for significant between-subjects intercept variance, and for each dependent variable, improve model fit over the unconditional means model.
<table>
<thead>
<tr>
<th>Model</th>
<th>Positive Affect</th>
<th>Neglective Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 4A.1</td>
<td>Model 4A.2</td>
</tr>
<tr>
<td></td>
<td>Trait AFFJS &amp;</td>
<td>State PA</td>
</tr>
<tr>
<td></td>
<td>Trait PA</td>
<td></td>
</tr>
<tr>
<td>Unconditional Means</td>
<td>.3832</td>
<td>.4199</td>
</tr>
<tr>
<td>$R^2_{y,y}$</td>
<td>.0000&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.1896&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>$R^2_c$</td>
<td>.5573&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-.0024&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>.5063&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>3907.73</td>
<td>3874.91</td>
</tr>
<tr>
<td>AIC</td>
<td>3913.73</td>
<td>3884.91</td>
</tr>
<tr>
<td>BIC</td>
<td>3930.35</td>
<td>3912.61</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,y}$ = Proportion of total DV variability explained; $R^2_c$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.

<sup>a</sup> compared to Model 1.1
<sup>b</sup> compared to Model 4A.1
<sup>c</sup> compared to Model 4A.2
<sup>d</sup> compared to Model 4B.1
<sup>e</sup> compared to Model 4B.2
<sup>f</sup> identical to Model 4B.2
Table 31
State Affective Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics Across Models used to Test Hypothesis 5

<table>
<thead>
<tr>
<th></th>
<th>Positive Affect</th>
<th>Negative Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 5A.1</td>
<td>Model 5A.2</td>
</tr>
<tr>
<td>Unconditional</td>
<td>Trait AFFOC</td>
<td>State PA</td>
</tr>
<tr>
<td>Means</td>
<td>-.6561</td>
<td>.6642</td>
</tr>
<tr>
<td>$R_y^2$</td>
<td>.0000</td>
<td>.1856</td>
</tr>
<tr>
<td>$R_r^2$</td>
<td>.7394</td>
<td>-.0019</td>
</tr>
<tr>
<td>$R_0^2$</td>
<td>.3394</td>
<td>NA</td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>2501.72</td>
<td>2446.86</td>
</tr>
<tr>
<td>AIC</td>
<td>2507.72</td>
<td>2456.86</td>
</tr>
<tr>
<td>BIC</td>
<td>2524.34</td>
<td>2484.55</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Note. $R_{y, j}^2$ = Proportion of total DV variability explained; $R_r^2$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R_0^2$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R_1^2$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.

- a compared to Model 1.1
- b compared to Model 5A.1
- c compared to Model 5A.2
- d compared to Model 5B.1
- e compared to Model 5B.2
- f identical to Model 5B.2
Results of testing Hypotheses 4 and 5. Having essentially controlled for the effects of trait-based attitudes and affect on state-based AFFJS and AFFOC, the next step in testing Hypotheses 4 and 5 is to model the effects of adding state-based PA and NA at Level-1. This was achieved by fitting a series of models similar to Equation 6.1 and 6.2, substituting the appropriate attitudinal and affective terms. To remain nested, these models excluded Trait NA, which failed to predict state-based attitudes in the comparison models. Parameter coefficients and variance component estimates of fitting these models can be found in Table 32 and 33, with their pseudo $R^2$ and goodness-of-fit statistics found in Table 30 and 31.

For example, in relation to its comparison model (i.e., 4A.1), Model 4A.2 adds State PA at Level-1, and fits significantly better ($\Delta D_3 = 331.63, p < .01$). The coefficient estimates demonstrate convincingly that State PA is a significant predictor of State AFFJS ($\gamma_{10} = .525, p < .01$). This implies that when controlling for the effects of Trait AFFJS and PA at Level-2 by constraining them to their respective grand means, a 1-unit increase in State PA above an individual’s personal mean results in a .525-unit increase in State AFFJS. To confirm the superiority of Model 4A.2 over its comparison model, Model 4A.2 now accounts for 42% of the total State AFFJS variance (i.e., $R^2_y = .4199$) and an additional 19% of the within-subjects variance beyond its comparison model (i.e., $R^2_r = .1896$). Furthermore, the variance components indicate that significant variance remains at both the within-subjects ($\sigma^2 = .342, p < .01$) and between-subjects levels ($\tau_{00} = .418, p < .01; \tau_{11} = .237, p < .01$), again permitting the inclusion of additional Level-1 and 2 predictors.
Notice that with the inclusion of State PA al Level-1, the variability surrounding the State AFFJS intercept estimate has increased slightly in Model 4A.2 (i.e., $R^2_0 = -.0024$). However, this increase is negligible, and is a pattern repeated throughout the remaining Hypothesis 4 and 5 analyses. Only in Model 4A.3 does the intercept variance increase by more than one percent. Therefore, $R^2_0$ will not be discussed with respect to the remaining Hypothesis 4 and 5 models.

Next, we see that although Trait NA failed to significantly predict State AFFJS in the comparison model, State NA is a significant predictor when added in Model 4B.2 ($\gamma_{10} = -1.082, p < .01$). That is, controlling for the effect of Trait AFFJS (i.e., when the individual is at the grand mean), a 1-unit increase in an individual’s State NA value, above his or her personal mean, resulted in a 1.082-unit decrease in his or her State AFFJS value. An examination of the deviance statistics indicates that the inclusion of state-based affect again results in a better fitting model than the comparison, here Model 4B.1 ($\Delta D_3 = 448.65, p < .01$). Model 4B.2 also accounts for a greater proportion of State AFFJS’ total ($R^2_{y,\delta} = .3906$) and within-subjects ($R^2_r = .2512$) variance than the comparison model. Finally, both the within-subjects ($\sigma^2 = .316, p < .01$) and between-subjects ($\tau_{00} = .452, p < .01; \tau_{11} = 3.167, p < .01$) variance components indicate that significant variance remains, permitting the inclusion of additional Level-1 and 2 predictors.

Examining the results of adding state-based affect to the prediction of State AFFOC in Model 5A.2 and 5B.2 suggests a similar set of conclusions. For example, in both equations, State AFFOC is predicted to have an intercept value of 5.018 (i.e., $\gamma_{00}, p$
< .01) when levels of the remaining predictors are at their respective grand-mean or group-mean centered values. In Model 5A.2, controlling for levels of the remaining variables, a 1-unit increase above the grand means in Trait AFFOC ($\gamma_{01} = .820, p < .01$) and Trait PA ($\gamma_{02} = .509, p < .05$) again results in an elevated initial status on State AFFOC. More importantly, the slope term for group-centered State PA is significant ($\gamma_{10} = .265, p < .01$), suggesting that controlling for trait-based affect and attitudes, a 1-unit increase in an individual’s state-based PA resulted in a .265-unit increase in his or her state-based AFFOC.

Adding State PA to the prediction of State AFFOC had a number of beneficial outcomes. First, all three goodness-of-fit statistics indicate that Model 5A.2 fits better than the comparison model, 5A.1 ($\Delta D_3 = 316.06, p < .01$). Similar to the other models, the addition of state-based affect in Model 5A.2 resulted in the prediction of a greater proportion of State AFFOC’s total ($R^2_y = .6642$) and within-subjects ($R^2_r = .1856$) variance than the comparison model. Finally, both the within-subjects ($\sigma^2 = .158, p < .01$) and between-subjects ($\tau_{00} = .535, p < .01; \tau_{11} = .109, p < .01$) variance components indicate that significant variance remains, again permitting the inclusion of additional Level-1 and 2 predictors.

Demonstrating a consistent pattern of results, Model 5B.2 serves as the final test of Hypotheses 4 and 5. As can be found in Table 33, grand-mean centered Trait AFFOC remains a significant predictor of State AFFOC ($\gamma_{01} = .958, p < .01$), controlling for the influence of the remaining predictors. Again, Trait NA fails to predict State AFFOC; however, group-centered State NA does predict State AFFOC ($\gamma_{10} = -.351, p < .01$). This
suggests that an individual’s State AFFOC level will drop by .351-units when he or she is 1-unit above his or her personal mean on State NA, controlling for Trait AFFOC. Finally, the inclusion of State NA in Model 5B.2 improves model fit over the comparison model, Model 5B.1 ($\Delta D_3 = 103.43, p < .01$), accounts for slightly more total ($R^2_{\hat{y}} = .6288$) and within-subjects ($R^2_\tau = .0722$) variance than the comparison model, and leaves significant within-subjects ($\sigma^2 = .180, p < .01$) and between-subjects ($\tau_{00} = .592, p < .01; \tau_{11} = .279, p < .01$) variance unaccounted for.

Together, these results provide strong support for Hypotheses 4 and 5, demonstrating that state-based affect predicted state-based attitudes over and above trait-based measurements of the same affect and attitudes. Evidence for this conclusion comes from three sources. First, in all four models directly testing these hypotheses (i.e., Model 4A.2, 4B.2, 5A.2, and 5B.2) State PA and NA parameter estimates (i.e., $\gamma_{10s}$) were significant. Second, the addition of State PA and NA in these models resulted in improved model fit over the comparison models; and finally, all four models accounted for a greater proportion of the total and within-subjects variance than their comparison models.
Table 32
Models 4A.2 and 4B.2 – Effects of State Affect at Level-1 over Trait Affect and Attitudes at Level-2 when Predicting State Affective Job Satisfaction

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{01}$</td>
</tr>
<tr>
<td>(4A.2) State Affective Job Satisfaction – State PA, Trait AFFJS &amp; PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$<em>{ij} = \beta_0 + \beta_1$GrpCentStatePA$</em>{ij} + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$GMCentTraitAFFJS$<em>i + \gamma</em>{02}$GMCentTraitPA$<em>i + u</em>{0i}$</td>
<td>5.042**</td>
<td>.610**</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4B.2) State Affective Job Satisfaction – State NA, Trait AFFJS &amp; NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$<em>{ij} = \beta_0 + \beta_1$GrpCentStateNA$</em>{ij} + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$GMCentTraitAFFJS$<em>i + u</em>{0i}$</td>
<td>5.042**</td>
<td>.732**</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_0$; $\gamma_{01}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{02}$ = slope of Level-2 model predicting $\beta_1$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_1$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_{0i}$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_1$ (i.e., variance in $u_{1i}$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, and $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$, and $\tau_{11}$ is listed off the diagonal.

†$p < .10$.  * $p < .05$.  **$p < .01$
Table 33  
Models 5A.2 and 5B.2 – Effects of State Affect at Level-1 over Trait Affect and Attitudes at Level-2 when Predicting State Affective Organizational Commitment

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₀₁</td>
</tr>
<tr>
<td>(5A.2) State Affective Org. Commitment – State PA, Trait</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFFOC &amp; PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOCᵢⱼ = β₀ᵢ + β₁ᵢGrpCentStatePAᵢ + rᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β₀ᵢ = γ₀₀ + γ₀₁GMCentTraitAFFOCᵢ + γ₀₂GMCentTraitPAᵢ + u₀ᵢ</td>
<td>5.018**</td>
<td>.820**</td>
</tr>
<tr>
<td>L2: β₁ᵢ = γ₁₀ + u₁ᵢ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5B.2) State Affective Org. Commitment – State NA, Trait</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AFFOC &amp; NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOCᵢⱼ = β₀ᵢ + β₁ᵢGrpCentStateNAᵢ + rᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: β₀ᵢ = γ₀₀ + γ₀₁GMCentTraitAFFOCᵢ + u₀ᵢ</td>
<td>5.018**</td>
<td>.958**</td>
</tr>
<tr>
<td>L2: β₁ᵢ = γ₁₀ + u₁ᵢ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note:  
L1 = Level-1; L2 = Level-2; γ₀₀ = intercept of Level-2 model predicting β₀ᵢ; γ₀₁ = slope of Level-2 model predicting β₀ᵢ; γ₀₂ = slope of Level-2 model predicting β₁ᵢ; σ² = within-subjects variance in Level-1 residual (i.e., variance in rᵢⱼ); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ᵢ (i.e., variance in u₀ᵢ); τ₁₁ = variance in Level-2 residual for models predicting β₁ᵢ (i.e., variance in u₁ᵢ).  
Note: Variance components (i.e., σ², τ₀₀, and τ₁₁) are listed on the diagonal; τ₀₁, the estimated covariance between τ₀₀, and τ₁₁ is listed off the diagonal.  
†p < .10.  *p < .05.  **p < .01
Assessing the impact of time-lagged affect. Although the addition of State PA and NA in Models 4A.2, 4B.2, 5A.2, and 5B.2 improved model fit, the within-subjects (i.e., $\sigma^2$) and both between-subjects variance components (i.e., $\tau_{00}$, $\tau_{11}$) remained significant in all four equations, indicating significant variance remained unaccounted for at Level-1 and 2 respectively. Therefore, in an attempt to account for this remaining variance, a series of additional analyses were conducted drawing from Model 2&3B. More specifically, Models 4A.3, 4B.3, 5A.3 and 5B.3 all replicate the previous set of models with the exception that each adds a time-lagged state affect term at Level-1. The general form of these models, extending Model 4A.2, is provided in Equation 8.1 and 8.2. Again, the equations provided demonstrate all possible variable combinations, which were not necessarily included in the final fitted models (particularly excluding Trait NA and time-lagged State NA). Variables and interactions were trimmed across successive model iterations to arrive at the final models provided for State AFFJS and AFFOC in Table 34. As the final models remain nested, the goodness-of-fit and pseudo $R^2$ values can also be found in Table 30 and 31.

$$StateAFFJS_{ij} = \beta_{0i} + \beta_{1i}\{GrpCentStatePA_{iy}\} + \beta_{2i}\{Lag1GrpCentStatePA_{iy}\} + r_{ij}$$

Where:

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(GMCentTraitAFFJS) + \gamma_{02}(GMCentTraitPA) + u_{0i}$$

$$\beta_{1i} = \gamma_{10} + u_{1i}$$

$$\beta_{2i} = \gamma_{20} + u_{2i}$$

(8.1)
\[
\text{StateAFFJS}_i = \left[ \gamma_{00} + \gamma_{01}(\text{GMCentTraitAFFJS}) + \gamma_{02}(\text{GMCentTraitPA}) + \gamma_{10}(\text{GrpCentStatePA}) + \gamma_{20}(\text{Lag1GrpCentStatePA}) \right] \\
+ \left[ u_{0i} + u_{1i}(\text{GrpCentStatePA}) + u_{2i}(\text{Lag1GrpCentStatePA}) + r_i \right]
\] (8.2)

One key feature of the final time-lagged models in Table 34 is that time-lagged State NA failed to significantly account for variance in either State AFFJS (i.e., Model 4B.3) or State AFFOC (i.e., Model 5B.3). Therefore, as these models duplicate models 4B.2 and 5B.2 respectively, their results are not presented in Table 34 or Tables 30 and 31, and will not be discussed further. The failure of time-lagged State NA to again significantly predict state-based attitudes suggests that State NA’s effect on state-based attitudes only occurs when measured concomitantly. That is, neither Trait NA nor Lag1GrpCentStateNA accounted for a unique proportion of State AFFJS or State AFFOC’s variance. This is in contrast with positive affect, which has consistently demonstrated its ability to predict state-based attitudes when measured from various state and trait perspectives. Models 4A.3 and 5A.3 extend this by demonstrating a significant time-lagged effect of State PA when predicting State AFFJS and AFFOC respectively. However, note that once again, the effects of time-lagged State PA (i.e., \(\gamma_{20}\)) are weaker than those of State PA when measured concomitantly (i.e., \(\gamma_{10}\)).

Specifically, Model 4A.3 demonstrates that Lag1GrpCentStatePA (\(\gamma_{20} = .199, p < .05\)) predicts State AFFJS over and above GrpCentStatePA (\(\gamma_{10} = .421, p < .01\)), GMCentTraitAFFJS (\(\gamma_{01} = .582, p < .01\)) and GMCentTraitPA (\(\gamma_{02} = .434, p < .10\)). This model fits significantly better than either Model 4A.2 or 4A.1 (\(\Delta D_4 = 1070.36, p < .01\); \(\Delta D_7 = 1401.99, p < .01\) respectively), and predicted a greater proportion of State AFFJS’s
total \( R^2_{y,j} = .4303 \) and within-subjects \( R^2_r = .2678 \) variance than the comparison model. Just as important, the inclusion of time-lagged State PA also accounted for 50.63% of the variance surrounding the State PA coefficient estimate. This is likely the result of obvious similarity between the terms. This conclusion is supported by a significant covariance term between the two \( (\tau_{12} = .108, p < .01) \), suggesting a carryover effect whereby higher State PA values the previous hour (i.e., Lag1GrpCentStatePA) were systematically related to higher State PA levels the following hour (i.e., GrpCentStatePA). Finally, the within-subjects \( (\sigma^2 = .309, p < .01) \) and between-subjects \( (\tau_{00} = .428, p < .01; \tau_{11} = .117, p < .05; \tau_{22} = .149, p < .05) \) variance components remain significant, allowing the continued inclusion of additional Level-1 and 2 predictors.

State AFFOC demonstrated a similar pattern with respect to time-lagged State PA, with the major exception that the variance component for time-lagged State PA was non-significant \( (\tau_{22} = .018, p > .05) \). For example, Lag1GrpCentStatePA \( (\gamma_{20} = .124, p < .01) \) predicted State AFFOC above and beyond the effects of GrpCentStatePA \( (\gamma_{10} = .164, p < .01), \) GMCentTraitAFFOC \( (\gamma_{01} = .829, p < .01) \) and GMCentTriatPA \( (\gamma_{02} = .547, p < .05) \). This model also fit significantly better than either Model 5A.2 or Model 5A.1 \( (\Delta D_4 = 638.46, p < .01; \Delta D_7 = 954.52, p < .01 \text{ respectively}) \). While Model 5A.3 predicted slightly less total State AFFOC variance \( (R^2_{y,j} = .6593) \) than Model 5A.2, this is negligible, and outweighed by improvements in the amount of within-subjects variance \( (R^2_r = .2474) \) and variance surrounding the State PA coefficient estimate \( (R^2_i = .3394) \) accounted for. Together, these results demonstrate state affect’s ability to predict state based attitudes above and beyond trait-based affect and attitudes.
Table 34
Models 4A.3 and 5A.3 – Effects of State Affect and Lagged State Affect at Level-1 over Trait Affect and Attitudes at Level-2 when Predicting State Affective Job Satisfaction and Affective Organizational Commitment

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{01}$</td>
</tr>
<tr>
<td>(4A.3) State Affective Job Satisfaction – State PA, Lagged PA, Trait AFFJS &amp; PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$<em>{ij}$ = $\beta_0 + \beta_1$GrpCentStatePA$</em>{ij}$ + $\beta_2$Lag1GrpCentStatePA$<em>{ij} + r</em>{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$GMCentTraitAFFJS$<em>{i}$ + $\gamma</em>{02}$GMCentTraitPA$_{i} + u_0$</td>
<td>5.043**</td>
<td>.582**</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_1$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_2$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5A.3) State Affective Org. Commitment – State PA, Lagged PA, Trait AFFOC &amp; PA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOC$<em>{ij}$ = $\beta_0 + \beta_1$GrpCentStatePA$</em>{ij}$ + $\beta_2$Lag1GrpCentStatePA$<em>{ij} + r</em>{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$GMCentTraitAFFOC$<em>{i}$ + $\gamma</em>{02}$GMCentTraitPA$_{i} + u_0$</td>
<td>5.016**</td>
<td>.829**</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_1$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_2$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Models 4B.3 and 5B.3 were identical to Models 4B.2 and 5B.2 respectively and are not reported.

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_0$; $\gamma_{01}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{02}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_2$; $\gamma_{20}$ = intercept of Level-2 model predicting $\beta_2$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_0$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_1$ (i.e., variance in $u_1$); $\tau_{22}$ = variance in Level-2 residual for models predicting $\beta_2$ (i.e., variance in $u_2$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$, and $\tau_{22}$) are listed on the diagonal; $\tau_{01}$, $\tau_{02}$, and $\tau_{12}$, the estimated covariances between $\tau_{00}$, $\tau_{11}$, and $\tau_{22}$ are listed off the diagonal.

$\dagger p < .10$.  * $p < .05$.  ** $p < .01$
Comparison Models Used to Test Emotional Contagion Processes

The preceding analyses have demonstrated a relatively consistent pattern of both within- and between-subjects variability in state-based measures of work-related attitudes and affect. These analyses have also examined the state- and trait-based relationships between the various conceptualizations of affect and attitudes measured and set the stage for the remaining analyses, which test the existence of the hypothesized contagion mechanism. Hypothesis 6 directly examines contagion within the supervisor-subordinate dyad by quantifying the ability of supervisor state-based measures of affect and attitudes to predict subordinate state-based measures of the same affect and attitudes, measured concomitantly. The remaining hypotheses examine the extent to which various trait-based variables moderate the contagion mechanism. In the MRCM framework, these analyses examine the cross-level interaction between trait-based moderator variables modeled at Level-2 and the contagion effect modeled at Level-1.

Analyzing this final set of hypotheses and exploratory analyses required a restructuring of the dataset so that state- and trait-based measures of both supervisor and subordinate variables within a dyad were arranged in the same row of the dataset. That is, each row of data contained all state- and trait-based information for a dyad from a specific measurement period (e.g., 3:00 p.m. of the eight day of the study), or 60 rows of data per dyad. Restructuring the dataset in this manner effectively halved the sample size for the remaining analyses, from 41 individuals to 20 dyads. The result is a loss of power at the between-subjects level of analysis, which was compensated for by using a more liberal $p < .10$ critical value when examining the remaining models.
A second result of restructuring the dataset is that the tested models cannot be compared against the unconditional means and growth models constructed earlier. To facilitate the necessary comparisons, new unconditional means and growth models were computed. Recall that an examination of the previous unconditional growth models demonstrated time of day and day of week effects for State PA and NA respectively. Further recall that growth is not the focus of these analyses, that attempts to residualize or control for the effects of time on State PA and NA had little effect, and were dropped in favor of simpler models. Attempts to model the unconditional growth models for the restructured dataset resulted in similar conclusions (Time remained a non-significant predictor of all four attitudinal variables, and day of week had a slight negative linear effect on State NA. The one exception was that time of day no longer had a significant linear effect on State PA). Therefore, results for only the unconditional means models (Model 6.1) are presented below (see Table 35).
<table>
<thead>
<tr>
<th>Model (No. / DV)</th>
<th>Coefficient (95%CI)</th>
<th>Variance Components (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>σ²</td>
</tr>
<tr>
<td>(6.1) Subordinate State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateAFFJSᵢⱼ = ₀ᵢ + ᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6.1) Subordinate State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJSᵢⱼ = ₀ᵢ + ᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ₀ᵢ = γ₀₀ + ₀₀ᵢ</td>
<td>5.108** (4.584 – 5.631)</td>
<td>1.256** (.673 – 2.341)</td>
</tr>
<tr>
<td>(6.1) Subordinate State Affective Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateAFFOCᵢⱼ = ₀ᵢ + ᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ₀ᵢ = γ₀₀ + ₀₀ᵢ</td>
<td>5.002** (4.286 – 5.717)</td>
<td>2.348** (1.261 – 4.371)</td>
</tr>
<tr>
<td>(6.1) Subordinate State Cognitive Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGOCᵢⱼ = ₀ᵢ + ᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ₀ᵢ = γ₀₀ + ₀₀ᵢ</td>
<td>4.676** (3.937 - 5.416)</td>
<td>2.508** (1.347 – 4.668)</td>
</tr>
<tr>
<td>(6.1) Subordinate State Positive Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStatePAᵢⱼ = ₀ᵢ + ᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ₀ᵢ = γ₀₀ + ₀₀ᵢ</td>
<td>3.212** (2.802 – 3.622)</td>
<td>.768** (.412 – 1.432)</td>
</tr>
<tr>
<td>(6.1) Subordinate State Negative Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateNAᵢⱼ = ₀ᵢ + ᵢⱼ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ₀ᵢ = γ₀₀ + ₀₀ᵢ</td>
<td>1.201** (1.072 - 1.330)</td>
<td>.076** (.040 – .142)</td>
</tr>
</tbody>
</table>

**Note:** State AFFJS, COGJS, AFFOC and COGOC had a 7-point response format; State PA and NA had a 5-point response format.

**Note:** 95%CI = 95% Confidence Interval; L1 = Level-1; L2 = Level-2; γ₀₀ = intercept of Level-2 model predicting β₀ᵢ; σ² = within-subjects variance in Level-1 residual (i.e., variance in ᵢⱼ); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ᵢ (i.e., variance in ₀₀ᵢ).

* *p < .05. **pp < .01.
Again, specifics of each unconditional means model are less important than the general conclusions that can be made. For example, notice that the generic equation used to calculate each unconditional means model has changed slightly, and now includes subordinate level variables as the dependent variable. This reflects the nature of the contagion hypothesis, in which supervisor state-based affect and attitudes are used to predict subordinate state-based affect and attitudes. The result, is that each unconditional means model now reflects the need to regress subordinate level variables on their respective supervisor variables.

Next, comparing the results of Table 35 with those of the full sample in the original unconditional means models (see Table 15) leads to three observations. First, intercept estimates for each variable are slightly lower than when estimated using the full sample; however, overlapping confidence intervals suggest none of these differences are significant. These intercept estimates replicate the subordinate only means for these variables found in Table 13, where State COGOC was the only variable to reach marginally significant differences between supervisors and subordinates (Note. Small differences between Table 13 and 35 reflect the removal of Dyad 11 from the sample).

Second, both within- and between-subjects variance components (i.e., $\sigma^2$ and $\tau_{00}$ respectively) increased in magnitude for all six dependent variables. Moreover, non-overlapping confidence intervals indicate that the increase in within-subjects variance (but not between-subjects variance) for all four state-based attitudinal variables was significant. The increased variability surrounding parameter estimates in these models likely reflects the decreased power caused by halving the sample size used to estimate the
Finally, all six models demonstrate significant within- and between-subjects variability, permitting the inclusion of additional predictors at Level-1 and 2 respectively.

**Hypothesis 6**

The first predictor added to each unconditional means model was the supervisor state-based corollary of each dependent variable. A general form of the model tested (Model 6.2) can be found in Equation 9.1 (see Equation 9.2 for an algebraically solved version), where ‘SupGrpCentStateX’ can be replaced with the supervisors’ concomitant, state-based measure of all six dependent variables (i.e., State AFFJS, COGJS, AFFOC, COGOC, PA, or NA). As state-based predictors, these variables were group-centered around each individual supervisor’s mean.

\[
SubStateX_{ij} = \beta_{0i} + \beta_{1i}(SupGrpCentStateX_{ij}) + r_{ij}
\]

Where:

\[
\beta_{0i} = \gamma_{00} + u_{0i}
\]

\[
\beta_{1i} = \gamma_{10} + u_{1i}
\]

\[
SubStateX_{ij} = [\gamma_{00} + \gamma_{10}(SupGrpCentStateX_{ij})] + [u_{0i} + u_{1i}(SupGrpCentStateX_{ij}) + r_{ij}]
\]

Adding this variable directly tests Hypothesis 6, which states that:

\(H_6\): A pattern of relationships consistent with Emotional Contagion effects on mood, job satisfaction and organizational commitment within the supervisor-subordinate dyad will be found, as indicated by: (a) Significant prediction of subordinate state mood from supervisor state mood; (b) Significant prediction of subordinate state affective job
satisfaction from supervisor state affective job satisfaction; (c) Significant prediction of subordinate state affective organizational commitment from supervisor state affective organizational commitment; (d) State cognitive job satisfaction and state cognitive organizational commitment will demonstrate weaker contagion effects.

The result of these analyses can be found in Table 36, which partially supported the contagion effect. Of the six dependent variables, only State NA demonstrated a direct contagion effect, with state-based supervisor NA predicting state-based subordinate NA when measured at the same time (γ₁₀ = .170, p < .10). Although supervisor affect and attitudes failed to significantly predict subordinate affect and attitudes in the remaining five analyses, notice that γ₁₀ was positive in each analysis. This pattern suggests that although not significant, higher levels of supervisor state-based affect and attitudes were generally related to higher levels of subordinate state-based affect and attitudes. It is entirely possible that decreased statistical power in this set of analyses (compared to Hypotheses 1-5) prevented these values from reaching significant levels, and suggests the need to explore the hypothesized cross-level interactions to determine if the presence of any moderators makes the contagion process more likely to occur.
Table 36
Model 6.2 - Emotional Contagion: Predicting Subordinate State Affect and Attitudes from Supervisor State Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$\gamma_{00}$</td>
</tr>
<tr>
<td>(6.2) Subordinate State Affective Job Satisfaction – Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateAFFJS$_{ij} = \beta_0 + \beta_1 \text{SupGrpCentStateAFFJS}<em>i + r</em>{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td></td>
<td>$4.980**$</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6.2) Subordinate State Cognitive Job Satisfaction – Supervisor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJS$_{ij} = \beta_0 + \beta_1 \text{SupGrpCentStateCOGJS}<em>i + r</em>{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td></td>
<td>$5.113**$</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: $L1 = \text{Level-1}; L2 = \text{Level-2}; \gamma_{00} = \text{intercept of Level-2 model predicting } \beta_0; \gamma_{10} = \text{intercept of Level-2 model predicting } \beta_1; \sigma^2 = \text{within-subjects variance in Level-1 residual (i.e., variance in } r_{ij}); \tau_{00} = \text{between-subjects variance in Level-2 residual for models predicting } \beta_0 (i.e., \text{variance in } u_{0i}); \tau_{11} = \text{variance in Level-2 residual for models predicting } \beta_1 (i.e., \text{variance in } u_{1i}).$

Note: Variance components (i.e., $\sigma^2, \tau_{00}, \tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.

†$p < .10. * p < .05. **p < .01.$
Table 36 (Cont.)
Model 6.2 - Emotional Contagion: Predicting Subordinate State Affect and Attitudes from Supervisor State Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{10}$</td>
</tr>
<tr>
<td>(6.2) Subordinate State Affective Org. Commitment – Supervisor State Affective Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateAFFOC$<em>{ij} = \beta_0 + \beta_1$SupGrpCentStateAFFOC$</em>{ij} + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>$5.031**$</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td>.025</td>
<td>.000</td>
</tr>
<tr>
<td>L1: SubStateCOGOC$<em>{ij} = \beta_0 + \beta_1$SupGrpCentStateCOGOC$</em>{ij} + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>$4.695**$</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td>.002</td>
<td>-.067</td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_{0i}$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_{1i}$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_{0i}$ (i.e., variance in $u_{0i}$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_{1i}$ (i.e., variance in $u_{1i}$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.

$\dagger p < .10$.  * $p < .05$.  ** $p < .01$.  

†$p < .10$.  * $p < .05$.  ** $p < .01$.  


Table 36 (Cont.)
Model 6.2 - Emotional Contagion: Predicting Subordinate State Affect and Attitudes from Supervisor State Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{10}$</td>
</tr>
<tr>
<td>(6.2) Subordinate State Positive Affect – Supervisor State Positive Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStatePA$<em>{ij}$ = $\beta_0 + \beta_1$SupGrpCentStatePA$</em>{ij}$ + $r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>3.219**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td>.001</td>
<td>.094</td>
</tr>
<tr>
<td>(6.2) Subordinate State Negative Affect – Supervisor State Negative Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateNA$<em>{ij}$ = $\beta_0 + \beta_1$SupGrpCentStateNA$</em>{ij}$ + $r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>1.208**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td>.170†</td>
<td>.070</td>
</tr>
</tbody>
</table>

*Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_{0i}$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_{1i}$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_{0i}$ (i.e., variance in $u_{0i}$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_{1i}$ (i.e., variance in $u_{1i}$).

*Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.

†$p < .10$. *$p < .05$. **$p < .01$. 
However, a number of observations must be made before testing moderating effects. First, the within-subjects variance component (i.e., $\sigma^2$) in all six analyses remained significant, suggesting that additional state-based variables can be added at Level-1 to account for within-subjects variability in the parameter estimates. This conclusion is supported by the Pseudo $R^2$ statistics (see Table 37 – 42), where the inclusion of SupGrpCentStateX in Model 6.2 resulted in a 1.01% average increase in within-subjects variability ($R^2_{\text{within}}$ ranged from -.0682 for State NA to .0593 for State AFFOC). Second, between-subjects variability surrounding the intercept estimate (i.e., $\tau_{00}$) in all six models remained significant, permitting the addition of trait-based Level-2 variables in the prediction of the $\beta_0$ parameter. Although the $R^2_{\text{intercept}}$ statistic in Tables 37 – 42 suggest the addition of SupGrpCentStateX generally accounted for more intercept variability ($R^2_{\text{intercept}}$ ranged from -.0263 for State NA to .0549 for State COGJS), the results of Hypotheses 4 and 5 suggest that trait-based corollaries of the six dependent variables be tested to account for this intercept variability.

Third, all six models directly testing the emotional contagion mechanism (i.e., Model 6.2) failed to account for more than a fraction of the total variability in each respective dependent variable ($R^2_{\text{model}}$ ranged from <.0001 for State AFFOC to .0020 for State COGJS). Fourth, it is important to note that although only State NA demonstrated a significant contagion effect, all six dependent variables demonstrated a significant improvement in model fit with the addition of the SupGrpCentStateX variable. As can be seen in Tables 37 – 42, $\Delta D$ exceeded the 11.34 critical value ($df = 3; p < .01$) in all six analyses. Finally, a significant variance component for the SupGrpCentStateX slope
parameter (i.e., $\tau_{11}$) would indicate the need to add cross-level moderator terms and allow the remaining hypotheses to be tested. However, this term was only significant for State PA. Although these results preclude the need to test cross-level moderators, the inability of SupGrpCentStateX to account for much total, within- or between-subjects variability, combined with the nature of the remaining hypotheses, warrants these analyses.

In keeping with the precedent set during the previous analyses, a number of alternative equations were also tested. These included numerous attempts to fit models including exponential functions (i.e., squared and cubed) of SupGrpCentStateX, and interactions with these variables. These models were designed to examine whether or not more extreme supervisor affect and attitudes were more contagious and to account for a portion of the remaining within-subjects variance. A second set of models examined the Level-1 moderating effects of two time varying variables. Recall that a necessary precondition for contagion to occur is that the dyad must interact. In the current study, the percent of each measurement period spent together and the occurrence of an interaction in the five minutes preceding the measurement period were collected and separately included in Level-1 of each contagion model to test if the amount of time interacting moderated the contagion effect. Across the board, these models failed to provide interpretable solutions (e.g., nonsignificant parameter estimates, failure to converge), and suggest that neither the extremity of the supervisor’s affect and attitude, nor the amount of time spent interacting influenced the contagion process. The inability of time spent interacting to moderate the emotional contagion process is particularly troubling, and is discussed in greater detail in Chapter V.
Table 37
State Affective Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics across Models used to test Hypothesis 6

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{\gamma,\delta}$</td>
<td>.0018</td>
<td>.0010</td>
<td>.3260</td>
<td></td>
</tr>
<tr>
<td>$R^2_{\gamma}$</td>
<td>-.0309</td>
<td>.0870</td>
<td>-.0309</td>
<td></td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>.0522</td>
<td>.1004</td>
<td>.5549</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>2092.08</td>
<td>1734.09</td>
<td>1371.94</td>
<td>1717.75</td>
</tr>
<tr>
<td>AIC</td>
<td>2098.08</td>
<td>1746.09</td>
<td>1383.94</td>
<td>1731.75</td>
</tr>
<tr>
<td>BIC</td>
<td>2112.55</td>
<td>1773.75</td>
<td>1410.43</td>
<td>1764.02</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Note. $R^2_{\gamma,\delta} =$ Proportion of total DV variability explained; $R^2_{\gamma} =$ Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0 =$ Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained.

Table 38
State Cognitive Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics across Models used to test Hypothesis 6

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{\gamma,\delta}$</td>
<td>.0020</td>
<td>.0000</td>
<td>.3956</td>
<td></td>
</tr>
<tr>
<td>$R^2_{\gamma}$</td>
<td>-.0130</td>
<td>.0957</td>
<td>-.0130</td>
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</tr>
<tr>
<td>$R^2_0$</td>
<td>.0549</td>
<td>.0629</td>
<td>.6576</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1362.91</td>
<td>1142.65</td>
<td>895.57</td>
<td>1122.63</td>
</tr>
<tr>
<td>AIC</td>
<td>1368.91</td>
<td>1154.65</td>
<td>907.57</td>
<td>1136.63</td>
</tr>
<tr>
<td>BIC</td>
<td>1383.38</td>
<td>1182.30</td>
<td>934.05</td>
<td>1168.89</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Note. $R^2_{\gamma,\delta} =$ Proportion of total DV variability explained; $R^2_{\gamma} =$ Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0 =$ Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained.
Table 39
State Affective Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics across Models used to test Hypothesis 6

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,\delta}$</td>
<td>.0000</td>
<td>.0002</td>
<td>.6989</td>
<td></td>
</tr>
<tr>
<td>$R^2_r$</td>
<td>.0593</td>
<td>.0297</td>
<td>.0593</td>
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</tr>
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<td>$R^2_0$</td>
<td>.0085</td>
<td>.0043</td>
<td>.7572</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1401.87</td>
<td>1103.54</td>
<td>905.03</td>
<td>1075.40</td>
</tr>
<tr>
<td>AIC</td>
<td>1407.87</td>
<td>1115.54</td>
<td>917.03</td>
<td>1089.40</td>
</tr>
<tr>
<td>BIC</td>
<td>1422.33</td>
<td>1143.18</td>
<td>943.50</td>
<td>1121.65</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,\\delta} = \text{Proportion of total DV variability explained};$ $R^2_r = \text{Proportion of within-subjects variance (i.e., } \sigma^2 \text{) explained};$ $R^2_0 = \text{Proportion of between-subjects intercept variance (i.e., } \tau_{00} \text{) explained.}$

Table 40
State Cognitive Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics across Models used to test Hypothesis 6

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>$R^2_{y,\delta}$</td>
<td>.0001</td>
<td>.0003</td>
<td>.5806</td>
<td></td>
</tr>
<tr>
<td>$R^2_r$</td>
<td>-.0080</td>
<td>.1560</td>
<td>-.0080</td>
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<tr>
<td>$R^2_0$</td>
<td>.0120</td>
<td>-.0211</td>
<td>.6467</td>
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</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1451.96</td>
<td>1196.67</td>
<td>896.14</td>
<td>1176.69</td>
</tr>
<tr>
<td>AIC</td>
<td>1457.96</td>
<td>1208.67</td>
<td>908.14</td>
<td>1190.69</td>
</tr>
<tr>
<td>BIC</td>
<td>1472.43</td>
<td>1236.31</td>
<td>934.61</td>
<td>1222.93</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,\\delta} = \text{Proportion of total DV variability explained};$ $R^2_r = \text{Proportion of within-subjects variance (i.e., } \sigma^2 \text{) explained};$ $R^2_0 = \text{Proportion of between-subjects intercept variance (i.e., } \tau_{00} \text{) explained.}$
Table 41
State Positive Affect: Pseudo $R^2$ and Goodness-of-fit Statistics across Models used to test Hypothesis 6

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>$R^2_{y,i}$</td>
<td>.0003</td>
<td>.0003</td>
<td>.4900</td>
</tr>
<tr>
<td>$R^2_r$</td>
<td>.0000</td>
<td>.1015</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>-.0130</td>
<td>-.0143</td>
<td>.5508</td>
</tr>
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</table>

Deviance (-2LL) 1214.72 1026.78 804.47 1011.02
AIC 1220.72 1038.78 816.47 1025.02
BIC 1235.18 1066.40 842.94 1057.24
No. of parameters 3 6 6 7

Note. $R^2_{y,i}$ = Proportion of total DV variability explained; $R^2_r$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained.

Table 42
State Negative Affect: Pseudo $R^2$ and Goodness-of-fit Statistics across Models used to test Hypothesis 6

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,i}$</td>
<td>.0012</td>
<td>.0020</td>
<td>.2683</td>
</tr>
<tr>
<td>$R^2_r$</td>
<td>-.0682</td>
<td>.0682</td>
<td>-.0682</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>-.0263</td>
<td>.1447</td>
<td>.2895</td>
</tr>
</tbody>
</table>

Deviance (-2LL) -174.93 -78.61 -135.60 -84.83
AIC -168.93 -66.61 -123.60 -70.83
BIC -154.47 -38.99 -97.13 -38.60
No. of parameters 3 6 6 7

Note. $R^2_{y,i}$ = Proportion of total DV variability explained; $R^2_r$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained.
Examining contagion’s directionality. Another avenue explored was the issue of contagion’s hypothesized directionality, from supervisor to subordinate. Although the lack of experimental control precludes tests for causality, the time-series nature of the dataset can support contagion’s directionality. This was examined through a series of analyses similar to Model 6.2, with the exception that SupGrpCentStateX was replaced with newly created variables from the previous time period (i.e., _PTP; Model 6.3). This new ‘SupGrpCentStateX_PTP’ variable was computed by removing the final daily data point (i.e., 4:00 p.m. for all 10 days of the study) from the data set and temporally shifting the new variable. The result was that the supervisor’s 9:00 a.m. data now coincided with his or her subordinate’s 10:00 a.m. data and so on, such that the results of these analyses reflect the extent to which supervisor affect and attitudes predict subordinate affect and attitudes one hour later.

Interestingly, results of these analyses were more supportive of the emotional contagion mechanism. First, both State COGOC ($\gamma_{10} = .088$, $p < .10$) and State NA ($\gamma_{10} = .180$, $p < .10$) demonstrated the expected pattern of relationships (see Table 43 for these analyses only). For example, subordinates reported a 1.195 unit grand mean on State NA; however, this value increased by .180 units for every 1-unit increase in his or her supervisor’s self-reported State NA during the previous time period. This suggests that the more strongly a supervisor experiences State NA, the more likely his or her subordinate will experience an elevated level of State NA, one hour later. Furthermore, the $R_c^2$, $R_0^2$, and deviance statistics generally support the superior model fit of models including the SupGrpCentStateX_PTP variable (i.e., Model 6.3) over models including the SupGrpCentStateX variable (i.e., Model 6.2; see Tables 37 – 42).
Table 43
Model 6.3 - Emotional Contagion: Using Supervisor Data from the Previous Time Period to Predict Subordinate State Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₁₀</td>
</tr>
</tbody>
</table>
| (6.3) Subordinate State Cognitive Org. Commitment –  
Supervisor State Cognitive Org. Commitment-Previous Time Period |       |                                  |      |       |       |
| L1: SubStateCOGOCᵢⱼ = β₀ᵢ + β₁ᵢSupGrpCentStateCOGOC_PTPᵢⱼ + rᵯ |       |                                  |      |       |       |
| L2: β₀ᵢ = γ₀₀ + u₀ᵢ | 4.685** | 2.561** |       |       |       |
| L2: β₁ᵢ = γ₁₀ + u₁ᵢ | .088† | - .091 | .003 |       |       |
| (6.3) Subordinate State Negative Affect –  
Supervisor State Negative Affect-Previous Time Period |       |                                  |      |       |       |
| L1: SubStateNAᵢⱼ = β₀ᵢ + β₁ᵢSupGrpCentStateNA_PTPᵢⱼ + rᵯ |       |                                  |      |       |       |
| L2: β₀ᵢ = γ₀₀ + u₀ᵢ | 1.195** | .065** |       |       |       |
| L2: β₁ᵢ = γ₁₀ + u₁ᵢ | .180† | .070† | .082 |       |       |

Note: L₁ = Level-1; L₂ = Level-2; γ₀₀ = intercept of Level-2 model predicting β₀ᵢ; γ₁₀ = intercept of Level-2 model predicting β₁ᵢ; σ² = within-subjects variance in Level-1 residual (i.e., variance in rᵯ); τ₀₀ = between-subjects variance in Level-2 residual for models predicting β₀ᵢ (i.e., variance in u₀ᵢ); τ₁₁ = variance in Level-2 residual for models predicting β₁ᵢ (i.e., variance in u₁ᵢ).

Note: Variance components (i.e., σ², τ₀₀, τ₁₁) are listed on the diagonal; τ₀₁, the estimated covariance between τ₀₀ and τ₁₁ is listed off the diagonal.

†p < .10.  * p < .05.  **p < .01.
Controlling for subordinate trait affect and attitudes. The inability of SupGrpCentStateX and by extension, SupGrpCentStateX_PTP, to consistently predict subordinate state affect and attitudes, combined with significant between subjects variability surrounding the intercept estimate in all six unconditional means models, led to a final set of analyses. These analyses, Model 6.4, represent a continuation of Hypotheses 4 and 5, which controlled for the effects of trait-based affect and attitudes on intercept values at Level-2 (see Equations 10.1 and 10.2).

\[ SubStateX_{ij} = \beta_{0i} + \beta_{1i}(\text{SupGrpCentStateX}_{ij}) + r_{ij} \]

Where :
\[ \beta_{0i} = \gamma_{00} + \gamma_{01}(\text{SubGMCentTraitX}_{i}) + u_{0i} \]
\[ \beta_{1i} = \gamma_{10} + u_{1i} \]

\[ SubStateX_{ij} = [\gamma_{00} + \gamma_{01}(\text{SubGMCentTraitX}_{i}) + \gamma_{10}(\text{SupGrpCentStateX}_{ij})] + [u_{0i} + u_{1i}(\text{SupGrpCentStateX}_{ij}) + r_{ij}] \]

An examination of these equations indicates that SupGrpCentStateX remains the only Level-1 predictor of within-subjects variability in subordinate state-based affect and attitudes. At Level-2, the subordinate’s grand mean centered ‘TraitX’ value was added to account for between-subjects variability in the intercept value caused by dispositional affect and attitudes. The result, is an examination of the extent to which a supervisor’s state-based affect and attitudes predict similar state-based affect and attitudes in his or her subordinate, above and beyond the subordinate’s characteristic level on these variables. As previously discussed with respect to Hypotheses 4 and 5, controlling for an
individual’s dispositional standing on the variables of interest is theoretically pragmatic, and will occur in the remaining analyses.

Results of these analyses suggest that the addition of SubGMCentTraitX negated the contagion main effect. That is, $\gamma_{10}$ was non-significant for all six dependent variables (see Table 44). Not surprisingly however, SubGMCentTraitX significantly added to the prediction of the intercept above the grand mean in all six analyses. For each dependent variable, subordinates reporting a trait-based affective or attitudinal value above the grand mean also demonstrated consistently higher state-based affect and attitude values. Perhaps more interesting, is the extent to which model fit improved with the inclusion of the SubGMCentTraitX variable. Tables 37 through 42 clearly demonstrate this effect. For example, controlling for ‘TraitX’ resulted in Model 6.4 accounting for 26.83% (State NA) to 69.89% (State AFFOC) of the total variability in subordinate state-based affect and attitudes, far more than Models 6.1, 6.2 or 6.3.

Just as important, the inclusion of SubGMCentTraitX in Model 6.4 accounted for 28.95% (State NA) to 75.72% (State AFFOC) of the variability surrounding the intercept estimate (Note, the inclusion of identical Level-1 predictors (i.e., SupGrpCentStateX) between Model 6.2 and 6.4 resulted in identical $R^2$ values). Although a majority of each dependent variable’s total and between-subjects intercept variability was accounted for by Model 6.4, $\sigma^2$ and $\tau_{00}$ remain significant for all six dependent variables, permitting the inclusion of additional time varying Level-1 and time invariant Level-2 intercept predictors. Similar to Model 6.2, only State PA exhibited significant between-subjects variance surrounding the slope estimates of the contagious affect and attitudes (i.e., $\tau_{11}$). Again, variability surrounding the SupGrpCentStateX slope estimate is necessary to test
the proposed moderation effects and the lack of significant variability likely reflects the limited power of these analyses. Therefore, the hypothesized cross-level interactions will still be tested.

Finally, the deviance statistics generally indicate that controlling for TraitX in Model 6.4 resulted in significant improvements in model fit over both the unconditional means models and models only including SupGrpCentStateX (i.e., Model 6.2). The one exception was for State NA which demonstrated superior model fit for Model 6.4 compared to the unconditional means model, but not compared to Model 6.2. Together, this indicates that by controlling for SubGMCentTraitX, Model 6.4 demonstrated improved model fit and accounted for a greater proportion of the total and between subjects intercept variability than the models previously tested. Combined with the results of Hypotheses 4 and 5, this suggests Model 6.4 be used as the comparison model for the remaining hypotheses.

Together, these analyses provide limited support for the contagion main effects proposed by Hypothesis 6. For example, Hypothesis 6(a) was only partially supported in that only State NA demonstrated the expected contagious effect when measured concomitantly and during the previous time period, but failed to do so when the subordinate’s trait-level NA was taken into account. Furthermore, neither Hypothesis 6(b) nor 6(c) were supported in that both State AFFJS and AFFOC failed to demonstrate the contagion effect under all tested conditions. Finally, the available data also failed to support Hypothesis 6(d) as supervisor State COGOC unexpectedly demonstrated a main effect in the prediction of subordinate State COGOC when measured during the previous time period. Perhaps most importantly, the contagion effect completely disappeared
when controlling for subordinate trait affect and attitudes. That is, after controlling for a subordinate’s characteristic affective and attitudinal state, moment-by-moment fluctuations in a supervisor’s affect and attitudes failed to predict comparable affect and attitudes in his or her subordinate. Fortunately, the failure to identify significant main effects for supervisor affect and attitudes does not preclude the search for potential moderators, which are explored next.
Table 44
Model 6.4 - Emotional Contagion: Controlling for Subordinate Trait Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6.4) Subordinate State Affective Job Satisfaction - Supervisor State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateAFFJS(\gamma_j) = (\beta_0 + \beta_1)SupGrpCentStateAFFJS(\gamma_j) + (r_{ij})</td>
<td></td>
<td>.533**</td>
</tr>
<tr>
<td>L2: (\beta_0 = \gamma_0 + \gamma_0)SubGMCentTraitAFFJS(i) + (u_{0i})</td>
<td>(4.977**)</td>
<td>(.656**)</td>
</tr>
<tr>
<td>L2: (\beta_1 = \gamma_0 + \gamma_1)</td>
<td>(.035)</td>
<td>(-.078)</td>
</tr>
</tbody>
</table>

(6.4) Subordinate State Cognitive Job Satisfaction - Supervisor State Cognitive Job Satisfaction

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJS(\gamma_j) = (\beta_0 + \beta_1)SupGrpCentStateCOGJS(\gamma_j) + (r_{ij})</td>
<td></td>
<td>.233**</td>
</tr>
<tr>
<td>L2: (\beta_0 = \gamma_0 + \gamma_0)SubGMCentTraitCOGJS(i) + (u_{0i})</td>
<td>(5.113**)</td>
<td>(.888**)</td>
</tr>
<tr>
<td>L2: (\beta_1 = \gamma_0 + \gamma_1)</td>
<td>(.122)</td>
<td>.029</td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; \(\gamma_0\) = intercept of Level-2 model predicting \(\beta_0\); \(\gamma_1\) = slope of Level-2 model predicting \(\beta_0\); \(\gamma_0\) = intercept of Level-2 model predicting \(\beta_1\); \(\sigma^2\) = within-subjects variance in Level-1 residual (i.e., variance in \(r_{ij}\)); \(\tau_{00}\) = between-subjects variance in Level-2 residual for models predicting \(\beta_0\) (i.e., variance in \(u_{0i}\)); \(\tau_{11}\) = variance in Level-2 residual for models predicting \(\beta_1\) (i.e., variance in \(u_{1i}\)).

Note: Variance components (i.e., \(\sigma^2\), \(\tau_{00}\), \(\tau_{11}\)) are listed on the diagonal; \(\tau_{01}\), the estimated covariance between \(\tau_{00}\) and \(\tau_{11}\) is listed off the diagonal.

\(\dagger p < .10.\)  \(\ast p < .05.\)  \(\ast\ast p < .01.\)
Table 44 (Cont.)
Model 6.4 - Emotional Contagion: Controlling for Subordinate Trait Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{01}$</td>
</tr>
<tr>
<td>(6.4) Subordinate State Affective Org. Commitment – Supervisor State Affective Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateAFFOC$ij$ = $\beta_0 + \beta_1$SupGrpCentStateAFFOC$ij + r_j$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$SubGMCentTraitAFFOC$_i$ + $u_0$</td>
<td>$5.031^{**}$</td>
<td>$.990^{**}$</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_1$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGOC$ij$ = $\beta_0 + \beta_1$SupGrpCentStateCOGOC$ij + r_j$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$SubGMCentTraitCOGOC$_i$ + $u_0$</td>
<td>$4.694^{**}$</td>
<td>$1.042^{**}$</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_1$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_0$; $\gamma_{01}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_1$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_j$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_0$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_1$ (i.e., variance in $u_1$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.

$p < .10$. * $p < .05$. ** $p < .01$. † $p < .01$. **p < .01.
Table 44 (Cont.)
Model 6.4 - Emotional Contagion: Controlling for Subordinate Trait Affect and Attitudes

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ₀₀</td>
<td>γ₀₁</td>
</tr>
</tbody>
</table>

(6.4) Subordinate State Positive Affect –

Supervisor State Positive Affect
L1: \( \text{SubStatePA}_i = \beta_0 + \beta_1 \text{SupGrpCentStatePA}_i + r_{ij} \)
L2: \( \beta_0 = \gamma_{00} + \gamma_{01} \text{SubGMCent TraitPA}_i + u_0 \)  
\( 3.218^{**} \)  
L2: \( \beta_1 = \gamma_{10} + u_1 \)  
\( 0.001 \)  
\( 0.911^{**} \)  
\( 0.345^{**} \)

(6.4) Subordinate State Negative Affect –

Supervisor State Negative Affect
L1: \( \text{SubStateNA}_i = \beta_0 + \beta_1 \text{SupGrpCentStateNA}_i + r_{ij} \)
L2: \( \beta_0 = \gamma_{00} + \gamma_{01} \text{SubGMCent TraitNA}_i + u_0 \)  
\( 1.208^{**} \)  
L2: \( \beta_1 = \gamma_{10} + u_1 \)  
\( 0.126 \)  
\( 0.234^{*} \)  
\( 0.054^{**} \)

Note: L1 = Level-1; L2 = Level-2; \( \gamma_{00} \) = intercept of Level-2 model predicting \( \beta_0 \); \( \gamma_{01} \) = slope of Level-2 model predicting \( \beta_0 \); \( \gamma_{10} \) = intercept of Level-2 model predicting \( \beta_1 \); \( \sigma^2 \) = within-subjects variance in Level-1 residual (i.e., variance in \( r_{ij} \)); \( \tau_{00} \) = between-subjects variance in Level-2 residual for models predicting \( \beta_0 \) (i.e., variance in \( u_0 \)); \( \tau_{11} \) = variance in Level-2 residual for models predicting \( \beta_1 \) (i.e., variance in \( u_1 \)).

Note: Variance components (i.e., \( \sigma^2, \tau_{00}, \tau_{11} \)) are listed on the diagonal; \( \tau_{01} \), the estimated covariance between \( \tau_{00} \) and \( \tau_{11} \) is listed off the diagonal.

‡\( p < .10 \)  
* \( p < .05 \)  
** \( p < .01 \)
General Model for Cross-Level Moderation

The consistent absence of a significant main effect for supervisor state affect and attitudes on subordinate state affect and attitudes heighten the importance of the remaining hypotheses. These hypotheses all revolve around the same general premise, which is that a trait-level variable, such as emotional contagion susceptibility or emotional expressiveness, will moderate and strengthen the relationship between supervisor and subordinate affect and attitudes. The similarity between these hypotheses allows each to be tested using a multilevel model with the same overall structure. Equation 11.1 depicts the structure of this model (see Equation 11.2 for an algebraically solved version), with each cross-level moderator (i.e., ModZ) being added to the prediction of SupGrpCentStateX’s slope estimate at Level-2.

\[
SubStateX_{ij} = \beta_0 + \beta_1 (SupGrpCentStateX_{ij}) + r_{ij}
\]

Where:

\[
\beta_0 = \gamma_{00} + \gamma_{01} (SubGMCentTraitX_i) + u_{0i}
\]

\[
\beta_1 = \gamma_{10} + \gamma_{11} (ModZ_i) + u_{1i}
\]

\[
SubStateX_{ij} = \left[ \gamma_{00} + \gamma_{01} (SubGMCentTraitX_i) + \gamma_{10} (SupGrpCentStateX_{ij}) \right]
\]

\[
+ \gamma_{11} (ModZ_i * SupGrpCentStateX_{ij})
\]

\[
+ u_{0i} + u_{1i} (SupGrpCentStateX_{ij}) + r_{ij}
\]

As Level-2 now reflects the dyad, the supervisor and subordinate both provide moderator data. For example, the supervisor provided information concerning his or her emotional expressiveness (i.e., Hypothesis 7), and the tenure, in months, that he or she
had worked with the subordinate (i.e., Hypothesis 9). The subordinate on the other hand, provided information concerning his or her emotional contagion susceptibility (i.e., Hypothesis 8), the extent to which he or she liked the supervisor they were participating with (i.e., Hypothesis 10), the power he or she ascribed to the supervisor (i.e., Exploratory Analysis 1), their work self-concept (i.e., Exploratory Analysis 2), and the quality of their relationship with the supervisor (i.e., LMX; Exploratory Analysis 3). Similar to previous Level-2 variables, each of these moderators was grand mean centered against the appropriate sample (i.e., supervisor or subordinate sample). Finally, pseudo $R^2$ and goodness-of-fit statistics were computed by comparing each cross-level moderation model against Model 6.4, rather than the unconditional means model. This permitted the direct calculation of ModZ’s incremental improvement in model fit and the prediction of subordinate affect and attitudes, above and beyond the effects of supervisor state and subordinate trait affect and attitudes. As the only additional variable in each subsequent model is ModZ, a Level-2 predictor of the slope parameter, improvements in model fit should primarily be expected between-subjects in the slope estimate (i.e., $R^2_i$), rather than the within- (i.e., $R^2_r$) or between-subjects intercept variance estimates (i.e., $R^2_{0i}$; for each dependent variable’s pseudo $R^2$ and goodness-of-fit statistics, see Tables 46 – 51 and Tables 54 – 59 for Hypotheses 7-10 and Exploratory Analysis 1-3, respectively).

**Hypothesis 7**

Based on the available literature, Hypothesis 7 suggests that within a dyad, the supervisor’s emotional expressiveness will moderate the emotional contagion process, such that the more emotionally expressive the supervisor, the stronger the relationship between the supervisor’s state-based affect and attitudes and his or her subordinate’s. Of
the six dependent variables, only Negative Affect demonstrated the expected pattern of relationships (see Table 45). The results suggest that when all other variables are at their respective grand and group-centered means, subordinates reported an average State NA rating of 1.209 ($p < .01$) on a 5-point scale. However, subordinates with a Trait NA rating 1-unit above the grand mean, also reported an average State NA personal intercept value .263-units ($p < .01$) higher than $\gamma_{00}$. This suggests that those subordinates reporting a higher than average level of Trait NA also consistently reported higher levels of State NA, all other variables being equal. Unfortunately, the inclusion of supervisor emotional expressiveness at Level-2 increased variability in the intercept estimate ($R_{0}^{2} = -.1296$; see Table 51); however, $\tau_{00}$ remains significant ($\tau_{00} = .061$, $p < .01$) suggesting other Level-2 intercept predictors can be added to the model.

Next, notice that although the main effect of SupGrpCentStateNA was not significant ($\gamma_{10} = .051$, $p > .10$), its interaction with supervisor emotional expressiveness was ($\gamma_{11} = .196$, $p < .05$). An interpretation of this cross-level interaction suggests that, controlling for subordinate Trait NA, the combined effect of a supervisor 1-unit above the grand mean on emotional expressiveness and 1-unit above his or her personal State NA mean, resulted in a significant .247-unit increase in his or her subordinate’s reported State NA. The inclusion of supervisor emotional expressiveness as a cross-level moderator reduced variability surrounding this slope estimate by 90% (i.e., $R_{1}^{2}$). As $\tau_{11}$ is non-significant, no further additions should be made to the prediction of the slope term. However, $\sigma^{2}$ remains significant, suggesting additional Level-1 variables could be added to account for the remaining significant within-subjects variability which also increased
slightly with the inclusion of supervisor emotional expressiveness ($R^2_r = -.1489$).

Finally, the inclusion of supervisor emotional expressiveness at Level-2 resulted in the model accounting for slightly more total subordinate State NA variability ($R^2_{y,y} = .2777$); however, while the AIC and BIC supported the superiority of this model, the deviance statistic did not ($\Delta D_1 = 1.07, p > .05$). Together, these results partially support Hypothesis 7(a) only, as neither affective attitude (i.e., AFFJS or AFFOC) nor State PA demonstrated the expected moderator effect.
Table 45
Hypothesis 7 – Moderating Effects of Supervisor Emotional Expressiveness

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \gamma_{00} )</td>
<td>( \gamma_{01} )</td>
</tr>
<tr>
<td>Subordinate State Negative Affect – Supervisor State Negative Affect</td>
<td>( \beta_0 + \beta_1 \text{SupGrpCentStateNA}<em>{ij} + \epsilon</em>{ij} )</td>
<td>( \gamma_{00} + \gamma_{01} \text{SubGMCentTraitNA}<em>i + \epsilon</em>{0i} )</td>
</tr>
<tr>
<td>L1: ( \beta_0 = \gamma_{00} + \gamma_{01} \text{SubGMCentTraitNA}<em>i + \epsilon</em>{0i} )</td>
<td>1.209**</td>
<td>.263*</td>
</tr>
<tr>
<td>L2: ( \beta_1 = \gamma_{10} + \gamma_{11} \text{SupGMCentEmotExpressiveness}<em>i + \epsilon</em>{1i} )</td>
<td>( \gamma_{10} )</td>
<td>( \gamma_{11} )</td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; \( \gamma_{00} \) = intercept of Level-2 model predicting \( \beta_{0i} \); \( \gamma_{01} \) = slope of Level-2 model predicting \( \beta_{0i} \); \( \gamma_{10} \) = intercept of Level-2 model predicting \( \beta_{1i} \); \( \gamma_{11} \) = slope of Level-2 model predicting \( \beta_{1i} \); \( \sigma^2 \) = within-subjects variance in Level-1 residual (i.e., variance in \( \epsilon_{ij} \)); \( \tau_{00} \) = between-subjects variance in Level-2 residual for models predicting \( \beta_{0i} \) (i.e., variance in \( \epsilon_{0i} \)); \( \tau_{11} \) = variance in Level-2 residual for models predicting \( \beta_{1i} \) (i.e., variance in \( \epsilon_{1i} \)).

Note: Variance components (i.e., \( \sigma^2 \), \( \tau_{00} \), \( \tau_{11} \)) are listed on the diagonal; \( \tau_{01} \), the estimated covariance between \( \tau_{00} \) and \( \tau_{11} \) is listed off the diagonal.

\( \hat{p} < .10 \). * \( p < .05 \). ** \( p < .01 \).
Table 46
State Affective Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics for Hypotheses 7-10

<table>
<thead>
<tr>
<th>Model 6.4: Controlling for TraitAFFJS</th>
<th>Hypothesis 7: Emotional Expressiveness</th>
<th>Hypothesis 8: Emotional Contagion</th>
<th>Hypothesis 9: Tenure with Supervisor</th>
<th>Hypothesis 10: Supervisor Liking</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,j}$</td>
<td>.3260</td>
<td>.3260</td>
<td>.3260</td>
<td>.3249</td>
</tr>
<tr>
<td>$R_t^2$</td>
<td>.0000</td>
<td>-.0019</td>
<td>.0000</td>
<td>-.0019</td>
</tr>
<tr>
<td>$R_0^2$</td>
<td>-.0018</td>
<td>-.0036</td>
<td>-.0018</td>
<td>-.0018</td>
</tr>
<tr>
<td>$R_1^2$</td>
<td>.1500</td>
<td>.4500</td>
<td>-.0500</td>
<td>.1500</td>
</tr>
</tbody>
</table>

| Deviance (-2LL)                     | 1717.75                                | 1717.43                           | 1716.93                             | 1717.33                          | 1717.21 |
| AIC                                 | 1731.75                                | 1733.43                           | 1732.93                             | 1733.33                          | 1733.21 |
| BIC                                 | 1764.02                                | 1770.32                           | 1769.82                             | 1770.22                          | 1770.09 |
| No. of parameters                   | 7                                      | 8                                 | 8                                   | 8                                | 8       |

Note. $R^2_{y,j} = \text{Proportion of total DV variability explained}; R_t^2 = \text{Proportion of within-subjects variance (i.e., } \sigma^2) \text{ explained}; R_0^2 = \text{Proportion of between-subjects intercept variance (i.e., } \tau_{00}) \text{ explained}; R_1^2 = \text{Proportion of between-subjects slope/IV1 variance (i.e., } \tau_{11}) \text{ explained.}$
Table 47
State Cognitive Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics for Hypotheses 7-10

<table>
<thead>
<tr>
<th>Model 6.4: Controlling for TraitCOGJS</th>
<th>Hypothesis 7: Emotional Expressiveness</th>
<th>Hypothesis 8: Emotional Contagion</th>
<th>Hypothesis 9: Tenure with Supervisor</th>
<th>Hypothesis 10: Supervisor Liking $^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,j}$</td>
<td>.3956</td>
<td>.3969</td>
<td>.3956</td>
<td>.3982</td>
</tr>
<tr>
<td>$R^2_y$</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>.0000</td>
<td>.0023</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_1$</td>
<td>.0000</td>
<td>.0909</td>
<td>.0000</td>
<td>.5091</td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1122.63</td>
<td>1122.62</td>
<td>1120.60</td>
<td>1122.62</td>
</tr>
<tr>
<td>AIC</td>
<td>1136.63</td>
<td>1138.62</td>
<td>1136.60</td>
<td>1138.62</td>
</tr>
<tr>
<td>BIC</td>
<td>1168.89</td>
<td>1175.48</td>
<td>1173.47</td>
<td>1175.49</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,j}$ = Proportion of total DV variability explained; $R^2_y$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained. $^a$ significant cross-level emotional contagion moderator.
Table 48
State Affective Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics for Hypotheses 7-10

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Model 6.4: Controlling for TraitAFFOC</th>
<th>Hypothesis 7: Emotional Expressiveness</th>
<th>Hypothesis 8: Emotional Contagion</th>
<th>Hypothesis 9: Tenure with Supervisor</th>
<th>Hypothesis 10: Supervisor Liking</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,j}$</td>
<td>.6989</td>
<td>.6989</td>
<td>.6989</td>
<td>.6989</td>
<td>.6989</td>
</tr>
<tr>
<td>$R^2_{y}$</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>.0018</td>
<td>.0053</td>
<td>.0105</td>
<td>-.0018</td>
<td></td>
</tr>
<tr>
<td>$R^2_1$</td>
<td>.0000</td>
<td>-1.0000</td>
<td>.0000</td>
<td>.0000</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1075.40</td>
<td>1075.32</td>
<td>1074.90</td>
<td>1073.35</td>
<td>1074.60</td>
</tr>
<tr>
<td>AIC</td>
<td>1089.40</td>
<td>1091.32</td>
<td>1090.90</td>
<td>1089.35</td>
<td>1090.60</td>
</tr>
<tr>
<td>BIC</td>
<td>1121.65</td>
<td>1128.17</td>
<td>1127.75</td>
<td>1126.20</td>
<td>1127.45</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,j}$ = Proportion of total DV variability explained; $R^2_{y}$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.
<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Model 6.4: Controlling for TraitCOGOC</th>
<th>Hypothesis 7: Emotional Expressiveness</th>
<th>Hypothesis 8: Emotional Contagion</th>
<th>Hypothesis 9: Tenure with Supervisor</th>
<th>Hypothesis 10: Supervisor Liking</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R_{y,eta}^2$</td>
<td>.5806</td>
<td>.5791</td>
<td>.5806</td>
<td>.5806</td>
<td>.5806</td>
</tr>
<tr>
<td>$R_y^2$</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R_0^2$</td>
<td>-.0011</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R_1^2$</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1176.69</td>
<td>1175.69</td>
<td>1175.84</td>
<td>1176.69</td>
<td>1176.68</td>
</tr>
<tr>
<td>AIC</td>
<td>1190.69</td>
<td>1191.69</td>
<td>1191.84</td>
<td>1192.69</td>
<td>1192.68</td>
</tr>
<tr>
<td>BIC</td>
<td>1222.93</td>
<td>1228.54</td>
<td>1228.70</td>
<td>1229.54</td>
<td>1229.53</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>7</td>
<td>8</td>
<td>8</td>
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<td>8</td>
</tr>
</tbody>
</table>

Note. $R_{y,eta}^2$ = Proportion of total DV variability explained; $R_y^2$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R_0^2$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R_1^2$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.
Table 50
State Positive Affect: Pseudo $R^2$ and Goodness-of-fit Statistics for Hypotheses 7-10

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Model 6.4: Controlling for TraitPA</th>
<th>Hypothesis 7: Emotional Expressiveness</th>
<th>Hypothesis 8: Emotional Contagion</th>
<th>Hypothesis 9: Tenure with Supervisor</th>
<th>Hypothesis 10: Supervisor Liking</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,j}$</td>
<td>.4900</td>
<td>.4872</td>
<td>.4872</td>
<td>.4900</td>
<td>.4900</td>
</tr>
<tr>
<td>$R^2_y$</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_0$</td>
<td>.0000</td>
<td>.0000</td>
<td>.0029</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_1$</td>
<td>.0162</td>
<td>.1053</td>
<td>.0283</td>
<td>.0688</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>1011.02</td>
<td>1010.59</td>
<td>1009.25</td>
<td>1010.69</td>
<td>1009.32</td>
</tr>
<tr>
<td>AIC</td>
<td>1025.02</td>
<td>1026.59</td>
<td>1025.25</td>
<td>1026.69</td>
<td>1025.32</td>
</tr>
<tr>
<td>BIC</td>
<td>1057.24</td>
<td>1063.43</td>
<td>1062.08</td>
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<td>1062.16</td>
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<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,j} =$ Proportion of total DV variability explained; $R^2_y =$ Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0 =$ Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1 =$ Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.
Table 51
State Negative Affect: Pseudo $R^2$ and Goodness-of-fit Statistics for Hypotheses 7-10

<table>
<thead>
<tr>
<th></th>
<th>Model 6.4: Controlling for TraitNA</th>
<th>Hypothesis 7: Emotional Expressiveness</th>
<th>Hypothesis 8: Emotional Contagion</th>
<th>Hypothesis 9: Tenure with Supervisor</th>
<th>Hypothesis 10: Supervisor Liking</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2_{y,\beta}$</td>
<td>.2683</td>
<td>.2777</td>
<td>.2673</td>
<td>.2683</td>
<td>.2714</td>
</tr>
<tr>
<td>$R^2_\gamma$</td>
<td>-.1489</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
<td>.0000</td>
</tr>
<tr>
<td>$R^2_0$</td>
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<tr>
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<td>-85.49</td>
<td>-84.85</td>
<td>-85.33</td>
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<tr>
<td>AIC</td>
<td>-70.83</td>
<td>-67.76</td>
<td>-69.49</td>
<td>-68.85</td>
<td>-69.33</td>
</tr>
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<td>-30.93</td>
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<td>-32.50</td>
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<td>7</td>
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</table>

Note. $R^2_{y,\beta} =$ Proportion of total DV variability explained; $R^2_\gamma =$ Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0 =$ Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1 =$ Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.

*a* significant cross-level emotional contagion moderator.
Hypothesis 8

The next hypothesis proposes that the subordinate’s susceptibility to emotional contagion will moderate the relationship between supervisor and subordinate affect and attitudes. Even though including emotional contagion susceptibility as a Level-2 moderator generally increased the proportion of slope variance accounted for, the cross-level interaction term failed to reach significance for all six dependent variables. These models also generally accounted for the same or less, total, within-subjects and between-subjects intercept variance, compared to Model 6.4, which excluded the interaction term. Furthermore, changes in the deviance statistic across all six dependent variables were non-significant. These results fail to support Hypothesis 8.

Hypothesis 9

Next, Hypothesis 9 proposed that dyadic tenure between the supervisor and subordinate would moderate the supervisor-subordinate contagion process, with dyads who had worked together for a longer time expected to demonstrate stronger relationships between supervisor and subordinate state affect and attitudes. Even though tenure was intentionally measured in months, rather than years, to increase variability, the cross-level interaction term for dyadic tenure failed to achieve significance with all six dependent variables. Furthermore, the inclusion of supervisor-subordinate tenure at Level-2 had little-to-no effect on the pseudo $R^2$ indices, even for the slope parameter. Including supervisor-subordinate tenure also failed to significantly improve model fit, as $\Delta D$ was non-significant and the AIC and BIC indices were slightly higher across all six dependent variables. Therefore, Hypothesis 9 was not supported.
Hypothesis 10

As the final moderator proposed by the existing emotional contagion literature, Hypothesis 10 proposes that the extent to which the subordinate personally likes his or her supervisor will moderate the relationship between the supervisor’s and subordinate’s state affect and attitudes, with greater supervisor liking leading to greater supervisor-subordinate similarities. Results of these analyses indicate that supervisor liking moderated the contagious nature of only State COGJS. As seen in Table 52, when all other variables are at their respective grand and group-centered means, subordinates reported an average State COGJS rating of 5.113 ($p < .01$). Again, subordinates reporting higher Trait COGJS also reported higher State COGJS ratings ($\gamma_{01} = .896, p < .01$), controlling for the remaining variables. Interestingly, SupGrpCentStateCOGJS demonstrated a significant main effect in the analysis ($\gamma_{10} = .120, p < .10$); however, this was superseded by its significant interaction with supervisor liking ($\gamma_{11} = .128, p < .05$). The nature of this interaction suggests that when a supervisor is 1-unit above his or her personal State COGJS average, and the subordinate reported liking the supervisor 1-unit higher than the grand-mean, the subordinate demonstrated a .248-unit increase in his or her State COGJS rating.

The inclusion of supervisor liking as a Level-2 moderator of the SupGrpCentStateCOGJS slope estimate resulted in a significantly better fitting model ($\Delta D_1 = 5.99, p < .05$; see Table 47). Moreover, including supervisor liking reduced variability surrounding the slope parameter estimate by nearly 51% ($R^2_1 = .5091$), an effect exhibited to lesser degrees by State AFFJS ($R^2_1 = .1500$), PA ($R^2_1 = .0688$), and NA ($R^2_1 = .1750$). Including supervisor liking as a Level-2 moderator also resulted in the
model accounting for slightly more total State COGJS variance ($R^2_{y} = .3982$) compared to Model 6.4 which excluded the moderator ($R^2_{y} = .3956$); however, within-subjects and variability surrounding the intercept remained unchanged, still permitting the inclusion of additional Level-1 and 2 predictors. Unfortunately, even though the moderating effect of supervisor liking on the supervisor-subordinate State COGJS relationship was supported by these results, they directly contradict Hypothesis 10, which argued for a moderating effect on subordinate State PA, NA, AFFJS and AFFOC. Therefore, Hypothesis 10 was not supported.
Table 52
Hypothesis 10 – Moderating Effects of Supervisor Liking

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subordinate State Cognitive Job Satisfaction – Supervisor State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJS&lt;sub&gt;i&lt;/sub;j = β&lt;sub&gt;0&lt;/sub&gt;i + β&lt;sub&gt;1&lt;/sub&gt;iSupGrpCentStateCOGJS&lt;sub&gt;i&lt;/sub;j&lt;/sub&gt; + &lt;sub&gt;r&lt;/sub&gt;&lt;sub&gt;i&lt;/sub;j</td>
<td>233**</td>
<td></td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;0&lt;/sub&gt;i = γ&lt;sub&gt;00&lt;/sub&gt; + γ&lt;sub&gt;01&lt;/sub&gt;iSubGMCentTraitCOGJS&lt;sub&gt;i&lt;/sub&gt; + u&lt;sub&gt;0&lt;/sub&gt;i</td>
<td>5.113**</td>
<td>.896**</td>
</tr>
<tr>
<td>L2: β&lt;sub&gt;1&lt;/sub&gt;i = γ&lt;sub&gt;10&lt;/sub&gt; + γ&lt;sub&gt;11&lt;/sub&gt;iSubGMCentSupLiking&lt;sub&gt;i&lt;/sub&gt; + u&lt;sub&gt;1&lt;/sub&gt;i</td>
<td></td>
<td>.120†</td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; γ<sub>00</sub> = intercept of Level-2 model predicting β<sub>0</sub>i; γ<sub>01</sub> = slope of Level-2 model predicting β<sub>0</sub>i; γ<sub>10</sub> = intercept of Level-2 model predicting β<sub>1</sub>i; γ<sub>11</sub> = slope of Level-2 model predicting β<sub>1</sub>i; σ<sup>2</sup> = within-subjects variance in Level-1 residual (i.e., variance in <sub>r</sub><sub>i</sub;j); τ<sub>00</sub> = between-subjects variance in Level-2 residual for models predicting β<sub>0</sub>i (i.e., variance in u<sub>0</sub>i); τ<sub>11</sub> = variance in Level-2 residual for models predicting β<sub>1</sub>i (i.e., variance in u<sub>1</sub>i).

Note: Variance components (i.e., σ<sup>2</sup>, τ<sub>00</sub>, τ<sub>11</sub>) are listed on the diagonal; τ<sub>01</sub>, the estimated covariance between τ<sub>00</sub> and τ<sub>11</sub> is listed off the diagonal.

†p < .10. *p < .05. **p < .01.
**Exploratory Analysis 1**

The remaining analyses represent a series of exploratory analyses based on the Industrial/Organizational Psychology literature, rather than variables traditionally studied in emotional contagion research. As such, little-to-no existing research supported the potential moderating effects of these variables. However, these variables were examined due to their known influence on the type of relationship enjoyed by each dyad (i.e., power, LMX) and to study the influence of the subordinate’s self-definition in relation to others (i.e., work-self concept). Interestingly, all three exploratory analyses returned significant cross-level moderation effects.

Exploratory Analysis 1 extends the previous analyses by examining the cross-level moderating effect of power on the relationship between supervisor and subordinate affect and attitudes. Recall that according to French and Raven (1959), interpersonal power has five bases (i.e., reward, referent, coercive, legitimate, and expert power); however, for simplicity, only an overall power assessment was examined (i.e., the intent was to study the effect of how much power the subordinate ascribed to the supervisor; therefore, only subordinate data was used). Using the same general multi-level model (see Equation 11.1), the results suggest that interpersonal power has a cross-level moderating effect on the contagion mechanism for COGJS, COGOC and PA (see Table 53). Although the significant moderating effect of interpersonal power on the cognitively oriented attitudes contradicts the hypothesized effect, the significant moderating effect on PA partially supports Exploratory Analysis 1 (see Tables 54 – 59 for pseudo $R^2$ and goodness-of-fit information).
Table 53
Exploratory Analysis 1 – Moderating Effects of Interpersonal Power

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
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<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{01}$</td>
</tr>
<tr>
<td>Subordinate State Cognitive Job Satisfaction – Supervisor State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJS$<em>{ij}$ = $\beta_0 + \beta_1$SupGrpCentStateCOGJS$</em>{ij}$ + $r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$SubGMCentTraitCOGJS$_{ij}$ + $u_0$</td>
<td>5.113**</td>
<td>.936***</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + \gamma_{11}$SubGMCentPower$_{ij}$ + $u_1$</td>
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<td>.557***</td>
</tr>
<tr>
<td>L1: SubStateCOGOC$<em>{ij}$ = $\beta_0 + \beta_1$SupGrpCentStateCOGOC$</em>{ij}$ + $r_{ij}$</td>
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<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$SubGMCentTraitCOGOC$_{ij}$ + $u_0$</td>
<td>4.698**</td>
<td>1.066**</td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + \gamma_{11}$SubGMCentPower$_{ij}$ + $u_1$</td>
<td>.006</td>
<td>-.516**</td>
</tr>
<tr>
<td>Subordinate State Positive Affect – Supervisor State Positive Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStatePA$<em>{ij}$ = $\beta_0 + \beta_1$SupGrpCentStatePA$</em>{ij}$ + $r_{ij}$</td>
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<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}$SubGMCentTraitPA$_{ij}$ + $u_0$</td>
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<td>.850**</td>
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</table>

Note: L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_0$; $\gamma_{01}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_1$; $\gamma_{11}$ = slope of Level-2 model predicting $\beta_1$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00}$ = between-subjects variance in Level-1 residual in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_0$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_1$ (i.e., variance in $u_1$).

Note: Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.

$\dagger p < .10$, $^* p < .05$, $^{**} p < .01$. 

Note: Validation components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.
### Table 54
State Affective Job Satisfaction: Pseudo $R^2$ and Goodness-of-fit Statistics for Exploratory Analyses 1-3

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Note. $R^2_{y,\hat{y}}$ = Proportion of total DV variability explained; $R^2_r$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV 1 variance (i.e., $\tau_{11}$) explained.
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<tbody>
<tr>
<td>Model 6.4: Controlling for TraitCOGJS</td>
<td>Model 6.4: Controlling for TraitCOGJS</td>
<td>Model 6.4: Controlling for TraitCOGJS</td>
<td>Model 6.4: Controlling for TraitCOGJS</td>
<td>Model 6.4: Controlling for TraitCOGJS</td>
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Note. $R^2_{y,j}$ = Proportion of total DV variability explained; $R^2_y$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.

*significant cross-level emotional contagion moderator.
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Note. $R^2_{y,.y}$ = Proportion of total DV variability explained; $R^2_y$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_o$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.
Table 57
State Cognitive Organizational Commitment: Pseudo $R^2$ and Goodness-of-fit Statistics for Exploratory Analyses 1-3

<table>
<thead>
<tr>
<th></th>
<th>Exploratory Analysis 1: Power $^a$</th>
<th>Exploratory Analysis 2: Independent WSC</th>
<th>Exploratory Analysis 2: Relational WSC</th>
<th>Exploratory Analysis 2: Collective WSC</th>
<th>Exploratory Analysis 3: LMX $^a$</th>
</tr>
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<td>$R^2_{y,j}$</td>
<td>.5806</td>
<td>.5822</td>
<td>.5806</td>
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<td>$R_y^2$</td>
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</table>

Note. $R^2_{y,j}$ = Proportion of total DV variability explained; $R^2_y$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV 1 variance (i.e., $\tau_{11}$) explained.

$^a$ significant cross-level emotional contagion moderator.
Table 58
State Positive Affect: Pseudo $R^2$ and Goodness-of-fit Statistics for Exploratory Analyses 1-3

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<td>1063.67</td>
<td>1063.78</td>
<td>1063.83</td>
<td>1062.57</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
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<td>8</td>
</tr>
</tbody>
</table>

Note. $R^2_{y,y}$ = Proportion of total DV variability explained; $R^2_y$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_{0}$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_{1}$ = Proportion of between-subjects slope/IV 1 variance (i.e., $\tau_{11}$) explained.

*significant cross-level emotional contagion moderator.
Table 59
State Negative Affect: Pseudo $R^2$ and Goodness-of-fit Statistics for Exploratory Analyses 1-3

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>$R^2_{y,y}$</td>
<td>.2683</td>
<td>.2683</td>
<td>.2673</td>
<td>.2756</td>
<td>.2694</td>
<td>.2714</td>
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<tr>
<td>$R^2_{y}$</td>
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<td>.0000</td>
<td>-.0638</td>
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<tr>
<td>$R^2_0$</td>
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<td>-.0741</td>
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<tr>
<td>$R^2_1$</td>
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<td>-.0750</td>
<td>.9250</td>
<td>.0500</td>
<td>.1000</td>
<td></td>
</tr>
<tr>
<td>Deviance (-2LL)</td>
<td>-84.83</td>
<td>-84.83</td>
<td>-85.06</td>
<td>-86.83</td>
<td>-85.78</td>
<td>-85.80</td>
</tr>
<tr>
<td>BIC</td>
<td>-38.60</td>
<td>-32.00</td>
<td>-32.23</td>
<td>-34.00</td>
<td>-32.94</td>
<td>-32.97</td>
</tr>
<tr>
<td>No. of parameters</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
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<td>8</td>
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</tbody>
</table>

Note. $R^2_{y,y}$ = Proportion of total DV variability explained; $R^2_{y}$ = Proportion of within-subjects variance (i.e., $\sigma^2$) explained; $R^2_0$ = Proportion of between-subjects intercept variance (i.e., $\tau_{00}$) explained; $R^2_1$ = Proportion of between-subjects slope/IV1 variance (i.e., $\tau_{11}$) explained.

*significant cross-level emotional contagion moderator.*
For example, subordinates reported an average State COGJS rating of 5.113 on a 7-point scale ($p < .01$) when all other variables were at their respective grand or group-centered means. However, subordinates who reported a Trait COGJS rating 1-unit above the grand mean, reported on average, a State COGJS rating .936-units higher. Next, the results suggest that although there was no main effect of supervisor State COGJS on subordinate State COGJS ($\gamma_{10} = .110, p > .10$), interpersonal power significantly moderated this relationship ($\gamma_{11} = .557, p < .01$). These results suggest that when all other variables were at their respective grand and group-centered means, a 1-unit increase in a supervisor’s State COGJS above his or her own group-centered mean resulted in a non-significant .110-unit increase in his or her subordinate’s State COGJS rating. However, when the supervisor was 1-unit above his or her own group-centered mean on State COGJS and the subordinate ascribed 1-unit more than the grand-mean of power to the supervisor, the subordinate’s State COGJS rating was .667-units higher. That is, the more power the subordinate ascribed to the supervisor, the stronger the relationship between his or her own State COGJS and that of his or her supervisor (see Figure 8 for a graphic depiction of power’s moderating effect on SubStateCOGJS. Listed values are based on predictor values 1 SD above and below the mean (e.g., Aiken & West, 1991)).
As expected, including power as a significant supervisor-subordinate COGJS relationship moderator resulted in a slight increase in the total amount of subordinate State COGJS accounted for, when compared against Model 6.4 ($R^2_{y.\delta} = .4007$; see Table 55). As within-subjects ($\sigma^2 = .232, p < .01$) and between-subjects variability surrounding the intercept ($\tau_{00} = .430, p < .01$) remain significant, additional Level-1 and 2 variables can be added. More importantly, the addition of power at Level-2 resulted in a 41.82% decline in the variability surrounding the slope estimate. Finally, adding interpersonal power as a Level-2 moderator significantly improved model fit over Model 6.4 ($\Delta D_1 = 9.78, p < .01$).
Using State PA as the dependent variable in Exploratory Analysis 1 returned a similar pattern of results. For example, SubGMCentTraitPA significantly added to the prediction of the intercept value ($\gamma_{01} = .977, p < .01$; $\alpha_{00} = .347, p < .01$); however, adding interpersonal power as a cross-level moderator resulted in slightly less intercept variability being accounted for ($R^2_0 = -.0058$; see Table 58), compared to Model 6.4. Furthermore, a non-significant main effect of supervisor State PA ($\gamma_{10} = -.005, p > .10$) was paired with a significant moderating effect of power on the supervisor-subordinate relationship ($\gamma_{11} = .850, p < .01$), which resulted in 37.25% more slope variance being accounted for, compared to Model 6.4. Again, the inclusion of interpersonal power at Level-2 significantly improved the model’s fit over Model 6.4 ($\Delta D_1 = 8.41, p < .01$).

More interesting however, was evidence of a significant negative parameter estimate for the power moderator in the State COGOC equation (compare power’s positive and negative moderating effects on State COGJS and COGOC in Figures 8 and 9 respectively).
Figure 9. Negative moderating effect of power on State COGOC

For example, subordinates reported an average State COGOC rating of 4.698 ($p < .01$) on a 7-point scale, controlling for all other variables. This intercept was supplemented by Trait COGOC, where a 1-unit increase in Trait COGOC above the grand mean, controlling for the remaining variables, resulted in a significant 1.066-unit increase in the State COGOC intercept. More importantly, the results suggest a non-significant main effect of supervisor State COGOC on subordinate State COGOC ($\gamma_{10} = .006, p > .10$) combined with a significant negative moderating effect of power ($\gamma_{11} = - .516, p < .01$). This suggests that a supervisor above his or her personal State COGOC mean who was ascribed greater than average power, would have a subordinate experiencing significantly lower State COGOC at the same time. Also, notice that
although interpersonal power was a significant moderator, and improved overall model fit
compared to Model 6.4 ($\Delta D_1 = 8.51, p < .01$), the addition of power at Level-2 did not
decrease variability surrounding the slope estimate (see Table 57). This reflects the fact
that the slope estimate for supervisor State COGOC had no remaining variability in
Model 6.4.

Of the six dependent variables, State COGOC was the only variable to
demonstrate a significant negative moderation effect across all tested moderators. This
suggests that something about the measurement of cognitive organizational commitment
in the current study, rather than the contagion mechanism may have been the cause of
these results. This issue will be explored further in the discussion.

**Exploratory Analysis 2**

Exploratory Analysis 2 examined the extent to which the subordinate’s work self-
concept moderated the supervisor-subordinate relationship. Recall that on the Friday
preceding the ESM period, participants were asked to respond to subscales reflecting an
Independent, Relational, or Collective work self-concept (i.e., WSC). Of the three, only
the Relational WSC demonstrated a moderating effect on the contagion mechanism.
Theoretically, this is plausible as the Independent WSC subscale assessed the extent to
which individuals compare themselves against others, the Relational WSC subscale
measured an individual’s concern for others, and the Collective WSC subscale assessed
the extent to which an individual valued group achievements.

Results of these analyses (see Table 60) demonstrate that the Relational WSC had
a positive moderating effect on the supervisor-subordinate contagion effect for State
COGIS, PA and NA. In all three instances, possessing a higher than average Relational
WSC resulted in a stronger relationship between a supervisor’s and subordinate’s affect and attitudes. For example, when all other variables were at their respective grand and group-centered means, subordinates reported an average State COGJS rating of 5.113 ($p < .01$) on a 7-point scale. This was augmented by the subordinate’s Trait COGJS rating ($\gamma_0 = .819$, $p < .01$), which again suggests that all else being equal, subordinates who reported above average Trait COGJS, also reported higher average State COGJS ratings. Finally, although the main effect of SupGrpCentStateCOGJS was non-significant ($\gamma_0 = .105$, $p > .10$), its relationship with subordinate StateCOGJS was moderated by the subordinate’s Relational WSC ($\gamma_1 = .675$, $p < .01$). This suggests that controlling for the remaining variables, when the supervisor was 1-unit above his or her personal StateCOGJS average, and the subordinate reported a Relational WSC 1-unit above the grand mean, the subordinate also reported on average, a State COGJS rating .780-units above the mean.
Table 60
Exploratory Analysis 2 – Moderating Effects of Relational Work Self-Concept

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( \gamma_0 )</td>
<td>( \gamma_0 )</td>
</tr>
<tr>
<td>Subordinate State Cognitive Job Satisfaction – Supervisor State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJS(<em>{ij}) = ( \beta_0 + \beta_1 \text{SupGrpCentStateCOGJS}</em>{ij} + r_{ij} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ( \beta_0 = \gamma_0 + \gamma_0 \text{SubGMCentTraitCOGJS} + u_0 )</td>
<td>5.113**</td>
<td>.819**</td>
</tr>
<tr>
<td>L2: ( \beta_1 = \gamma_0 + \gamma_1 \text{SubGMCentRelationalWSC} + u_1 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subordinate State Positive Affect – Supervisor State Positive Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStatePA(<em>{ij}) = ( \beta_0 + \beta_1 \text{SupGrpCentStatePA}</em>{ij} + r_{ij} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ( \beta_0 = \gamma_0 + \gamma_0 \text{SubGMCentTraitPA} + u_0 )</td>
<td>3.218**</td>
<td>.900**</td>
</tr>
<tr>
<td>( \beta_1 = \gamma_0 + \gamma_1 \text{SubGMCentRelationalWSC} + u_1 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subordinate State Negative Affect – Supervisor State Negative Affect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateNA(<em>{ij}) = ( \beta_0 + \beta_1 \text{SupGrpCentStateNA}</em>{ij} + r_{ij} )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: ( \beta_0 = \gamma_0 + \gamma_0 \text{SubGMCentTraitNA} + u_0 )</td>
<td>1.208**</td>
<td>.266*</td>
</tr>
<tr>
<td>( \beta_1 = \gamma_0 + \gamma_1 \text{SubGMCentRelationalWSC} + u_1 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: L1 = Level-1; L2 = Level-2; \( \gamma_0 \) = intercept of Level-2 model predicting \( \beta_0 \); \( \gamma_0 \) = slope of Level-2 model predicting \( \beta_0 \); \( \gamma_1 \) = intercept of Level-2 model predicting \( \beta_1 \); \( \gamma_1 \) = slope of Level-2 model predicting \( \beta_1 \); \( \sigma^2 \) = within-subjects variance in Level-1 residual (i.e., variance in \( r_{ij} \)); \( \tau_{00} \) = between-subjects variance in Level-2 residual for models predicting \( \beta_0 \) (i.e., variance in \( u_0 \)); \( \tau_{11} \) = variance in Level-2 residual for models predicting \( \beta_1 \) (i.e., variance in \( u_1 \)).

Note: Variance components (i.e., \( \sigma^2 \), \( \tau_{00} \), \( \tau_{11} \)) are listed on the diagonal; \( \tau_{01} \), the estimated covariance between \( \tau_{00} \) and \( \tau_{11} \) is listed off the diagonal.

†p < .10. *p < .05. **p < .01.
Furthermore, both State PA and NA (γ_{11} = .691, p < .10; γ_{11} = .335, p < .05, respectively) demonstrated a moderating effect of Relational WSC on the relationship between supervisor and subordinate affect. When examining the pseudo $R^2$ values for these models, adding the Relational WSC as a cross-level moderator accounted for a larger proportion of the between-subjects variability surrounding the slope estimate for all three variables (State COGJS: $R^2_1 = .4727$; State PA: $R^2_1 = .1093$; State NA: $R^2_1 = .9250$). However, for all three variables, this was at the cost of a decrease in the amount of between-subjects intercept variance accounted for (State COGJS: $R^2_0 = -.0116$; State PA: $R^2_0 = -.0029$; State NA: $R^2_0 = -.0741$). Interestingly, the remaining pseudo $R^2$ and goodness-of-fit indices indicate some differences between the three variables. Specifically, including the Relational WSC as a Level-2 moderator increased the amount of total State COGJS and NA variability accounted for (i.e., $R^2_{y,j}$), while the amount of total State PA variability accounted for decreased. Next, including the Relational WSC as a State COGJS and PA moderator increased the amount of within-subjects variability accounted for (i.e., $R^2_r$), while the amount of within-subject State NA variability accounted for decreased ($R^2_r = -.0638$). The final difference between the three dependent variables was the level of significance the goodness-of-fit index achieved. For example, adding the Relational WSC resulted in a significant improvement in model fit for State COGJS ($\Delta D_1 = 10.67, p < .01$), a marginal improvement in model fit for State PA ($\Delta D_1 = 3.07, p < .10$), and a non-significant improvement in model fit for State NA ($\Delta D_1 = 2.00, p > .10$) when compared against Model 6.4. Together, these results partially support Exploratory Analysis 2.
**Exploratory Analysis 3**

The final exploratory analysis examined the extent to which leader-member exchange, or LMX, moderated the relationship between supervisor and subordinate affect and attitudes. Results of these analyses indicate that LMX demonstrated a significant moderating effect on both State COGJS and COGOC (see Table 61). In general, the results are similar to previous analyses in that both the intercept (COGJS: $\gamma_{00} = 5.113, p < .01$; COGOC: $\gamma_{00} = 4.696, p < .01$) and SubGMCentTraitX are significant (COGJS: $\gamma_{01} = .892, p < .01$; COGOC: $\gamma_{01} = 1.046, p < .01$), and indicate that all else being equal, subordinates who report higher trait-level attitudes also report higher state-level attitudes. Also similar to the previous analyses, the within-subjects and between-subjects intercept variances remain significant in both models. However, the two models diverge for the remaining parameters.

Specifically, the main effect for SupGrpCentStateCOGJS is marginally significant ($\gamma_{10} = .128, p < .10$), while the SupGrpCentStateCOGOC main effect is not ($\gamma_{10} = .014, p > .10$). More importantly, the cross-level moderating effect of LMX is similar to the results for interpersonal power. When added as a Level-2 moderator of SupGrpCentStateCOGJS’ effect on subordinate State COGJS, LMX demonstrated a significant positive moderating effect ($\gamma_{11} = .202, p < .05$). Adding LMX to the State COGJS model resulted in a 29.09% decrease in the variability surrounding the slope estimate, and significantly improved the model’s fit over Model 6.4 ($\Delta D_1 = 4.08, p < .05$; see Table 55). However, LMX demonstrated a significant negative moderating effect on State COGOC ($\gamma_{11} = -.189, p < .10$). Unfortunately, State COGOC in Model 6.4 left no slope variance unaccounted for, and so the addition of LMX as a Level-2 moderator
failed to significantly improve the model’s fit ($\Delta D_1 = 2.70, p > .10$; see Table 57).

Although these results generally support the existence of the emotional contagion mechanism and the moderating effects of LMX, LMX only demonstrated significant moderating effects on the cognitively oriented attitudes. These results contradict the general emotional contagion hypothesis, failing to support Exploratory Analysis 3.
Table 61
Exploratory Analysis 3 – Moderating Effects of Leader-Member Exchange

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{01}$</td>
</tr>
<tr>
<td><strong>Subordinate State Cognitive Job Satisfaction – Supervisor State Cognitive Job Satisfaction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGJS$<em>{ij} = \beta_0 + \beta</em>{iSupGrpCentStateCOGJS} + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}SubGMCentTraitCOGJS_i + u_{0i}$</td>
<td>$5.113**$</td>
<td>$0.892**$</td>
</tr>
<tr>
<td>L2: $\beta_{ij} = \gamma_{00} + \gamma_{01}SubGMCentLMX_i + u_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subordinate State Cognitive Org. Commitment – Supervisor State Cognitive Org. Commitment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: SubStateCOGOC$<em>{ij} = \beta_0 + \beta</em>{iSupGrpCentStateCOGOC} + r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \gamma_{01}SubGMCentTraitCOGOC_i + u_{0i}$</td>
<td>$4.696**$</td>
<td>$1.046**$</td>
</tr>
<tr>
<td>L2: $\beta_{ij} = \gamma_{00} + \gamma_{01}SubGMCentLMX_i + u_{ij}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* L1 = Level-1; L2 = Level-2; $\gamma_{00}$ = intercept of Level-2 model predicting $\beta_0$; $\gamma_{01}$ = slope of Level-2 model predicting $\beta_0$; $\gamma_{10}$ = intercept of Level-2 model predicting $\beta_{ij}$; $\gamma_{11}$ = slope of Level-2 model predicting $\beta_{ij}$; $\sigma^2$ = within-subjects variance in Level-1 residual (i.e., variance in $r_{ij}$); $\tau_{00}$ = between-subjects variance in Level-2 residual for models predicting $\beta_0$ (i.e., variance in $u_{0i}$); $\tau_{11}$ = variance in Level-2 residual for models predicting $\beta_{ij}$ (i.e., variance in $u_{ij}$).

*Note:* Variance components (i.e., $\sigma^2$, $\tau_{00}$, $\tau_{11}$) are listed on the diagonal; $\tau_{01}$, the estimated covariance between $\tau_{00}$ and $\tau_{11}$ is listed off the diagonal.

$\dagger p < .10$. $\ast p < .05$. $** p < .01$. 


Overview of Results

Due to the large number of analyses conducted, a brief summary is warranted. First, Hypothesis 1 was supported, with the unconditional means model for each dependent variable demonstrating significant within- and between-subjects variability, permitting the inclusion of additional time-varying and time-invariant variables respectively. However, an examination of the ICC for each dependent variable indicated that the majority of this variability was at the between-subject level of analysis. Next, the unconditional growth models demonstrated that state-based variability in all four attitude variables was not influenced by either the time of day or the day of the week. This was in contrast to the effects of time on State PA and NA. Specifically, State PA demonstrated a significant time of day effect, decreasing over the course of the workday. State NA demonstrated a significant day of the week effect, with State NA values decreasing over the course of the workweek. However, further analyses indicated that controlling for the effect of time on state affect had little impact on computed parameter estimates or variance components, and future analyses simply used the affect terms in their original metric.

Except for the variables involved, Hypotheses 2 and 3 were identical, arguing that (a) state affectively oriented attitudes (i.e., State AFFJS and AFFOC) would demonstrate a stronger relationship with state mood (i.e., PA and NA) than would state cognitively oriented attitudes, and that (b) the state affectively oriented attitudes would demonstrate greater within-subjects variability than their cognitively oriented counterparts. In general, these hypotheses were supported for State AFFJS (i.e., Hypothesis 2(a) and 2(b)), but not for State AFFOC. For example, when included as Level-1 predictors, State
PA and NA accounted for a greater proportion of the total and within-subjects State AFFJS than State COGJS variance. State PA and NA also achieved larger parameter estimated effects in the prediction of State AFFJS than COGJS. For State AFFJS, the relationship with state affect was also related to the demonstration of greater within-subjects variability than its cognitively oriented counterpart, that is, individuals were more likely to demonstrate moment-by-moment fluctuations in their State AFFJS ratings. Although these effects were not replicated for state organizational commitment, the results of Hypotheses 2 and 3 demonstrate that all four attitudinal variables were significantly predicted by State PA and NA. More specifically, moment-by-moment deviations from an individual’s average state-based mood influenced his or her state-based attitudes, with State PA positively and State NA negatively related to state-based levels of all four attitudinal variables. Just as important, a time-lagged version of State PA, collected during the previous measurement period also significantly predicted state-based attitudes; however, its effect was always weaker than State PA measured concomitantly with the attitude.

Next, analyses testing Hypotheses 4 and 5 found that average state-based AFFJS and AFFOC were predicted by trait or dispositional levels of the same attitude when included as intercept predictors at Level-2 (i.e., Trait AFFJS and AFFOC respectively). Second, trait-based measures of PA, but not NA also predicted state-based measures of AFFJS and AFFOC. Third and most important, state-based measures of both PA and NA predicted the affectively oriented attitudes (i.e., State AFFJS and AFFOC) above and beyond the predictive effects of Trait PA, NA, AFFJS and AFFOC. That is, moment-by-moment variability in an individual’s affectively oriented attitudes was predicted by the
moment-by-moment variability in their mood, over and above the effects of the individual’s dispositional levels on the same affect and attitude variables. Finally, time-lagged State PA again significantly predicted state-based attitudes, but time-lagged State NA did not. This would suggest that NA only influences state-based attitudes when measured at the same time as the attitude (i.e., neither Trait NA nor time-lagged NA had a significant predictive effect).

Together, the first five hypotheses demonstrated that affect and attitudes fluctuate over time within an individual, as well as between individuals. Just as importantly, they demonstrate that for a single individual, state- and trait-based measures of affect and attitude are related and can be used to predict one another. Next, the data were restructured to test the main hypothesis, which was that based on an emotional contagion mechanism, the state-based affect and attitudes of a more powerful supervisor will transfer down to his or her less powerful subordinate and predict the subordinate’s state affect and attitudes. This was directly tested by Hypothesis 6, which found that only for State NA did a supervisor’s moment-by-moment variability significantly predict similar fluctuations in his or her subordinate. Interestingly, the supervisors’ State NA and COGOC from the previous time period both predicted subordinate levels on these variables; however, once the subordinates’ dispositional or trait level on each DV was accounted for (i.e., used as a Level-2 predictor of the state-based intercept estimate), these contagion effects disappeared. Just as importantly, neither the extremity of the supervisors’ affect and attitudes, nor the amount of time the dyad spent interacting during each measurement period moderated the contagion effect. Not only did these results generally fail to support the emotional contagion hypothesis, the significant prediction of
subordinate State COGOC from supervisor COGOC collected during the previous measurement period directly contradicted Hypothesis 6(d).

Given weak support for the emotional contagion hypothesis, several hypothesized and exploratory variables were assessed as potential cross-level moderators. As can be seen Table 62, a number of these variables demonstrated significant moderating effects on the relationship between supervisor and subordinate state-based affect and attitudes.
<table>
<thead>
<tr>
<th>Emotional Expressiveness</th>
<th>Emotional Contagion</th>
<th>Tenure with the Supervisor</th>
<th>Liking</th>
<th>Interpersonal Power</th>
<th>Independent WSC</th>
<th>Relational WSC</th>
<th>Collective WSC</th>
<th>LMX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFFJS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
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<tr>
<td>COGJS</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>COGOC</td>
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<td>PA</td>
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<td>-</td>
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<tr>
<td>NA</td>
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<td>-</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>✓</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
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<td>3</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

✓ - Significant cross-level moderator of the supervisor-subordinate emotional contagion mechanism.

Note. Moderating effects of Power and LMX on COGOC were negative, all other moderating effects were positive.
A number of important observations can be made based on Table 62. First, the cross-level moderators suggested by the existing emotional contagion literature (i.e., supervisor emotional expressiveness, subordinate emotional contagion susceptibility, tenure with the supervisor, and supervisor liking) performed poorly. Only 2 of the 24 possible moderating effects for these variables were significant. On a more positive note, the three exploratory moderators suggested by the I/O literature effectively accounted for shared variability between supervisors and subordinates. Specifically, the relationship between supervisor and subordinate affect and attitudes was stronger in dyads where the subordinate ascribed more power to the supervisor, possessed a more relational self-concept and rated the quality of the relationship with his or her supervisor more positively. However, these results are tempered by the observation of two negative moderating effects of power and LMX on COGOC.

Third, due to their measurement, only state affect (i.e., State PA and NA) and state affectively oriented attitudes (i.e., State AFFJS and AFFOC) were expected to demonstrate an emotional contagion effect. The total number of significant moderating effects, across moderators, contradicts this hypothesis. Specifically, six significant cross-level moderating effects were identified for the cognitively oriented attitudes (i.e., State COGJS and COGOC), while no significant moderating effects were observed for the affectively oriented attitudes. Together, these results suggest that while contagion effects occurred, a number of factors may have affected the specific instances in which they occurred, which will be discussed next.
CHAPTER V

DISCUSSION

Contributions of the Current Study and Call for Future Research

The current study advances the field in a number of theoretical and methodological ways. This chapter discusses the purpose of the current study and the extent to which it achieved five main goals. Where appropriate, additional research is proposed and limitations of the current study are discussed.

Purpose of the Current Study

To varying degrees, the current study achieved five main goals. First, four short measures of affectively and cognitively oriented job satisfaction and organizational commitment were developed. Furthermore, the different patterns of variability and relationships these measures had with other variables demonstrates the importance of distinguishing the affective vs. cognitive foci of attitudes. Second, all six state-based dependent variables (i.e., AFFJS, COGJS, AFFOC, COGOC, PA and NA) demonstrated significant levels of both within- and between-subjects variability. Third, previous trait-based research was extended by demonstrating State PA and NA independently predicted all four state-based attitudes, even after controlling for dispositional (i.e., trait) affect and attitude levels. Furthermore, there was some indication that State PA measured earlier in the day continued to influence current levels of the various attitudes, suggesting that future research further explore time-lagged affective relationships.
Fourth, the current study demonstrated in a real-world sample of existing supervisor-subordinate dyads that emotional contagion occurs, and that contagious affect and attitudes flow from higher to lower status individuals. Moreover, a number of stable individual and dyadic characteristics were identified which moderate the strength of the emotional contagion mechanism. Finally, these goals were accomplished by longitudinally examining the relationship between state-based measures of dyadic affect and attitudes through an ESM methodology. This methodology is relatively new to the I/O field and demonstrates how the repeated measurement of on-going phenomena in the real world can overcome a number of the methodological deficiencies other data collection methods suffer from.

The measurement of affectively and cognitively oriented attitudes. Given the persistent view that organizational attitudes such as job satisfaction and organizational commitment have both affective and cognitive bases (e.g., Locke, 1969), and that most existing measures are believed to over sample cognitively oriented attitudes (e.g., Organ & Near, 1985), it is surprising that more work has not been conducted on the development of appropriate scales. The current study took the perspective of previous authors (e.g., Eagly & Chaiken, 1993; Schleicher et al., 2004; Weiss, 2002b) that attitudes are evaluative judgments with both affective and cognitive components and sought to develop scales that tapped into these components differentially. Contrary to previous research that examined entire scales (e.g., Brief & Roberson, 1989; Schleicher et al., 2004; Williams, 1988), the current study examined the affective and cognitive nature of individual items. This allowed the development of four, 3-item scales which
demonstrated convergent and discriminant validity with various affective and cognitive latent variables (e.g., affective and cognitive semantic differentials; Crites et al., 1994).

However, results from the pilot studies contradict previous research (e.g., Organ & Near, 1985) suggesting that existing organizationally relevant attitude measures are primarily cognitive in nature. First, fewer than 1/4 (i.e., 33 of 146) of the job satisfaction and organizational commitment items rated in Pilot Study 1 were rated as consistently affective or consistently cognitive in orientation. Instead, the majority of existing items appeared to require a relatively equal affective and cognitive judgment when responding. Furthermore, the numbers of affectively (i.e., 17 items) vs. cognitively (i.e., 16 items) rated items were equally split, and at least one item from 10 of the 12 rated scales was selected for future research. The only result consistent with previous research, was that items within a single scale were consistently rated as either only affectively, or cognitively oriented (the lone exception was the OCQ which had separate items rated as both more affectively and more cognitively oriented).

However, the results of a pilot study conducted prior to Pilot Study 2 and not described in detail in this document, indicate the SME ratings in Pilot Study 1 poorly differentiated affectively from cognitively oriented attitudes. This required the selection of additional items from the existing scales and development of new items. More importantly, the results of multiple regression and factor analyses indicated that cognitively oriented scales were more difficult to develop. Specifically, job satisfaction and organizational commitment items identified as more affectively oriented were consistently related to affective latent factors (i.e., PANAS and ASD-org scales) in a multiple regression framework. In contrast, very few cognitively oriented items were
more strongly predicted by one, let alone both of the cognitive latent factors (i.e., Job Cognitions or CSD-org scales). When developing the final scales, this resulted in fewer cognitively oriented attitude items to select from, lower coefficient alpha reliabilities for the cognitive scales and a number of unexplainable factor intercorrelations (see Figure 7).

The development of the cognitive organizational commitment scale (i.e., COGOC) was especially difficult. When developing this scale, only four items were available to select from. These items were highly varied in terms of their content and pattern of relationships with the affective and cognitive latent factors. As a result, the final 3-item scale was more strongly related to the affective than the cognitive semantic differential, the opposite of the intended pattern.

Difficulty developing the COGOC may explain a number of effects observed in the Primary Study. First, the slight affective nature of the COGOC scale may explain why the State AFFJS scale obtained stronger relationships with State PA and NA than the COGJS, but the AFFOC and COGOC failed to achieve similar differentiation. Second, the similar affective nature of the AFFOC and COGOC may explain why the AFFOC failed to demonstrate greater within-subjects variability. Third and most troubling, was the observation of significant negative moderating effects of power and LMX on the relationship between supervisor and subordinate state cognitive organizational commitment scores. Finally, the difficulties encountered while developing the four short attitude scales in the current study suggests the need for future research to develop affectively and cognitively oriented attitude scales of varying length. In sum, three of the four desired composite scales were successfully created (i.e., AFFJS, COGJS, and AFFOC), with the fourth cognitive organizational commitment (i.e., COGOC) scale
proving more challenging to develop. These scales provided a foundation for conducting the focal study, as well as enriching our understanding of existing scales at the item level.

State affect and attitude variability. Next, in order to test the contagion mechanism, it was necessary to first establish the presence of meaningful within-subjects variability in state affect and attitudes. This was accomplished by partitioning each dependent variable’s variance with an unconditional means model, and was necessary for two reasons. First, recall that between-subjects variability reflects mean level differences in state affect and attitude scores between two or more individuals. More important to the current study, within-subjects variability reflects moment-by-moment variability in the state-based affect and attitude scores within a single individual, and is an indication of the extent to which individuals fluctuate over time. Establishing within-subjects variability in the current study demonstrated that individuals fluctuated over time. This allowed the main emotional contagion hypothesis to be tested, which was that fluctuations in supervisor state affect and attitudes would predict subordinate fluctuations in the same affect and attitude variables. Second, existing literature (e.g., Eid & Diener, 1999; Miner et al., 2005; Penner, Shiffman, Paty & Fritzsche, 1994) has observed significant within-subjects variability in affect. Partitioning each dependent variable’s variance also permitted testing the hypothesis that affectively oriented attitudes would demonstrate greater within-subjects variability than their cognitively oriented counterparts (i.e., lower ICC values in Table 16).

The available data both supports and contradicts this perspective. First, State AFFJS demonstrated significantly greater within-subjects variability than its cognitive counterpart (i.e., State COGJS). Interestingly, the proportion of State AFFJS variability
attributed to within-subjects effects (i.e., 1-.691 = 30.9%) was greater than that of State PA (i.e., 1-.768 = 23.2%), but less than that attributed to State NA (i.e., 1-.588 = 41.2%). In contrast, State AFFOC not only failed to demonstrate a significantly greater proportion of within-subjects variance, but actually demonstrated less within-subjects variance than COGOC. Furthermore, State AFFOC had the lowest proportion of within-subjects variance (i.e., 1-.914 = 8.6%) of the six dependent variables.

Compared to previous research, the dependent variables in the current study demonstrated limited within-subjects variability. Two likely sources for the observed within-subjects variability include the sample and measures used. Although selected from a variety of business units, all participants in the current study were from a single manufacturing organization. It is entirely likely that a stabilizing force within the organization or manufacturing industry (e.g., highly structured work tasks, static procedures, etc.) limited momentary fluctuations in participant affect and attitudes. This conclusion is partially supported by the research of Miner et al. (2005) who found that 56% of the variability in hedonic tone of a manufacturing sample was within-subjects, suggesting that greater within-subjects variability should have been found. The results from Miner et al. also suggest that for State PA and NA specifically, limited within-subjects variability could also reflect the measure used to capture affect. Several authors (e.g., Russell & Carroll, 1999) have suggested the hedonic tone/pleasantness and activation dimensions on the affect circumplex are more appropriate for capturing momentary fluctuations in mood (i.e., within-subjects variability). This may explain why Miner et al. found a greater proportion of state affect’s variance reflected within-subjects variability. For the attitudinal variables, it is again entirely likely the limited within-
subjects variability reflects the difficulty encountered while developing the four scales. However, the inability to capture within-subjects variability was unfortunate as the variable with the greatest within-subjects variability (i.e., State NA) was also the only variable which demonstrated the emotional contagion effect.

Previous research (e.g., Eid & Diener, 1999; Larsen, 1987) has also found that affective variability reflects stable individual differences between people. It is possible that as members of the same organization, participants in the current sample were selected and remained with the organization due to similar characteristics (e.g., Attraction-Selection-Attrition Model; Schneider, Goldstein & Smith, 1995). The result is that a common third variable not measured in the current study, such as personality (e.g., Ilies & Judge, 2002), could have acted to stabilize individual variability in affect and attitudes, limiting the variability observed. This by no means implies that affective and attitudinal stability is a negative characteristic of a work environment. In fact, it may be a highly adaptive characteristic, allowing individual coworkers to develop schema like expectations of how others will react in a given situation. The effect of affective and attitudinal stability/variability on workplace behaviors is an avenue future research should explore (Miner & Hulin, 2006; see Beal, Weiss, Barros & MacDermid for a theoretical look at the influence of affective variability on performance).

It is also interesting that similar to previous research (e.g., Weiss et al., 1999) cyclical variability in State PA and NA were both found. Specifically, positive affect slowly decreased over the course of the workday and negative affect decreased over the course of the workweek. In the case of PA, the negative linear trend likely reflects
fatigue as the individual progresses throughout the day, while a ‘blue Monday’ effect
could explain State NA’s negative linear trend.

Two additional time effects are also worth noting. First, all four state-based
attitudinal variables failed to demonstrate significant time effects in the current sample.
One possible explanation is that within-subjects variability in the attitudes is more
strongly influenced by fluctuations in the ongoing situation, rather than an artifact of
when the data was collected. Second, controlling for time’s effect on State PA and NA
(i.e., residualizing PA and NA on the appropriate time variable to remove time’s
influence) altered the parameter estimates and variance components strength, but failed to
alter the pattern of relationship between affective and attitudinal variables. More
specifically, comparing the parameter estimates for State PA, NA and time-lagged PA
from Models 2&3 A and B, with those from Models 2&3 C and D demonstrates that
controlling for time’s effect on PA and NA decreased the absolute value, but not the
significance of the parameter estimates.

Furthermore, controlling for time’s effect on state affect generally increased the
within-subjects, but decreased the between-subjects intercept and slope variance
components. Although simpler models that did not control for time’s effect were chosen
in the current study (primarily due to power issues), future research should explore the
impact of time effects, and what controlling for time’s effect has on other important
relationships in the workplace. Thus, the current study found meaningful levels of
within-subjects variability; however, the proportion of total variance attributable to
within-subjects effects was not as large as that found in some previous research. Also
consistent with previous research, the current study found cyclical time of day and day of
week variability in State PA and NA respectively. Controlling for such influences will likely prove important in future research.

*State affect predicts state attitudes, above and beyond the effects of trait affect and attitudes.* The next issue addressed by the current study was the ability of state affect to predict state attitudes (i.e., Hypotheses 2 and 3), even after controlling for the influence of trait affect and attitude levels (i.e., Hypotheses 4 and 5). Previous research (e.g., Thoresen et al., 2003) has demonstrated a consistent link between PA/NA and organizationally relevant attitudes, such as job satisfaction and organizational commitment. However, the majority of this research has examined both affective and attitudinal variables from a trait perspective (e.g., Watson & Slack, 1993), or in rare cases, researchers have examined the relationship between state-based mood and trait-based attitudes (e.g., Fisher, 2000). Only recently (e.g., Niklas & Dormann, 2005), have researchers attempted to examine the relationship between state affect and state attitudes.

This is an important avenue for future research as the current study demonstrated that both affect and attitudes fluctuate over time. More importantly, the results of Hypotheses 2-5 demonstrate that variability in state affect predicts variability in state attitudes, over and above the influence of between-subjects differences in trait affect and attitudes. More specifically, Hypotheses 2 and 3 demonstrate that when entered simultaneously as time varying Level-1 predictors, both State PA and NA uniquely add to the prediction of state attitudes (i.e., AFFJS, COGJS, AFFOC, COGOC). Furthermore, Hypotheses 4 and 5 demonstrated that independently, State PA predicted State AFFJS and AFFOC, above and beyond the influences of Trait PA and trait-based versions of the attitudes (i.e., Trait AFFJS and Trait AFFOC respectively). Likewise, even after
controlling for the influence of Trait NA, AFFJS and AFFOC, State NA significantly predicted momentary variability in the state-based attitudes. Although not directly assessed, these results support one of the basic tenets of the Affective Events Theory (Weiss & Cropanzano, 1996), which is that due to their temporal proximity, state affect (i.e., an affective reaction) should mediate the relationship between trait affect (i.e., dispositions) and state attitudes.

Next, it is interesting that although the average State NA rating was considerably lower than that of State PA (see Table 13), State NA’s effect on state-based job attitudes was typically larger than State PA’s (Note: this is tempered by a nonsignificant parameter estimate for State NA when time-lagged State PA was added to the prediction of State COGOC in Model 2&3B). This suggests that although a negative mood was experienced less frequently while working, fluctuations in momentary negative affect above an individual’s personal average resulted in a comparably larger fluctuation in state attitudes than when a particularly positive mood was experienced. These results coincide with research by Miner et al. (2005) that although five times less common than positive workplace events, negative events had five times the effect on mood. These results highlight the importance of negative affect/events in employees’ workplace experience, and suggest that future research should explore variables that moderate the influence of negative affect/events on employee attitudes and behavior.

Furthermore, negative affect’s effect was highly specific, only predicting attitudes when measured concomitantly with the attitude. In particular, State PA, time-lagged State PA and Trait PA all uniquely added to the prediction of the state-based attitudes across the analyses conducted (i.e., Hypotheses 2-5). In contrast, only State NA,
measured at the same time, predicted state-based attitudes. That is, neither trait nor time-
lagged negative affect predicted momentary variability in the state attitudes.

It is entirely possible these results reflect the specificity hypothesis (see Ajzen &
Fishbein, 1977; Fishbein & Ajzen, 1974), which states that the level of specificity
between predictors and criteria must match (e.g., measured at the same time) for accurate
prediction to occur, but this fails to explain why PA was so predictive. Another
possibility, is that negative affect’s effects were attenuated by dropout from the
organization. That is, high NA individuals could have self-selected out, or been removed
from the organization, while High PA individuals remained. This conclusion is
supported by the fact that participants reported the lowest mean and standard deviation
for Trait NA compared to the remaining dependent variables. A third possibility is that
highly negative events were extremely rare (e.g., Miner et al., 2005) and that the
sampling scheme utilized in the current study (i.e., interval-contingent) may not have
adequately captured negative experiences. This conclusion is supported by the
observation of a lower mean and standard deviation for State NA compared to the
remaining dependent variable in the current sample.

Two final comments with respect to affect and attitudes are worth making. First,
as the time between the affect and attitude measurements increased, the predictive effects
of State PA and NA decreased (e.g., Judge & Ilies, 2004). In the case of State PA, time-
lagged effects consistently demonstrated significant but weaker effects than PA measured
concomitantly. The effect of time-lagged State NA however, never reached significance,
again demonstrating its immediacy. Second, in the majority of the Hypotheses 2-5
analyses, significant within- and between-subjects intercept and slope variance remained
unaccounted for. This suggests that additional time-varying Level-1 and time-invariant Level-2 predictors respectively, can be added to these models to account for the remaining variance. In the current study, characteristics of the individual (i.e., trait affect and attitudes) were used to account for a portion of this variance. Future research should explore situational factors (e.g., affective events, social interactions, environmental characteristics) that can also account for a portion of this variance.

*Emotional contagion as an explanation for shared state affect and attitude variability within on-going supervisor-subordinate dyads.* Thus far, the current study has demonstrated a consistent pattern of affective and attitudinal variability within a single individual over time, and that variability in state positive and negative affect not only predicts variability in attitudes, but does so over and above the influence of trait-based affect and attitudes. While interesting in their own right, these results focus on a single individual in isolation. The workplace is a complex environment where numerous interdependent and constantly changing contextual forces (e.g., coworkers, the physical environment, and the work itself) act upon an individual at any given time. Based on the existing emotional contagion research, the current study sought to examine one such contextual factor, the supervisor-subordinate dyad.

Hypothesis 6 proposed that existing supervisor-subordinate dyads would demonstrate a pattern of shared affective and attitudinal variability, such that state-based supervisor affect and attitudes would predict subordinate state-based affect and attitudes, when measured at the same time. Furthermore, based on their affective nature (and greater expected variability), affectively oriented attitudes were expected to demonstrate a stronger contagious effect than their cognitively oriented counterparts. In general, the
research failed to support this hypothesis. Specifically, emotional contagion, evidenced by a significant positive relationship between supervisor and subordinate state affect and attitudes, only existed for State NA, again demonstrating the immediacy of NA.

However, an interesting and somewhat unexplainable result of the Hypothesis 6 analyses was that time-lagged versions of supervisor State NA and COGOC were both contagious. That is supervisor State NA and COGOC collected during the previous measurement period had a residual effect on subordinate State NA and COGOC levels respectively. On the one hand, these results support the directionality of the contagion effect, from supervisor to subordinate. On the other, these results do not easily comply with previous emotional contagion research, which has found that contagion is a rapid process, occurring within 500 ms (e.g., Wild et al., 2001). This potentially indicates that a more cognitive appraisal process may have occurred (discussed in greater detail shortly). Just as important, all three observed contagion effects disappeared when subordinate trait affect and attitudes were accounted for. That is, the unique variance supervisor state-based affect and attitudes had accounted for, was eliminated after modeling subordinate trait-based measures of each DV as a Level-2 intercept predictor. Another way of conceptualizing this is that after controlling for a subordinate’s dispositional level on each dependent variable, fluctuations in his or her supervisor’s state-based affect and attitudes failed to predict momentary fluctuations in the subordinate’s affect and attitudes.

Next, while directly testing for contagious affect and attitudes was unsuccessful (i.e., predicting subordinate affect and attitudes directly from supervisor levels), tests of the remaining hypotheses and exploratory analyses demonstrated that several relevant
supervisor, subordinate and dyadic characteristics moderate the emotional contagion mechanism’s strength. For example, supervisor emotional expressiveness moderated and strengthened the relationship between supervisor and subordinate NA. Presumably, supervisors who rated themselves as highly expressive exhibited a greater number and/or variety of emotional indicators, which subordinates perceived and mimicked. The result was a stronger relationship between supervisor and subordinate negative affect. A second observed moderating effect was for the extent to which the subordinate liked his or her supervisor. Interestingly, this was corroborated by LMX, which was highly correlated with supervisor liking ($r = .88, p < .01$). Supervisor liking and LMX both moderated the relationship between supervisor and subordinate State COGJS, with greater intra-dyad liking and LMX leading to greater similarity in the momentary fluctuations of this attitude between dyad members.

What is interesting about LMX, is that it was also a significant negative moderator of the supervisor-subordinate COGOC relationship. The nature of this negative moderating effect suggests that if a subordinate rated dyadic LMX higher than average (i.e., above the grand mean), he or she also demonstrated a significant, but negative, relationship between his or her State COGOC and that of his or her supervisor. A negative moderating effect on State COGOC ratings was also observed when interpersonal power was entered as the Level-2 moderator (i.e., the only two observed moderating effects on COGOC were both negative). It is relevant to note that the remaining significant moderating effects of interpersonal power and LMX were all positive. Furthermore, the observation of these two negative moderating effects directly contradicts the contagion mechanism’s expected pattern and likely reflects the
Two final points about the moderator analyses are worth making. First, although one of its parameter estimates was negative, interpersonal power demonstrated one of the most consistent moderating effects of the variables studied (i.e., the cross-level moderating effect of interpersonal power was significant for three of the six dependent variables). By directly testing the moderating effect of power, the current study supports previous research that argued, but failed to explicitly examine, that contagious affect, attitudes and behaviors flow down the power structure of a group (e.g., Anderson et al., 2003; Savell et al., 1995; Sy et al., 2005). Second, it is highly interesting that of the three self-concept orientations measured, only the relational work self-concept moderated the emotional contagion mechanism. In all three analyses where the relational WSC was a significant Level-2 moderator (i.e., for State COGJS, PA and NA), subordinates who rated themselves above the grand mean demonstrated a stronger relationship with the cyclical fluctuations in his or her supervisor’s affect and attitudes.

Although not a direct replication, these results corroborate with Ilies et al. (2007) who found that more collectivistic individuals demonstrated a stronger relationship between their own and their fellow teammates state affect. These differences (i.e., relational vs. collective self-concepts) likely reflect subtle differences in the measures used. For example, the individualism-collectivism measure used by Ilies et al. focused on
the preference for working in a group, while the collective work self-concept scale used in the current study focused on group performance. Instead, the relational work-self concept measure focused on the desire to develop close, caring relationships with others, potentially making it a more comparable measure to that used by Ilies et al. In any event, this and the study by Ilies et al. demonstrate that an individual’s self-concept is an important determinant of emotional contagion’s influence on his or her affect and attitudes. Just as important, by demonstrating such a wide variety of stable subordinate, supervisor and dyadic characteristics moderate the emotional contagion mechanism, the current study demonstrates the need to explore additional boundary conditions for emotional contagion within the workplace. Examples include perceived supervisor and organizational support, the strength of social networks, charismatic leadership (e.g., Bono & Ilies, 2006), and controlling for the influence of shared events.

The benefits of an experience sampling methodology. A fifth, and perhaps most important contribution of the current research is the demonstration of an appropriately conducted experience sampling study. In fact, the premise of the current study, to examine shared dyadic variability in state affect and attitudes, could not have been effectively studied without the use of such methods. Although ESM methods have been discussed in the I/O literature for over a decade (e.g., Alliger & Williams, 1993), few studies have taken advantage of the methodology (e.g., Judge & Ilies, 2004; Niklas & Dormann, 2005). The advent of MRCM will likely rectify this situation. Compared with traditional analytical methods, MRCM is more appropriate for analyzing ESM data in that it allows researchers to simultaneously partition variance into within- (i.e., Level-1) and between-subjects (i.e., Level-2) sources.
In the current study for example, subordinate state affect and attitudes were predicted from the joint influence of supervisor state-based affect and attitudes (i.e., Level-1) and a cross-level moderating trait variable (i.e., Level-2), while controlling for the influence of subordinate trait affect and attitudes on the intercept value (i.e., Level-2). The field will benefit greatly from additional research examining appropriate methods of testing multilevel mediation, structural equation modeling and factor analysis. As these methods become more available, additional ESM research needs to be conducted to examine if existing models, based on trait data, replicate when examined using state-based data.

The current study benefited from following Stone and Shiffman’s (2002) seven reporting guidelines (see Table 12), which were used to design and execute the current study. According to Stone and Shiffman, participant compliance is one of the most important considerations while conducting an ESM study. Evidence provided in Table 15 indicates that participants in the current study responded approximately 76% of the time, similar to response rates found in previous electronic ESM research (e.g., Stone, Shiffman, Schwartz et al., 2002). For Hypotheses 1-5, this translated into 1,876 within-subjects observations. Just as important, over 60% of the data could be paired from the 20 supervisor-subordinate dyads (i.e., 736 paired observations), allowing the remaining hypotheses and exploratory analyses to be studied. Collecting this quantity of state-based data using traditional research methods would be highly inefficient. However, given a short survey and a correctly selected sampling schedule (i.e., interval-, signal-, or event-contingent), participants are able to provide a detailed account of their experiences.
Arguably, the quality of the collected data also benefited from the use of an ESM, particularly with the use of an electronic PDA data collection technique. This is derived from the collection of data in situ (Hormuth, 1986), or as the experience occurs.

Collecting state-based data repeatedly in the current study, resulted in the capture of momentary fluctuations in participant affect and attitudes, without introducing potentially biasing memory demands on the participants (Takarangi et al., 2006). It is also likely that the collected data’s quality was improved through a thorough training program. Anecdotally, this is supported by the limited number of problems participants encountered while completing their surveys. However, as with all studies, there were a number of limitations to the current study.

Limitations

Statistical power. One of the primary limitations of the current study was the power available to detect cross-level moderating effects. Due to the simultaneous calculation of within- and between-subjects effects, the calculation of multilevel power is complicated and heuristic recommendations offer limited guidance (e.g., Maas & Hox, 2005; Snijders & Bosker, 1999). The current study attempted to address this issue by collecting a large number of surveys (i.e., 6 per day x 10 days) to provide adequate within-subjects power (i.e., surveys nested within individuals). However, the between-subject power was limited by the total number of participants and PDAs available. This resulted in greater within- and between-subjects power in the analyses testing Hypotheses 1-5 (i.e., 1,876 completed surveys nested within 41 individuals), than in the analyses testing the contagion mechanism (i.e., 736 paired observations nested within 20 dyads). The drop in statistical power for the second set of analyses resulted in a much larger
proportion of statistically nonsignificant results for the contagion analyses, and introduces the possibility that the observed moderating effects occurred by chance alone. To rectify this situation, additional waves of data could be collected to bolster the within-and between-subjects sample sizes, resulting in greater power.

Sampling schedule. A second, and related measurement issue, was the decision to use an interval-contingent sampling schedule. Recall that when conducting an ESM study, a researcher has the option of three sampling schedules: interval-, signal-, and event-contingent schedules (Alliger & Williams, 1993). One benefit of selecting an interval-contingent sampling schedule in the current study was that it created predictable survey completion times that fit into participant schedules. With the addition of flexible 20-minute windows of opportunity, this likely promoted the strong response rates observed. An additional benefit of the interval-contingent sampling schedule was that it ensured supervisor-subordinate dyads completed their surveys at approximately the same time. This was a key criterion in the decision to use an interval-contingent schedule, as simultaneously completed surveys were necessary for testing emotional contagion.

However, an event-contingent sampling schedule could have also ensured simultaneously completed surveys. More importantly, an event-contingent schedule has the additional benefit of more precisely sampling rare behaviors. By offering participants a clear operational definition of the focal experience, social interaction within the dyad, participants could have been instructed to only complete surveys after an interaction. As social interaction is a necessary pre-condition for emotional contagion to occur, this represents an important benefit of the event-contingent sampling schedule.
It is entirely possible that the general failure to detect emotional contagion in this sample reflects the interval-contingent sampling schedule’s inability to collect data following an interaction. More specifically, subordinates reported spending less than 10% of each measurement period with their supervisors, and on average, interacted with their supervisor in the five minutes preceding survey completion less than 25% of the time (Note: neither interaction criteria moderated the contagion mechanism). Had an event-contingent schedule been used in the current study, every hypothesis could have still been tested, and more importantly, the study would have provided a more robust test of emotional contagion. However, the current study demonstrated that in the presence of certain moderators, supervisor state-based affect and attitudes predict concomitantly measured subordinate affect and attitudes. If social interaction is a necessary precondition for contagion to occur and dyads were not interacting frequently, it raises the question of what was actually being tested. Therefore, future emotional contagion research will likely benefit from a hybrid ESM method, using interval-contingent sampling to develop a broad understanding of participant experience, and an event-contingent sampling schedule to clearly examine emotional contagion.

*Emotional contagion vs. shared cognitive appraisals.* Therefore, the final and perhaps most important limitation of the current study, is the failure to unequivocally demonstrate that emotional contagion, and not a more cognitive appraisal process was the cause of observed supervisor-subordinate co-variability. Although the use of an ESM in the current study overcame a number of shortcomings found in previous emotional contagion research (e.g., the repeated measurement of the dyads in their natural environment demonstrated emotional contagion is an ongoing process; dispositional/trait
characteristics were statistically controlled for), it was beyond the current study’s scope to measure, or control for the similarity between dyad member’s experiences. This leaves the possibility that similar cognitive appraisals of shared events, and not emotional contagion within the dyad, was responsible for shared affective and attitudinal variability.

Data from two unexpected results potentially supports this perspective. First, although no hypothesis was directly expressed, the expectation was that more extreme supervisor state affect and attitude ratings would be more contagious (e.g., Savell et al., 1995; Wild et al., 2001). That is, the more an individual supervisor’s state affect and attitudes deviated from his or her personal mean (e.g., SupGrpCentStateAFFJS²), the more noticeable they would be, and therefore, more likely to influence subordinate state affect and attitudes. Across the six DVs, attempts to model squared and cubed versions of the centered supervisor affect and attitude values produced nonsignificant parameter estimates or failed to converge. Second, no hypothesis was expressly stated; however, personal interaction is necessary for emotional contagion to occur and the level of supervisor-subordinate interaction was expected to moderate and strengthen the contagion effect. As previously mentioned, two state-based indices of social interaction were collected in the current study: the percentage of each measurement period spent interacting, and the existence of an interaction in the five minutes preceding each measurement. When included as Level-1 moderators, neither interaction index demonstrated the expected moderation effect.

Although not directly contradicting the emotional contagion hypothesis, these observations do highlight the possibility that alternative mechanisms, such as group cognition, were responsible for shared affective and attitudinal variability between
supervisors and subordinates (for a detailed discussion of team cognition, see Salas & Fiore, 2004). Furthermore, although the pattern of significant cross-level moderation effects (i.e., Level-2 slope parameter predictors) generally supported the contagion hypothesis, two aspects of these results support the possibility of alternative explanations. First, only a small percentage of the cross-level moderating effects tested were significant. Specifically, based on previous emotional contagion research, 24 moderation effects were tested (4 variables x 6 DVs). Of these, only two significant moderators were found (i.e., 8.33%). That is, two of the study’s most important constructs, supervisor emotional expressiveness and subordinate emotional contagion susceptibility failed to convincingly moderate the contagion effect. Including the exploratory analyses, only 10 of the 54 moderation effects tested produced a significant cross-level moderation effect (i.e., 18.52%). Given the small sample size and power to detect such effects, it is possible these significant results are capitalizing on chance, rather than reflecting true results.

A second characteristic of the moderator analyses that raises doubt, was that six significant cross-level moderation effects were found for the cognitively oriented job attitudes, while zero significant moderator relationships were found for the affectively oriented job attitudes. These results directly contradict the expected pattern of relationships. The inability of these variables to significantly moderate and strengthen the expected supervisor-subordinate state affect and attitude relationships raises the question of what truly caused ‘contagion’ to occur. Nevertheless, something caused supervisor state affect and attitudes to predict concomitantly measured subordinate affect and attitudes. Moreover, results of a regression analysis not reported elsewhere indicate
that supervisor trait affect and attitudes repeatedly failed to predict subordinate trait affect and attitudes for all six dependent variables. This demonstrates that something beyond dispositions is responsible for the shared variability observed in this sample of supervisor-subordinate dyads. Only additional research, controlling for shared events and using a more fine-grained event-contingent sampling technique will be able to tease apart the source of this dynamic co-variability.

Conclusion

Although the causal mechanism cannot unequivocally be labeled ‘emotional contagion,’ the current study demonstrated that individual’s within pre-existing supervisor-subordinate dyads experience co-varying fluctuations in their moment-by-moment state affect and attitude ratings. Various stable characteristics of the supervisor, subordinate and dyad also demonstrably moderated the strength of this relationship. The current study also demonstrated the importance of immediate experience, with concomitantly measured state affect predicting state attitudes over and above trait affect and attitude ratings. Finally, the demonstration of significant within- and between-subjects variability in state-level affect and attitudes further solidifies the necessity for I/O Psychology to longitudinally measure state-based variables. Individuals work in an ever-changing environment, and the demonstration of a properly conducted ESM study displays how our theories can be updated to match this reality.
REFERENCES


APPENDICES
APPENDIX A

OVERALL JOB SATISFACTION (BRAYFIELD & ROTHE, 1951)

This measure, developed by Brayfield and Rothe (1951) is an 18-item unidimensional measure of overall job satisfaction. In previous research it has demonstrated good reliability, with coefficient alphas ranging from .88 to .91 across different studies. In terms of validity, the measure has demonstrated positive correlations with similar concepts such as job facets, supervisory support and job involvement, and negative correlations with measures of family-work conflict, role ambiguity and role conflict. Confirmatory factor analyses have also demonstrated its independence from organizational commitment and job involvement measures (Fields, 2002). This measure was selected for the current study due to its demonstrated relationship with affect (e.g., Williams, 1988).

Graduate students rated the affective vs. cognitive orientation of the items from this survey using the following scale:

- A more affective evaluation of the job.
- A relatively equal emotional and cognitive evaluation of the job.
- A more cognitive evaluation of the job.

The following statement preceded the items to inform graduate students what response scale respondents would use to complete the survey:

Participants respond to the following questions using the rating scale:

1=Strongly Disagree
2=Disagree
3=Undecided
4=Agree
5=Strongly Agree
1. My job is like a hobby to me.
2. My job is usually interesting enough to keep me from getting bored.
3. It seems that my friends are more interested in their jobs.
4. I consider my job rather unpleasant.
5. I enjoy my work more than my leisure time.
6. I am often bored with my job.
7. I feel fairly well satisfied with my present job.
8. Most of the time I have to force myself to go to work.
9. I am satisfied with my job for the time being.
10. I feel that my job is no more interesting than others I could get.
11. I definitely dislike my work.
12. I feel that I am happier in my work than most other people.
13. Most days I am enthusiastic about my work.
14. Each day of work seems like it will never end.
15. I like my job better than the average worker does.
16. My job is pretty uninteresting.
17. I find real enjoyment in my work.
18. I am disappointed that I ever took this job.
APPENDIX B

MINNESOTA SATISFACTION QUESTIONNAIRE (WEISS, DAWIS, ENGLAND & LOFQUIST, 1967)

The Minnesota Satisfaction Questionnaire (MSQ; Weiss, Dawis, England & Lofquist, 1967) is one of the most commonly used measures of job satisfaction. The original scale is 100 items long, but due to the time constraints of the Primary Study, the 20 item short form of the scale was examined in Pilot Study 1. Each item in the short form is designed to represent the 20 subscales in the long form of the measure, and are combined to measure job satisfaction in general. Coefficient alpha reliability estimates are good, with values ranging from .85 to .91 on the 20-item short form, with a reported test-retest reliability of $r = .58$ (Fields, 2002). Validity evidence for the MSQ is similarly strong, with the 20-item short form demonstrating positive correlations with life satisfaction and job involvement and negative correlations with role conflict and ambiguity. Confirmatory factor analyses also demonstrate that the MSQ job satisfaction scale is distinct from organizational commitment and job involvement; however, exploratory factor analyses indicate that the 20-item short form may not be unidimensional. Rather, evidence of a four factor solution is most prevalent (Fields, 2002). However, for this particular study, the factor structure of the total scale is of less concern than the affective or cognitive orientation of the items.
The MSQ was included in Pilot Study 1 due to the stronger cognitive orientation of its items (e.g., Brief & Roberson, 1989). The MSQ was selected over the Job Descriptive Index (JDI; Smith, Kendall & Hulin, 1969) for two reasons. First, Brief and Roberson demonstrated that the MSQ was more strongly related to job cognitions than the JDI ($\beta = .64, p < .001$ vs. $\beta = .55, p < .001$). Second, the MSQ items are statements participants respond to using a 5-point Likert scale similar to most of the remaining scales used in this study, which will allow items from different scales to be easily combined. The JDI on the other hand, is a much longer, 72 item scale which asks participants to respond Yes, No, or ? to primarily one-word phrases. This represents a very different testing paradigm than the remaining items, which would cause some difficulty when combining JDI items with items from the remaining scales. Similar reasoning was used to exclude the Faces Scale of Overall Job Satisfaction (Kunin, 1955) from the study even though it has demonstrated one of the strongest relationships with affect (e.g., Brief & Roberson, 1989).

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=very dissatisfied with this aspect of my job
2=dissatisfied with this aspect of my job
3=can't decide if I am satisfied or not with this aspect of my job
4=satisfied with this aspect of my job
5=very satisfied with this aspect of my job
19. The chance to work alone on the job.
20. The chance to do different things from time to time.
21. The chance to be "somebody" in the community.
22. The way my boss handles his or her subordinates.
23. The competence of my supervisor in making decisions.
24. Being able to do things that don't go against my conscience.
25. The way my job provides for steady employment.
26. The chance to do things for other people.
27. The chance to tell people what to do.
28. The chance to do something that makes use of my abilities.
29. The way the company policies are put into practice.
30. The pay and the amount of work that I do.
31. The chance for advancement on this job.
32. The freedom to use my own judgment.
33. The chance to try my own methods of doing the job.
34. The working conditions.
35. The way my co-workers get along with each other.
36. The praise I get for doing a good job.
37. The feeling of accomplishment I get from the job.
38. Being able to keep busy all the time.
APPENDIX C

JOB IN GENERAL SCALE (IRONSON, SMITH, BRANNICK, GIBSON & PAUL, 1989)

The Job in General Scale (Ironson, Smith, Brannick, Gibson, & Paul, 1989) is an 18-item measure designed to be used alone, or with the JDI to measure overall (i.e., facet free) job satisfaction. Similar to the other measures used in Pilot Study 1, the Job in General Scale exhibits acceptable reliability (coefficient alphas range from .82 to .94) and validity, correlating negatively with turnover intentions and positively with various facets of job satisfaction (Fields, 2002). Unlike the JDI, which the Job in General Scale mimics in terms of item format and rating scale, the Job in General Scale was selected for inclusion in Pilot Study 1 for two reasons. First, it is much shorter than the JDI at only 18 items, and second, based on the item stems, the scale’s content is expected to demonstrate a more affective orientation (ex. pleasant, bad, rotten, enjoyable).

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

Yes=Agrees that item describes the job in general
?=Undecided
No=Item does not describe the job in general
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<td>Waste of time</td>
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<td>Better than most</td>
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<td>Makes me content</td>
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<td>Poor</td>
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APPENDIX D

ORGANIZATIONAL COMMITMENT QUESTIONNAIRE (MOWDAY, STEERS & PORTER, 1979)

The Organizational Commitment Questionnaire (OCQ; Mowday, Steers & Porter, 1979) is a 15-item measure of overall organizational commitment that can be modified to measure commitment to one’s profession and job. In this study, the original 15-item version was used, which has demonstrated good reliabilities in the range of .81 to .93. Although the OCQ demonstrates the expected relationships with multiple variables, the factor structure of the measure is somewhat unclear. Also unclear, is the extent to which the OCQ is distinct from Meyer and Allen’s Affective Commitment Scale (Meyer & Allen, 1997); however, it was included for its historical prevalence in the literature and non-overlapping item content.

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=Strongly disagree
2=Moderately disagree
3=Slightly disagree
4=Neither disagree nor agree
5=Slightly agree
6=Moderately agree
7=Strongly agree
57. I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful.

58. I talk up this organization to my friends as a great organization to work for.

59. I feel very little loyalty to this organization.

60. I would accept almost any type of job assignment in order to keep working for this organization.

61. I feel that my values and the organization's values are very similar.

62. I am proud to tell others that I am part of this organization.

63. I could just as well be working for a different organization as long as the type of work was similar.

64. This organization really inspires the very best in me in the way of job performance.

65. It would take very little change in my present circumstance to cause me to leave this organization.

66. I am extremely glad that I chose this organization to work for over others I was considering at the time I joined.

67. There's not too much to be gained by sticking with this organization indefinitely.

68. Often, I find it difficult to agree with this organization's policies on important matters relating to its employees.

69. I really care about the fate of this organization.

70. For me, this is the best of all possible organizations for which to work.

71. Deciding to work for this organization was a definite mistake on my part.
APPENDIX E

OVERALL JOB SATISFACTION (TAYLOR & BOWERS, 1974)

This measure of overall job satisfaction consists of seven items designed to measure satisfaction with the work itself, co-workers, supervision, promotions, pay, personal progress, and the organization as a whole (Taylor & Bowers, 1974). When combined into a scale score, the measure exhibits borderline acceptable reliability in the range of .70, and expected correlations with other measures. This scale was included as it contained single item measures intended to tap the facets assessed by the JDI, which was not explicitly included in the study.

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

A 5-point Likert Scale where:
1=completely satisfied
5=completely unsatisfied

72. All in all, how satisfied are you with the persons in your work group?
73. All in all, how satisfied are you with your supervisor?
74. All in all, how satisfied are you with your job?
75. All in all, how satisfied are you with this organization, compared to most?
76. Considering your skills and the effort you put into your work, how satisfied are you with your pay?
77. How satisfied do you feel with the progress you have made in this organization up to now?
78. How satisfied do you feel with your chance for getting ahead in this organization in the future?
APPENDIX F

OVERALL JOB SATISFACTION (CAMMANN, FICHMAN, JENKINS & KLESH, 1983)

This short, 3-item scale was designed as a unidimensional measure of overall job satisfaction (Cammann, Fichman, Jenkins & Klesh, 1983). This scale has demonstrated acceptable reliability (r’s range from .67 to .95) and the expected pattern of correlations with related variables.

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=Strongly disagree
2=Disagree
3=Slightly disagree
4=Neither agree nor disagree
5=Slightly agree
6=Agree
7=Strongly agree

79. All in all, I am satisfied with my job.
80. In general, I don't like my job.
81. In general, I like working here.
APPENDIX G

AFFECTIVE, NORMATIVE, AND CONTINUANCE COMMITMENT SCALES

(MEYER & ALLEN, 1997)

These three scales represent the most recent conceptualization of the commitment construct (Meyer & Allen, 1997). The Affective Commitment Scale (ACS) is designed to measure an individual’s “identification with, involvement in, and emotional [italics added] attachment to the organization” (Allen & Meyer, 1996, p. 253). The Normative Commitment Scale (NCS) measures the extent to which the employee feels an obligation to remain with the organization, and the Continuance Commitment Scale (CCS) measures the extent to which the employee believes there would be costs associated with leaving the organization. These measures were included due to the hypothesized and empirical relationships between affective commitment and affect and continuance commitment and cognition (e.g., Cropanzano, James and Konovsky, 1993; Allen & Meyer, 1996). Reliability evidence for the three scales is in the accepted range ($r$’s = .65-.88); however, there is no consistently accepted factor solution for the CCS in particular (Fields, 2002).

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=Strongly disagree
2=Disagree
3=Slightly disagree
4=Neither agree nor disagree
5=Slightly agree
6=Agree
7=Strongly agree
82. I would be very happy to spend the rest of my career with this organization. (ACS)
83. I really feel as if this organization's problems are my own. (ACS)
84. I do not feel like "part of the family" at my organization. (ACS)
85. I do not feel "emotionally attached" to this organization. (ACS)
86. This organization has a great deal of personal meaning for me. (ACS)
87. I do not feel a strong sense of belonging to my organization. (ACS)
88. I do not feel any obligation to remain with my current employer. (NCS)
89. Even if it were to my advantage, I do not feel it would be right to leave my organization now. (NCS)
90. I would feel guilty if I left my organization now. (NCS)
91. This organization deserves my loyalty. (NCS)
92. I would not leave my organization now because I have a sense of obligation to the people in it. (NCS)
93. I owe a great deal to this organization. (NCS)
94. It would be very hard for me to leave this organization now, even if I wanted to. (CCS)
95. Too much in my life would be disrupted if I decided I wanted to leave this organization now. (CCS)
96. Right now, staying with my organization is a matter of necessity as much as desire. (CCS)
97. I feel that I have too few options to consider leaving this organization. (CCS)
98. One of the few serious consequences of leaving this organization would be the scarcity of available alternatives. (CCS)
99. One of the major reasons I continue to work for this organization is that leaving would require considerable personal sacrifice—another organization may not match the overall benefits that I have here. (CCS)
APPENDIX H

GLOBAL JOB SATISFACTION (QUINN & SHEPARD, 1974; REVISED BY POND & Geyer, 1991; RICE ET AL., 1991)

This measure was originally developed by Quinn and Shepard (1974) and subsequently revised by different authors (i.e., Pond & Geyer, 1991; Rice, Gentile & McFarlin, 1991). Various alternate forms of the survey have also been developed, which include different subsets of items. In general, the full measure demonstrates good reliability ($r = .89$), and the expected positive correlations with variables such as satisfaction with different job facets, affective commitment, and job involvement, and negatively with turnover, perceived job alternatives, role conflict and role ambiguity (Fields, 2002). Of particular interest to this study was the alternative sixth item (i.e., 107), which has a more affectively oriented response scale (e.g., 1=terrible, 2=unhappy, 6=pleased, and 7=delighted).

Graduate students rated the affective vs. cognitive orientation of the items. Participants respond to each item in this measure using a different response scale. The response scale that is associated with each item follows the item stem below:
100. If you had to decide all over again whether to take the job you now have, what would you decide?  
Responses range from:  
1=definitely not take the job  
5=definitely take the job

101. If a friend asked if he/she should apply for a job like yours with your employer, what would you recommend?  
Responses range from:  
1=not recommend at all  
5=recommend strongly

102. How does this job compare with your ideal job?  
Responses range from:  
1=very far from ideal  
5=very close to ideal

103. How does your job measure up to the sort of job you wanted when you took it?  
Responses range from:  
1=not at all like I wanted  
5=just like what I wanted

104. All things considered, how satisfied are you with your current job?  
Responses range from:  
1=not at all satisfied  
5=completely satisfied

105. In general, how much do you like your job?  
Responses range from:  
1=not at all  
5=a great deal

106. How do you feel about your job overall?  
Responses range from:  
1=terrible  
2=unhappy  
3=mostly dissatisfied  
4=mixed (about equally dissatisfied and sat)  
5=mostly satisfied  
6=pleased  
7=delighted
APPENDIX I

ORGANIZATIONAL COMMITMENT (COOK & WALL, 1980)

This 9-item scale was developed to measure an employee’s organizational commitment through three subscales, organizational identification, organizational involvement, and organizational loyalty (Cook & Wall, 1980). Reliability estimates for the scale are in the acceptable range, with coefficient alphas ranging from .71 to .87, and the scale demonstrates the expected pattern of correlations with related measures (Fields, 2002).

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=Strongly disagree  
2=Disagree  
3=Slightly disagree  
4=Neither agree nor disagree  
5=Slightly agree  
6=Agree  
7=Strongly agree
107. I am quite proud to be able to tell people who it is I work for.
108. I sometimes feel like leaving this organization for good.
109. I am not willing to put myself out just to help the organization.
110. Even if the firm were not doing too well financially, I would be reluctant to change to another employer.
111. I feel like I am a part of the organization.
112. In my work, I like to feel I am making some effort, not just for myself, but for the organization as well.
113. The offer of a bit more money with another employer would not seriously make me think of changing my job.
114. I would not recommend a close friend to join our staff.
115. I would be happy to know that my own work has made a contribution to the good of the organization
APPENDIX J

JOB PERCEPTION SCALE (HATFIELD, ROBINSON & HUSEMAN, 1985)

The Job Perception Scale (Hatfield, Robinson & Huseman, 1985), is a 21-item measure designed to tap into the five dimensions identified by the JDI; satisfaction with the work itself, pay, promotion, supervision and co-workers. However, this survey’s measurement scale is different, in that respondents are asked to identify their perceptions of each job facet using a five point scale anchored on either end by the bipolar word pair. Although this measure uses a different rating scale compared to the other measures included in Pilot Study 1, it was included due to its expected relationships with affect at the item level. For example, bipolar pairs like pleasant/unpleasant, are rationally more affective in nature than the items from some of the other scales included in the study. The scale also demonstrates acceptable reliability and validity evidence (Fields, 2002).

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

Each of the following word-pairs represent the end-points/anchors of a 5-point bipolar rating scale.

116. Exciting/Dull
117. Pleasant/Unpleasant
118. Clear/Hazy
119. Challenging/Unchallenging
120. Satisfying/Unsatisfying
121. Rewarding/Unrewarding
122. Right/Wrong
123. Just/Unjust
124. Reliable/Unreliable
125. Reasonable/Unreasonable
126. Sincere/Insincere
127. Friendly/Unfriendly
128. Qualified/Unqualified
129. Careful/Careless
130. Loyal/Disloyal
131. Boring/Interesting
APPENDIX K

SATISFACTION WITH JOB FACETS (ANDREWS & WITHEY, 1976)

This measure was included due to the phrasing of some of its items, which ask the respondent how they “feel” about different aspects of their job (Andrews & Withey, 1976). Furthermore, the rating scale is the same as the one used on the alternative sixth item in Quinn & Shepard’s (1974) Global Job Satisfaction scale (i.e., 1=terrible, 2=unhappy, 6=pleased and 7=delighted), which is rationally, more affectively oriented. Finally, the scale also demonstrates acceptable reliability and validity evidence.

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=Terrible
2=Unhappy
3=Mostly Dissatisfied
4=Mixed (equally satisfied and dissatisfied)
5=Mostly Satisfied
6=Pleased
7=Delighted

132. How do you feel about your job?
133. How do you feel about the people you work with-your co-workers?
134. How do you feel about the work you do on your job-the work itself?
135. What is it like where you work-the physical surroundings, the hours, the amount of work you are asked to do?
136. How do you feel about what you have available for doing your job-I mean the equipment, information, good supervision, and so on?
APPENDIX L

GLOBAL JOB SATISFACTION (WARR, COOK, & WALL, 1979)

The final measure included in Pilot Study 1 was the Global Job Satisfaction scale developed by Warr, Cook and Wall (1979). This is a 15-item measure designed to assess an individual’s satisfaction with different intrinsically and extrinsically satisfying aspects of their job. Although it taps similar facets as many of the other scales, the scale was included due to different wording. It also demonstrates adequate reliability and validity evidence.

Graduate students rated the affective vs. cognitive orientation of the items and were informed that participants respond to the following questions using the rating scale:

1=I'm extremely dissatisfied
2=I'm very dissatisfied
3=I'm moderately dissatisfied
4=I'm not sure
5=I'm moderately satisfied
6=I'm very satisfied
7=I'm extremely satisfied

137. The freedom to choose your own method of working.
138. The recognition you get for good work.
139. The amount of responsibility you are given.
140. Your opportunity to use your abilities.
141. Industrial relations between management and workers in your firm.
142. The way your firm is managed.
143. The attention paid to suggestions you make.
144. Your hours of work.
145. The amount of variety in your job.
146. Your job security.
The affective evaluative component of job attitudes was measured using the following scale (Note: Participants did not see the scoring).

On the following set of 8 items, please indicate the position along the continuum that best describes your *feelings toward your job/feelings toward the company you work for*.

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Hateful       Sad           Annoyed        Tense         Bored         Angry         Disgusted      Sorrow
APPENDIX N

COGNITIVE SEMANTIC DIFFERENTIAL (CRITES, FABRIGAR & PETTY, 1994)

The cognitive evaluative component of job attitudes was measured using the following scale (Note: Participants did not see the scoring)

On the following set of 7 items, please indicate the position along the continuum that best describes the **traits or characteristics of your job/traits or characteristics of the company you work for**.

<table>
<thead>
<tr>
<th></th>
<th>Useful</th>
<th></th>
<th></th>
<th></th>
<th>Useless</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Wise</td>
<td></td>
<td></td>
<td></td>
<td>Foolish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Safe</td>
<td></td>
<td></td>
<td></td>
<td>Unsafe</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Beneficial</td>
<td></td>
<td></td>
<td></td>
<td>Harmful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Valuable</td>
<td></td>
<td></td>
<td></td>
<td>Worthless</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Perfect</td>
<td></td>
<td></td>
<td></td>
<td>Imperfect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Wholesome</td>
<td></td>
<td></td>
<td></td>
<td>Unhealthy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(+3)</td>
<td>(+2)</td>
<td>(+1)</td>
<td>(0)</td>
<td>(-1)</td>
<td>(-2)</td>
<td>(-3)</td>
<td></td>
</tr>
</tbody>
</table>
Trait and state based mood were assessed using the following scale.

This scale consists of a number of words that describe different feelings and emotions. Read each word and indicate to what extent you generally feel this way, that is, how you feel on the average, and you feel this way right now, that is, at the present moment.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Very slightly or not at all</th>
<th>A little</th>
<th>Moderately</th>
<th>Quite a bit</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Watershed</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>_____ interested</td>
<td>_____ irritable</td>
<td>_____ distressed</td>
<td>_____ alert</td>
<td>_____ excited</td>
<td>_____ ashamed</td>
</tr>
</tbody>
</table>
APPENDIX P

JOB COGNITIONS (WEISS, NICHOLAS & DAUS, 1999)

Job cognitions were measured using the following scale.

Please answer the following questions as accurately and honestly as possible.

1  2  3  4  5
Strongly Disagree  Disagree  Neither Disagree nor Agree  Agree  Strongly Agree

1. A person holding your job has the opportunity to earn a high salary.
2. A person holding your job has the opportunity to achieve job security.
3. A person holding your job has the opportunity to develop prestige.
4. A person holding your job has the opportunity to achieve self-fulfillment.
5. A person holding your job has the opportunity to earn promotions.
6. A person holding your job has the opportunity to earn recognition.
7. A person holding your job has the opportunity to develop self-esteem.
8. A person holding your job has the opportunity to achieve independence.
9. A person holding your job has the opportunity for personal growth.
10. A person holding your job has the opportunity to develop friendships.
11. A person holding your job has the opportunity to accomplish their goals.
12. A person holding your job has the opportunity to advance to a position of authority.
The ability to infect others with one’s emotions was assessed using the following scale:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Moderately Disagree</td>
<td>Slightly Disagree</td>
<td>Neither Agree nor Disagree</td>
<td>Slightly Agree</td>
<td>Moderately Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

Please answer the following questions as accurately and honestly as possible.

1. Whenever I feel positive emotions, people can easily see exactly what I am feeling.
2. I sometimes cry during sad movies.
3. People often do not know what I am feeling.
4. I laugh out loud when someone tells me a joke I think is funny.
5. It is difficult for me to hide my fear.
6. When I’m happy, my feelings show.
7. My body reacts very strongly to emotional situations.
8. I’ve learned it is better to suppress my anger than to show it.
9. No matter how nervous or upset I am, I tend to keep a calm exterior.
10. I am an emotionally expressive person.
11. I have strong emotions
12. I am sometimes unable to hide my feelings, even though I would like to.
13. Whenever I feel negative emotions, people can easily see exactly what I am feeling.
14. There have been times when I have not been able to stop crying even though I tried to stop.
15. I experience my emotions very strongly.
16. What I’m feeling is written all over my face.
APPENDIX R

EMOTIONAL CONTAGION SCALE (DOHERTY, 1997)

Emotional contagion susceptibility was assessed using the following scale:

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Never</td>
<td>2</td>
<td>Rarely</td>
</tr>
</tbody>
</table>

1. If someone I’m talking with begins to cry, I get teary-eyed.
2. Being with a happy person picks me up when I’m 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. When I look into the eyes of the one I love, my mind is filled with thoughts of romance.
7. It irritates me to be around angry people.
8. Watching the fearful faces of victims on the news makes me try to imagine how they might be feeling.
9. I melt when the one I love holds me close.
10. I tense when overhearing an angry quarrel.
11. Being around happy people fills my mind with happy thoughts.
12. I sense my body responding when the one I love touches me.
13. I notice myself getting tense when I’m around people who are stressed out.
15. Listening to the shrill screams of a terrified child in a dentist’s waiting room makes me feel nervous.
APPENDIX S
THE LEVELS OF SELF-CONCEPT SCALE (SELENTA & LORD, 2005)

The self-concept’s three levels were assessed using the following scale:

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither Agree nor Disagree</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

Individual level – Comparative identity subscale

1. I thrive on opportunities to demonstrate that my abilities or talents are better than those of other people.
2. I have a strong need to know how I stand in comparison to my coworkers.
3. I often compete with my friends.
4. I feel best about myself when I perform better than others.
5. I often find myself pondering over the ways that I am better or worse off than other people around me.

Relational level – Concern for others subscale

1. If a friend has having a personal problem, I would help him or her even if it meant sacrificing my time or money.
2. I value friends who are caring, empathic individuals.
3. It is important to me that I uphold my commitments to significant people in my life.
4. Caring deeply about another person such as a close friend or relative is important to me.
5. Knowing that a close other acknowledges and values the role that I play in their life makes me feel like a worthwhile person.
Collective level – Group achievement focus subscale

1. Making a lasting contribution to groups that I belong to, such as my work organization, is very important to me.
2. When I become involved in a group project, I do my best to ensure its success.
3. I feel great pride when my team or group does well, even if I’m not the main reason for its success.
4. I would be honored if I were chosen by an organization or club that I belong to, to represent them at a conference or meeting.
5. When I’m part of a team, I am concerned about the group as a whole instead of whether individual team members like me or whether I like them.
APPENDIX T

INTERPERSONAL POWER QUESTIONNAIRE (HINKIN & SCHRIESHEIM, 1989)

French and Raven’s five bases of interpersonal power were assessed using the following scale:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neither Disagree nor Agree</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

Please rate the extent to which the following statements about your immediate supervisor accurately complete the following statement: “My supervisor can…”

1. Increase my pay levels. (Reward)
2. Make me feel valued. (Referent)
3. Give me undesirable job assignments. (Coercive)
4. Make me feel like he or she approves of me. (Referent)
5. Make me feel that I have commitments to meet. (Legitimate)
6. Make me feel personally accepted. (Referent)
7. Make me feel important. (Referent)
8. Give me good technical suggestions. (Expert)
9. Make work difficult for me. (Coercive)
10. Share his or her considerable experience and/or training with me. (Expert)
11. Make things unpleasant for me. (Coercive)
12. Make being at work distasteful for me. (Coercive)
13. Influence whether or not I get a pay raise. (Reward)
14. Make me feel like I should satisfy job requirements. (Legitimate)
15. Provide me with sound job-related advice. (Expert)
16. Provide me with special benefits. (Reward)
17. Influence whether or not I get a promotion. (Reward)
18. Give me the feeling that I have responsibilities to fulfill. (Legitimate)
19. Provide me with needed technical knowledge. (Expert)
20. Make me recognize that I have tasks to accomplish. (Legitimate)
Leader-member exchange was assessed using the following scale:

1. Do you know where you stand with your leader…do you usually know how satisfied your leader is with what you do?
   Rarely   Occasionally   Sometimes   Fairly Often   Very Often

2. How well does your leader understand your job problems and needs?
   Not a Bit   A Little   A Fair Amount   Quite a Bit   A Great Deal

3. How well does your leader recognize your potential?
   Not at All   A Little   Moderately   Mostly   Fully

4. Regardless of how much formal authority he/she has built into his/her position, what are the chances that your leader would use his/her power to help you solve problems in your work?
   None   Small   Moderate   High   Very High

5. Again, regardless of the amount of formal authority your leader has, what are the chances that he/she would “bail you out,” at his/her expense?
   None   Small   Moderate   High   Very High

6. I have enough confidence in my leader that I would defend and justify his/her decision if he/she were not present to do so.
   Strongly Disagree   Disagree   Neutral   Agree   Strongly Agree

7. How would you characterize your working relationship with your leader?
   Extremely Ineffective   Worse Than Average   Better Than Average   Extremely Effective
APPENDIX V

CONVERGENT AND DISCRIMINANT VALIDITY EVIDENCE FOR THE AFFECTIVE JOB SATISFACTION ITEMS – STANDARDIZE REGRESSION WEIGHTS OF REGRESSING THE AFFECTIVE AND COGNITIVE LATENT FACTOR PAIRS ON EACH ITEM

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>PANAS / VIE</th>
<th>ASD / CSD</th>
<th>Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, I like working here.</td>
<td></td>
<td>0.838*</td>
<td>-0.176</td>
</tr>
<tr>
<td>2. In general, I don't like my job.</td>
<td></td>
<td>0.905*</td>
<td>-0.189*</td>
</tr>
<tr>
<td>3. I find real enjoyment in my work.</td>
<td></td>
<td>0.717*</td>
<td>-0.017</td>
</tr>
<tr>
<td>4. I consider my job rather unpleasant.</td>
<td></td>
<td>0.773*</td>
<td>-0.122</td>
</tr>
<tr>
<td>5. Most days I am enthusiastic about my work.</td>
<td></td>
<td>0.838*</td>
<td>-0.148</td>
</tr>
<tr>
<td>6. I definitely dislike my work.</td>
<td></td>
<td>0.776*</td>
<td>-0.163</td>
</tr>
<tr>
<td>7. Pleasant-Unpleasant</td>
<td></td>
<td>0.860*</td>
<td>-0.096</td>
</tr>
<tr>
<td>8. Satisfying- Unsatisfying</td>
<td></td>
<td>0.716*</td>
<td>0.027</td>
</tr>
<tr>
<td>9. How do you feel about the people you work with - your co-workers?</td>
<td></td>
<td>0.517*</td>
<td>-0.233</td>
</tr>
<tr>
<td>10. How do you feel about the work you do on your job - the work itself?</td>
<td></td>
<td>0.603*</td>
<td>-0.055</td>
</tr>
<tr>
<td>11. How do you feel about where you work - the physical surroundings, the hours, the amount of work you are asked to do?</td>
<td></td>
<td>0.679*</td>
<td>-0.204</td>
</tr>
<tr>
<td>12. How do you feel about what you have available for doing your job - the equipment, information, supervision, etc.?</td>
<td></td>
<td>.566*</td>
<td>-0.024</td>
</tr>
<tr>
<td>13. How do you feel about your job overall?</td>
<td></td>
<td>0.892*</td>
<td>-0.037</td>
</tr>
</tbody>
</table>
APPENDIX W

CONVERGENT AND DISCRIMINANT VALIDITY EVIDENCE FOR THE
COGNITIVE JOB SATISFACTION ITEMS – STANDARDIZE REGRESSION
WEIGHTS OF REGRESSING THE AFFECTIVE AND COGNITIVE LATENT
FACTOR PAIRS ON EACH ITEM

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The chance to work alone on the job.</td>
<td>0.166 0.220</td>
<td>0.360 0.187</td>
</tr>
<tr>
<td>2. The chance to do different things from time to time.</td>
<td>0.354* 0.204 0.466* 0.088</td>
<td></td>
</tr>
<tr>
<td>3. The chance to be &quot;somebody&quot; in the community.</td>
<td>0.396* 0.204 0.385* 0.208</td>
<td></td>
</tr>
<tr>
<td>4. The way my boss handles his or her subordinates.</td>
<td>0.643* -0.021 0.336 0.230</td>
<td></td>
</tr>
<tr>
<td>5. The competence of my supervisor in making decisions.</td>
<td>0.599* -0.024 0.343 0.211</td>
<td></td>
</tr>
<tr>
<td>6. The way my job provides for steady employment.</td>
<td>0.022 0.440* 0.127 0.411*</td>
<td></td>
</tr>
<tr>
<td>7. The chance to do things for other people.</td>
<td>0.201 0.265* 0.086 0.384*</td>
<td></td>
</tr>
<tr>
<td>8. The chance to tell people what to do.</td>
<td>0.211 0.206 0.588* -0.061</td>
<td></td>
</tr>
<tr>
<td>9. The chance to do something that makes use of my abilities.</td>
<td>0.370* 0.294* 0.212 0.357*</td>
<td></td>
</tr>
<tr>
<td>10. The way the company policies are put into practice.</td>
<td>0.627* -0.012 0.308 0.270</td>
<td></td>
</tr>
<tr>
<td>11. The pay for the amount of work that I do.</td>
<td>0.447* 0.089 0.126 0.404*</td>
<td></td>
</tr>
<tr>
<td>12. The chance for advancement on this job.</td>
<td>0.493* 0.139 0.055 0.607*</td>
<td></td>
</tr>
<tr>
<td>13. The freedom to use my own judgment.</td>
<td>0.444* 0.259* 0.288 0.415*</td>
<td></td>
</tr>
<tr>
<td>14. The chance to try my own methods of doing the job.</td>
<td>0.320* 0.345* 0.355* 0.324*</td>
<td></td>
</tr>
<tr>
<td>15. The working conditions.</td>
<td>0.643* 0.012 0.439* 0.252</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX W (CONT.)
CONVERGENT AND DISCRIMINANT VALIDITY EVIDENCE FOR THE
COGNITIVE JOB SATISFACTION ITEMS – STANDARDIZE REGRESSION
WEIGHTS OF REGRESSING THE AFFECTIVE AND COGNITIVE LATENT
FACTOR PAIRS ON EACH ITEM

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>Beliefs</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. The way my co-workers get along with each other.</td>
<td>0.254*</td>
<td>0.418*</td>
</tr>
<tr>
<td>17. Being able to keep busy all the time.</td>
<td>0.294*</td>
<td>0.394*</td>
</tr>
<tr>
<td>18. Compared to previous co-workers, how satisfied are you with your current co-workers?</td>
<td>0.312*</td>
<td>0.412*</td>
</tr>
<tr>
<td>19. Compared to previous supervisors, how satisfied are you with your current supervisor?</td>
<td>0.563*</td>
<td>0.495*</td>
</tr>
<tr>
<td>20. Compared to previous jobs, how satisfied are you with your current job?</td>
<td>0.416*</td>
<td>0.258</td>
</tr>
<tr>
<td>21. Compared to previous organizations you have worked for, how satisfied are you with the organization you currently work for?</td>
<td>0.556*</td>
<td>0.323</td>
</tr>
<tr>
<td>22. Based on your skills and the amount of effort you put into your work, how satisfied are you with your pay?</td>
<td>0.406*</td>
<td>0.201</td>
</tr>
<tr>
<td>23. If you had to decide all over again whether to take the job you have now, what would you decide?</td>
<td>0.372*</td>
<td>0.238</td>
</tr>
<tr>
<td>24. How does your job compare with your ideal job?</td>
<td>0.337*</td>
<td>0.346*</td>
</tr>
<tr>
<td>25. How does your job measure up to the sort of job you wanted when you took it?</td>
<td>0.187</td>
<td>0.399*</td>
</tr>
<tr>
<td>26. I know I am satisfied with my job.</td>
<td>0.617*</td>
<td>0.385*</td>
</tr>
<tr>
<td>27. After thinking about it, I am satisfied with my job.</td>
<td>0.666*</td>
<td>0.419*</td>
</tr>
</tbody>
</table>
APPENDIX X

CONVERGENT AND DISCRIMINANT VALIDITY EVIDENCE FOR THE
AFFECTIVE ORGANIZATIONAL COMMITMENT ITEMS – STANDARDIZE
REGRESSION WEIGHTS OF REGRESSING THE AFFECTIVE AND COGNITIVE
LATENT FACTOR PAIRS ON EACH ITEM

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ASD / CSD</td>
</tr>
<tr>
<td>1. I really care about the fate of this organization.</td>
<td>0.391*</td>
</tr>
<tr>
<td></td>
<td>0.362*</td>
</tr>
<tr>
<td>2. I would be very happy to spend the rest of my career with this company.</td>
<td>0.464*</td>
</tr>
<tr>
<td></td>
<td>0.095</td>
</tr>
<tr>
<td>3. I feel &quot;emotionally attached&quot; to this organization.</td>
<td>0.455*</td>
</tr>
<tr>
<td></td>
<td>0.234*</td>
</tr>
<tr>
<td>4. I am very proud when I tell people what company I work for.</td>
<td>0.445*</td>
</tr>
<tr>
<td></td>
<td>0.287*</td>
</tr>
<tr>
<td>5. I would feel guilty if I left my organization now.</td>
<td>0.457*</td>
</tr>
<tr>
<td></td>
<td>0.202*</td>
</tr>
<tr>
<td>6. I feel like I am a part of the organization.</td>
<td>0.333*</td>
</tr>
<tr>
<td></td>
<td>0.376*</td>
</tr>
<tr>
<td>7. I would feel a sense of loss if I left the organization.</td>
<td>0.454*</td>
</tr>
<tr>
<td></td>
<td>0.274*</td>
</tr>
</tbody>
</table>
## APPENDIX Y

**CONVERGENT AND DISCRIMINANT VALIDITY EVIDENCE FOR THE COGNITIVE ORGANIZATIONAL COMMITMENT ITEMS – STANDARDIZE REGRESSION WEIGHTS OF REGRESSING THE AFFECTIVE AND COGNITIVE LATENT FACTOR PAIRS ON EACH ITEM**

<table>
<thead>
<tr>
<th>Item Stem</th>
<th>ASD / CSD</th>
<th>PANAS / VIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am willing to work long hours to help this organization be successful.</td>
<td>0.519*</td>
<td><strong>0.384</strong></td>
</tr>
<tr>
<td></td>
<td>0.244*</td>
<td><strong>0.451</strong></td>
</tr>
<tr>
<td>2. If offered a job at a different organization, doing similar work, I would decline the offer.</td>
<td><strong>0.268</strong></td>
<td>0.650</td>
</tr>
<tr>
<td></td>
<td><strong>0.285</strong></td>
<td>0.073</td>
</tr>
<tr>
<td>3. If asked to weigh the pros and cons of working for this organization, I would chose to remain.</td>
<td>0.494*</td>
<td><strong>0.755</strong></td>
</tr>
<tr>
<td></td>
<td>0.203*</td>
<td>0.091</td>
</tr>
<tr>
<td>4. When I weigh my available employment options, I believe my best option is to remain with this organization.</td>
<td>0.340*</td>
<td>0.516</td>
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<tr>
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<td>0.296*</td>
<td>0.266</td>
</tr>
<tr>
<td>5. I could list several reasons for my decision to remain with this organization.</td>
<td>0.378*</td>
<td>0.606*</td>
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<tr>
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<td>0.311*</td>
<td>0.279</td>
</tr>
<tr>
<td>6. I would lose too much if I left this organization.</td>
<td>0.289*</td>
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<tr>
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<td>0.274*</td>
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<tr>
<td>7. I agree with the policies and procedures this organization operates by.</td>
<td>0.371*</td>
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<tr>
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APPENDIX Y (CONT.)

CONVERGENT AND DISCRIMINANT VALIDITY EVIDENCE FOR THE
COGNITIVE ORGANIZATIONAL COMMITMENT ITEMS – STANDARDIZE

REGRESSION WEIGHTS OF REGRESSING THE AFFECTIVE AND COGNITIVE
LATENT FACTOR PAIRS ON EACH ITEM

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<tr>
<td>8. I know I am committed to my organization.</td>
<td>0.443*</td>
<td>0.399*</td>
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<td>9. The costs of leaving my current job would outweigh the benefits of</td>
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<td>taking another job.</td>
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<td>10. I can think of many reasons why I should remain with this organization.</td>
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<td>11. I rarely think about leaving this organization.</td>
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<td>12. Leaving this organization would require considerable personal</td>
<td>0.341*</td>
<td>0.283*</td>
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<tr>
<td>sacrifice—another organization may not match the benefits I have here.</td>
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APPENDIX Z

INTERCORRELATIONS AMONG STATE AND TRAIT LEVEL VARIABLES
Table Z1
Intercorrelations among State and Trait Level Variables

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Note. State-based correlations are calculated using aggregate data.
Table Z1 (Cont.)
Intercorrelations among State and Trait Level Variables

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<td>28. LMX</td>
<td>.66**</td>
<td>.76**</td>
<td>.66**</td>
<td>.73**</td>
<td>.13</td>
<td></td>
<td>.48*</td>
<td>.88**</td>
<td>.62**</td>
<td>.13</td>
<td>.11</td>
<td>.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. % of measurement period</td>
<td>.07</td>
<td>.11</td>
<td>.01</td>
<td>.11</td>
<td>.33</td>
<td></td>
<td>.30</td>
<td>.19</td>
<td>.35</td>
<td>.04</td>
<td>.37</td>
<td>-.13</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>interacting with Supervisor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. Interacted with Supervisor in last 5 minutes (Y/N)</td>
<td>-.55*</td>
<td>-.44</td>
<td>-.31</td>
<td>-.36</td>
<td>.23</td>
<td></td>
<td>.16</td>
<td>-.16</td>
<td>-.02</td>
<td>-.10</td>
<td>.45*</td>
<td>-.31</td>
<td>-.28</td>
<td>.35</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX AA

HYPOTHESES 2 & 3 MODELS; CONTROLLING FOR THE INFLUENCE OF TIME ON
STATE AFFECT
### Table AA1

**Model 2&3C – Effects of Concomitantly Measured State Affect on State Attitudes: Controlling for the Influence of Time on State Affect**

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{0}$</td>
<td>$\gamma_{1}$</td>
</tr>
<tr>
<td><strong>(2&amp;3C) State Affective Job Satisfaction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$_j = \beta_0 + \beta_1 \text{ResidGrpCentStatePA}_j$ + $\beta_2 \text{ResidGrpCentStateNA}_j + r_j$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>$\gamma_{00}$</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td>$\gamma_{10}$</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_{2i}$</td>
<td>$\gamma_{20}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.299**</td>
<td>.902**</td>
</tr>
<tr>
<td><strong>(2&amp;3C) State Cognitive Job Satisfaction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGJS$_j = \beta_0 + \beta_1 \text{ResidGrpCentStatePA}_j$ + $\beta_2 \text{ResidGrpCentStateNA}_j + r_j$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>$\gamma_{00}$</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td>$\gamma_{10}$</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_{2i}$</td>
<td>$\gamma_{20}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.165**</td>
<td>.855**</td>
</tr>
</tbody>
</table>
Table AA1 (cont.)
Model 2&3C – Effects of Concomitantly Measured State Affect on State Attitudes: Controlling for the Influence of Time on State Affect

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\gamma_{00})</td>
<td>(\gamma_{10})</td>
</tr>
<tr>
<td>(2&amp;3C) State Affective Org. Commitment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOC(_ij) = (\beta_0 + \beta_1)ResidGrpCentStatePA(_ij) + (\beta_2)ResidGrpCentStateNA(<em>ij) + (r</em>{ij})</td>
<td>(\gamma_{00})</td>
<td>(\gamma_{10})</td>
</tr>
<tr>
<td>L2: (\beta_0 = \gamma_{00} + u_{0i})</td>
<td>5.013**</td>
<td></td>
</tr>
<tr>
<td>L2: (\beta_1 = \gamma_{10} + u_{1i})</td>
<td></td>
<td>.106**</td>
</tr>
<tr>
<td>L2: (\beta_2 = \gamma_{20} + u_{2i})</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2&3C) State Cognitive Org. Commitment
L1: StateCOGOC\(_ij\) = \(\beta_0 + \beta_1\)ResidGrpCentStatePA\(_ij\) + \(\beta_2\)ResidGrpCentStateNA\(_ij\) + \(r_{ij}\) | \(\gamma_{00}\) | \(\gamma_{10}\) | \(\gamma_{20}\) | \(\sigma^2\) | \(\tau_{00}\) | \(\tau_{11}\) | \(\tau_{22}\) |
| L2: \(\beta_0 = \gamma_{00} + u_{0i}\) | 4.740** | | | | 1.800** | | |
| L2: \(\beta_1 = \gamma_{10} + u_{1i}\) | | .101** | | | -.004 | .017** | |
| L2: \(\beta_2 = \gamma_{20} + u_{2i}\) | | | -.038† | | -.018 | -.009** | .011** |
Table AA2
Model 2&3D – Effects of Concomitantly Measured and Time Lagged State Affect on State Attitudes: Controlling for the Influence of Time on State Affect

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{10}$</td>
</tr>
<tr>
<td>(2&amp;3D) State Affective Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFJS$<em>{ij}$ = $\beta_0 + \beta_1$ResidGrpCentStatePA$</em>{ij}$ + $\beta_2$ResidGrpCentStateNA$<em>{ij}$ + $\beta_3$Lag1ResidGrpCentStatePA$</em>{ij}$ + $\epsilon$</td>
<td>2.69**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \epsilon_{0i}$</td>
<td>4.941**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + \epsilon_{1i}$</td>
<td>125**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + \epsilon_{2i}$</td>
<td>1.186**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_3 = \gamma_{30} + \epsilon_{3i}$</td>
<td>0.078**</td>
<td></td>
</tr>
<tr>
<td>(2&amp;3D) State Cognitive Job Satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGJS$<em>{ij}$ = $\beta_0 + \beta_1$ResidGrpCentStatePA$</em>{ij}$ + $\beta_2$ResidGrpCentStateNA$<em>{ij}$ + $\beta_3$Lag1ResidGrpCentStatePA$</em>{ij}$ + $\epsilon$</td>
<td>1.51**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + \epsilon_{0i}$</td>
<td>5.113**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + \epsilon_{1i}$</td>
<td>0.081**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + \epsilon_{2i}$</td>
<td>0.071**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_3 = \gamma_{30} + \epsilon_{3i}$</td>
<td>0.046*</td>
<td></td>
</tr>
</tbody>
</table>
Table AA2 (cont.)
Model 2&3D – Effects of Concomitantly Measured and Time Lagged State Affect on State Attitudes: Controlling for the Influence of Time on State Affect

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficients</th>
<th>Variance &amp; Covariance Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{10}$</td>
</tr>
<tr>
<td>(2&amp;3D) State Affective Org. Commitment*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateAFFOC$<em>{ij}$ = $\beta_0 + \beta_1$.ResidGrpCentStatePA$</em>{ij}$ + $\beta_2$.ResidGrpCentStateNA$<em>{ij}$ + $\beta_3$.Lag1ResidGrpCentStatePA$</em>{ij}$ + $r_{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>5.009**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td>.063*</td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_{2i}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_3 = \gamma_{30} + u_{3i}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2&amp;3D) State Cognitive Org. Commitment*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L1: StateCOGOC$<em>{ij}$ = $\beta_0 + \beta_1$.ResidGrpCentStatePA$</em>{ij}$ + $\beta_2$.Lag1ResidGrpCentStatePA$<em>{ij}$ + $r</em>{ij}$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_0 = \gamma_{00} + u_{0i}$</td>
<td>4.794**</td>
<td></td>
</tr>
<tr>
<td>L2: $\beta_1 = \gamma_{10} + u_{1i}$</td>
<td></td>
<td>.091**</td>
</tr>
<tr>
<td>L2: $\beta_2 = \gamma_{20} + u_{2i}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Failed to converge
APPENDIX BB

IRB APPROVAL – PILOT STUDY 1

May 30, 2006

Nathan J. Sestak
87 28th St. NW
Barberton, Ohio 44203

Mr. Sestak:

The University of Akron’s Institutional Review Board for the Protection of Human Subjects (IRB) completed a review of the protocol entitled "Subject Matter Expert Classification of Existing Job Satisfaction and Organizational Commitment Items". The IRB application number assigned to this project is 20060512.

The protocol was reviewed on May 26, 2006 and qualified for exemption from continuing IRB review. The protocol represents minimal risk to subjects and matches the following federal category for exemption:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) Information is recorded in such a manner that subjects can be identified, directly or through identifiers linked to subjects; AND (ii) any disclosure of responses outside the research could reasonably place the subjects at risk of civil or criminal liability or be damaging to subjects’ financial standing, employability or reputation

Enclosed is a copy of the informed consent document, which the IRB has approved for your use in this research. In addition, your request for a waiver of documentation of informed consent, as permitted under 45 CFR 46.117(c), is also approved.

Annual continuation applications are not required for exempt projects. If you make any changes or modifications to the study's design or procedures that either increase the risk to subjects or include activities that do not fall within one of the categories exempted from the regulations, please contact the IRB first, to discuss whether or not a request for change must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to their implementation.

Please retain this letter for your files. If the research is being conducted for a master’s thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Sincerely,

Sharon McWhorter
Interim Director

Cc: Rosalie Hall, Advisor
    Department Chair
    Phil Allen, IRB Chair
APPENDIX CC

IRB APPROVAL – PILOT STUDY 2

Office of Research Services and Sponsored Programs
Akron, OH 44325-2102
(330) 972-7600, Office
(330) 972-6281, Fax

July 6, 2006

Nathan J. Sestak
87 28th St. NW
Barberton, Ohio 44203

Mr. Sestak:

The University of Akron’s Institutional Review Board for the Protection of Human Subjects (IRB) completed a review of the protocol entitled “Psychometric Verification of Four Job Satisfaction and Organizational Commitment Scales”. The IRB application number assigned to this project is 20060612.

The protocol was reviewed on July 5, 2006 and qualified for exemption from continuing IRB review. The protocol represents minimal risk to subjects and matches the following federal category for exemption:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) Information is recorded in such a manner that subjects can be identified, directly or through identifiers linked to subjects; AND (ii) any disclosure of responses outside the research could reasonably place the subjects at risk of civil or criminal liability or be damaging to subjects’ financial standing, employability or reputation

Enclosed is a copy of the informed consent document, which the IRB has approved for your use in this research. In addition, your request for a waiver of documentation of informed consent, as permitted under 45 CFR 46.117(c), is also approved.

Annual continuation applications are not required for exempt projects. If you make any changes or modifications to the study’s design or procedures that either increase the risk to subjects or include activities that do not fall within one of the categories exempted from the regulations, please contact the IRB first, to discuss whether or not a request for change must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to their implementation.

Please retain this letter for your files. If the research is being conducted for a master’s thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Sincerely,

Sharon McWhorter
Interim Director

Cc: Rosalie Hall, Advisor
Phil Allen, IRB Chair
January 17, 2007

Nathan J. Sestak
87 28th St. NW
Barberton, Ohio 44203

Ms. Sestak:

The University of Akron’s Institutional Review Board for the Protection of Human Subjects (IRB) completed a review of the protocol entitled “Psychological Contagion within the Supervisor-Subordinate Dyad: An Experience Sampling Investigation of Mood and Job Attitude Contagion at Work”. The IRB application number assigned to this project is 20070104.

The protocol was reviewed on January 16, 2007 and qualified for exemption from continuing IRB review. The protocol represents minimal risk to subjects and matches the following federal category for exemption:

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information is recorded in such a manner that subjects can be identified, directly or through identifiers linked to subjects; AND (ii) any disclosure of responses outside the research could reasonably place the subjects at risk of civil or criminal liability or be damaging to subjects’ financial standing, employability or reputation.

Enclosed is a copy of the informed consent document, which the IRB has approved for your use in this research.

Annual continuation applications are not required for exempt projects. If you make any changes or modifications to the study’s design or procedures that either increase the risk to subjects or include activities that do not fall within one of the categories exempted from the regulations, please contact the IRB first, to discuss whether or not a request for change must be submitted. Any such changes or modifications must be reviewed and approved by the IRB prior to their implementation.

You are required to submit a Final Report to the IRB, upon completion of this research.

Please retain this letter for your files. If the research is being conducted for a master’s thesis or doctoral dissertation, the student must file a copy of this letter with the thesis or dissertation.

Sincerely,

Sharon McWhorter
Interim Director

Cc: Rosalie Hall, IRB Chair
APPENDIX EE

INFORMED CONSENT – PRIMARY STUDY

INFORMED CONSENT

PROJECT TITLE: Psychological Contagion within the Supervisor-Subordinate Dyad: An Experience Sampling Investigation of Mood and Job Attitude Contagion at Work

INTRODUCTION: You are invited to participate in a research project being conducted by Nathan Sestak, Industrial/Organizational Psychologist – Timken and Ph.D. Candidate in the Department of Psychology at the University of Akron.

RESEARCH PURPOSE AND DESCRIPTION OF PROCEDURES: This study examines the psychological contagion process within the supervisor-subordinate dyad. You will participate in conjunction with either the individual you directly report to (hereafter referred to as the “Supervisor”), or with an individual who reports directly to you (hereafter referred to as the “Subordinate”). Today you will complete base-line measures for comparison purposes and be trained on the technology used in the study. Beginning Monday morning, you will be asked to complete a short, 2-4 minute survey assessing your job attitudes, mood and activities you are currently engaged in, six (6) times daily, for the next two (2) work weeks. These surveys will occur at 9:00am, 10:00am, 11:00am, 2:00pm, 3:00pm and 4:00pm. Data collection will occur either through a PDA or Internet-based survey. You will receive periodic emails from the researcher, reminding you to participate.

EXCLUSION: You must complete the study with your supervisor or subordinate.

RISKS AND DISCOMFORTS: Participation in this study may interfere with your work schedule. However, this is a Timken sanctioned research study and no economic harm will ensue.

BENEFITS: You will receive no direct benefit from your participation in this study, but your participation may help us better understand the contagion process at work.

PAYMENTS TO PARTICIPANTS: Upon completion of the study, each member of the three supervisor-subordinate dyads with the most completed surveys will receive a $50.00 gift certificate to a store of their choosing.

RIGHT TO REFUSE OR WITHDRAW: Your participation in this research is voluntary and you may refuse to participate, or may discontinue participation at any time, without penalty or loss of benefits to which you are otherwise entitled.

CONFIDENTIAL DATA COLLECTION: Your responses will remain confidential. Any identifying information collected will be kept in a secure location and only the researcher will have access to the data. Participants will not be individually identified in any publication or presentation of the research results. Only aggregate data will be used. Your signed consent form will be kept separate from your data, and nobody will be able to link your responses to you.

WHO TO CONTACT WITH QUESTIONS: The researcher will be available to answer any questions you may have (W. 330-471-2135; C. 330-858-2049; nathan.sestak@timken.com). If at any time, you feel your questions have not been adequately answered, you may request to speak with the Chair of the Department of Psychology (Dr. Levy, 330-972-4349), or the Associate Director of Research Services at the University of Akron (Sharon McWhorter, 330-972-7666).

ACCEPTANCE & SIGNATURE: I have read the information provided above and all of my questions have been answered. I voluntarily agree to participate in this study. I will receive a copy of this consent form for my records.

(Participant Name – Please Print) (Participant Signature) (Date)