The Strong Situation Hypothesis:

An Examination Using Interpersonal Theory

by

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ABSTRACT

As methods for measuring the relationship between personality and behavior have become more sophisticated, so too has the interest in better explaining the role that environments play in this relationship. Recent efforts have been made to clarify the hypothesized moderating role of environments on this relationship and Cooper and Withey (2009), in particular, have provided evidence for the paucity of empirical research that explains the ways in which strong and weak situations may differentially affect the relationship between personality and behavior. They contend, through a thorough review of the literature, that the intuitive nature of the theory provides promise and that there is likely some substantive basis for the assertion that environmental strength should moderate the relationship between personality and theoretically relevant behaviors. The current study was designed to test the moderating influence of interpersonal environment on the relationship between interpersonal personality and interpersonal behavior, specifically whether the evidence exists for the hypothesis that moderation differentially exists for strong and weak environments. No evidence was provided for the moderating role of environments. Evidence was provided for the predictive utility of traits in all models; however, differential predictive utility existed for environments when examined separately using the Power and Affiliation axes of the Interpersonal Circle.

DEDICATION

This project is dedicated to the numerous family and friends who supported me through my graduate work at Arizona State University, especially Sherise Federico, my parents—Richard and Rosalie Primé—and my cohort mates and dear friends: Jessica Rohlfing, Tyler Barratt, Elizabeth Poloskov.

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CHAPTER 1

INTRODUCTION

Since the beginnings of the field, psychologists have been interested in the role of environments in shaping human personality and behavior. The earliest focus on environment by psychologists was its role in explaining human development (Berg; 1933; Conklin, 1922; Issacs, 1931; Krout, 1931). Today, a review of the literature reveals that environment is a primary construct in numerous subdisciplines of psychology, including environmental psychology (De Young, 2013), social psychology (Sorenson, 2002), personality psychology (Fleeson, 2007), and organizational psychology (Adkins & Naumann, 2001).

Perhaps the best-known psychological theory that addresses the construct of environment is the *nature versus nurture* theory first explained by Galton (1875) and later expanded upon by Erikson (1959) and others. The nature versus nurture theory juxtaposes the influential strength of biological factors (i.e., nature) and environmental factors (i.e., nurture) in the development of the individual. The central question of the theory is: to which degree is individual expression guided by the inherited traits and/or the environmental conditions to which the individual is exposed. In many ways, this line of thinking provided the foundation for the notion that individuals develop personalities and resultant behaviors according to the interplay of dispositional features and life experience. Sigmund Freud first considered environmental factors in his theories of development by explaining the role of the contextual environment and the ways in which individuals are shaped by the environmental influences to which they are exposed (Kris & Freud, 1954). Freud called this the *social environment* and we can presume that he

chose this term because he recognized that psychological conceptualizations of environment are often a proxy for the people in the individual's immediate environment. This notion of that environments are defined by the actual people within the environment was expanded upon by Parson's (1951) and others to create what is known today as Social Systems Theory and Systems Psychology. In the most general sense, social systems theory is an interdisciplinary literature in which its authors seek to explain the ways in which individuals interact with those around them to create a homeostatic, yet ever-changing construct all its own (Rogers, 2010). As defined by Alluisi (1970), Systems Psychology was inspired by systems theory and is a theory and subdiscipline of psychology which is concerned with understanding, describing, and predicting human behavior within the context of their interactions with other individuals. According to this theoretical perspective, environments are primarily defined by the interpersonal interactions and, secondarily, by the behaviors that result from these actions. The systems thinking approach was a major advancement in understanding the individual within the social environment and its effects are felt today in numerous scientific disciplines and subdisciplines including sociology, social psychology, applied psychology, organizational psychology, clinical psychology, and counseling psychology.

Around the same time that systems-related thinking was beginning to evolve, an opposing paradigm shift toward behaviorism was gaining equal strength in the psychological community. In sharp contrast with systems approaches, behaviorism sought to relegate the role of environment to that of a single stimulus or a set of stimuli from which individuals simply react (Skinner, 1974). From this theoretical perspective, the individual processes (i.e., personality traits, individual characteristics, and

dispositional factors) were viewed as largely immeasurable and of tertiary concern to the psychological sciences. This dogmatic focus on behavior defined the principal tenet of behaviorism: that psychology should concern itself with the observable behaviors of people rather than with the unobservable events that take place in their minds (Skinner, 1974). The strict behaviorist school of thought maintains that behaviors can be described scientifically without recourse either to internal physiological events or to hypothetical constructs such as thoughts or beliefs (Baum, 1994). As illustrated in Figure 1, a simple distillation of this scientific position is a direct causal relationship that can be established between environmental stimuli and the resultant reactive behavior.

Figure 1. Simple Model of Behavioral Psychology View of Environmental Influence on Behavior

Not surprisingly, Personality Psychologists took umbrage with such a reductive view of human behavior and argued that the human internal processes were indeed

measurable and, in fact, should be measured as part of an axis of psychological explanation (Mischel, 1979). The theoreticians and researchers in this area believed that the behaviorists were missing the point by focusing solely on the environment and behavior relationship and posited that psychological processes begin with the internal, which are then influenced by external stimuli, and ultimately become expressed in behavioral manifestations of the internal processes. Consequently, the personality models and theories focused on measuring and explaining the individual drivers that shape observable behavioral expressions. Trait theorists, in particular, set to the task of creating parsimonious models that could both capture and explain the commonalities and variability within the continuum of human expression. Findings in this area led to breakthroughs in the conceptualization and measurement of what we think of today as personality (Pervin & John, 1993) and multiple competing models with strong empirical bases now exist, including but not limited to trait theories of personality (McCrae, Terracciano, et al., 2005; Roberts & Pomerantz, 2004), typological models of personality (Robins, John & Caspi, 1998), categorical and dimensional approaches (Brown & Barlow, 2009; Ruscio & Ruscio, 2008, Widiger, Livesly & Clark, 2009; Widiger & Trull, 2007), and the increasingly popular Five Factor Model (also know as The Big Five; Digman, 1997; McAdams, & Pals, 2006, O'Connor & Dyce, 2001).

As the personality literature has evolved, so too has the literature seeking to explain the relationship between personality and behavior. In a fairly recent review of the literature on behavior and behavior assessment, Kelly and Agnew (2012) explain the empirical support for the notion that behavior is observable, socially meaningful, and variable on several dimensions (e.g., intentional vs. habitual, discrete vs. continuous) and

variable in measure (e.g., frequency, desirability). They further explain that—depending on the ways in which one measures behavior—personality and behavior may interact in multiple ways (e.g., as interaction variables or as predictor and outcome variables). One of the most compelling and frequently researched relationships between personality and behavior is one in which behavior is an outcome or the result of personality predictors. Ample examples of the literature in this area exist and include such varied methodologies and areas of interest as: (1) treatment outcomes (e.g., Lipsey & Wilson, 1993), (2) risk-taking behaviors (e.g., Zuckerman & Kuhlman, 2000), and (3) engagement in work-related roles (e.g., Thomas, 2011). Like personality theory, this approach to measuring the personality and behavior relationship asserts that behavior is the result of internal drivers—such as personality traits—and individuals act according to stable and enduring personality factors that are measurable and predictive of behavior.

As methods for measuring the relationship between personality and behavior have become increasingly sophisticated, so too has the interest in better explaining the role that environments play in this relationship. From the earliest conceptions of psychological theories of environment through now, environment is believed to have what statisticians would consider a statistical moderating effect on the relationship between personality and behavior. In statistical terms, moderation occurs when the relationship between two variables is affected by a third variable. The third variable is referred to as the moderating variable or simply the moderator (Cohen et. al., 2003). In laymen's terms, a moderator is best explained as "context". Whenever, the caveat, "well, it depends" arises in psychological explanations, what is most likely being raised for discussion is a moderating variable. For example, if a researcher in this area sought to explore whether

an individual may interact with people differently at work or at home, a model could be constructed where work would serve as the moderating variable (i.e., environment) in one model and home could serve as the moderating variable in another model, which could then be tested for exerting some influence on the relationship between the individual's personality and the resulting behaviors. These two models could then be tested to see if the individual acts differently at work or at home. If different relationships were observed when a moderator was added to the model, then one could argue for the moderating effect of environment on the relationship between personality and behavior. Figure 2 provides an illustration of the hypothesized moderating role of environment on the relationship between personality and behavior.

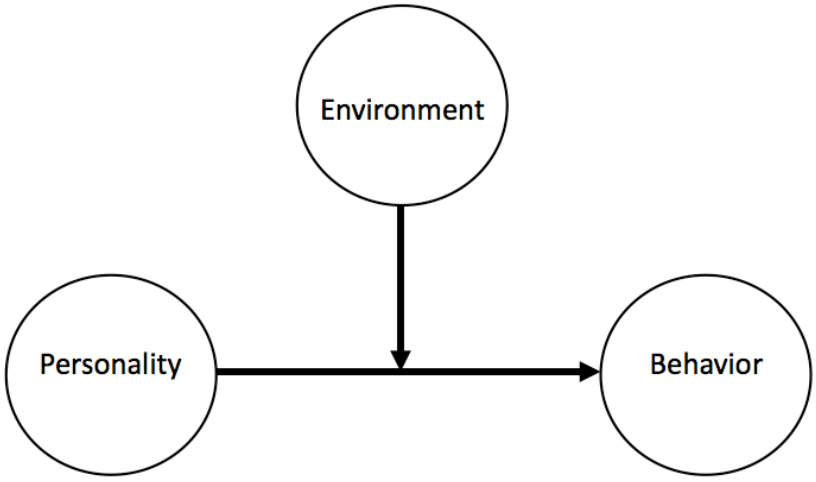

Figure 2. Tripartite Model of Personality, Behavior, and Environment.

The Strong Situation Hypothesis

Recent efforts have been made to clarify the moderating role of environments on the relationship between personality and behavior. One article, in particular, authored by Cooper and Withey (2009) described in great detail the efforts by personality psychologists, social psychologists, and organizational behaviorists to explain the ways in which strong and weak situations may affect the relationship between personality and behavior. According to Cooper and Withey (2009), the accumulating evidence of the modest predictive power of personality across situations (Mischel, 1968) and the similarly modest predictive power of situations (Funder & Ozer, 1983) gave way to a partial consensus in the scientific community that behavior is both the product of personality and situation (Endler & Parker, 1992; Weiss & Adler, 1984). This led to developments in the study of the differential effects of situations in both social and organizational behaviors when situations are varied and manipulated. Some evidence has been presented in these literatures for statistical main effects where carefully manipulated environments can cause behaviors (see e.g., Cialdini, 2008; Johns, 2006, for examples of the powerful effects of both small and large changes in situations and contexts); however, as stated by Cooper and Withey (2009), no study to date has properly been designed to test whether environment does indeed moderate the relations between personality and behavior. Additionally, although several aspects of situations have been identified as likely constraints on the expression of personality (see e.g., Marshall & Brown, 2006, on the salience of the situation; Zimbardo, 2007, on situation novelty), the differential effects of situational constraint on personality—most often referred to as situational strength in the literature—are still largely unknown.

The primary question in all of this, as defined by personality theorist Walter Mischel, is: "When are situations most likely to exert powerful effects, and conversely, when are person variables likely to be most influential?" (Mischel, 1977, p.346). Cooper and Withey explain further that Michel's answer to this very question was that situations are likely to matter most when situations are strong, and conversely, personality is likely to matter most when situations are weak. His reasoning was that strong situations constrain options and provide clear signals about what is expected. Uniform expectancies restrict the degree of behavioral variability across individuals, which in turn limit observed personality-behavior relations. In contrast, behaviors are more likely to reflect relevant personality traits when signals and constraints are weak. (Mischel, 1977, p.63)

Building upon Michel's initial breakthroughs in the theoretical definitions of situational strength, Cooper and Withey (2009) identified five conceptual developments in the literature between situation strength, personality, and behavior. The first development is the aforementioned definition of situation strength offered by Mischel. The second development is the connections between the three variables and the demand characteristic concept, which refers to the cues in the situation and their interpretability. Alexander and Knight (1971) described strong situations as those with strong cues and tightly scripted roles. Conversely, their definition of weak situations is exemplified by unclear demand characteristics, such as: (1) vague cues about what is expected of the individual, and (2) very loose rules about the roles that individuals are expected to play. The third conceptual development is the application of the situation strength construct to collectivities. This refers to the ways in which the situation strength construct can be applied to collective groups and organizations. Cooper and Withey (2009) explain that

this conceptual development has been used to illustrate differences between strong and weak organizational cultures (see e.g., O'Reilly & Chatman, 1996) and, according to the depiction offered in the literature, strong organizational cultures are defined by shared assumptions, standards, and values that provide a normative order designed to increase behavioral consistency, act as a form of social control, and homogenize thinking and response to situations. They further cite Tosi (2002) to explain that there seems to be less personality-driven behavior in tightly structured mechanized organizational cultures and, conversely, there is more personality-driven behavior in loosely structured organic organizations. The fourth conceptual development is empirical work done by social scientists to better define the meaning and consequences of situations and the theoretically relevant behaviors. The literature in this area has been particularly enlightening, especially in the area of if… then contingencies. The idea is that situations have many features, the summations of which become prototypes that determine the strength of the if… then contingencies (Cantor, Mischel, & Swartz, 1982; Wright & Mischel, 1987). The adopted conventional wisdom to arise from these findings is that strong situations have more precise if… then contingencies, while weak situations are defined by vague if… then contingencies. Further developments in this area helped to define the individual processes at work in the perceptions of both strong and weak environments. For example, Shoda, Mischel and Wright (1989) found that departures from if… then contingencies affect dispositional attributions, with the larger departures in weak situations resulting in stronger dispositional attributions. This may point to some tentative evidence for the claim that weak situations provide more variability in expression. Further evidence comes from Shoda and collegues (et al., 1993a) whose

findings show that strong situations are more demanding and stressful than weak situations and evoke more spontaneous responses (Shoda et al., 1993b), as opposed to highly mediated cognitive responses. Cooper and Withey cite this finding as evidence for the claim that expression is constrained in strong situations and individuals are required to quickly respond in a manner that aligns with the demand characteristics of the environment—or at least the variability in response is limited by the spontaneous nature of the response. Additionally, evidence exists that active processing of situational cues exists and behavioral expressions are deliberately chosen according to perceived strength of the situation. For example, Shoda and Mischel (2000) demonstrated that the individual processes involved in encoding and understanding situations affects the outcome and the influence of situations. In short, their study demonstrated that perceived situational constraints had the effect of creating differential outcomes in behavior that aligned with the strength of the situation (i.e., they aligned with the demand characteristics of the situation). The fifth and final conceptual development identified by Cooper and Withey (2009) is one in which the notion of situation strength has been transformed in the literature from a hypothesis that still needs empirical support to that of conventional wisdom. The idea appears in organizational behavior textbooks (John & Saks, 2001; McShane & Young, 2005), in the press (Gladwell, 2000), and in journal articles that erroneously exclaim that, "It has been well known for some time that dispositional effects are likely to be strongest in relatively weak situations and weakest in relatively strong situations" (Davis-Blake & Pfeffer, 1989, p. 387).

All of these findings together demonstrate some evidence for the notion that individual processes are at play in determining the outcome and influence of situations

and, contrary to the belief that behavior is relatively invariant across situations and over time, there is indeed emerging evidence to support the notion that situational variability in human behavior may be the norm rather than the exception. However, as Cooper and Withey illustrate, the proof needed to support the greater assertion that weak environments allow greater individual variability in expression than strong environments remains incomplete and further study is needed to make the empirical claim. Nevertheless, they do contend through a thorough review of the literature that the intuitive nature of the theory provides promise and that there is likely some substantive basis for the assertion that situational strength should moderate the relationship between personality and theoretically relevant behaviors.

Interpersonal Theory

Interpersonal Psychology offers a particularly strong empirical and theoretical basis for testing the moderating effect of environments on the personality and behavior relationship. During the 1950's, the reductive views of the behaviorist and psychoanalytic schools of thought dominated the field of psychology and interpersonal psychology was established to offer a more integrative alternative: one that explored the scientific merits of the notion that personality, behavior, and environment are all interconnected and measurable. Interpersonal Psychology was first brought to prominence by efforts of the Kaiser Foundation Research Group (e.g., Feedman, Ossorio, & Coffey, 1951; Leary, 1957) and the field has since emerged as a significant academic discipline. Over the past 60 plus years, thousands of research articles, chapters, and books have been published that address interpersonal processes in personality; social psychology; behavior in dyads and groups; relationships, and in psychotherapy (Strack & Horowitz, 2010).

Perhaps the most important breakthrough in the field of interpersonal psychology was the development of the Interpersonal Circumplex by Leary in his seminal work The Interpersonal Diagnosis of Personality (1957). The original version of the Interpersonal Circumplex contained 16 segments that were developed to systematize the vast array of interpersonal traits and behaviors documented by the Kaiser Foundation Research Group in their work with patients in a psychiatric hospital. The interpersonal circumplex was further tested after Leary's original work, and today a modern conception of the interpersonal circumplex, called the Interpersonal Circle (IPC; Wiggins, Phillips & Trapnell, 1989), is comprised of 8 octants that organize interpersonal constructs (e.g., traits and behaviors) around a circular model with two underlying axes. Wiggins (1991) advocated that the axes be interpreted in reference to the metaconcepts of agency and communion (Bakan, 1966), where agency (also known as "power") refers to the condition of being a differentiated or autonomous individual who strives to protect that differentiation and communion (also known as "affiliation") refers to the condition of being part of a larger social entity, which manifests in striving for contact and congregation (Fournier, Moskowitz, & Zuroff, 2010). The simplicity of the model is as practical as it is compelling: essentially constructs such as interpersonal traits and behaviors can be distilled into 8 octants that blend the combinations of agency and communion to create a unique model with measurement features not found elsewhere (see Figure 3).

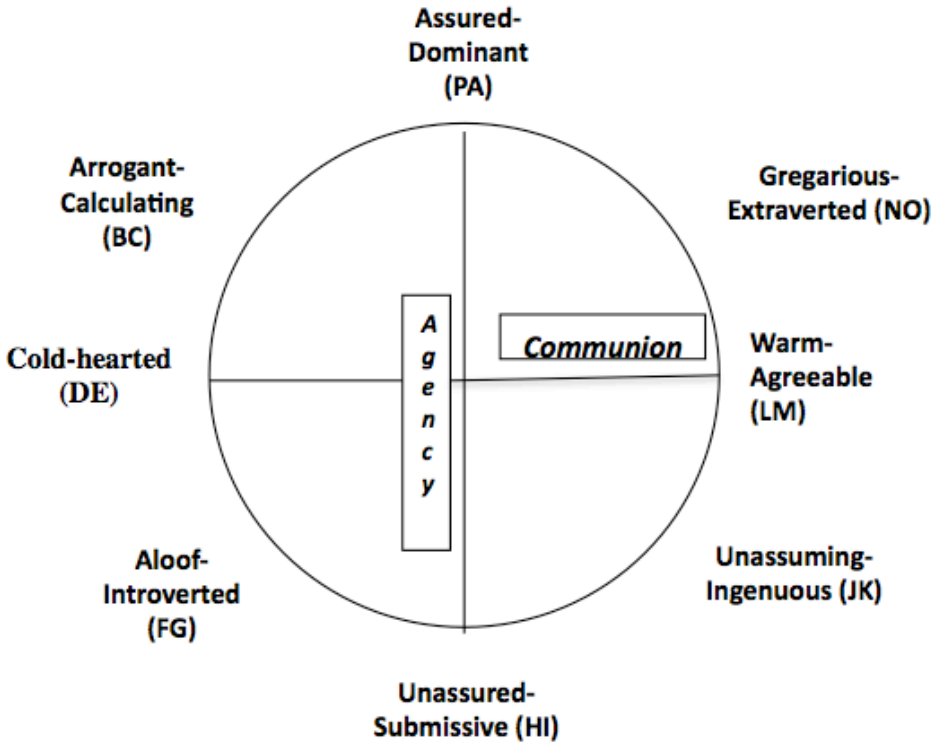

Figure 3: The Interpersonal Circle (Wiggins, 1979)

As illustrated in Figure 3, points closest to one another on the circle are similar and those that are distal are dissimilar. Each octant is unique in definition and dimensional space. The four octants situated at the ends of the bipolar axes represent extreme expressions of the underlying two-dimensional plane (e.g., dominance and submission) and the combination of these points on the polar axes define the intermediary points on the circle. For example, from a trait perspective, an individual who is both high in agency (Assured-Dominant; PA) and high in communion (Warm-Agreeable; LM) would best be described using the Gregarious-Extraverted (NO) octant and might be

described as autonomous but friendly and easy to get along with. By comparison, an individual who is primarily friendly (i.e., Warm-Agreeable; LM) and neutral in the area of agency, would best be described using the Warm-Agreeable octant. This individual might be described as extremely easy to work with and accommodating since they are not incredibly independent and are primarily sociable and agreeable. Several IPC models exist with only minor differences. These models differ in the labels they use for two underlying dimensions and octants, and although the differences are minor—and in actuality, they share more commonalities than differences—it is important to point out that different variables/descriptors for octants and dimensions were utilized in the development of each competing model. In practice, it is often the case that researchers and theorists use the models interchangeably to illustrate different concepts (e.g., the theory of complementarity is best illustrated using the model developed by Strong, Hills and Nelson, 1988); however, one cannot assume they are identical and should use care in explaining which model is being employed.

As has been noted elsewhere (e.g., Gurtman & Balakrishnana, 1998), three features implicitly define circular models: (1) two dimensionality, (2) constant radius, and (3) continuous distribution of variables (Gurtman, 2010). Two-dimensionality in this model implies that differences between variables are reducible to the aforementioned two-dimensional plane of agency and communion while the constant radius property is best understood by thinking of each variable on the circle as a point emanating from the center of the circle. In Cartesian terms, the origin or center point is the neutral blending of all the variables on the circle—mathematically assessed as a circular mean. Thus, the strength of relationship to any area of the circle is indicated by a vector that emanates

from the origin in the direction of the octant or blending of octants that best capture the construct and the strength of the individual expression of the construct. For example, and again using traits as the example, an individual who is both high in agency (Assured-Dominant; PA) and high in communion (Warm-Agreeable; LM) would best be described using the Gregarious-Extraverted (NO) octant; however, what may be different about the vector approach is that the relative strength of the orientation is expressed by the length of the vector. In this case, if we measure the orientation of the individual on the IPC and find the relationship to be strong, then the vector would be long indicating a more distinct or extreme expression of the defining feature of that octant (see Figure 4). By comparison, an individual who is somewhat friendly (i.e., Warm-Agreeable; LM) and slightly more oriented toward submissiveness in the area of agency, would likely best be described using the Unassuming-Ingenuous (JK) octant but the associated vector would be shorter, indicating a weaker expression of the defining features of the octant. These examples are illustrated in Figure 4 below.

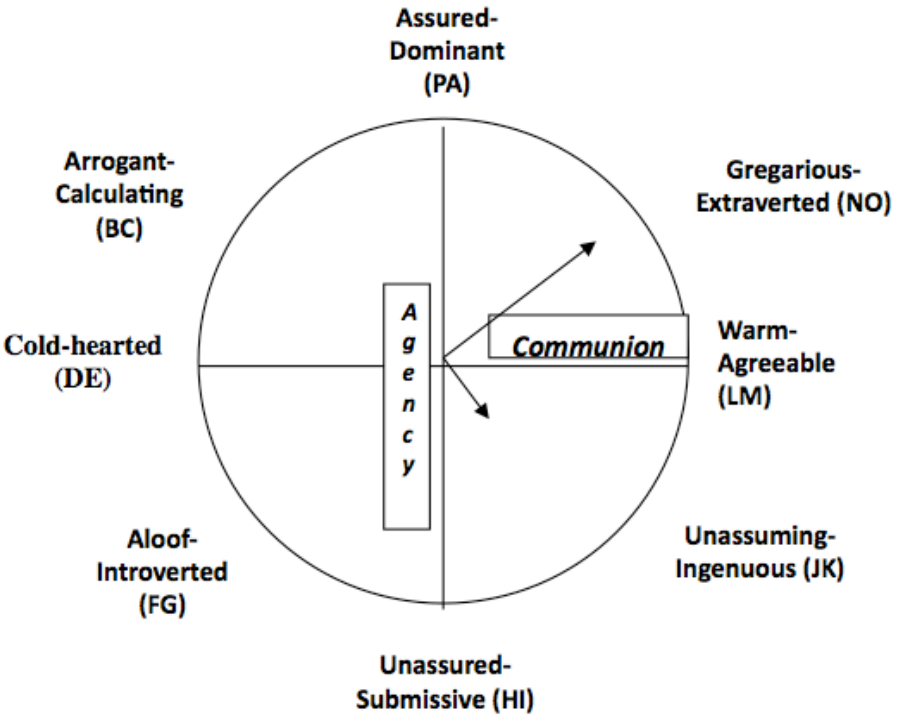

Figure 4: Illustration of Trait Orientation of the Interpersonal Circle and Vector Length

This particular application of the constant radius property is known in interpersonal theory and research as the notion of interpersonal rigidity and flexibility. Interpersonal rigidity exists at the trait level and behavior is often used as the proxy of measure. In its simplest form, the rigidity hypothesis is the notion that regardless of context and situation, trait rigid individuals do not vary their behavior according to the social cues and expectations of the environment; for example, a rigidly bossy individual is bossy in all situations. Research conducted to measure the validity of the hypothesis

(Strong, Hills, & Nelson 1988; Tracey, 2005) has shown that empirical support exists when measuring the relationship using interpersonal models. The aforementioned vector length approach to measurement supports the conception that trait rigid individuals demonstrate less behavioral variation when faced with different interaction styles in others and, conversely, less trait rigid individuals showed a greater range of interpersonal behavior (Tracey, 2005).

Interpersonal Complementarity. The pairing of interpersonal styles, called Interpersonal Complementarity, is also a central construct in interpersonal theory and research, which refers to the extent to which the behaviors of interacting individuals 'fit' with one another (Tracey, 2005). Measured from an interpersonal perspective, rigidity and flexibility relies on the degree to which an individual is able to complement the behaviors of another individual. The model proposed by Strong et al. (1988) and operationalized by the Interpersonal Communication Rating Scale (ICRS; Strong, Hills & Nelson, 1988) is employed in Figure 5 below to illustrate interpersonal complementarity and its use in the measure of rigidity and flexibility.

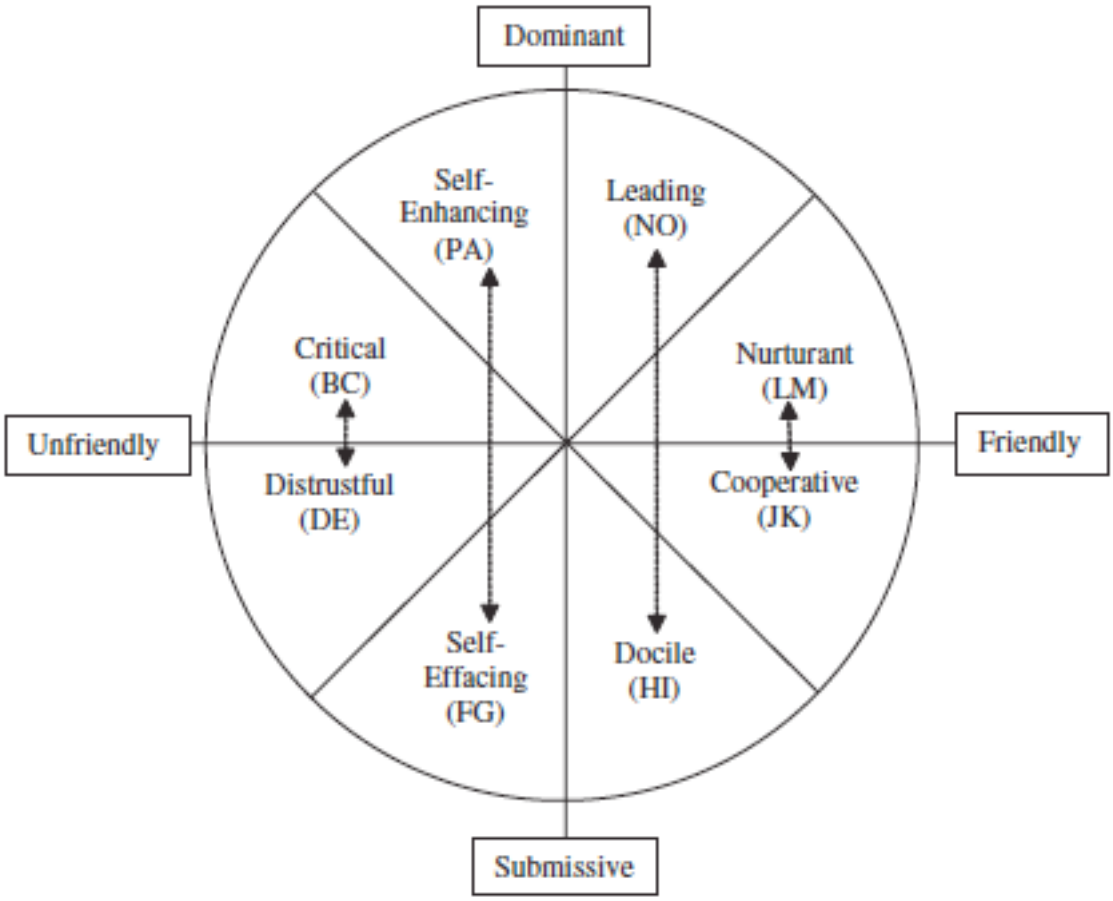

Figure 5: Representation of Strong, Hills, and Nelson's (1988) circular representation of interpersonal behaviors, with complementary behaviors indicated by arrows (Tracey, 2004)

The theory of complementarity contends that one interactant may begin any given interpersonal exchange with an initiating behavior that, in turn, creates a pull from the other individual to either complement or reject the initial behavioral message. For example, in Figure 5, an initiation of Leading behavior by one interactant would create a request for the receiving interactant to complement the Leading behavior with a Docile response. The theory contends that the aggregate of these exchanges creates harmony or

discord in the relationship—complementarity creates harmony, non-complementarity creates discord. Thus, complementarity is the idea that relationships are harmonious, productive, and self-sustaining when individual behaviors are paired according to the interaction styles and self-beliefs of the interactants. In effect, the interactants are making statements about themselves within the relationship that communicate either reciprocity or a rejection of the self-views of the interactants. A statement such as, "I'm in charge" (i.e., Leading) can thus be met with a behavioral response that recapitulates this message (e.g., "You are in charge and I will communicate my understanding of that by deferring to your lead"; Docile) or one that rejects that message (e.g., "You're not in charge, I'm in charge"; Leading).

Rigidity and flexibility in interpersonal interactions is, therefore, the ability of individuals to match their behaviors according to the demand characteristics of the context or situation. Rigid individuals behave in the same manner across situations and flexible individuals adjust their behaviors according to the situation. Thus, one would expect interpersonally rigid individuals to either ignore or to be less adept at reading environmental cues than their interpersonally flexible counterparts, which may have some bearing in a study designed to examine the moderating role of environments in the relationship between personality and behavior.

The continuous distribution of variables property is also implied in the above example, as variables must be arranged along a circular continuum in order for there to be no major gaps in coverage around the circumference of the circle (Gurtman, 1997). Therefore, a considerable benefit is gained from the interpersonal model when employed in tandem: the blending of octants and the length of the vector allow one to accurately

locate individual traits and behaviors in a continuous fashion with no separating categorical delineation or arbitrary cutoffs and with an inherent measure of extremeness. For several decades, researchers in this area have been successful in expanding circular theories to include multiple interpersonal models and measures, including but not limited to metaconstructs such as: traits (IAS; Wiggins, 1995; Wiggins, Trapnell, & Phillips, 1988), interpersonal problems (Horowitz, Alden, Wiggins, & Pincus, 2000), and values (Locke, 2000).

As demonstrated, the considerable empirical support, established measures, and theoretical sophistication of the interpersonal models provide a solid theoretical foundation from which to study the role of environments in the relationship between personality and behavior. The current study is designed to measure multiple hypotheses that examine the role of environments in the personality-behavior relation, including the moderating role of interpersonal environment on the relationship between interpersonal personality and interpersonal behavior. More specifically, by using interpersonal models of personality, behavior, and environment, the relations will be examined amongst the three constructs in a theoretically cohesive framework where each construct is measured in a continuous fashion (i.e., not categorical) and across measures and models that are based on the same theoretical foundations. Additionally, circumplex structure offers multiple measurement advantages over many other models. For example, circumplex structure differs from simple structure in that each factor covaries with each variable and relationships amongst factors and variables are not isolated or artificially controlled (see Figure 6).

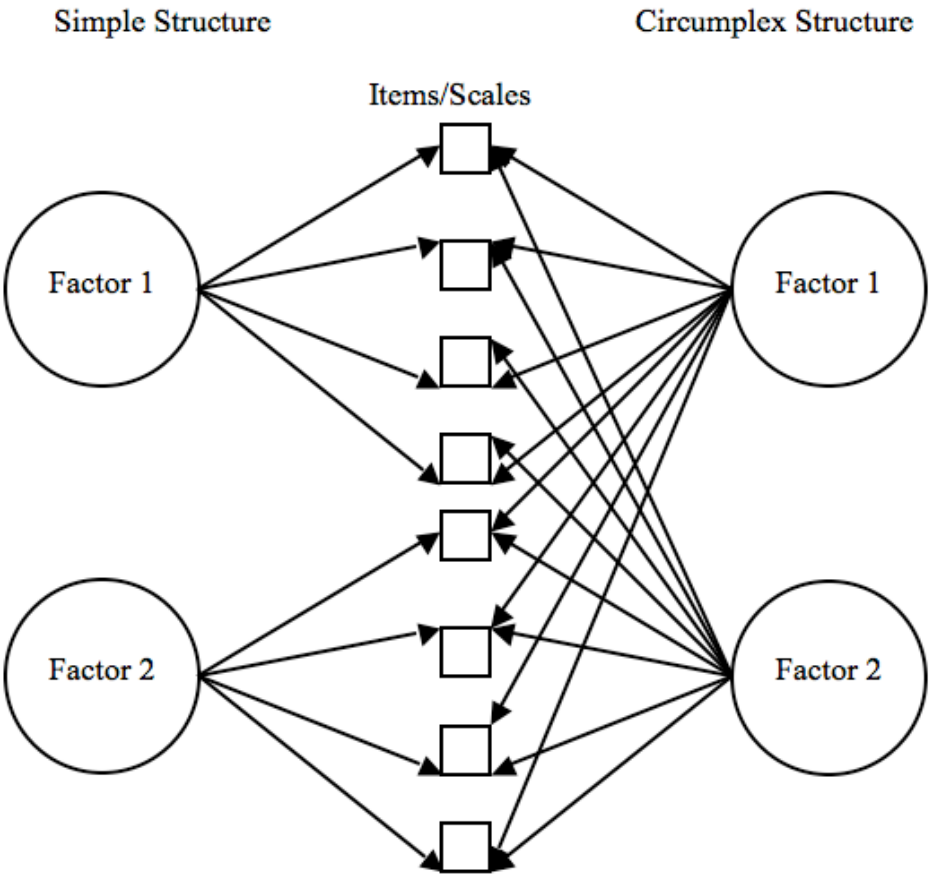

Figure 6: Simple Structure and Circumplex Structure Model Comparison (Acton & Revelle, 1998)

In Figure 6 above, Factor 1 represents Agency and Factor 2 Communion. As illustrated, variables oriented at the ends of the model are solely related to one of the factors; these variables include the octants that are situated at the ends of the axes that underlie the interpersonal circle (i.e., PA, HI, DE, LM, using the octant codes). Variables that are situated in the middle contain elements of both factors and thus are a blending of

Factor 1 and Factor 2; these variables include those octants that fall between the four that are situated at the ends of the interpersonal circle (i.e., BC, NO, FG, JK, using the octant codes). So, a benefit of a circumplex model is the ability to account for covariation amongst the factors in a theoretically relevant manner and to measure relationships amongst the variables such that they define key features of the model of interest.

Another benefit of employing interpersonal theory and research in this study is the availability of theoretically relevant measures with reported psychometric support. For the purposes of this study, I administered the Interpersonal Adjectives Scale (IAS; Wiggins, 1995; Wiggins, Trapnell, & Phillips, 1988) to measure interpersonal personality traits, the International Personality Item Pool—Interpersonal Circumplex (IPIP-IPC; Markey & Markey, 2009), to measure interpersonal behavior, and a new measure entitled the Circumplex Measure of Interpersonal Environment to measure the interpersonal environment. All three measures have strong psychometric support and the IAS, in particular, has been widely employed in the measurement of traits.

Applications of Interpersonal Theory in the Current Study

Participants for this study were recruited if they were able to provide rating composites of environments from small groups comprised of members of musical bands, work teams, classrooms, cohorts, and therapy groups. The unique musical band population was chosen because of the intimate yet small numbers of individuals (e.g., the average band has between 3 and 5 members) who were able provide self-report appraisals of co-constructed and collaborative environments. Furthermore, band environments were particularly appealing for the purposes of this study because of the interpersonal proximity in which individuals are forced to operate: bands are often intense

interpersonal groups where members are forced to collaborate on a greater goal; make compromises and concessions in order for the group to progress (e.g., scheduling around each other's lives); share in financial and logistical projects (e.g., rehearsal space, recording fees); and share intimate situations such as traveling for long periods of time and sharing living spaces. Unlike most work environments, band members volunteer to enter into these working relationships and willingly choose the individuals with which they share the interpersonal environment. So, for all practical purposes, bands are characterized by both elements of a professional environment and a personal environment because the members are electing to involve themselves in the environment and with the people but there is a foundation to the relationship that involves all the typical characteristics of work environments (e.g., collaborative relationships, organizational culture, delegation of tasks, etc). However, bands often differ from most work environments in that they lack the same degree of explicit hierarchal structure. Oftentimes, bands have an informal hierarchy where certain individuals may lead and take charge over others (e.g., in the areas of songwriting, promotion or otherwise); however, these roles are often implicit and the power afforded to traditional managers and supervisors is not inherent to the position. Two previous interpersonal studies (Dyce & O'Connor, 1992; O'Connor & Dyce, 1997) also used members of musical bands as their population of interest and they found the population to be well suited for measurement of these types of research questions. In one study (Dyce &O'Connor, 1992), the authors obtained ratings from band members to test personality complementarity using interpersonal dominance and group integration as indicators. In a second study (O'Connor & Dyce, 1997) they used the small-group mean aggregations to

obtain rigidity indices from which they tested positive regard, group integration, and personality compatibility.

All of this provides a unique opportunity to capture a range of interpersonal environments with strong and weak constraints along with a range of individual personalities and behaviors. In the current study, four major sets of questions are posed: (a) what is the relative relation of trait and environment in predicting behavior (b) does strength of environment moderate the trait-behavior relation, (c) does correspondence of the trait with the environment result in higher trait-behavior relations, and (d) does individual flexibility moderate the trait-behavior and the environment-behavior relation?

Question One pertains to the relative relation of trait and environment in predicting behavior. When examining the relation of trait in predicting behavior, it is hypothesized that trait will be a moderate predictor of behavior as prior research (Buss, 1979; Epstein & O'Brien, 1985; Funder, 2010; Funder & Ozer, 1983) has provided evidence for the relative congruence between traits and aggregate behaviors. On the other hand, when examining the relation of environment to behavior, it is hypothesized that environment will be a relatively weak indicator of behavior. This assertion about the predictive utility of environments rests upon the notion that environments that are examined irrespective of strength will not contain enough information to draw meaningful conclusions about the strength and orientation of the environment and their relative interaction(s) with traits. For example, if an individual is interpersonally distrustful (i.e, their trait orientation) and they are placed in a highly cooperative environment, then one would expect the predictive utility of environment to be low because the relation between the individual's traits and the environment should be low

(i.e., they would be more likely to act in a distrustful manner than a cooperative manner) and the result of this pairing would likely result in behaviors that are not predicted by the environment.

Question Two aims to empirically evaluate the question of whether the strength of environment moderates the trait-behavior relation. Evidence has been presented to does strength of environment moderate the trait-behavior relation illustrate that environment should have some effect on the trait-behavior relation provided it is tested using theoretically cohesive models that create conditions which allow for variation both in the manipulation of the strength of the environment and also the variance in personality and behavior (Cooper & Withey, 2009). Interpersonal Psychology offers such a framework, as multiple cohesive models with considerable empirical support exist. Environmental strength will be assessed using vector length, and it's expected that strong environments will moderate the relation between trait and behavior and in weak environments the trait-behavior relation will be moderate. This assertion is based on the aforementioned Strong Situation Hypothesis and the belief that strong environments constrain behavior through situational cues that prompt individuals to match their behaviors to the demand characteristics of the environment and weak environments allow for more behavioral variation.

Question Three is designed to examine whether higher correspondence between traits and environments results in higher trait-behavior relations. The underlying assumption associated with Question Three is that the higher the correspondence between traits and the environment, the higher their utility will be in predicting behavior. This is based on the belief that environments that correspond with traits will not constrain

behaviors to the degree of non-corresponding environment and will, thus, allow the individual to act in a manner that's congruent with their traits. The opposite should also be true: when an individual is placed in an environment that does not match their traits, it would be expected that their behavior will be constrained and they will be prompted to act differently (i.e., according to the environment). For example, a competitive individual who is operating in a competitive environment should display high correspondence between his or her traits and behaviors because the environment facilitates the behavior that best matches his or her traits (i.e., competitive behavior); however, if a submissive individual were placed in the same competitive environment then it would be expected that the correspondence between their traits and behaviors would be lower because the environment would provide cues that would in turn prompt them to act in a manner that is less congruent with their traits (i.e., they are prompted to change from submissive to competitive). This study will add to the considerable Personality and Interpersonal Psychology literatures by testing the predictive role of environment in the trait-behavior relation. The expectation is that environments that favor individual traits will complement behaviors that are congruent with the individual traits. If environments are conceptualized as having a constraining effect, then it would logically follow that higher correspondence between traits and environments would not create conditions where behaviors are altered or constrained by the environment. Conversely, if any individual were placed in an environment that did not correspond highly with their traits, then it would be expected that the environment would prompt the individual to act in a manner that is less congruent with their traits. For example, if an individual were self-effacing and they were placed in a competitive environment, then greater deviations from the trait predicted

behavior would be expected since they are prompted by environmental cues to act in a manner that is different from their trait predicted behavior (i.e., competitive rather than self-effacing). Similarly, an individual whose traits scores indicate a competitive interpersonal personality would, by virtue of fit with the environment, would exhibit a stronger relation between their traits and behaviors.

Question Four will first examine whether individual flexibility moderates the trait-behavior relation and then whether individual flexibility moderates the environment-behavior relation. This will be assessed using two separate models. The expectation is that persons who are interpersonally flexible will shift their behaviors to match the interpersonal environment. Conversely, the theory of interpersonal rigidity espouses that interpersonally rigid individuals will engage in one type of behavior regardless of environment and context. The underlying assumption related to Question Four is that individuals who are interpersonally flexible are more likely to (1) perceive environmental cues, and (2) change their behaviors according to the situation. When applied to the current model, one would expect that the relation between traits and behavior should be moderate for those interpersonally flexible individuals—due to receptivity of the environmental cues and their strength—because unlike interpersonally rigid individuals, interpersonally flexible individuals are not expected to engage in one type of behavior in all situations. Similarly, individual flexibility should moderate the relation between environment and behavior, as flexible individuals would interact differently according to the environment.

CHAPTER 2

LITERATURE REVIEW

The following section reviews in greater depth the variables and constructs associated with interpersonal personality, interpersonal behavior, and interpersonal environment. A general overview of the interpersonal psychology literature is provided along with a review of popular models and literature on the selected model is addressed.

Interpersonal Personality

The earliest foundations of the field of interpersonal psychology focused on defining the role of interpersonal personality. Indeed, the book that virtually launched the field of interpersonal psychology is titled, *The Interpersonal Diagnosis of Personality* (Leary, 1957). Leary's conceptions of interpersonal personality were primarily focused on using interpersonal models to explain psychopathology and, although Leary's work was influenced by the works of Sullivan's (1968) interpersonal theory of psychiatry, Leary developed theories and models that ultimately had a greater impact. Leary's major contribution to the field was the provision of defining framework in the form of the Interpersonal Circumplex. Leary first defined the two bipolar axes that underlie the Interpersonal Circumplex: *love* and *hate*, which are now more commonly referred to as *agency* and *communion* and, thus, he provided the first personality model that was based upon a two-dimensional representation. As part of his theory of interpersonal personality, Leary proposed the notion that personality can be represented as a blending of the two axes and every human trait can be mapped on the resulting circular structure using a vector coordinate within the circle (Leary, 1957). Leary's taxonomy offered multiple benefits that led to breakthroughs in measurement and conception of human personality;

notably, the circular structure of the Interpersonal Circumplex allows for an unmatched comparative framework both within the system (i.e., between traits) and also between healthy and unhealthy expressions of traits (i.e., rigidity as indicated by vector length; Tracey, 2005).

Jerry Wiggins made considerable strides in further defining interpersonal personality through his work where he developed a taxonomy of trait descriptors (1979), which he later employed in the construction of the Interpersonal Adjectives Scale (IAS; Wiggins, 1995). Wiggins was clear that his work was not intended to provide explanation for scientific pursuits, such as the generative or causal mechanisms of traits (Allport, 1937), whether traits reflect specific cognitive processes of observers (Hieder, 1958), whether traits are best construed idiographically or nomothetically (Allport, 1937; Bem & Allen, 1974; Kelly, 1955); or whether stable human tendencies are largely due to environmental or situational consistencies (Michel, 1968). Rather, he viewed his work as aspiring to provide the definitional features for the traits themselves. Using a theoretical approach, Wiggins developed a taxonomy of trait descriptors from which he extracted eight adjectival scales that serve as the principal vectors (i.e., octants) in his model. This work was later expanded to the IAS where he was able to measure and map in dimensional space a circular model of interpersonal traits.

Similar to the work of Conte and Plutchik (1981) explored the structure of interpersonal personality traits and found support for a circular model. In their study, a lexical approach was employed where 223 trait terms were selected from a larger domain of interpersonal traits and subjected to two separate methods of extraction. The first method is best summarized as a selection of trait terms, which was followed by direct

similarity scaling. This process involved raters who provided initial ratings of similarity and dissimilarity of terms that were then aggregated and mapped onto circular space. In short, if the reference trait was rated as having a positive sign, it meant that the angular position of that trait word would be somewhere within 90° of the reference trait. If the mean rating were 0, its angular position would be 90° away from the reference trait and if the mean rating had a negative sign, its angular position would be more than 90° away from the reference trait (Conte & Plutchik, 1981). The results of this method confirmed the underlying circular structure of the trait terms. This was replicated using a second set of reference terms. The correlation between the two sets of angular locations was .98, indicating that the ordering of the trait terms was nearly identical regardless of the set of reference words used to represent the dimensions. Method 2 employed a semantic differential profile similarity approach where 10 new judges provided reliability ratings of 40 trait terms across scales that were then tested for intraclass correlations. The intraclass correlation of averaged ratings was .90 (p <.01) or greater for each of the 40 traits. A semantic profile was then created for each semantic scale using the means and standard deviations of the 10 judges' ratings. The profiles were then intercorrelated and a 40x40 matrix was computed. Obtained Pearson product moment correlations then served as the basis for a principal components analysis that confirmed the circular structure of the model.

These two pioneering studies have led to several comparative works that have tested the overlap between circular models of interpersonal traits and alternative models of personality. Perhaps the most cited of all of these comparative studies is one authored by Costa and McCrae (1989) where the aim was to evaluate the commonalities between

the circumplex structure of traits and the increasingly popular Five Factor Model (FFM) of personality. In this study, Costa and McCrae jointly factored self-reports on the IAS with self-reports, peer ratings, and spouse ratings on the NEO Personality Inventory to examine the relations between the models. Their findings supported the circular ordering of variables and found two of the five dimensions for the FFM to underlie the interpersonal circumplex: Extraversion and Agreeableness. However, Trapnell and Wiggins (1990) expanded the examination of the overlap between the interpersonal circumplex and the FFM and he found support for the notion that all traits of the FFM contain agentic and communal qualities that can be described within the interpersonal circumplex space. He and others later titled this the *Dyadic-Interactional Perspective* of the FFM (Pincus & Wiggins, 1992; Trapnell & Wiggins, 1990; Wiggins & Pincus, 1994; Wiggins & Trapnel, 1996), which assigns a conceptual priority to the first two factors of the FFM (i.e., Dominance and Nurturance) and emphasizes the manifestations of agentic and communal concerns with the remaining three factors. This view espouses the interpersonal dynamics inherent in the FFM and places particular emphasis on the metaconcepts of agency and communion in all five of the factors in the FFM.

Further support for the circular ordering of traits and the value of interpersonal models of personality comes from recent efforts that have been made to identify the role of interpersonal relatedness in personality development. Considerable support for the notion that interpersonal relatedness and self-definition comprise two fundamental dimensions of personality development across the life span is beginning to amass (for a thorough review, see: Luyten & Blatt, 2013). In two-polarity models of personality, the underlying axes are shifted to match the orientation of the Extraversion and

Agreeableness axes found to correspond with FFM dimensions and the commensurate blendings of agency and communion that underlie the Interpersonal Circle—this is represented in Figure 7.

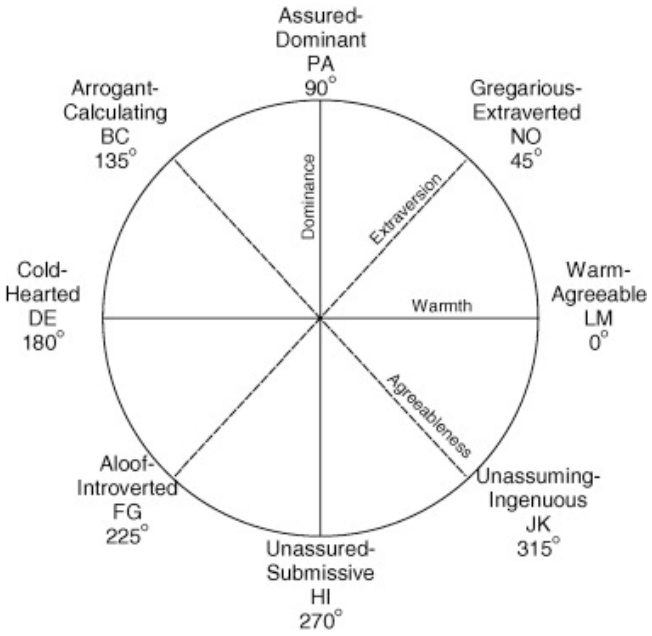

Figure 7: Overlap between Interpersonal Circle and Five Factor Model Dimensions; (Markey & Markey, 2006; McCrae & Costa, 1989)

As illustrated, this approach, which is based on the work of Pincus (2005), Meyer and Pilkonis (2005), and Horowitz et al. (2006), conceptualizes personality development as the attempt to achieve some equilibrium between interpersonal relatedness and self-definition; thus, psychopathology arises when individuals become preoccupied with, or express exaggerations of, one or more of these developmental dimensions. For example, an individual who experiences a disruption in attachment might manifest extreme expressions of anxiety and avoidance (i.e., Avoidant Personality Disorder), which can be represented on the circle and plotted in two-dimensional space. The model also takes into

consideration, the defining features of several other personality disorders, including levels of dominance and friendliness and self-criticism, which makes it a useful tool for conceptualizing other disorders, such as: Antisocial Personality Disorder and Dependent Personality Disorder. Furthermore, this model is proving to be especially useful in conceptualizing normal and disrupted personality development, vulnerability for psychopathology, and responsiveness to psychosocial interventions (Luyten & Blatt, 2013) by providing a theoretically cohesive framework for assessing interactions amongst biological, psychological, and social factors. According to Luyten & Blatt, 2013), the fundamental theory in this literature is that the interaction between sociocultural and biological factors, including neural systems underlying the capacity for interpersonal relatedness and self-definition, are implicated in the causation and treatment for a spectra of disorders in different cultures (Cicchetti & Rogosch, 1996; Luyten, Vliegen, Van Houdenhove, & Blatt, 2008). When considered together, this body of research suggests that theoretical formulations that focus on interpersonal relatedness and self-definition as central coordinates in personality development and psychopathology provide a comprehensive paradigm for future research in psychology and psychiatry… in the adaptive and disrupted personality development across the life span (Luyten & Blatt, 2013).

Interpersonal Behavior

Interpersonal Behavior has been measured and conceptualized in the interpersonal literature in a multitude of ways and there is a wealth of research that has examined its circular nature. As noted above and in the literature (see Tracey, 2004), there are three levels of assessment often associated with interpersonal behavior: trait ratings, aggregate

ratings of interactions, and behavioral interchange ratings. Perhaps due to the relative ease of obtaining the ratings, trait ratings have been most widely used to obtain behavior ratings in past interpersonal studies (Gurtman, 1992; Gurtman & Pincus, 2000; Tracey, Ryan, & Jaschik-Herman, 2001; Tracey & Schneider, 1995; Wiggins, 1995).

Another popular approach for obtaining behavior ratings is to solicit self or observer ratings of behavior that correspond with the Interpersonal Circle (IPC). The Chart of Interpersonal Reactions in Closed Living Environments (CIRCLE; Blackburn & Renwick, 1998) is a 49 item observer rating scale that is designed to help clinicians and helping professionals in inpatient psychiatric environments assess the interpersonal behaviors of clients. Observer ratings are measured on a 4-point Likert-type scale and aggregated at the situation level. Example items from the CIRCLE include, "dominates conversations" and "sits alone or keeps to himself". The items on the CIRCLE are designed to cover the circular space of the IPC and commensurate items for all octants are represented in the scales. As the name and the description of the measure implies, this instrument is particularly useful for assessing the interpersonal behaviors of inpatient and forensic populations.

A similar measure exists in the Check List of Psychotherapy transactions (CLOPT; Kiesler, Goldston & Schmidt, 1991), which is a 96-item measure of IPC behaviors designed specifically for ratings of clients by counselors. The item stem for all items is "When with the therapist, the client" which is followed by successive statements such as, "acts in a relaxed, informal, warm or nonjudgmental manner" and "acts in a stiff, formal, unfeeling, or evaluative manner". For each item, the rater provides behavioral ratings indicating whether the target enacted the behavior. Unlike the other IPC measures,

items are not measured on Likert-type scale; they are measures by either checking or leaving an item blank. Like the CIRCLE, the CLOPT is also a aggregate measure that captures behaviors at the situation level.

Another IPC self-rating measure that has been used fairly extensively is the Check List of Interpersonal Transactions (CLOIT; Kiesler, Goldsten, & Schmidt, 1991). As the name implies, the CLOIT is the self-rating version of the CLOPT and is similarly structured: with 96-items measure with items representing each of the more 16 segments of the IPC. Several studies (Kiesler, Goldston, Paddock & Van Denburg, 1986; Keisler, Schmidt & Larus, 1988; Keisler, Schmidt & Larus, 1989) report Chronbach alpha coefficients for the 16 scales of the CLOIT. Internal consistency estimates ranged from .24 to .81 across studies with an overall median of .61. Like the CLOPT, respondents indicate whether they enact a particular behavior; however, the item stem reads, "When with others…" and the successive statements are modified to represent the rating of one's self. Like the CIRCLE and the CLOPT, the CLOIT is also an aggregate measure that captures behaviors at the situation level.

Another approach to the measure of interpersonal behavior is to calculate the behavioral mean for participants to obtain a measure of the general behavioral tendency. Traditionally, small aggregations of behaviors can be obtained as an alternative to behavioral interchange ratings by either: (1) soliciting multiple administrations of a measure over time, (2) requesting self-ratings where participants are instructed to provide information about their general response pattern over time rather than for a single event, or (3) by having people other than the individual rate the general response pattern of the target individual. Each type of administration carries with it certain costs and benefits and

must be weighed according to the resources and needs of the study. The idea for obtaining a behavioral mean is that any given snapshot of behavior is likely to represents a single moment in time that is highly dependent on situational factors. Indeed, Mischel (1968) caused great controversy when he reported that cross-situational consistency coefficients between single behavioral indices rarely surpass a ceiling of .30 (Fournier, Moskowitz & Zuroff, 2010). The research community's response to Mischel was that situation specific behavior carries with it a great deal of error variance and if the error variance is distributed across situations, contexts, and behavioral referents, then a more stable approximation of a individual's true score can be obtained, which in turn should produce greater consistency in the behavior of individuals (Epstein, 1979; 1980; Moskowitz, 1982). However, Tracey (2004) has provided empirical evidence to the contrary, which is outlined in greater detail below.

Another approach is to use repeated measures of behaviors; however, they are less common since they require great effort and resources. One such study (Moskowitz, 1994), used intensive repeated measurements in naturalistic settings (IRM-NS; Moskowitz, Russell, Sadikaj & Sutton, 2009) and a specific technique called *event-contingent recording* to obtain self-ratings of behavior of the four dimensional poles of the IPC. On average, 6 to 7 ratings per day were reported from each participant over a 20-day period. Participants were asked to record their behaviors immediately following a significant interaction. According to its authors, IRM-NS procedures reveal inconsistencies in behavior across situations and, therefore, it was helpful to depict the behaviors of individuals using two types of profiles: *occasion-behavior* in which behavior is plotted across a set of occasions, and *situation-behavior* in which behavior is

plotted across a set of situations. When applying these techniques they found it helpful in allowing them to better examine behavior across time and across contexts.

Another consideration when measuring interpersonal behavior is the appropriateness of the level of measurement. Depending on the questions driving the research, it may be appropriate to aggregate behaviors to a single value or it may be more appropriate to assess within-person variability. These decisions are important, as the process of aggregation, by design, discards true variance with error variance. A novel approach to obtaining IPC ratings was utilized by Dyce and O'Connor (1992) and O'Connor and Dyce (1997) when they administered the Revised Interpersonal Adjectives Scale (IAS-R, Wiggins, Trapnell, and Phillips, 1988) to members of musical bands. In these studies, they wished to obtain an aggregate measure of IPC traits, as observed by others with whom the target individual should be appropriately familiar. They ultimately settled on musical bands as the population of interest, as the members of bands spend a considerable amount of time with each other across a variety of situations and contexts. The procedure they employed was simple yet unique, in that they asked each member of the band to provide ratings for other members of the band, which then provided them with the desired aggregate measure from which they could examine the variables and research questions of interest.

Yet another approach for measuring behavior is to obtain behavioral interchange ratings. Behavioral interchange ratings measure moment-by-moment interactions and provide the greatest detail, as the disaggregated behaviors carry with them variance in behavior scores that are eliminated upon aggregation. Some literature exists where specific interpersonal behaviors have been used as the unit of measure. Strong et al.

(1988) provided a behavioral interchange examination of complementarity when they published their findings from a study where participants interacted with confederates who emphasized one of the eight interpersonal behaviors for 16 minutes. The findings from this study illustrated the principle of complementarity in action and demonstrated how behaviors from one individual systematically affect how the other person behaves in return. Tracey (1994) examined this same dataset to compare the three prevailing models of complementarity and found the models of Carson (1969) and Kiesler (1983) to differ by only 6% and Wiggins (1979, 1982) model to differ by 32% and 33% respectively. Tracey (2004) expanded upon this work in greater detail by introducing a model that specified the levels of complementarity (see Figure 8) with an examination of commensurate measures to provide empirical support.

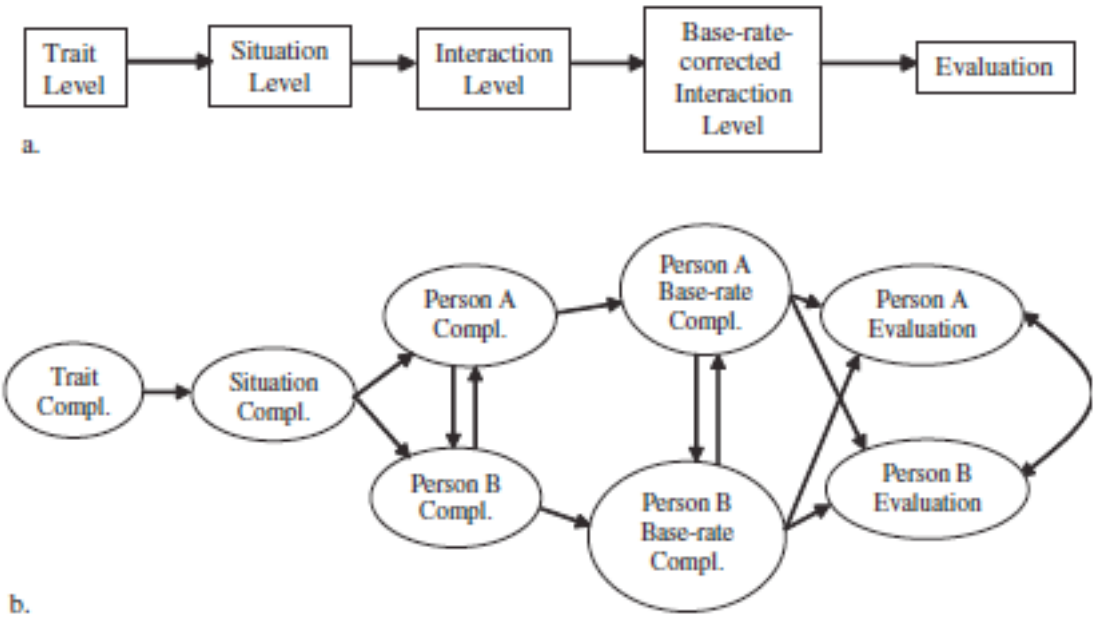

Figure 8: Tracey's (2004) Model of the Levels of Complementarity

His findings illustrated that behavioral interchanges are the preferred unit of analysis when assessing complementarity. Specifically, his findings showed that complementarity holds best when specific moment-to-moment behaviors are retained and not when examined as a mean value or in an aggregate form. More specifically, he found that trait ratings are moderately related to aggregate/situational of interactive behaviors. This pattern held for both exhibited behaviors and complementarity. His findings also illustrated a simplex structure underlying the levels of interpersonal behavior, which demonstrated that there is relatively little relation of most general or trait-level measures and the most specific behavioral interaction-level measures (Tracey, 2004).

This study employed a measure of interpersonal behavior using the relatively short IPC measure, entitled the International Personality Item Pool—Interpersonal Circle (Markey, 2000) as an self-rating of behavior. A recently published article (Markey, Anderson, & Markey, 2012) provided further support for the validity of IPIP-IPC in capturing interpersonal behaviors. More specifically, the authors used behavioral mapping, a method designed to relate behaviors to circumplex models, was used to examine the predictive validity of the IPIP-IPC. The findings from this study demonstrated that the IPIP-IPC is valid for predicting a multitude of interpersonal behaviors.

Interpersonal Environment

Although interpersonal environment and context is often a variable of interest in the interpersonal literature, no study currently exists which explicitly measures and characterizes environment in a manner that corresponds one-to-one with the Interpersonal Circle (IPC). Furthermore, in nearly all articles reporting environmental or situational

considerations, the construct of interpersonal environment is defined in non-specific ways, in which descriptors such as "context" are intertwined with personality characteristics and situational factors (Shoda & Mischel, 2000) or where situations are defined as environments based on obtuse criteria, such as whether situations contained 'psychologically active ingredients' (Shoda, 1994). As reported within the interpersonal behavior section of this paper, the difficulty measuring environment may stem from the fact that interpersonal environment, like interpersonal behavior, is susceptible to distortions in thinking and subjective perceptions, confounds in the unit of measure (i.e., environment as situation specific or as a global index), and the recognized need for aggregated scores from naturalistic and generalizeable settings (Moskowitz, Russell, Sadikaj & Sutton, 2009). Decisions for how to measure interpersonal environment are further confounded by evidence that illustrates the susceptibility of interpersonal behavior to fluctuations when situations are varied, social roles are accounted for, and interactant prompts are varied (Moskowitz, Ho & Turcotte-Tremblay, 2004; Moskowitz, Suh & Desnaulniers, 1994).

In this study, aggregate scores of environment were obtained and calculated using two separate approaches. The first approach to measuring the interpersonal environment was obtained through the Circumplex Measure of Interpersonal Environment (CMIE), in which participants were instructed to provide ratings of their perceptions of the interpersonal characteristics of the group environments according to IPC definitions. This approach to measuring the environment is obtained using a subjective rating approach whereby participants rated the level to which they believed that specific features of the interpersonal environment were present. The second approach was more objective in

nature and was obtained by calculating the mean behavior for each group using the individual behavior scores obtained from the IPIP-IPC. This approach was comparable to the one utilized by O'Connor & Dyce (1997) who used small-group mean aggregations to to obtain rigidity indices from which they tested positive regard, group integration, and personality compatibility. Similar to the trait and behavior indices, dimension scores from the IPC were employed in the measure of interpersonal environment. The obtained individual scores from both measurement approaches were then aggregated by calculating a group mean from the obtained individual ratings for each respective axis. As documented by others (Ajzen, 1987; Funder, 1995), aggregations of ratings are desirable because the judgments of any single individual are only partially accurate, and the unwanted sources of variance in single measures tend to cancel each other out in pooled indices. The underlying assumption in this approach is that participants share co-constructed and collaborative interpersonal environments of which they should be equally familiar. By obtaining environment ratings from multiple sources, a stable index of environment should arise.

Problem Statement

Strong and weak environments have been hypothesized to have differential moderating effects on the relationship between personality and behavior. In particular, personality psychologists, social psychologists, and organizational psychologists have prematurely adopted the assertion that personality matters most in weak environments and least in strong environments. This statement is supported by evidence published by Cooper and Withey (2009) that illustrates the paucity of research to date that has properly assessed the empirical support for this claim. Interpersonal Psychology offers a strong

theoretical and empirical base from which to assess the differential moderating effects of environment on the personality and behavior relationship. The current study is design to assess the differential moderating effects of strong and weak interpersonal environments on the relationship between interpersonal traits (i.e., personality) and interpersonal behavior using dimensional scores from the interpersonal circle. First, the predictive utility of interpersonal traits and interpersonal environment in forecasting interpersonal behavior will be assessed. Second, strength of the environment will be examined to investigate its moderating effect on the trait-behavior relation. Third, the correspondence of traits and environments will be investigated to see if higher correspondence results in higher trait-behavior relations. Lastly, an examination of interpersonal flexibility will be conducted to evaluate whether it moderates the: (1) trait-behavior relation, and (2) the environment-behavior relation. By recruiting participants who play in musical bands, a unique evaluation can be made about the ways in which co-constructed and collaborative environments within small groups can: (1) be assessed for circumplex structure, (2) mapped on the Interpersonal Circle; and (3) employed to obtain both aggregated and dissagregated ratings of strong and weak environments from which the interplay amongst interpersonal environments, interpersonal personality, and interpersonal behavior can be explored. These areas of inquiry will provide unique contributions to the fields of personality psychology and interpersonal psychology.

Research Questions

The overall question of interest relates to what role interpersonal environment plays in the relationship between interpersonal traits and interpersonal behavior, specifically, (a) what is the relative relation of trait and environment in predicting

behavior (b) does strength of environment moderate the trait-behavior relation, (c) does correspondence of the trait with the environment result in higher trait-behavior relations, and (d) does individual flexibility moderate the trait-behavior and the environment-behavior relation?

Hypotheses

The current study is designed to test the moderating effect of interpersonal environment on the relationship between interpersonal personality and interpersonal behavior. Evidence has been presented to illustrate that environment should affect the relationship between these two variables provided that they are examined: (1) using theoretically cohesive models, (2) measures that sufficiently capture variation in personality and behavior, and (3) measures that also allow for variation in the strength of the environment (Cooper & Withey, 2009). Interpersonal Psychology offers such a framework, as multiple cohesive models with considerable empirical support exist and the inherent interactions from which the model was developed are environmentally grounded.

The null hypothesis for this study is that environment will have no effect on the relations between traits and behavior. To assess for the null hypothesis, the behavioral variance at each level will be examined to ensure that it is significantly different from zero. The expectation is that significant variance will exist and, thus, it is hypothesized that interpersonal environment will be significantly related to the relationship between traits and behavior.

Hypothesis One pertains to the relative relation of trait and environment in predicting behavior. When examining the relation of trait in predicting behavior, it is

hypothesized that trait will be a moderate predictor of behavior as prior research (Buss, 1979; Epstein & O'Brien, 1985; Funder, 2010; Funder & Ozer, 1983) has provided evidence for the relative congruence between traits and aggregate behaviors. On the other hand, when examining the relation of environment to behavior, it is hypothesized that environment will be a relatively weak indicator of behavior. This assertion about the predictive utility of environments rests upon the notion that environments that are examined irrespective of strength will not contain enough information to draw meaningful conclusions about the strength and orientation of the environment and their relative interaction(s) with traits. For example, if an individual is interpersonally distrustful (i.e, their trait orientation) and they are placed in a highly cooperative environment, then one would expect the predictive utility of environment to be low because the relation between the individual's traits and the environment should be low (i.e., they would be more likely to act in a distrustful manner than a cooperative manner) and the result of this pairing would likely result in behaviors that are not predicted by the environment.

Hypothesis Two is designed to examine the relation of trait and behavior as moderated by environment. Evidence has been presented to illustrate that the environment should have some effect on the trait-behavior relation provided it is tested using theoretically cohesive models that create conditions which allow for variation both in the manipulation of the strength of the environment and also the variance in personality and behavior (Cooper & Withey, 2009). Interpersonal Psychology offers such a framework, as multiple cohesive models with considerable empirical support exist. Environmental strength will be assessed using vector length, and it's expected that strong

environments will moderate the relation between trait and behavior and in weak environments the trait-behavior relation will be moderate. This assertion is based on the aforementioned Strong Situation Hypothesis and the belief that strong environments constrain behavior through situational cues that prompt individuals to match their behaviors to the demand characteristics of the environment and weak environments allow for more behavioral variation. When examining the relation of trait and behavior as moderated by environment, it is hypothesized that the trait-behavior will be moderated by environment when the strength and orientation of the environment is taken into account. This assertion rests up the tenets of the Strong Situation Hypothesis (Cooper & Withey, 2009) and the hypothesized moderating effect of strong environments. Therefore, interpersonal theory would posit that the relative length of the environmental vector is an empirical indicator of the strength of the environment and strong environments should constrain behavioral expression. Thus, the environment would moderate the trait-behavior relation by creating situational cues that change the behavioral direction to adhere to environmental constraints, depending on the relative strength of the environment.

Hypothesis Three is designed to examine whether high correspondence of trait and environment results in higher trait-behavior relations. The underlying assumption associated with Hypothesis Three is that the higher the correspondence between traits and the environment, the higher their utility will be in predicting behavior. If environments are conceptualized as having a constraining effect, then it would logically follow that lower correspondence between traits and environments would create conditions where behaviors are altered or constrained by the environment. Conversely, if an individual

were placed in an environment that corresponded highly with their traits, then it would be expected that the environment would not prompt the individual to act in a manner that is less congruent with their traits. For example, if an individual were self-effacing and they were placed in a competitive environment, then greater deviations from the trait predicted behavior would be expected since they are prompted by environmental cues to act in a manner that is different from their trait predicted behavior (i.e., competitive rather than self-effacing). Similarly, an individual whose traits scores indicate a competitive interpersonal personality would, by virtue of fit with the environment, exhibit a stronger relation between their traits and behaviors. Therefore, when examining whether high correspondence of trait and environment results in higher trait-behavior relations, it is hypothesized that the higher the correspondence between trait and environment the higher the trait-behavior relation will be.

Hypothesis Four will first examine whether individual flexibility moderates the trait-behavior relation and then whether individual flexibility moderates the environment-behavior relation. This will be assessed using two separate models. The expectation is that persons who are interpersonally flexible will shift their behaviors to match the interpersonal environment. Conversely, the theory of interpersonal rigidity espouses that interpersonally rigid individuals will engage in one type of behavior regardless of environment and context. The hypotheses related to Hypothesis Four are that individuals who are interpersonally flexible are more likely to (1) perceive environmental cues, and (2) change their behaviors according to the situation; therefore, individual flexibility will moderate both the trait-behavior relation and the environment-behavior relation. When applied to the current model, one would expect that the relation between traits and

behavior should be moderate for those interpersonally flexible individuals—due to receptivity of the environmental cues and their strength—because unlike interpersonally rigid individuals, interpersonally flexible individuals are not expected to engage in one type of behavior in all situations. Similarly, individual flexibility should moderate the relation between environment and behavior, as flexible individuals would interact differently according to the environment.

CHAPTER 3

METHOD

Participants

Participants in this study were drawn from one sample of 210 total participants, of which all were included in the development of the CMIE. Of those participants, 26 were included in a smaller test-retest subsample that provided ratings for the CMIE items a second time. Finally, in the greater study, 151 participants from the initial 210 were retained. These individuals were retained because they participated with at least one other member of a group from which an environment score could be calculated. Thus, individuals who participated in the study but whom were unable to participate with at least one other member of a group were retained for the development of the CMIE but dropped from the overall analyses that required environment ratings.

The participants included in the development of the CMIE were comprised of 210 members (143 men and 65 women) of bands, work teams, students, and cohorts, which ranged in age from 18 to 52 years of age (mean 30, SD = 8). The race/ethnicity of the sample was 2.4% African American/Black, 2.4% Asian American/Pacific Islander, 1.4% Native American, 75.2% Caucausian, 8.6% Latino, and 9.5% Blended/Other.

A subset of 26 participants was obtained to assess test-retest reliability for the CMIE scale development. There were a total of 5 women and 21 men in the sample. Similar to the overall sample, this smaller test-retest sample had a mean age of 33.54 (*SD* = 5.6, ranging from 25 to 47) and self-identified as 3.8% Native Americans, 76.9% Causasian, and 15.4% Latino Americans. One participant did not provide their race/ethnicity.

Participants for the overall study consisted of 151 men (62.3%), women (35.1%), and individuals who self-identified as "Other" (2.6%). Participants completed the study online and were only included if they provided data that could be matched with at least one other member of a group to which they belonged. The mean age of participants was 29.7 (SD = 8.41, range: 18 to 52). The sample self-identified as 1.3% African American or Black, 2.6% Asian American or Pacific Islander, 9.9% Latino or Hispanic, 1.3% Native American or American Indian, 74.8% White/Caucasian, and 9.9% Multiethnic.

The sample included a total of 48 groups, which consisted of 19 work teams, 15 musical bands, 10 classes from a large Southwestern university, 3 graduate cohorts, and 1 experiential group. In the overall sample, groups ranged in number of participants from 2 to 17 members with an overall mean of 3.79 members per group. Work teams ranged in number from 2 to 5 members (M=2.63) and 2 teams had 100% of their members participate, 6 teams had 75% of their members participate, 1 team had 66% of their members participate, 9 teams had 50% of their members participate, and 1 team had 40% of their members participate. Musical bands ranged in number from 2 to 5 members (M=2.87) and 7 bands had 100% of their members participate, 1 had 75% of their members participate, 6 had 66% of their members participate, and one had 50% of their members participate. Classes ranged in number from 2 to 17 members (M=5.0) and 1 class had 85% of their members participate, 2 classes had 80% of their members participate, 1 had 50% of their members participate, 3 had 33% of their members participate, and 4 classes had 20% of their members participate. Cohorts ranged in number from 2 to 3 (M=2.33) and 2 cohorts had 33% of their members participate and 1

cohort had 28% of their members participate. The experiential group had 2 out of its 6 members participate.

Work teams were recruited from one employer in the financial services industry. This employer was chosen because of a work model utilized where teams are tasked with projects that are executed in small groups, which then require the members to work closely together and coordinate work amongst themselves to achieve the required tasks. Therefore, the work teams spent considerable time in close physical proximity working on collaborative projects, which provided a great deal of interpersonal and professional interactions. Teams were made up of human resources, accounting, finance, and management teams. The actual work product of the teams varied depending on the type of team to which members belonged—such as hiring and recruiting new employees; preparing financial statements; executing financial trades; and making executive decisions about business operations, etc—however, they all shared in common the intimate and collaborative nature that provided members with the ability to rate the interpersonal environment in aggregate and with a great deal of history and knowledge of the interpersonal composition of the group.

Bands were recruited from a nationwide sample and reported a variety of activities in which they were required to collaborate and spend time together. These tasks included rehearsing, playing live, traveling, recording, and promotional tasks (e.g., marketing themselves via interviews, meeting fans, etc). Classes were comprised of undergraduate courses and participants provided ratings at the end of a semester, which maximized the level to which they knew they were familiar with the classroom environment. Three of the courses were psychology courses (list titles) and the remaining

7 courses were courses that are part of an undergraduate series in which freshman take a series of courses together and, thus, are likely more familiar with their classmates than a regular undergraduate courses where individuals aren't in contact as regularly and/or over the span of an academic year. Graduate cohorts were recruited from one graduate counseling psychology program and were asked to rate the aggregate interpersonal environment of the individuals in their cohort only. The cohorts were drawn from varying years of tenure in the program with 1 cohort having spent over 5 years in contact and the other 2 having spent between 3 and 5 years together. The experiential group participated at the end of a semester-long course that was required of students who were enrolled in a graduate-level counseling program at the university. Two advanced students in the program led the experiential group, which was a general process group that met for approximately 1.5 hours per week and was designed to allow members to experience what it is like to be a group participant. The end goal of the experiential group was that participants of the group were learning to lead therapeutic groups by engaging as experiential members and then studying and discussing group theory as part of the didactic learning process. So, participants were members of a class and also experiential members of the group, which meant that members had multiple points of contact both in the group and in the class. To minimize confusion between the group and the class environment, participants were asked to rate the environment of the experiential group and to speak to the interpersonal composition of the experiential group only, in aggregate, over the course of the semester.

Measures

Demographics. A demographic questionnaire was designed to assess age, gender, ethnicity, and year in school (Appendix B). Informed consent (Appendix A) was presented on the first page of the survey and those who agreed to participate were directed to complete the survey.

Interpersonal personality measure. Interpersonal traits (Appendix C) were assessed using the Revised Interpersonal Adjectives Scale (IAS-R; Wiggins, Trapnell & Phillips, 1988). The IAS is the preferred measure of interpersonal traits with well documented psychometric and circumplex properties. Internal consistency estimates for the IAS were high in the initial reporting of the measure (Cofficient alpha's of .86 -.90). The IAS contains 64 interpersonal adjectives for which respondents provide self-rated assessments as to which degree the adjectives describe their interpersonal traits. Items are measured using a Likert-type scale that ranges from 1 very inaccurate to 8 very inaccurate. For the purposes of scoring and analysis, the adjectives are combined into eight 8-item octant scales. In addition to scores on each of the octants, the IAS can be scored to provide vector scores, which will provide the trait rigidity indices in this study. Adjectives are also accompanied with descriptive sentences to ensure respondents are familiar with the trait descriptors, as past research (Adams & Tracey, 2004) has demonstrated that a glossary was necessary to ensure clarity of meaning. Sample items include: Accommodating: obliging, tend to do favors for others, which corresponds with the Communal (LM) octant of the Interpersonal Circle (IPC), and Self-Assured: confident, know yourself to be usually right, which corresponds with the Agentic (PA) octant of the IPC.

Interpersonal behavior measure. The International Personality Item Pool—Interpersonal Circle (IPIP-IPC; Markey & Markey, 2009; Appendix D) is a 32-item measure of the Interpersonal Circumplex (IPC) that consists of short phrases (e.g., Reassure others, Demand attention, etc.) rather than the adjective approach used in many other IPC measures. These phrases are easily understandable and the relative brevity of the measure provides the opportunity to measure IPC structure in an extremely short amount of time. In fact, past research has demonstrated that the IPIP-IPC takes approximately 2 minutes to complete (Markey & Markey, 2009) and can eliminate approximately 70% of the time needed to complete other IPC measures. Three studies were reported in the initial validation of the IPIP-IPC and the results confirmed that the eight octant scales occurred in a predicted circular manner and that the measure has strong convergent validity with the IAS (Markey & Markey, 2009). Similar to other IPC measures, the reliability of the octant scores was modest (*M reliability* =.64, range = .51 to .75 in study 1; *M reliability* = .60; range = .46 to .75 in study 2; *M reliability* = .64; range = ..48 to .76 in study 3); however, dimensional scores produced reasonably high scores (.84 and .86 in study 1; .80 and .86 in study 2; .94 and .95 in study 3). This is also to be expected, since the dimensional scores use the aggregate of items and represent the overall circular structure of the measure. Another study was conducted (Markey, Anderson & Markey, 2013) which used behavioral mapping—a method designed to relate behaviors to circumplex models—to examine the utility of the IPIP-IPC in predicting interpersonal behaviors. In this study, interpersonal interactions between participants and a confederate were videotaped and then coded according to the Riverside Behavioral Q-Sort (Funder et al., 2000). The results from this study again confirmed the

circular structure of the measure, demonstrated similar internal consistency estimates, as measured using Cronbach's alpha (*M octant reliability* = .62; *dimension reliability* = .82 and .84), and illustrated that participants' interpersonal behaviors occurred in a manner predicted by their IPIP-IPC scores. The results from this study support the use of the IPIP-IPC in the measure of interpersonal behavior. The current study employed the IPIP-IPC to obtain self-ratings of behavior at the individual level. This will serve as the criterion variable in the all the models of the study. Additionally, the obtained ratings on the IPIP-IPC also allow for an alternative measure of environment through the calculation of the group mean behavior ratings. In this study, environment is conceptualized as the aggregate interpersonal interactions of the individuals in the group; thus, by calculating a mean behavior for the group from the obtained individual scores one is able to quantify the interpersonal environment using behavior as the measure from which the environment is constructed.

Interpersonal environment measure. The Circumplex Measure of Interpersonal Environment item pool included 128 items (16 per octant of the IPC) that were developed for the purposes of this study. Items were measured on an 8-point Likert-type scale ranging from 1 (Extremely Inaccurate) to 8 (Extremely Accurate). The process for item generation included a thorough review of existing IPC measures whereby the structure of each measurement was assessed for its ability to best capture the construct of interpersonal environment. After the review of measure structures, the final form adopted in this study was a modified adjectival approach, whereby items were structured to provide, first, an adjective descriptor of the environment (e.g., Calculating), which was then followed by a short sentence to ensure the clarity of the adjective stem (e.g., the

group is determined to gain the greatest personal advantage.). Next, adjective selection was informed by multiple conceptions of the IPC including the models espoused by Wiggins, Trapnell, and Phillips (1988), Kiesler (1983) and Carson (1969). For each octant of the IPC, items were generated using the octant labels from the various models and their applicability to the construct for environment. For example, an adjective such as "Competitive" may be easily applied to the measurement of interpersonal environment; however, and item such as "Aloof" is more of a trait descriptor and may not fit the definition of environments used in this study, so careful attention was paid in the selection of octant descriptors that were included in the item pool. Naturally, some items were more complexly determined (e.g., Extraverted) and, therefore, we included a number of those types of items in the item pool to determine if the empirical results would support their inclusion. After multiple rounds of review, the final item pool was selected and administered to participants in this study.

Procedure

Participants were recruited through courses, online through direct email requests, through social media, and through Internet messageboards. Incentives for completion of the study included raffles for merchandise and extra credit in courses. The survey was administered online via survey software called, Question Pro. Appendices A-E contain copies of the measures that were be used in the online survey. Data collection occurred from January 2014 to April 2014. Upon completion of the questionnaire, participants were prompted to send verification of completion through email to the primary investigator in order to be included in the raffle. Participants were asked to complete items from the demographic questionnaire first. The interpersonal traits, environment and

behavior measures were then presented in a counterbalanced order. A system was created for assigning participants unique identifiers that allowed for them later to be grouped by the environment in which they self-identified.

Band members were initially recruited through social media and messageboards whereby the author of this study posted requests for participation. If individuals were interested, they were asked to email or message the author for further detail. Participants who were interested in taking part in the study were then provided a unique username and password to gain access to the survey. This step where participants were asked to contact the author to obtain an identifier was used to ensure that participants met the criteria for participation in the study and later to match test-retest scores. All participants provided consent at the beginning of the study and items were counterbalanced to prevent measurement effects. Once participants were provided access to the study, they were asked to rate the interpersonal environment of their group from an in-group perspective (i.e., this is how I view the environment of my group) and question administration lasted, on average, approximately 25 minutes. All participants were given two weeks to complete the survey.

Recruitment was expanded beyond musical bands due to the need for more participants. The threat of heterogeneity of groups was weighed and it was determined that groups with similar structures (i.e., smaller groups with intimate knowledge of the interpersonal environment) to the musical bands would be the target of recruitment efforts to obtain more participants. Therefore, the employer of the work teams was solicited for recruitment because of the nature and composition of the groups in which it employed. Similarly, cohorts, classrooms, and the psychological group were solicited for

recruitment because of the size and composition of the groups. The owner and upper-management of the employer of the work teams agreed to allow its employees to participate and an email was sent to employees informing them of the opportunity to participate. The process for enrollment of work team members was the same as the one outlined above (i.e., participants were required to write the author to obtain access to the survey and were provided a unique code that allowed for tracking and grouping of members in teams).

Similarly, emails were sent to course instructors and the facilitator of the course in which the members of the psychological group were enrolled asking them if they would allow their students to participate in the study. The author of the study also attended a meeting and explained the study to the instructors of the classrooms and invited them to encourage their students to participate. These courses were selected due to the relatively low enrollment numbers (i.e., as compared with traditionally large university courses) and also because they were part of a series of courses in which students take several classes together, as a sort of cohort. The logic behind selecting these courses was that the class size and the longer-term nature of the contact between students would provide the students with a more informed perspective of the interpersonal environment than students who were enrolled in a traditional university course with hundreds of students and very little cohesive contact with their classmates. The cohort members were recruited via email from the graduate program in which the author was enrolled. Cohort members who were interested in participating were asked to email the author of the study to obtain further information. Again, the process for enrollment of classroom, psychological group, and cohort participants was the same as the one outlined for the band members and work

teams (i.e., participants were required to write the author to obtain access to the survey and were provided a unique code that allowed for tracking and grouping of members in teams).

From the initial sample, 210 out of 223 participants took part in the study. Six participants were dropped from the overall sample because they were missing items equal to, or in excess of, 20% of the data solicited in the study, which places the completion rate for the overall study at 94%. The sample of 151 participants was drawn from the initial 210 participants who provided data with at least one other member of a group to which they self-identified. Therefore, 59 participants provided data that could be utilized for the CMIE scale development portion of the study, but they were dropped from the overall study because they could not be matched with any of the groups needed for the overall study. The test-retest group was recruited from a smaller sample of 30 participants that were invited to complete a second administration of the CMIE items only. Of those 30 participants, 26 participants provided data (i.e., completion = 86%) that was matched with their initial scores using a unique identifier.

Missing Data

In order to address the issue of missing data, several procedures were employed, including a means for determining when to remove participants who did not sufficiently complete the survey. Following the recommendations of Schlomer, Bauman and Card (2010), participants who were missing items equal to or in excess of 20% of the data for each measure were removed from the study. For participants who were missing data but retained in the study, Little's (1988) test for patterns of missing data was conducted to assess whether data are missing completely at random (MCAR). Full Information

Maximum Likelihood (FIML) using Mplus statistical software was used to impute missing values for any participant who missed fewer than 20% of the items in the study and was thus retained in the study.

Analysis

In order to assess the structure of the Circumplex Measure of Interpersonal Environment (CMIE), the established procedure that has been used to create other circumplex inventories was utilized (e.g., Alden, Wiggins, & Pincus, 1990; Hopwood et al., 2011; Locke & Sadler, 2007; Wiggins, Trapnell, & Phillips, 1988). First, individual responses were ipsatized to control for overall response elevation that often arises as a confounding general factor in interpersonal research (Locke, 2010). Next, a series of iterative principal component analyses (PCA's) was conducted where two components were assessed using a Varimax rotation. This procedure is well established in the literature and supported by theory to capture the two orthogonal components of agency and communion that underlie the IPC. The aim of these PCA's are to produce octant scales from the summaries of the orthogonal components and to serve as a guide for the selection of items using the weighted sums that arise from the latent two-component model. Consequently, in this study, the two-component model served as a useful guide for item selection and octant generation since circumplex models are theoretically neutral as to whether agency and communion are simply useful summaries of octant scores versus latent constructs causing octant scores, as is assumed by factor analytic approaches (Locke, 2014). Using the item loadings, item communalities, item-scale correlations, and conformity to a circumplex structure, the original 128 items were examined and a final set of 32 items was selected, with eight 4-item octant scales.

Before analyses for the remainder of the study questions were conducted, scores were calculated for each individual (i.e., trait and behavior scores) and for the environment. Trait and behavior scores were obtained from self-ratings and were calculated at the individual level while environment scores were aggregated according the environment from which the participant self-identified. So, trait and behavior scores were calculated at the individual level and environment scores were aggregated from the individual ratings completed by the members of the group. For the purposes of this study, only the dimensional scores were calculated for the three variables of interest, as they have been shown to be more reliable indicators and they produce similar results to octant ratings (Moskowitz, 1994; Sadler & Woody, 2003; Tracey & Hays, 1989). Similarly, as noted by O'Connor and Dyce (1997), dimensional scores provide non-redundant samples of interpersonal constructs, as the four octants that are not positioned at the end of the dimensional axes are blendings of the two nearest axes. To obtain scores for each individual, scoring procedures provided with the IAS will be followed. Octant scores are obtained by calculating the mean of the responses made to the individual adjectives in each octant scale (e.g., PA, NO, DE, etc.). From these scores, dimension scores can be obtained by computing the following two sums (provided in the scoring guide):

Power = .30 [(PA – HI) + .707(NO + BC – FG – JK)]
Affiliation = .30 [(LM – DE) + .707(NO - BC – FG + JK)]

Vector length is calculated using the square root of ($Dom^2 + Lov^2$). Dimension scores were calculated using the scoring procedure provided with the IPIP-IPC. Markey (2009) has provided the syntax for calculating all of the octant and dimension scores. The syntax for the dimension scores is as follows:

power= ((pa*1)+(bc*.707)+(de*0)+(fg*-.707)+(hi*-1)+(jk*-.707)+(lm*0)+(no*.707))*.30 .

affiliation = ((pa*0)+(bc*-.707)+(de*-1.00)+(fg*-.707)+(hi*0)+(jk *.707)+(lm*1)+(no*.707))*.30 .

As a function of the formulae provided above, factor scores were divided by .30 to "give them unit variance" (Wiggins, Phillips & Trapnell, 1989 p. 297), which provides scales with means that are close to zero and standard deviations that are close to 1.00. This also maximizes the correlations among scales, which aids in analysis and interpretation of the factor scores. Next, the environmental scores were calculated. These scores were an aggregate as all members of the groups rated the environment. The scoring procedure of the CMIE followed the scoring procedure of the IAS, as the environment measure was modeled after the IAS.

The remainder of the analyses explained herein employed multilevel modeling as the statistical approach; specifically Hierarchical Linear Modeling (HLM) was utilized to as the most appropriate statistical tool to empirically investigate the questions of interest. Also, since the dimensions of Control and Affiliation are orthogonal, analyses on all data will be conducted separately for each model on each dimension.

Since this was the first study to measure interpersonal environment in this manner, two separate measures of environment were used. The first approach to measuring the interpersonal environment employed the Circumplex Measure of Interpersonal Environment (CMIE) to obtain ratings from individual group members that were then aggregated to obtain a group mean perception rating of environment. As outlined prior in this paper, the items on the CMIE were designed to measure environment in a manner similar to the Interpersonal Adjectives Scale where participants

were presented with an adjective and a short definition that described the environment and for which ratings were solicited. In this sense, the CMIE assessed environment using participants' self-perceptions of the ways in which certain environmental features may or may not be present. An alternative approach to measuring the interpersonal environment was made available through the behavior ratings that participants provided. Whereas the CMIE measured environment according the ratings of the environment that group members provided, an alternative was provided by calculating the group mean behavior ratings, which is the actual behavioral manifestation of the interpersonal environment; that is, it provided an actual measure of the ways in which individuals in the environment interacted with one another. So, the CMIE environment was an aggregate of the ratings of the perceptions of the interpersonal environment, whereas the group mean behavior ratings environment was derived from the average of all group behaviors using self-ratings of behavior from the IPIP-IPC. The benefit of using two environment measures was that: (1) there may have been features of the environment that were captured by one measure, but not the other (e.g., non-verbal communication or more emotion-based features such as "tension"), and (2) the design offered a basis of comparison to assess which measure performed best under the study conditions. Therefore, employing two separate approaches to measuring the interpersonal environment provided the opportunity to evaluate which best captured the features of the environment and how they performed similarly and/or differently.

Hypothesis One was designed to examine the relative contribution of trait and environment to behavior. The model included two levels for each level of analysis. The first analysis in this study examined the relative relation of trait and environment in

predicting behavior. This model included behavior as the outcome variable and trait as the parameter on Level 1, while the CMIE environment ratings or the group mean behavior ratings environment was included as the parameter on Level 2, depending on which environment was being analyzed. This model allowed for the assessment of the individual contribution of trait and environment separately while also accounting for individuals nested within groups.

The questions related to Hypothesis Two were designed to assess the relation of trait and behavior as moderated by environment. In Hypothesis Two, two separate models were assessed to examine whether support could be demonstrated for the moderating role of environment on the relation between traits and behaviors. In the first model, an analysis was conducted where behavior served as the outcome and traits served as the parameter on Level 1, and the environment served as the parameter on Level 2. Again, environment was either the CMIE environment ratings or the group mean behavior ratings environment depending on which environment was being analyzed. Trait and environment were allowed to interact and this was used as the moderator between trait and behavior. The second examination of the moderating influence of the environment examined the added effect of the environment vector on the relation between traits and behavior. This model was constructed in the following way: behavior was the outcome and traits served as the parameter on Level 1, while the respective environment and respective environment vector served as the parameters on Level 2. In both this analysis and the last, the environment was included as a parameter to account for individuals nested within groups.

Hypothesis Three was designed to assess the correspondence of trait and environment and the trait-behavior relation. The third hypothesis outlined in this study was that correspondence between trait and environment would result in a significant relation with behavior. To test this hypothesis, the absolute difference between trait and the environment was calculated and then the following model was examined: the Level 1 outcome variable was behavior while the absolute difference was the predictor on Level 1. This model did not include a Level 2 parameter because the environment is already accounted for in the absolute difference values. The absolute difference is the preferred means of assessing the similarities and/or differences between the trait and environment in this analysis because it allows for an assessment of the true difference between the values of interest. On the other hand, correlations are model dependent and based on variance, whereas the absolute difference is based on the actual difference between two real numbers. In this sense, values that are similar are closer in magnitude and an absolute value of zero indicates that two values are identical. Utilizing the absolute difference also presents advantages when it comes to interpretation because the initial values have substantive meaning that can be interpreted on their own. For these reasons, the absolute difference provides the purest indicator of difference and/or similarity that is irrespective of model dependencies and variances. In this analysis, the absolute difference provides an indicator of the correspondence between the two constructs of interest, interpersonal traits and the interpersonal environment, by providing an indicator of the actual difference in scores for the two constructs and how they substantively related to one another.

Hypothesis Four was designed to examine the moderating effect of individual flexibility on the trait-behavior and environment-behavior relations. The moderating effect of interpersonal flexibility was examined using two separate models: (1) whether individual flexibility moderated the trait-behavior relation, and (2) whether individual flexibility moderated the environment-behavior relation. The first model, which examined the trait-behavior relations, was conducted using the trait vector as the moderator, trait as the predictor, and behavior as the outcome variable on Level 1. The respective environmental mean (i.e., either CMIE environment ratings or group mean behavior ratings environment) was used to account for group membership at Level 2. The second model examined in Question Four was the same as the previous model where trait was removed and the environment vector was included in its place along with behavior as the outcome.

CHAPTER 4

RESULTS

In this section, the results of the analyses outlined in this study will be reported. First, the scale development results of the Circumplex Measure of Interpersonal Environment (CMIE) will be presented. Next, preliminary data will be presented that demonstrates the overall characteristics of the sample and the measures, including the correlations among subscales employed in the analyses. Next, the results of the analyses pertaining to the four major hypotheses of this study will be presented in order first focusing on the CIME as the indicator of the environment and then again with the group mean behavior ratings as the indicator of the environment. As a point of clarification, the language employed in this section implies that the variables "traits" and "behaviors" pertain to participants at the individual level and the variable "environment" pertains the aggregate group ratings by which individuals were aggregated (i.e., those groups that they rated and to which they self-identified).

Circumplex Measure of Interpersonal Environment Results

The results of the principal components analysis conducted to assess the structure of the CMIE showed that the first two factors accounted for 74.34% of the variance and a parallel analysis of 1000 random samples demonstrated that there were only 2 components. The eigenvalues (and variance accounted for) for each of the first four factors were as follows: 3.69 (46.1%), 2.26 (28.3%), .71 (8.9%), and .45 (5.6%). Descriptive statistics and reliabilities were computed using octant scores that were averaged using the 4 items from each octant. The means and standard deviations for each octant are reported in Figure 9.

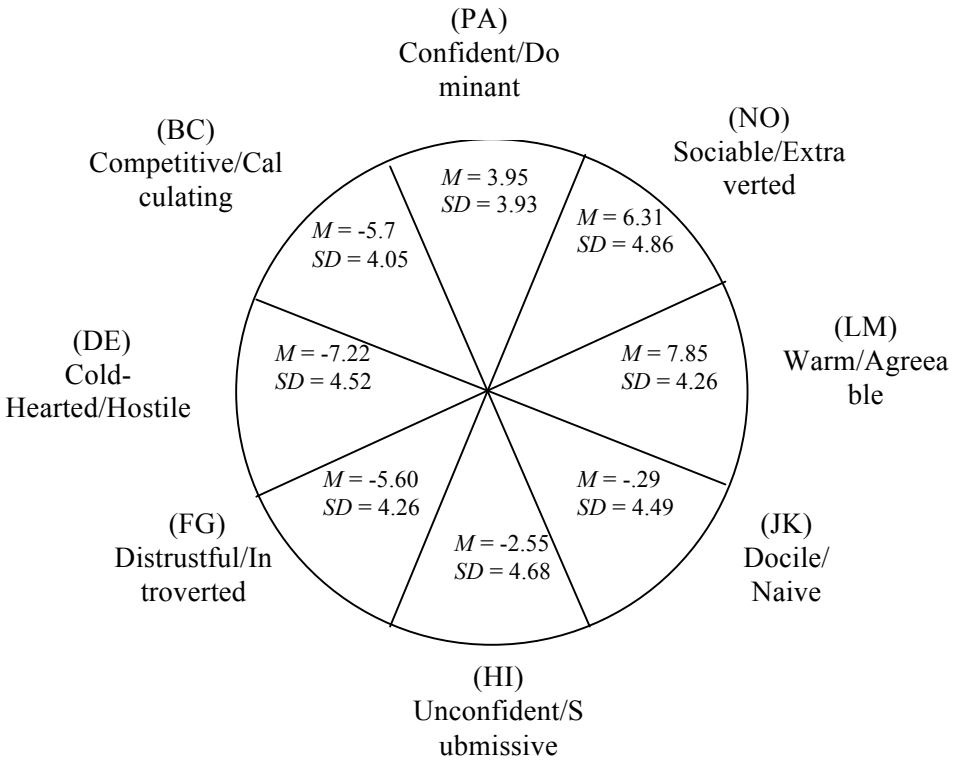

Figure 9: Means and Standard Deviations for Scales of Circumplex Scales of Interpersonal Environment.

When plotted in the two dimensional space of the IPC, the octant scales formed a circular pattern where octants plotted according to their proposed theoretical placement within the IPC and the expected circular structure was demonstrated. The component plot obtained in these analyses is provided in Figure 10.

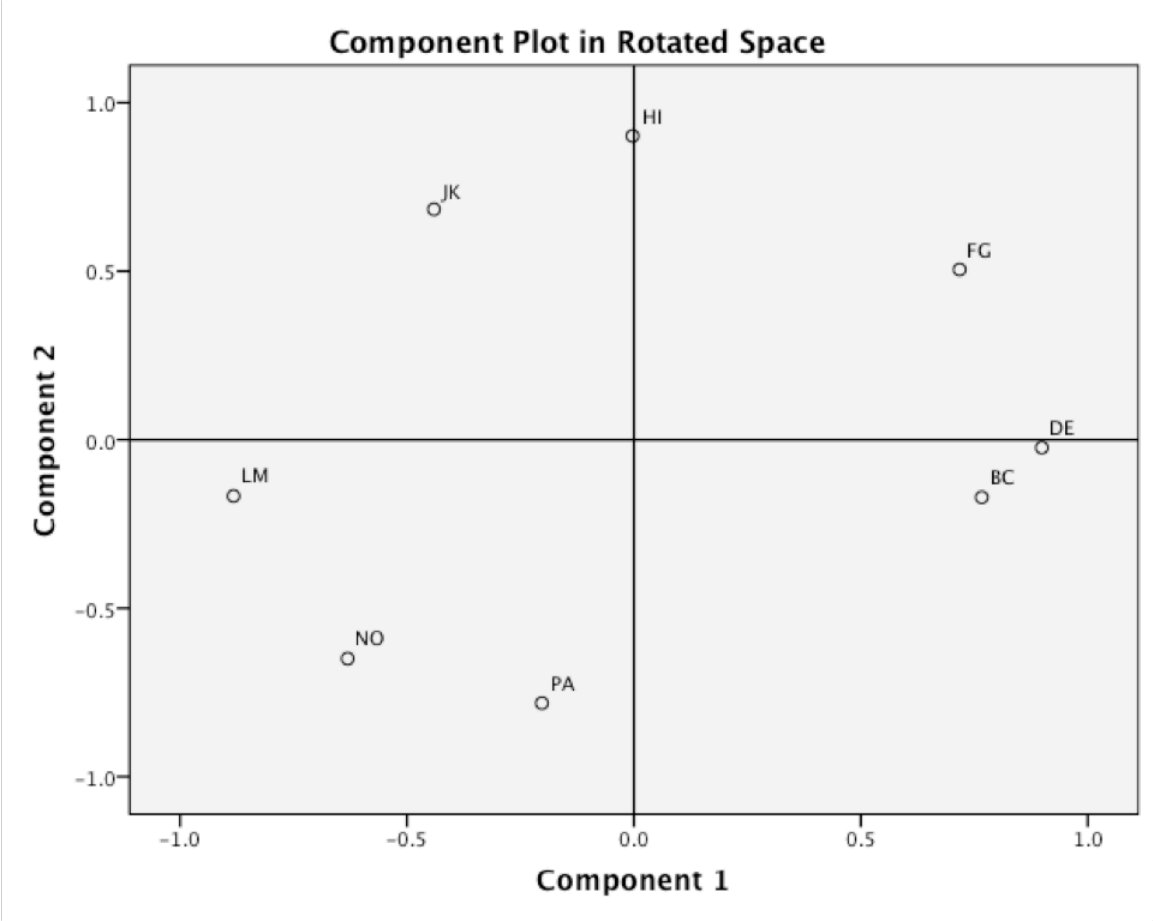

Figure 10. Component Plot of CMIE Subscales.

Next, a randomization test of hypothesized order relations (Hubert & Arabie, 1988; Tracey, 2000) was conducted to examine whether the CMIE octant scales conformed to a circular model when tested under more rigorous conditions. This procedure is considered the premiere test for assessing circularity where 288 order predictions of the correlations relative to other correlations in the matrix are assessed to determine the relative magnitudes of correlations of the eight-octant scales. In this test, octants that are close together on the IPC are predicted to be greater than those one-step away, which are in turn predicted to be greater than those two steps away and in turn

greater than those opposite, resulting in 288 order predictions among 8 types. To conduct this analysis, the computer program RANDALL (Tracey, 1997) was used, which calculates a correspondence index (*CI*) equal to the proportion of predictions met minus the proportion violated over the total number of predictions made. The parameters for the range of the *CI* are -1.0 (all predictions violated) to 1.0 (perfect fit). The results for the test of hypothesized order relations for these data were significant $p<.01$, with a *CI* of .87, with 269 predicts met, which indicates an extremely strong fit to a circular model.

The internal consistency estimates, using Cronbach's alpha, are provided in Table 1 and ranged from .57 to .84 (M =.72). The internal consistency estimates for the Power and Affiliation axes are also provided in Table 1 and the related Cronbach alpha values demonstrated strong internal consistency for both axes (Power =.93, Affiliation =.94). To further assess the validity of the CMIE, one-week test-retest coefficients were examined on the 26 participants. Test-retest scores yielded similar acceptable estimates indicating that the measure is fairly stable over time for this sample. The median value of the test-retest correlation was good (r = .71) and had a range of .37 to .79. The lowest observed correlation (.37) corresponded with the NO (*Sociable/Extraverted)* octant and the highest observed correlations (.79) corresponded with both the DE (*Cold-hearted/Hostile*) and BC (*Competitive/Calculating*) octants. The test-retest correlations for the Power and Affiliation axes are also provided in Table 1. The test-retest correlation for the Power axis was .80 and the obtained correlation for the Affiliation axis was .90, which indicated that both axes were very stable over time. The results for the reliability analyses for the test-retest group are also provided in Table 1.

Table 1
Reliability estimates for the CMIE octants and axes

		Test-Retest
Octant	α[a]	*r*[b]
(PA) Confident / Dominant	.61	.75
(BC) Competitive / Calculating	.64	.79
(DE) Cold-Hearted / Hostile	.84	.79
(FG) Distrustful / Introverted	.76	.78
(HI) Unconfident / Submissive	.71	.72
(JK) Docile / Naive	.57	.70
(LM) Warm / Agreeable	.83	.75
(NO) Sociable / Extraverted	.81	.37
Power Axis	.93	.80
Affiliation Axis	.94	.90

[a]: N =210
[b] N=26

Initial Statistics

Table 2 contains the means, standard deviations, and internal consistency statistics (i.e., obtained using Cronbach's alpha) for the overall scales used in the study. Scores for the trait (i.e., IAS) and behavior (i.e., IPIP-IPC) measures were calculated using individual self-ratings while the environment scores (i.e., CMIE) were calculated using the mean environment ratings that were aggregated from the individual ratings obtained from group members. As a function of the formulae provided by Wiggins (IAS; 1995) and Markey (IPIP-IPC; 2009) factor scores were multiplied by .30 to "give them unit variance" (Wiggins, Phillips & Trapnell, 1989 p. 297), which provides scales with means that are close to zero and standard deviations that are close to 1.00. As demonstrated, the means and standard deviations from these data adhere closely to the desired result.

Similarly, the internal consistency statistics—obtained using Cronbach's alpha--were strong for all scales used in the study.

Table 2
*Means and Standard Deviations for Scales**

Scale	*Mean*	*SD*	α[a]
IAS			
Power	-.001	.89	.92
Affiliation	-.019	1.19	.95
IPIP-IPC			
Power	.009	1.01	.95
Affiliation	-.018	1.05	.94
CMIE Environment			
Power	-.01	.61	.94
Affiliation	-.19	.54	.96
Group Mean Behavior Ratings Environment			
Power	-.002	.60	.95
Affiliation	-.008	.55	.94

n = 151
*IAS and IPIP scores are obtained from individual self-report while CMIE and Behavior Environment scores are obtained from aggregated mean ratings.

Table 3 contains the bivariate correlations for all the scales included in this study. This results reported in this table demonstrate that a number of scales were significantly correlated although caution should be used as these correlations are not based on independent data. Similar to overall trends in the literature examining the relation between traits and behavior, on both axes the trait scales were correlated with the

associated behavior scales (i.e., those that fell on the same axis). For example, the trait scale on the Power axis was positively correlated with behavior subscale on the Power axis (r =.69). Similarly, the trait scale on the Affiliation axis was positively correlated with behavior scale on the Affiliation axis (r =.77). When comparing across axes, the trait scale on the Power axis was positively correlated with the behavior subscale on the Affiliation axis (r =.18); however, the trait subscale of the Affiliation axis was not significantly correlated with the behavior scale on the Power axis. For the most part, these relations among scales seem to support the expected theoretical relationships that should exist among the trait and behavior scales. The strength of the relations between traits and behaviors on the same axes support the notion the respective axes were measuring similar constructs. However, since the axes are orthogonal, one would expect zero correlations across axes; therefore, the positive correlation coefficient between Power traits and Affiliation behaviors—although not particularly strong—raises some question about that relation and how best to interpret the result. One interpretation could be that, although the scales were measured orthogonally, the individuals who provided ratings for the relation could have had in mind extraversion-like features, which is a blending of dominant traits and affiliative behaviors.

When examining the scales used to measure environment, results showed that the CMIE Power and CMIE Affiliation scales were positively correlated (r=.49). Again, since the scales are measured orthogonally and, ideally, one would expect these scales to be distinct from one another, as indicated by a coefficient of zero, this relation raises confusion about the overlap in the ratings obtained for the two scales. Conversely, the Power and Affiliation axis scales for the group mean behavior ratings were negatively

correlated (r=-.35), which seems to illustrate that they are measuring constructs that are overlapping. Another unexpected relation that emerged is that the CMIE environment scale for the Power axis was negatively correlated with the Power scale for the group mean behavior ratings (r=-.29), which seems to indicate that the CMIE Power scale is measuring environment in a dissimilar manner from the group mean behavior ratings obtained. High behavior scores were associated with lower mean perceptions of power in the environment. The relation between the CMIE environment and the group mean behavior ratings for the Affiliation scales was not significant, which also raises questions about the validity of the scales given that both are expected to represent the same thing. When comparing the scales for trait and behaviors with the environment scales, the results showed that Power behavior was positively correlated the Power group mean behavior ratings (r=.21) and the Affiliation trait scale was positively correlated with the Affiliation scale for the group mean behavior ratings (r=.27). These coefficients were somewhat expected, since the group mean behavior ratings were obtained by calculating the group aggregate; however, the relatively weak coefficients illustrates the level to which the group aggregate behavior was distinct from individual behavior.

Table 3
Correlation Coefficients between scales[a]

Scale	Power Trait	Affiliation Trait	Power Behavior	Affiliation Behavior	CMIE Power	CMIE Affiliation	Group mean behavior ratings Power	Group mean behavior ratings Affiliation
Power Trait								
Affiliation Trait	.00							
Power Behavior	.69*	-.14						
Affiliation Behavior	.18*	.77*	.01					
CMIE Power	.02	-.06	-.13	-.01				
CMIE Affiliation	-.06	-.04	-.04	.02	.49*			
Group mean behavior ratings Power	.09	.11	.21**	.08	-.29*	-.15		
Group mean behavior ratings Affiliation	.11	.27*	.06	.41*	.01	.08	-.35*	

*Correlation is significant at the <.05 level (2-tailed).
[a]IAS and IPIP scores are obtained from individual self-report while CMIE scores are obtained from mean environment ratings.

The remainder of the results reported in this section will provide the findings of the analyses examining the four hypothesized questions. The results will first be presented for all four questions using the mean rating for environment by group as the environment indicator, and then results will be presented again for all four questions using the mean rating for behavior by group as the environment indicator. Additionally, since the remainder of the questions examined in this study employ orthogonal models, all results will be reported separately for the Power axis and the Affiliation axis. Hierarchical Linear Modeling (HLM) was the statistical application used to analyze a two-level data structure where individuals (Level 1) were nested within groups (Level 2).

Analysis of study questions

The remaining analyses focus on the relation of trait and environment variables in predicting behavior. Since two separate methods are used to operationalize the environment (the self-ratings of perception of the environment obtained from the CMIE and, separately, the group mean behavior ratings of each group) these will be examined separately but in an identical manner. First, all research questions will be examined using the CMIE method of defining the environment using group mean perception ratings and then all research questions will be examined using the group mean behavior ratings method. To further clarify, CMIE ratings were self-ratings of the perceptions of the interpersonal environment that were paired by group and then aggregated using the mean, thus providing a group mean of the perception of the environment. Conversely, the group mean behavior ratings were obtained by calculating the self-ratings of behavior using the average of behaviors per group, thus providing a group mean behavior rating. The definitions are provided in Table 4.

Table 4
Definitions of Environment Measures

Environment Measure Type	Environment Definition
CMIE Environment	CMIE Environment ratings were obtained through self-report of individual perceptions of the interpersonal characteristics of the environment. Scores were then averaged by axis (i.e., Power and Affiliation separately) and mean perception ratings, per group, served as the measure of environment.
Group Mean Behavior Rating Environment	Group Mean Behavior Ratings were obtained through self-report of behaviors using the IPIP-IPC. Scores were averaged by axis (i.e., Power and Affiliation separately) and mean behavior ratings, per group, served as the measure of environment.

Analyses using self-rated CMIE as the environmental definition

Question One was designed to examine the relative relation of trait and environment in predicting behavior. This model included behavior as the outcome variable and trait as the parameter on Level 1, while the mean environment rating was included as the parameter on Level 2. The related equation for affiliation was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvPow_j + \gamma_{10}*IASPow_{ij} + u_{0j} + r_{ij.}$ The results presented in Table 5 demonstrated that both the trait power ($t(102)=14.26$, $p<.001$) and the environment power ($t(46)=-2.00$, $p<.05$) were significantly related to power behavior for the individual. This finding indicated that the greater power trait ratings were related to greater power behavior (coeff=.81), whereas there was a negative relation between

environmental power and behavioral power (coeff=-.21). This relation indicates that power behavior decreased slightly in environments that were rated as having high power.

Table 5
Summary of Multi level modeling results of question one power axis results with CMIE environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.038	0.030	-0.562	46	0.577
Power Environment, γ_{01}	-0.210	0.105	-2.008	46	0.050
Slope, β_1					
Power Trait, γ_{10}	0.807	0.034	14.264	102	<0.001

The results for the relation of the affiliation trait and environment with affiliative behavior are presented in Table 6. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvAffil_j + \gamma_{10}*IASAffil_{ij} + u_{0j} + r_{ij.}$ These results demonstrated that only trait ratings were significantly related to affiliation behavior ($t(102)=20.27$, $p<.001$) and environmental affiliation was not related to affiliation behavior ($t(46)=.89$, $p>.05$). The obtained significant relation indicated that greater affiliation trait ratings were related to greater amounts of affiliation behavior (coeff=.68). Similar to the results obtained for the power axis, affiliative traits were predictive of affiliative behaviors when accounting for the environment; however, in this model the environment was not found to be a significant predictor of individual affiliation behaviors;

Table 6
Summary of Multi level modeling results of question one affiliation axis results with CMIE environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.015	0.051	-0.298	46	0.767
Affil Environment, γ_{01}	0.097	0.109	0.891	46	0.378
Slope, β_1					
Affil Trait, γ_{10}	0.677	0.033	20.266	102	<0.001

Question Two examined whether support could be demonstrated for the moderating role of environment on the relation between traits and behaviors. The model employed in this analysis utilized behavior as the outcome and traits as the parameter on Level 1, and the mean environment rating served as the parameter on Level 2. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvPow_j + \gamma_{10}*IASPow_{ij} + \gamma_{11}*CMIEEnvPow_j*IASPow_{ij} + u_{0j} + r_{ij.}$ Since this model is the same as the model presented in the prior question, but examined the added effect of the interaction of the trait and environment on behavior, only the pertinent interaction term will be interpreted. As can be seen in Table 7, the trait x environment interaction term for power was not significant ($t(101)=1.44$, $p>.05$).

Table 7
Summary of Multi level modeling results of question two power axis results with CMIE environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.039	0.067	-0.577	46	0.566
Power Environment, γ_{01}	-0.221	0.099	-2.234	46	0.030
Slope, β_1					
Power Trait, γ_{10}	0.825	0.052	15.945	101	<0.001
Power Environment, γ_{11}	0.124	0.084	1.438	101	0.154

As can be seen from Table 8, the interaction of affiliation trait by environment was also not a significant moderator of affiliative behavior ($t(101)=1.14$, $p>.05$). The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvAffil_j + \gamma_{10}*IASAffil_{ij} + \gamma_{11}*CMIEEnvAffil_j*IASAffil_{ij} + u_{0j} + r_{ij.}$

Table 8
Summary of Multi level modeling results of question two affiliation axis results with CMIE environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.014	0.051	-0.276	46	0.784
Affil Environment, γ_{01}	0.101	0.109	0.921	46	0.362
Slope, β_1					
Affil Trait, γ_{10}	0.678	0.032	20.697	101	<0.001
Affil Environment, γ_{11}	0.060	0.053	1.136	101	0.258

Question Three examined whether correspondence between trait and environment would result in a significant relation with behavior. To test this hypothesis, the absolute difference between trait and the environment was calculated and then the following model was examined: the Level 1 outcome variable was behavior while the absolute difference was the predictor on Level 1. This model did not include a Level 2 parameter because the environment was already accounted for in the absolute difference values. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{10}*AbsDiffPow_{ij} + u_{0j} + r_{ij.}$ As demonstrated in Table 9, the results from these analyses demonstrated that the absolute difference ($t(102)=.69$, $p>.05$) was not significantly related to power behavior for the individual.

Table 9
Summary of Multi level modeling results of question three power axis results with CMIE environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	0.008	0.072	0.122	47	0.904
Slope, β_2					
Power Absolute Difference, γ_{20}	0.092	0.133	0.692	102	0.491

The results for the relation of trait and environmental affiliation on affiliative behavior are presented in Table 10. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{10}*AbsDiffAffil_{ij} + u_{0j} + r_{ij.}$ The results demonstrated that the absolute difference between trait and environment also was not significantly related to affiliation behavior

($t(102)=.10$, $p>.05$).

Table 10
Summary of Multi level modeling results of question three affiliation axis results with CMIE environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.014	0.092	-0.149	47	0.882
Slope, β_2					
Affil Absolute Difference, γ_{20}	0.008	0.083	0.102	102	0.919

Question Four examined the moderating effect of interpersonal flexibility in two separate applications: (1) whether individual flexibility moderated the trait-behavior relation, and (2) whether individual flexibility moderated the environment-behavior relation. The first model, which examined the trait-behavior relations, was conducted using the trait vector for the respective axes as the moderator, trait as the predictor, and behavior as the outcome variable on Level 1. The mean environment rating was used to account for group membership at Level 2. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvPow_j + \gamma_{10}*IASPow_{ij} + \gamma_{11}*CMIEEnvPow_j*IASPow_{ij} + \gamma_{20}*PowTraitVec_{ij} + \gamma_{21}*CMIEEnvPow_j*PowTraitVec_{ij} + u_{0j} + r_{ij.}$ The rationale for employing a trait vector is that it provides an indicator of interpersonal flexibility by measuring the strength and orientation of the individual's traits. Therefore, an individual trait vector was employed to account for the strength and orientation of each individual's

trait profile, which was then compared against the overall trait profile and, thus, served as an indicator of interpersonal flexibility. The results presented in Table 11 demonstrated that the trait vector ($t(99)=1.31$, $p>.05$) was not a significant moderator of power behavior for the individual.

Table 11
Summary of Multi level modeling results of question four power axis results with CMIE environment: trait-behavior relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.035	0.066	-0.530	46	0.599
Power Environment, γ_{01}	-0.218	0.097	-2.241	46	0.030
Slope, β_1					
Power Trait, γ_{10}	0.827	0.055	15.124	99	<0.001
Power Environment, γ_{11}	0.131	0.090	1.447	99	0.151
Slope, β_2					
Power Trait Vector, γ_{20}	0.011	0.113	0.097	99	0.923
Power Environment, γ_{21}	0.217	0.165	1.313	99	0.192

The results for the moderating effect on affiliative behavior are presented in Table 12. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvAffil_j + \gamma_{10}*IASAffil_{ij} + \gamma_{11}*CMIEEnvAffil_j*IASAffil_{ij} + \gamma_{20}*AffilTraitVec_{ij} + \gamma_{21}*CMIEEnvAffil_j*AffilTraitVec_{ij.}$ Similar to the analysis of the power relations, these results also demonstrated that the trait vector ($t(99)=-1.18$, $p>.05$) was not a significant moderator of affiliation behavior for the individual.

Table 12
Summary of Multi level modeling results of question four affiliation axis results with CMIE environment: trait-behavior relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.015	0.050	-0.291	46	0.772
Affil Environment, γ_{01}	0.087	0.105	0.828	46	0.412
Slope, β_1					
Affil Trait, γ_{10}	0.674	0.032	21.038	99	<0.001
Affil Environment, γ_{11}	0.071	0.055	1.297	99	0.198
Slope, β_2					
Affil Trait Vector, γ_{20}	0.025	0.087	0.291	99	0.772
Affil Environment, γ_{21}	-0.173	0.147	-1.180	99	0.241

The second model examined in Question Four was the same as the previous model where trait was removed and the environment vector was included in its place along with behavior as the outcome. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvPow_j + \gamma_{02}*CMIEEnvPowVec_j + \gamma_{10}*IASPow_{ij} + \gamma_{11}*CMIEEnvPow_j*IASPow_{ij} + \gamma_{12}*CMIEEnvPowVec_j*IASPow_{ij} + \gamma_{20}*PowInteraction_{ij} + \gamma_{21}*CMIEEnvPow_j*PowInteraction_{ij} + \gamma_{22}*CMIEEnvPow_j*PowInteraction_{ij} + \gamma_{30}*PowTraitVec_{ij} + \gamma_{31}*CMIEEnvPow_j*PowTraitVec_{ij} + \gamma_{32}*CMIEEnvPowVec_j*PowTraitVec_{ij} + u_{0j} + r_{ij.}$ The results presented in Table 13 demonstrated that the trait vector ($t(94)=1.48$, $p>.05$) was not a significant moderator of environment vector-behavior relation on the power axis.

Table 13
Summary of Multi level modeling results of question four power axis results with CMIE environment: trait-environment relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.056	0.062	-0.903	45	0.371
Power Environment, γ_{01}	-0.237	0.095	-2.485	45	0.017
Power Environment Vector, γ_{02}	-0.073	0.116	-0.627	45	0.534
Slope, β_1					
Power Trait, γ_{10}	0.789	0.081	9.706	94	<0.001
Power Environment, γ_{11}	0.244	0.172	1.419	94	0.159
Power Environment Vector, γ_{12}	-0.043	0.166	-0.206	94	0.796
Slope, β_2					
Power Trait*Environment Interaction , γ_{20}	-0.055	0.091	-0.604	94	0.547
Power Environment, γ_{21}	0.153	0.113	1.251	94	0.214
Power Environment Vector, γ_{22}	-0.243	0.109	-2.232	94	0.028
Slope, β_3					
Power Trait Vector, γ_{30}	0.021	0.101	0.208	94	0.836
Power Environment, γ_{31}	0.141	0.169	0.831	94	0.408
Power Environment Vector, γ_{32}	0.337	0.227	1.482	94	0.142

The results for the moderating effect of the trait vector on the environment vector-behavior relation for the affiliation axis are presented in Table 14. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*CMIEEnvAffil_j + \gamma_{02}*CMIEEnvAffilVec_j + \gamma_{10}*IASAffil_{ij} + \gamma_{11}*CMIEEnvAffil_j*IASAffil_{ij} + \gamma_{12}*CMIEEnvAffilVec_j*IASAffil_{ij} + \gamma_{20}*AffilInteraction_{ij} + \gamma_{21}*CMIEEnvAffil_j*AffilInteraction_{ij} + \gamma_{22}*CMIEEnvAffil_j*AffilInteraction_{ij} +$

γ_{30}*$AffilTraitVec_{ij}$ + γ_{31}*$CMIEEnvAffil_j$*$AffilTraitVec_{ij}$ + γ_{32}*$CMIEEnvAffilVec_j$*$AffilTraitVec_{ij}$ + u_{0j}+ $r_{ij.}$ These results demonstrated that the trait vector (t(94)=.92, p>.05) was also not a significant moderator of environment vector-behavior relation for the affiliation axis.

Table 14
Summary of Multi level modeling results of question four affiliation axis results with CMIE environment: trait-environment relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.018	0.053	-0.341	45	0.734
Affil Environment, γ_{01}	0.096	0.114	0.604	45	0.549
Affil Environment Vector, γ_{02}	0.012	0.079	0.146	45	0.884
Slope, β_1					
Affil Trait, γ_{10}	0.665	0.035	18.909	94	<0.001
Affil Environment, γ_{11}	0.083	0.063	1.318	94	0.191
Affil Environment Vector, γ_{12}	0.043	0.042	0.959	94	0.340
Slope, β_2					
Affil Trait*Environment Interaction, γ_{20}	-0.035	0.040	-0.872	94	0.385
Affil Environment, γ_{21}	0.067	0.071	0.946	94	0.346
Affil Environment Vector, γ_{22}	-0.006	0.067	-0.086	94	0.932
Slope, β_3					
Affil Trait Vector, γ_{30}	0.004	0.072	0.058	94	0.954
Affil Environment, γ_{31}	-0.202	0.174	-1.161	94	0.249
Affil Environment Vector, γ_{32}	0.139	0.151	0.924	94	0.358

Analyses using group mean behavior ratings as the environmental definition

The following analyses examined the relative relation of trait and the group mean

behavior ratings as the indicator of environment in predicting behavior. The model associated with Question One included behavior as the outcome variable and trait as the parameter on Level 1, while the group mean behavior ratings were included as the parameter on Level 2. The related equation for affiliation was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvPow_j + \gamma_{10}*IASPow_{ij} + u_{0j} + r_{ij.}$ The results presented in Table 15 demonstrated that trait power ($t(102)=13.99$, $p<.001$) was significantly related to power behavior for the individual; however, the mean behavior on the power axis was not significantly related to power behavior ($t(46)=1.31$, $p<.05$). This finding indicated that the greater power trait ratings were related to greater power behavior (coeff=.79) when accounting for the mean power behavior of the group.

Table 15
Summary of Multi level modeling results of question one power axis results with group mean behavior ratings environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.025	0.0678	-0.372	46	0.712
Power Environment, γ_{01}	0.218	0.166	1.312	46	0.196
Slope, β_1					
Power Trait, γ_{10}	0.796	0.057	13.993	102	<0.001

The results for the relation of the affiliation trait and environment on affiliative behavior are presented in Table 16. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvAffil_j + \gamma_{10}*IASAffil_{ij} + u_{0j} + r_{ij.}$ These results demonstrated that trait ratings ($t(102)=20.27$, $p<.001$) and the group mean behavior ratings ($t(46)=.89$, $p=0.38$) were both significantly related to affiliation behavior. The

obtained significant relation indicated that greater affiliation trait ratings were related to greater amounts of affiliation behavior (coeff=.62) and affiliation behavior was positively related to groups with affiliative mean behaviors (coeff=.40).

Table 16
Summary of Multi level modeling results of question one affiliation axis results with group mean behavior ratings environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.009	0.044	-0.203	46	0.840
Affil Environment, γ_{01}	0.404	0.077	5.226	46	<0.001
Slope, β_1					
Affil Trait, γ_{10}	0.624	0.039	16.951	102	<0.001

Question Two examined whether support could be demonstrated for the moderating role of the group mean behavior ratings on the relation between traits and behaviors. The model for both the power and affiliation analyses were designed in the following manner: behavior served as the outcome and traits served as the parameter on Level 1, and the group mean for behavior served as the parameter on Level 2. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvPow_j + \gamma_{10}*IASPow_{ij} + \gamma_{11}*MeanBehEnvPow_j*IASPow_{ij} + u_{0j} + r_{ij.}$ Again, since this model is the same as the model presented in the prior question, but examined the added effect of the interaction of the trait and the group mean behavior ratings on behavior, only the pertinent interaction term will be interpreted. As can be seen in Table 17, the trait x group mean behavior ratings interaction term for power was not a significant moderator of power behavior

($t(101)=-1.06$, $p>.05$).

Table 17
Summary of Multi level modeling results of question two power axis results with group mean behavior ratings environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.015	0.066	-0.228	46	0.566
Power Environment, γ_{01}	0.259	0.149	1.735	46	0.090
Slope, β_1					
Power Trait, γ_{10}	0.796	0.058	13.726	101	<0.001
Power Environment, γ_{11}	-0.149	0.142	-1.057	101	0.293

As can be seen from Table 18, the interaction of affiliation trait x group mean behavior ratings was also not a significant moderator of affiliative behavior ($t(101)=-1.47$, $p>.05$). The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvAffil_j + \gamma_{10}*IASAffil_{ij} + \gamma_{11}*MeanBehEnvAffil_j*IASAffil_{ij} + u_{0j} + r_{ij.}$

Table 18
Summary of Multi level modeling results of question two affiliation axis results with group mean behavior ratings environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	0.006	0.048	0.124	46	0.902
Affil Environment, γ_{01}	0.408	0.077	5.308	46	<0.001
Slope, β_1					
Affil Trait, γ_{10}	0.621	0.035	17.596	101	<0.001
Affil Environment, γ_{11}	-0.084	0.057	-1.468	101	0.145

Question Three, in this section, was designed to examine whether correspondence between trait and the group mean for behavior would result in a significant relation with behavior. To test this hypothesis, the absolute difference between trait and the group mean behavior was calculated and then the following model was examined: the Level 1 outcome variable was behavior while the absolute difference between trait and the group mean behavior was the predictor on Level 1. Similar to the last set of analyses examining Question Three, this model did not include a Level 2 parameter because the Level 2 parameter (i.e., in this instance, the group mean behavior) is already accounted for in the absolute difference values. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{10}*AbsDiffPow_{ij} + u_{0j} + r_{ij.}$ As demonstrated in Table 19, the results from these analyses demonstrated that the absolute difference ($t(102)=-.005$, $p>.05$) was not significantly related to power behavior for the individual.

Table 19
Summary of Multi level modeling results of question three power axis results with group mean behavior ratings environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	0.009	0.071	0.124	47	0.902
Slope, β_2					
Power Absolute Difference, γ_{20}	-0.001	0.206	-0.005	102	0.996

The results for the relation of trait and environmental affiliation on affiliative behavior are presented in Table 20. The related equation for affiliation was as follows: $IPIPAffil_{ij} =$

$\gamma_{00} + \gamma_{10}*AbsDiffAffil_{ij} + u_{0j} + r_{ij.}$ The results demonstrated that the absolute difference between trait and group mean behavior ratings also was not significantly related to affiliation behavior for the individual (t(102)=-.99, p>.05).

Table 20
Summary of Multi level modeling results of question three affiliation axis results with group mean behavior ratings environment

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.018	0.094	-0.191	47	0.850
Slope, β_2					
Affil Absolute Difference, γ_{20}	-0.142	0.144	-0.987	102	0.326

Question Four, in this section, was designed to examine the moderating effect of interpersonal flexibility in two separate models: (1) whether individual flexibility moderated the trait-behavior relation when accounting for the group mean behavior ratings, and (2) whether individual flexibility moderated the environment-behavior relation. The first model, which examined the trait-behavior relations, was conducted using the trait vector as the moderator, trait as the predictor, and behavior as the outcome variable on Level 1, while the group mean behavior ratings was used at Level 2. The related equation for power was as follows: $IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvPow_j + \gamma_{10}*IASPow_{ij} + \gamma_{11}*MeanBehEnvPow_j*IASPow_{ij} + \gamma_{20}*PowTraitVec_{ij} + \gamma_{21}*MeanBehEnvPow_j*PowTraitVec_{ij} + u_{0j} + r_{ij..}$ The results presented in Table 21 demonstrated that the trait vector (t(99)=.79, p>.05) was not a significant moderator of

power behavior for the individual.

Table 21
Summary of Multi level modeling results of question four power axis results with group mean behavior ratings environment: trait-behavior relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.014	0.065	-0.211	46	0.834
Power Group Behavior Environment, γ_{01}	0.283	0.144	1.958	46	0.056
Slope, β_1					
Power Trait, γ_{10}	0.788	0.058	13.556	99	<0.001
Power Environment, γ_{11}	-0.189	0.129	-1.460	99	0.147
Slope, β_2					
Power Trait Vector, γ_{20}	-0.017	0.113	-0.151	99	0.880
Power Environment, γ_{21}	0.183	0.231	0.790	99	0.431

The results for the moderating effect on affiliative behavior are presented in Table 22. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvAffil_j + \gamma_{10}*IASAffil_{ij} + \gamma_{11}*MeanBehEnvAffil_j*IASAffil_{ij} + \gamma_{20}*AffilTraitVec_{ij} + \gamma_{21}*MeanBehEnvAffil_j*AffilTraitVec_{ij.}$ Similar to the analysis of the power relations, these results also demonstrated that the trait vector ($t(99)=.23$, $p>.05$) was not a significant moderator of affiliation behavior for the individual.

Table 22
Summary of Multi level modeling results of question four affiliation axis results with group mean behavior environment: trait-behavior relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	0.008	0.049	0.154	46	0.878
Affil Environment, γ_{01}	0.407	0.078	5.239	46	<0.001
Slope, β_1					
Affil Trait, γ_{10}	0.622	0.039	15.810	99	<0.001
Affil Environment, γ_{11}	-0.092	0.067	-1.380	99	0.171
Slope, β_2					
Affil Trait Vector, γ_{20}	0.028	0.081	0.352	99	0.726
Affil Environment, γ_{21}	0.022	0.147	0.235	99	0.815

The second model examined under Question Four was the same as the previous model where trait was removed and the appropriate environment vector was included in its place along with behavior as the outcome. The related equation for power was as follows:

$$IPIPPow_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvPow_j + \gamma_{02}*MeanBehEnvPowVec_j + \gamma_{10}*IASPow_{ij} + \gamma_{11}*MeanBehEnvPow_j*IASPow_{ij} + \gamma_{12}*MeanBehEnvPowVec_j*IASPow_{ij} + \gamma_{20}*PowInteraction_{ij} + \gamma_{21}*MeanBehEnvPow_j*PowInteraction_{ij} + \gamma_{22}*MeanBehEnvPow_j*PowInteraction_{ij} + \gamma_{30}*PowTraitVec_{ij} + \gamma_{31}*MeanBehEnvPow_j*PowTraitVec_{ij} + \gamma_{32}*MeanBehEnvPowVec_j*PowTraitVec_{ij} + u_{0j} + r_{ij.}$$

The results presented in Table 23 demonstrated that the trait vector ($t(94)=-.26$, $p>.05$) was not a significant moderator of environment vector-behavior relation on the power axis when accounting for the group mean behavior ratings. However, in this model, two

significant relationships emerged, these included: (1) a significant positive relation between traits and the power environment vector ($t(94)=4.98$, $p<.001$), and (2) a significant negative relation between the trait-environment vector interaction term and the group mean behavior ratings ($t(94)=-5.52$, $p<.001$). These results indicate that, in this model, power behaviors increased moderately for interpersonally flexible individuals (coeff=.27) when the individual indicated greater power traits and the strength and the orientation of the environment was also powerful. However, when traits and the strength and orientation of the environment were powerful and group behavior ratings were also powerful, then interpersonally flexible individuals decreased their individual power behaviors (coeff=-.40).

Table 23
Summary of Multi level modeling results of question four power axis results with group mean behavior ratings environment: trait-environment relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	-0.049	0.062	-0.795	45	0.431
Power Environment, γ_{01}	0.394	0.111	3.545	45	<0.001
Power Environment Vector, γ_{02}	-0.006	0.096	-0.066	45	0.947
Slope, β_1					
Power Trait, γ_{10}	0.638	0.056	11.301	94	<0.001
Power Environment, γ_{11}	-0.074	0.106	-0.697	94	0.488
Power Environment Vector, γ_{12}	0.269	0.054	4.983	94	<0.001
Slope, β_2					
Power Trait*Environment Interaction, γ_{20}	0.025	0.047	0.527	94	0.600
Power Environment, γ_{21}	-0.406	0.073	-5.523	94	<0.001
Power Environment Vector, γ_{22}	0.011	0.052	0.212	94	0.832
Slope, β_3					
Power Trait Vector, γ_{30}	-0.045	0.095	-0.497	94	0.620
Power Environment, γ_{31}	0.362	0.154	2.352	94	0.021
Power Environment Vector, γ_{32}	-0.029	0.112	-0.261	94	0.795

The results for the moderating effect of the trait vector on the environment vector-behavior relation for the affiliation axis are presented in Table 24. The related equation for affiliation was as follows: $IPIPAffil_{ij} = \gamma_{00} + \gamma_{01}*MeanBehEnvAffil_j + \gamma_{02}*MeanBehEnvAffilVec_j + \gamma_{10}*IASAffil_{ij} + \gamma_{11}*MeanBehEnvAffil_j*IASAffil_{ij} + \gamma_{12}*MeanBehEnvAffilVec_j*IASAffil_{ij} + \gamma_{20}*AffilInteraction_{ij} +$

γ_{21}*$MeanBehEnvAffil_j$*$AffilInteraction_{ij}$ + γ_{22}*$MeanBehEnvAffil_j$*$AffilInteraction_{ij}$ + γ_{30}*$AffilTraitVec_{ij}$ + γ_{31}*$MeanBehEnvAffil_j$*$AffilTraitVec_{ij}$ + γ_{32}*$MeanBehEnvAffilVec_j$*$AffilTraitVec_{ij}$ + u_{0j}+ $r_{ij.}$ These results demonstrated that the trait vector (t(94)=-.93, p>.05) was also not a significant moderator of environment vector-behavior relation for the affiliation axis when accounting for the group mean behavior ratings. However, a significant relation emerged in this model between the affiliation traits and the environmental vector (t(94)=2.20, p=.02), which indicates that affiliative behaviors increased slightly for interpersonally flexible individuals (coeff=.12) when the individual indicated greater affiliative traits and the strength and the orientation of the environment was also affiliative.

Table 24
Summary of Multi level modeling results of question four affiliation axis results with group mean behavior ratings environment: trait-environment relation

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *d.f.*	*p*-value
Intercept, β_0					
Intercept, γ_{00}	0.021	0.040	0.515	45	0.609
Power Environment, γ_{01}	0.448	0.088	5.097	45	<0.001
Power Environment Vector, γ_{02}	0.128	0.058	2.204	45	0.033
Slope, β_1					
Power Trait, γ_{10}	0.627	0.042	14.802	94	<0.001
Power Environment, γ_{11}	-0.059	0.063	-0.943	94	0.348
Power Environment Vector, γ_{12}	0.116	0.048	2.400	94	0.018
Slope, β_2					
Power Trait*Environment Interaction, γ_{20}	-0.032	0.025	-1.267	94	0.208
Power Environment, γ_{21}	-0.020	0.048	-0.428	94	0.669
Power Environment Vector, γ_{22}	0.059	0.032	1.871	94	0.064
Slope, β_3					
Power Trait Vector, γ_{30}	0.067	0.070	0.952	94	0.344
Power Environment, γ_{31}	-0.092	0.103	-0.886	94	0.378
Power Environment Vector, γ_{32}	-0.089	0.096	-0.926	94	0.357

Table 25
Summary table of analyses

Research Question	CMIE Coeff	*p*	Group Mean Behavior Rating Coeff	*p*
Question One				
Trait and Environment Relation				
Pow Trait	.81	.001*	.80	.001*
Power Env	-21	.05*	.22	.19
Affil Trait	.68	.001*	.62	.001*
Affil Env	.10	.38	.40	.001*
Question Two				
Moderation by Environment				
Power Trait	.82	.001*	.80	.001*
Power Env	-.22	.05*	.26	.09
Power Trait*Env	.12	.15	-.15	.29
Affil Trait	.68	.001*	.62	.001*
Affil Env	.10	.38	.41	.001*
Affil Trait*Env	.06	.25	-.08	.14
Question Three				
Trait and Environment Correspondence				
Power Absolute Diff	.09	.49	-.001	.99
Affil Absolute Diff	.008	.92	-.14	.33
Question Four				
Trait-Behavior Relation Moderated by Interpersonal Flexibility				
Power Trait	.82	.001*	.78	.001*
Power Trait*Env	.13	.15	-.18	.15
Power Vector	.01	.92	-02	.88
Power Vector*Env	.21	.19	.18	.43

	Affil Trait		.67	.001*	.62	.001*
	Affil Trait*Env		.07	.20	-.09	.17
	Affil Vector		.02	.77	.28	.72
	Affil Vector*Env		-.17	.24	.02	.81

Question
Four
Environment-Behavior Relation Moderated by Interpersonal Flexibility

	Power Trait		.79	.001*	.64	.001*
	Power Trait*Env		.24	.16	-.07	.49
	Power Trait*Env Vector		-.04	.80	.27	.001*
	Power Trait*Env Int		-.05	.55	.02	.60
	Power Trait*Env Int*Env		.15	.21	-.40	.001*
	Power Trait*Env Int*Env Vector		-.24	.03	.01	.83
	Power Trait Vector		.02	.84	-.05	.62
	Power Trait Vector*Env		.14	.41	.36	.02
	Power Trait Vector*Env Vector		.34	.14	-.03	.80
	Affil Trait		.66	.001*	.63	.001*
	Affil Trait*Env		.08	.19	-.06	.35
	Affil Trait*Env Vector		.04	.34	.12	.02*
	Affil Trait*Env Int		-.03	.38	-.03	.21
	Affil Trait*Env Int*Env		.06	.35	-.02	.67
	Affil Trait*Env Int*Env	Vector	-.005	.93	.06	.06
	Affil Trait Vector		.004	.95	.07	.34
	Affil Trait Vector*Env		-.20	.25	-.09	.38
	Affil Trait Vector*Env Vector		.14	.36	-.09	.36

*Significant at the <.05 level

CHAPTER 5

DISCUSSION

This study was designed to measure the effect of environment on the relations between personality and behavior using interpersonal theory and the related Interpersonal Circumplex models. As outlined by Cooper and Withey (2009), prior research in this area was lacking clarity about the effect of environment on the trait-behavior relation, which was in part due to issues with the methods and theoretical applications. In this study, efforts were made to ameliorate past methodological issues by employing a theoretically cohesive framework to measure the empirical relations in a continuous fashion (i.e., not categorical) and by utilizing measures and models that were based on the same theoretical foundations. Interpersonal theory provided a particularly strong empirical and theoretical basis for testing the related questions, including several conceptual advantages such as the ability to measure: (1) the strength and orientation of several the constructs of interest, (2) individual and aggregate ratings, and (3) the ways in which theoretically established pairings (e.g., complementarity) might affect the relations.

This study was designed to examine four major questions using orthogonal models and, as such, analyses were conducted separately for the two axes inherent in the interpersonal model: the Power axis and the Affiliation Axis. Environment in this study was measured using two separate proxies: (1) the mean environmental rating, as measured by the obtained self-ratings of environmental perception from the Circumplex Measure of Interpersonal Environment, and (2) the group mean behavior ratings. The group mean behavior ratings were used as a second indictor of environment because they provided a comparative basis for the relatively new approach to assessing the

interpersonal environment used in this study and also because the conceptualization of environment, in this study, was that the aggregate of interactions in the group characterize the environment; therefore, group behavior serves as an appropriate alternative as it is the average of the respective group's interpersonal interactions.

The relative contribution of trait and environment to behavior was examined first. The results in this study demonstrated support for the significance of traits in explaining behavior for both the power and the affiliation axes. Indeed, in all analyses conducted in this study, traits were a significant parameter. When examining the contribution of trait in explaining behavior, it was hypothesized that trait would be a moderate predictor of behavior as prior research (e.g., Buss, 1979; Epstein & O'Brien, 1985; Funder, 2010; Funder & Ozer, 1983) has provided evidence for the relative congruence between traits and behaviors. This hypothesis was supported and the findings in this study demonstrated a much stronger coefficient for both axes than those normally found in the literature. The normal range usually reported in the literature for behaviors predicted by traits is .20 to .40. Historical reviews (e.g., Hunt, 1965; Mischel, 1968; Vernon, 1964; Wallace, 1966) claimed the predictive utility of traits to typically fall between .20 and .30 and argued that they rarely exceed .40. Personality researchers responded by pointing out a huge method confound, which was that the literature the prior reviews cited included self-ratings of behaviors with separate measures of behaviors that did not include self-ratings. Funder and Ozer (1983) added to the rebuttal and argued that .30 to .40 was respectable effect given the complexity of behaviors and situations for which many studies had not properly accounted or controlled. Tracey illustrated in two separate studies (1994; 2004) that another confound for which many prior studies had not properly accounted was the

level of measurement and efforts to control for base rates in both overall dispositions and/or global responses to situations). In this study, the coefficients on the power axis were slightly stronger than those for the affiliation axis although these differences were not tested for significance. These results demonstrate that behavior aligns slightly more with traits on the power axis (i.e., dominance versus submission) than on the affiliation axis (i.e., friendliness versus coldness) and, thus, individuals in this study acted in greater accordance with their traits when providing self-appraisals of how they behave with respect to dominance/submission than how they behave when providing self-appraisals of affiliative or non-affiliative behavior.

When examining the relation of environment to behavior, it was hypothesized that environment would be a relatively weak indicator of behavior. This assertion about the predictive utility of environments rested upon the notion that when environments are examined irrespective of strength they would not contain enough information to draw meaningful conclusions about the strength and orientation of the environment and their relative interaction(s) with traits. In this study, the effect of environment was first examined in the model as a separate parameter and then as a parameter that was allowed to interact with traits. The analysis conducted using the CMIE environment demonstrated that environment and behavior were negatively related for the power axis (coeff=-.21). This finding indicated that environments perceived as being high in power (i.e., dominance) were met with lower power behavior by the individuals involved, and the negative relation between the power traits and behaviors found in this study seems to indicate that when individuals perceive environments as having high levels of power features and cues, they respond by behaving less in accordance with their own power

traits, in a sense acting complementarily. In the analysis conducted using the group mean behavior ratings environment, a moderate relation between the group mean behavior ratings and affiliative behavior was demonstrated (coeff=.40), which indicated that environments characterized by high affiliative group mean behavior ratings (i.e., friendliness) were met with friendly behavior by the individual, also complementarity. In essence, when individuals perceived environments as having high levels of friendly features and cues, they responded by behaving in a moderately friendly and warm manner.

Question Two of this study was a test of the moderating role of environments in the trait-behavior relation, which was assessed in two separate models. The first model assessed the moderating role of the mean environment ratings and employed the interaction between traits and environment ratings as a moderator of behavior. The second model employed the group mean behavior ratings as the environment indicator and the interaction between traits and the group mean behavior ratings was tested as the moderator of behavior. The hypothesis associated with Question Two was that the interaction between traits and environments would provide at least a modest effect; however, neither model provided support for the moderating role of environments, which indicated that, in these models, the trait-behavior relation was not dependent upon nor significantly affected by the environment parameter. Had the environment parameter illustrated some appreciable change in the relations between traits and behavior, then some evidence for the Strong Situation Hypothesis would have been provided.

The lack of significance for the moderating role of environments may be explained from the following perspectives. On one hand, it could be that despite the

appealing nature of the theory, environments do not operate as a moderator in the trait-behavior relationship. Indeed, the article that inspired this study (Cooper & Withey, 2009) illustrated a paucity of empirical evidence for the relation despite it being an area of investigation for several decades. Another explanation may be that environments are indeed important in the trait-behavior relation, but they operate more as a predictive construct similar to traits, rather than a moderator. Funder (2006) described the *personality triad* as being comprised of persons, situations (i.e., environments), and behaviors. This conceptualization places environments alongside traits as a predictor of behavior rather than as a moderator, which might be a more accurate representation of the relationship and the predictive role that environments provide. Recently, Funder (2016) expanded the personality triad to a more comprehensive theoretical model, The Situation Construal Model (SCM), which includes construal as a moderator (i.e., rather than environment as the moderator) and also attends to issues of valence inherent in such a model. If the SCM model is accurate, future studies may illustrate support for the moderating role of construal and further support for the predictive role of environments when measured in a comprehensive model. Another interpretation that might explain the lack of support for the moderating role of environments could be provided by the specificity of measurement. Although the design employed in this study allowed for a test of the strength of environments, it might be that only extreme environments moderate the trait-behavior relation and, thus, the relation was not captured in this study because the environments did not reach a threshold in which the relation exists and/or there was a paucity of environments in this study with features that were extreme enough to demonstrate a moderating effect. An example of this logic is provided by military boot

camp. Military boot camp is extreme in its environmental constraints to the degree that individuals are punished for acting outside of the strict behavioral expressions. If environments with extreme constraints are those that provide some evidence for the moderating role of environments, individuals designing future studies examining these relations might wish to capture extreme environments as part of their design. Indeed, extreme examples such as this would deemphasize the role of construal as a moderator in the Situation Construal Model (Funder, 2016), as construal implies interpretation and there is little left up to interpretation since the constraints of extreme environments are so overt. Instead environments would be placed back in the position of a moderator when environments are extreme. However, simply measuring extreme environments might still provide an incomplete assessment of the role of the environment because simply measuring extreme environments irrespective of additional variables would raise uncertainty about whether the constraints of the environment were attributable to the hierarchical nature of leader-driven interpersonal environments or some other features.

The conceptualization of environments in this study was one in which individual members of groups provided ratings of the perceptions of the interpersonal nature of the group through the sum of interactions (i.e., CMIE ratings) or behaviors (i.e., group mean behavior ratings) over time. An environment that is formed by cues from a strong leader or from overt constraints still adheres to this interpersonal definition because the members are choosing to participate by following cues and/or pre-established norms, essentially that extreme environments are explained by the far ends of the interpersonal axes (e.g., extreme dominance). This means that interpersonal theory and the related Interpersonal Circle (IPC) models would still be applicable to such questions and may

provide the best theoretical basis from which to continue this line of scientific questioning. Researchers designing future studies in this area are cautioned to attend to these and related questions.

The third hypothesis outlined in this study was that correspondence between trait and environment would result in a significant relation with behavior. The underlying assumption associated with this question was that the higher the correspondence between traits and the environment, the higher their utility would be in predicting behavior. If environments are conceptualized as having a constraining effect, then it would logically follow that lower correspondence between traits and environments would create conditions where behaviors are altered or constrained by the environment. Conversely, if an individual were placed in an environment that corresponded highly with their traits, then it would be expected that the environment would not prompt the individual to act in a manner that is less congruent with their traits. For example, if an individual were self-effacing and this person were placed in a competitive environment, then greater deviations from the trait predicted behavior would be expected since the individual would be prompted by environmental cues to act in a manner that is different from their trait predicted behavior (i.e., competitive rather than self-effacing). Similarly, an individual whose trait scores indicated a competitive interpersonal personality would likely exhibit a stronger relation between their traits and behaviors by virtue of fit with the environment. Therefore, when examining whether high correspondence of trait and environment results in higher trait-behavior relations, it was hypothesized that the higher correspondence between trait and environment would result in higher the trait-behavior relations.

Correspondence in this study was measured using the absolute difference. The absolute difference is the preferred means of assessing the similarities and/or differences between the trait and environment because it allowed for an assessment of the true difference between the constructs of interest. The absolute difference also carries with it the added benefit of not being model dependent or based on variance because it measures the actual difference between two real numbers. In this sense, values that are similar are closer in magnitude and an absolute value of zero indicates that two values are identical. Utilizing the absolute difference also presents advantages when it comes to interpretation because the initial values have substantive meaning that can be interpreted on their own.

The analyses in this study again employed both the mean environment ratings and the mean group ratings to assess correspondence and the results showed that there was no effect for correspondence on either axis and for both approaches to measuring environment. This finding might indicate that correspondence is relatively weak at this level of measurement because it captures overall dispositions and global mean group responses. Tracey (2004) found that match is best captured at the behavioral interchange level and individuals designing future studies that seek to measure correspondence are cautioned to consider whether the level of measurement is appropriate for the questions being investigated. Correspondence, in this study, was a means of examining the positive end of the constraint spectrum (i.e., did it allow participants to behave freely); therefore, it also serves as a proxy for whether it's appropriate to measure environmental constraints in this manner. The lack of significance for Question Three in this study implies that environmental constraints at the global level are likely too general to have an appreciable effect of the trait-behavior relation. Thus, the theory that environments constrain

behaviors is not entirely disproven by this question, but more likely indicates that the level of measurement is important and future studies should examine the relation at the behavioral interchange level. The logic guiding this interpretation is that the focus of constraints is on the ways in which individuals interact with one another; therefore, measuring correspondence—and constraints, by proxy—should include the optimal level of measurement that focuses less on the aggregate match and instead on the interchange that occurs when individuals encounter environmental constraints.

The fourth major question in this study examined the moderating effect of interpersonal flexibility using two separate applications: (1) whether individual flexibility moderated the trait-behavior relation, and (2) whether individual flexibility moderated the environment-behavior relation. This was assessed using two separate models and the expectation was that individuals who were interpersonally flexible would shift their behaviors to match the interpersonal environment. Conversely, the theory of interpersonal rigidity espouses that interpersonally rigid individuals would engage in one type of behavior regardless of environment and/or context. The related hypotheses were that individuals who are interpersonally flexible are more likely to: (1) perceive environmental cues, and (2) change their behaviors according to the situation. Therefore, individual flexibility on the respective dimension would moderate both the trait-behavior relation and the environment-behavior relation due to the person's ability to perceive the cues and adjust their behaviors according to those cues. Intuitively, it would follow that interpersonally flexible individuals would exhibit a higher receptivity to environmental cues and adjust their behaviors according to those cues. Similarly, it was believed that

individual flexibility would moderate the relation between environment and behavior because flexible individuals would interact differently according to the environment.

In this study, no support was provided for the notion that the strength and orientation of individual traits (i.e., interpersonal flexibility and/or rigidity) moderated the trait-behavior or the environment-behavior relation. However, when examining whether individual flexibility moderated the environment-behavior relation for power using the group mean behavior ratings as the environment indicator, three significant relations emerged. The first relation indicated that interpersonally flexible individuals behaved with moderately greater dominance (coeff=.27) when the environment and their traits were oriented toward power. This provides support for the notion that when traits and environments match, they may promote increased behavior from interpersonally flexible individuals in the area of power. Noteworthy is the fact that match was tested using correspondence earlier in the study and no significant relations emerged, so it may be that the relation only emerges when accounting for greater complexity in the model and interpersonal flexibility. In this case, the analyses accounted for the group mean behavior ratings, the strength and orientation of the environment, and the individual's traits along with flexiblility. In this same model, another significant relation emerged that showed that power behaviors decreased (coeff=-.40) when power traits and the strength and orientation of the environment interacted and were examined in conjunction with the group mean behavior ratings while also accounting for individual flexibility. Considered together, these two findings might seem counter to one another; however, it seems to indicate that the match between power traits and environments moderately promotes power behavior (i.e., the first instance) until high power behavior from the group is

factored in for interpersonally flexible individuals. Basically, if the group is powerful, then interpersonally flexible individuals react by decreasing their power behaviors. This finding might provide some support for the differential role that various constructions of interpersonal environments might play in the behavioral expression of traits. On the Affiliation axis, a significant relation emerged in this model between the affiliation traits and the environmental vector, which indicated that affiliative behaviors increased slightly for interpersonally flexible individuals (coeff=.12) when the individual indicated greater affiliative traits and the strength and the orientation of the environment was also affiliative. This finding also provides support for the notion that interpersonally flexible individuals placed in environments that match their trait and behavior preferences modify their behavior to better match the environment.

The lack of support for the moderating role of interpersonal flexibility raises questions about the relations, especially considering the seemingly intuitive nature of the hypothesis. Similar to the interpretations offered for the test of moderation in Question Two of this study, possible explanations may include: (1) no relation exists, (2) a relation exists, but the study did not capture it due to a lack of representative individuals/groups and/or the level of measurement, and (3) the relation is important, but does not rise to the level of moderation. The second interpretation is one with promise and one similar to areas of inquiry in which interpersonal researchers have been focusing their efforts in recent years. Although some significant relationships emerged, it may be that a design that included the measurement of behavioral interchanges might better capture the relations. For example, the use of a behavioral mapping system similar to the one employed by Markey and colleagues (2013) or a system like the momentary assessment

of interpersonal process, as illustrated by Thomas and colleagues (2014) might provide a more accurate level of measurement that captures the if-then nature of the interplay amongst the variables of interest. The obtained significant findings in some of the models in Question Four also provide promise for future research that is designed to measure the relations at the appropriate level because it is likely that greater specificity of measurement will yield better results. If interpersonal flexibility is a proxy for the negotiation process that occurs in interpersonal interactions, then it would logically follow that a more finite examination of those negotiations would better represent the relations that emerge at the level of the interactions (i.e., behavioral interchange) and the related phenomena would better be explained.

In this study, two separate measures of environment were utilized to assess which approach performed best under which conditions. The obtained means, standard deviations, and internal reliability coefficients were remarkably similar; however, differences between the two measures emerged when the bivariate correlations between the scales used in the study were analyzed. The group mean behavior ratings illustrated that the power and affiliation scales were negatively correlated (r=-.35), On the other hand, the obtained correlation coefficients for the CMIE showed the Power and Affiliation axes underlying the CMIE to be positively correlated at .50, which indicated that there was a great deal of overlap between the ratings provided for the two scales. The obtained negative correlation for the group mean behavior ratings and the positive CMIE correlation are both problematic because, ideally, one would expect orthogonal scales to be distinct from one another, as indicated by a zero coefficient. Since the psychometric properties of the CMIE demonstrated that the two orthogonal axes underlie the measure,

this relation raises confusion about the ways in which the participants of this study perceived the environmental definitions underlying the CMIE to be conceptually similar. After examining the discrepancy further, the overlap between the CMIE axes arose after: (1) the sample size was reduced to only group participants, and (2) after participants were grouped together and the mean environmental rating was calculated. When the correlations were analyzed at the individual level (i.e., before calculating the environmental mean rating), the obtained correlation coefficient was also positive and significant but proved to be much more modest (r=.19). Similarly, when the data from each analysis was plotted, it was apparent that the dataset that contained the initial sample of 210 participants was more evenly distributed around the entire area of the IPC. Conversely, when the data for the CMIE mean environment ratings were plotted, it was revealed that that data was mostly centered on the origin of the IPC but also skewed positively toward the upper-right quadrant of the IPC and plotted similarly to the diagonal Extraversion/Introversion axis that has been found to underlie the IPC. This also indicates that when the data from the CMIE was aggregated, by group, it was restricted toward the origin of the IPC.

When comparing across scales, another unexpected relation that emerged was that the CMIE scale for the Power axis was negatively correlated with the Power scale for the group mean behavior ratings (r=-.29), which seemed to indicate that the CMIE Power scale was measuring environment in a manner dissimilar from the Power environment rating obtained from the group mean behavior ratings. When plotted together, it was revealed that the group mean behavior ratings were mostly measuring the bottom right quadrant of the IPC, which plots similarly to the diagonal Agreeableness axis that has

been illustrated to underlie the IPC, while the CMIE was mostly measuring the upper-right quadrant of the IPC which plots similar to the diagonal Extraversion axis that has been illustrated to underlie the IPC. This explains the negative correlation between the two scales as they are capturing two separate quadrants of the IPC: the CMIE was measuring the area that defines Extraversion and the group mean behavior ratings were measuring the area that defines Friendly/Submissive. The relation between the CMIE environment and the group mean behavior ratings environment on the Affiliation axis was not significant. When plotted using both axes, the group mean behavior ratings were shown to cover more of the IPC, which demonstrated that the group mean behavior ratings were better able to capture a fuller representation of the IPC space.

Perhaps more importantly is the way in which the two measures performed in the analyses in the study. In favor of the relative strengths of the two measurement approaches, the results between the two measures did not vary widely. For the most part, the analyses showed similar results across models and axes and, indeed, in this study, 20 separate models were assessed and the results were similar in all but two: (1) Question One where the Power environment was significant using the CMIE measure while the Affiliation environment was significant using the group mean behavior ratings, and (2) the last model designed to assess the moderating role of interpersonal flexibility in the environment-behavior relation. In this last model, three relations were found to be significant using the group mean behavior ratings environment, whereas the model using the CMIE environment did not demonstrate any significant relations. In summary, the CMIE measure demonstrated one relation to be significant while the group mean behavior ratings measure demonstrated four relations to be significant. This may indicate

that the group mean behavior ratings were a better indicator of the interpersonal environment; however, given the exploratory nature of this approach to measuring the interpersonal environment it is uncertain whether it would perform similarly in future studies and/or whether the CMIE might provide some added benefit to measuring features of the environment that are not strictly behavioral in nature (e.g., implicit features of the environment, the emotional valence, etc). Future studies may provide answers about which of the two environment measures performs best across studies and for which applications.

Future Directions and Limitations.

Although evidence has been provided for the relative contributions of this study, some limitations do exist. The scope of this study did not allow for repeated measures and/or a cross-situational design, which, if employed in future designs, might provide further detail about the relations among the constructs of interest. As stated previously, and as outlined by Cooper and Withey (2009), prior studies examining questions related to those covered in this study have contained some methodological flaws that raise questions about the generalizability of the findings. A future study that utilized a design similar to the one outlined in this study with the added contribution of a cross-situational design might provide further empirical support for the relations of the constructs examined in this study. Similarly, due to the exploratory nature of the study and the limitations posed in the design and scope, limitations exist with respect to the heterogeneity of the groups sampled and also monomethod bias. Although efforts were made to recruit groups of similar size and scope, many of the groups differed in their construction and capacity. The sample included musical bands, work groups, classes,

therapy groups and cohorts, which all varied greatly in their size and function. Future studies might benefit from a sample that is more targeted in its focus (e.g., solely work groups). Similarly, the constructs in this study were measured in a similar fashion (i.e., self-report) and with similarly constructed measures, which might have created some level of monomethod bias that emerged in the results.

Another limitation of this study was the size of the sample and the size of the groups in the sample. Despite considerable effort to recruit as many participants as possible, it proved difficult to recruit members who were willing to participate along with other members of a group to which they self-identified. Certainly, recruiting participants from University classrooms is a norm within the field and provides valuable data; however, this study sought to expand recruitment efforts to multiple domains. Efforts were especially made to recruit participants from domains in which they shared some intimate knowledge of the group make-up and for which there might be less conscripted power dynamics. The domains included in this study included work, school, group therapy, musical performance, and graduate student cohorts. These groups and the recruitment efforts to elicit their participation, although sufficient and valid in this study, could be improved in future studies, primarily through recruitment of a greater sample size (i.e., both number of groups and size of groups). Results obtained from a study with a similar design that contained a larger sample and more homogenous groups might add to the knowledge gained in this study and could also address more specifically whether group size affects the trait-behavior relation. Groups with few members (e.g., 2 or 3 members) were particularly problematic as the aggregation of scores could be highly affected by a single members perceptions or behaviors. Future studies are advised to aim

to include groups of four or more members. Additionally, as a general rule, groups with greater numbers of members who participate in the rating process should provide scores that provide researchers with greater confidence in the aggregation of ratings.

This study was the first to try and capture interpersonal environments in this manner and although attention was paid to the conceptual benefits of measuring environments according to the related theory, many empirical questions still exist about the ways in which interpersonal environments are best measured in practice. For example, in this study, environments were measured by aggregating individual ratings to obtain an environmental mean—both from environmental ratings and through the mean behavior of the group—however, many other approaches were possible, including obtaining ratings from: (1) individuals outside of the group (i.e., intergroup), and (2) both within and outside of the group (i.e., intra-and intergroup. Since no prior studies have addressed the issue, future research could address if other approaches to measuring the environment yield improvements over and beyond the approach utilized in this study. Similarly, this was also the first study to utilize the Circumplex Measure of Interpersonal Environment (CMIE), as it was developed for the purposes of examining the questions of interest. Although the obtained validity indices are robust, future studies could provide additional data about the ways in which the measure could be employed and/or its function in multiple applications.

Future studies could also benefit from efforts to measure behavior in similar but slightly different aggregated manner. According to this approach, behavior could be assessed: (1) using repeated measures, (2) across situations, (3) through self-and other report, and/or (4) through other report. This would, in part, address the criticism directed

at self-report measures as containing excessive error and/or some level of social-desirability that skews scores and affects the generalizability of the findings. Studies using aggregated behavior ratings in models similar to those employed here would also likely add to the knowledge about conceptual and methodological advantages of behavioral measurement in interpersonal situations.

Conclusions

In this study, consistent evidence was presented for the significant relation between traits and behaviors and, indeed, the trait parameter was significant in every model in which it was tested. The consistent nature of the significance of traits pertains to a long-standing debate in the literature, aptly titled the *Person-Situation Debate* (Epstein & O'Brien, 1985; Funder, 2010). This discussion, which has existed in the personality literature for decades, has detailed efforts to better understand the commonalities and differences in the predictive utility of personality and/or situations. Evidence in this study was consistently supportive of the trait-behavior relation the stronger than usual obtained coefficients for the trait-behavior relation on both axes lends itself to the argument that the predictive utility of traits and behaviors is influenced by the specificity of what is being measured (i.e., power versus affiliation in this case) and at which level (i.e., individual, group, or individuals nested within groups). This very issue is also at the core of the debate: essentially, trait psychologists were criticized in the earliest stages of the subdiscipline for not adequately addressing issues of method variance (Campbell & Fiske, 1959), social desirability and response sets (Edwards, 1957), and construct validity (Cronbach & Meehl, 1955) in their measurement of traits. The predictive utility of traits in the trait-behavior relation garnered disapproval and research in this area slowed for

some time. In recent years, trait psychologists have demonstrated evidence for counterarguments that bolster support for the predictive utility of traits (Funder, 2000; Funder & Colvin, 1991; McCrae, 2002) and the results of this study demonstrate similar support.

Despite the considerable support for the trait-behavior relation in this study, environments were only found to be significant in the two models explained below. This study was designed to specifically address the role of environments in the relations between traits and behaviors and served as a direct test of several assumptions inherent in the *Strong Situation Hypothesis*. One of the primary assumptions inherent in the Strong Situation Hypothesis is the moderating role of environments, which was examined in this study and for which no evidence was found. More specifically, the role of the environment as a moderator in the trait-behavior relation was examined in the following two ways: (1) the moderating role of the interaction between trait-and environment, and (2) the strength and orientation of the traits and the environment. The environment did, however, emerge as significant in two ways: (1) power behaviors increased when the strength and orientation of the environment supported them through interaction with traits when factoring in individual flexibility, and (2), conversely, power behaviors decreased when accounting for the mean power behaviors of the group when accounting for individual flexibility; essentially, flexible individuals decreased their power behaviors when the group was powerful. The significant findings in both analyses may lend support for the interpretability of cues in the environment and the notions of *uniform expectancies* and *demand characteristics*. The idea of uniform expectancies was first defined by Mischel (1977) as environmental cues that restrict the degree of behavioral variability in

environments. In this study, it appears that cues in power environments may have led individuals to behave in less powerful ways. This interpretation is also bolstered when considered in tandem with the notion of demand characteristics, which are cues in the environment that signal to the individual which behaviors are expected. Power environments align with the definition of strong situations offered by Alexander and Knight (1971), which essentially characterizes strong situations as carrying more explicit cues and tightly scripter roles than weak environments that do not narrow behaviors and/or carry with them prescriptive expectations about the ways in which individuals are allowed to act. Although it could just as intuitively follow that strong cues could exist on the affiliation axis—for example, to act either in a friendly or cold manner depending on the situational cues—evidence in this study did not support this notion. The results of this study showed, rather, that individuals behave in accordance according to environmental cues on the power axis when their traits and the environment match with their power preferences. That is, individuals behaved in a dominant manner when the environment corresponded with their level of individual power, unless the group was found to be strong in behavior, then individuals decreased their power behaviors. Although these findings may seem redundant and/or intuitive, neither relation had been measured with this level of specificity nor had any prior study examined the related questions with the same level of scientific rigor and with theoretically cohesive models.

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APPENDIX A

INFORMED CONSENT

Dear Participant:

I am a graduate student under the direction of Professor Terence Tracey, Ph.D. in the School of Letters and Sciences at Arizona State University.

I am conducting a research study to evaluate the interpersonal nature of small group interactions. I am inviting your participation, which will involve completing an online survey that takes approximately 30 minutes to complete. Participants must be 18 or older to complete the survey.

Your participation in this study is voluntary. You can skip questions if you wish. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. As compensation for your time, a raffle will be conducted where three bands will be chosen at random to receive a $100 credit good toward the production (i.e., shirts and screenprinting) of band shirts. In order to be eligible for the raffle, all members of the band will need to complete the questionnaire. Upon completion of the study, you will be asked to email the primary investigator with proof of study completion to be entered into the raffle. The winners of the raffle will be drawn at random using computer software.

Responses from this survey will be used to psychologists and social psychologists to understand which factors influence small group interactions. There are no foreseeable risks or discomforts to your participation.

All data will be collected via this online survey and used in aggregate form for analyses. Your responses will be anonymous. The results of this study may be used in reports, presentations, or publications but your name will not be used.

If you have any questions concerning the research study, please contact the research team: Dominic Primé (Dominic.Prime@asu.edu) or Terence Tracey (Terence.Tracey@asu.edu). If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788.

Beginning the questionnaire will be considered your consent to participate.

Sincerely,

Dominic R. Primé, M.Ed.

APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE

Please answer each question as completely and honestly as possible. All information collected will be confidential and anonymous.

Age:_____
Sex: _____ M _____ F
Ethnicity: _____African American or Black _____ Asian American or Pacific Islander
_____ Latino or Hispanic _____ Native American or American Indian
_____ Caucasian or Caucasian _____ Other: _____

**Measures from Appendices B, C, and D were counterbalanced.

APPENDIX C

INTERPERSONAL ADJECTIVE SCALE

The following is a list of words that are used to describe people's characteristics. Please rate how accurately each word describes you as a person. Judge how accurately each word describes you on the following scale:

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

For example, consider the word BOLD. How accurately does that word describe you as a person? If you think this is a quite accurate description of you, write the number "6" next to the word:

6 BOLD

If you think this word is a slightly inaccurate description of you, write the number "4" next to it; if it is very inaccurate, write the number "2" next to it, and so on.

Please be sure to do all of them.

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

___ 1. Introverted: feel more comfortable by yourself; are less interested in other people.

___ 2. Undemanding: don't demand much or expect much from others.

___ 3. Assertive: tend to be aggressive and outspoken with others.

___ 4. Unauthoritative: don't try to influence others; go with others' opinions.

___ 5. Uncalculating: don't try to manipulate others or maximize your own gain.

___ 6. Accomodating: obliging; tend to do favors for others.

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

___ 7. Kind: thoughtful and caring for others.

___ 8. Charitable: generous; like to help others.

___ 9. Shy: lack self-confidence; tend to be uncomfortable around others.

___ 10. Uncunning: not crafty or sly; tend to be straightforward with others.

___ 11. Coldhearted: have little warmth or feeling for others.

___ 12. Ruthless: pursue your own interests regardless of the effect on others.

___ 13. Dissocial: don't care for the company of others.

___ 14. Tender-hearted: easily feel love, pity or sorrow for others.

___ 15. Soft-hearted: tend to be easy-going or gentle with others.

___ 16. Cheerful: happy, usually in good spirits.

___ 17. Dominant: tend to lead others, like to command, take charge in a group.

___ 18. Antisocial: dislike the company of others; behavior not affected by social rules.

___ 19. Iron-hearted: tend to be stern or harsh with others.

___ 20. Enthusiastic: enjoy active involvement with others.

___ 21. Self-assured: confident, know yourself to be usually right.

___ 22. Cruel: able to cause pain and suffering to others; unfeeling.

___ 23. Unsparkling: not lively or entertaining with others.

___ 24. Cunning: crafty, skillful at manipulating others, devious.

___ 25. Meek: timid, have trouble being assertive or standing up to others.

___ 26. Uncharitable: dislike helping others; tend to judge others harshly.

___ 27. Unsly: not tricky or cunning; tend to be genuine, sincere, trusting.

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

___ 28. Unaggressive: tend to be mild-mannered, not forceful around others.

___ 29. Jovial: cheerful, playful around others.

___ 30. Crafty: can mislead or manipulate others for your own purposes.

___ 31. Boastless: don't like to brag.

___ 32. Domineering: tend to control or manipulate others.

___ 33. Unargumentative: tend to avoid arguments or fights.

___ 34. Tender: warm and loving with others.

___ 35. Unsympathetic: not interested or concerned about others' feelings or problems.

___ 36. Timid: tend to be fearful or uncomfortable around others.

___ 37. Unbold: not daring or courageous.

___ 38. Forceful: tend to take charge or assert control.

___ 39. Unwily: not tricky or crafty.

___ 40. Extraverted: likes being with others; outgoing and lively around others.

___ 41. Gentle-hearted: warm or kind with others.

___ 42. Persistent: don't give up when others think you are wrong.

___ 43. Perky: lively; energetic around others.

___ 44. Friendly: open, accepting, warm around others.

___ 45. Unneighborly: unfriendly, aloof toward others, avoid contact with others.

___ 46. Self-confident: sure of yourself around others, comfortable meeting people.

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

___ 47. Outgoing: enjoy meeting other people.

___ 48. Boastful: tend to brag.

___ 49. Bashful: tend to shy away from public attention.

___ 50. Firm: steadfast, does not give in easily, gets others to do things your way.

___ 51. Uncrafty: not tricky or sly when dealing with others.

___ 52. Unsociable: don't enjoy meeting people or being in the company of others.

___ 53. Hard-hearted: unconcerned and unfeeling toward others.

___ 54. Wily: crafty, cagey or tricky.

___ 55. Calculating: tend to use or manipulate others to your own advantage.

___ 56. Uncheery: not lively or jolly around others.

___ 57. Sly: crafty, secretive or cunning when dealing with others.

___ 58. Neighborly: friendly, like to get involved with people around you.

___ 59. Warmthless: have no feeling of pleasure or affection for others.

___ 60. Distant: tend not to go toward others; tend to stay away from others.

___ 61. Cocky: self-centered, conceited, think highly of your own abilities.

___ 62. Sympathetic: feel interested or sensitive to the feelings and problems of others.

___ 63. Forceless: not forceful with others; timid or weak, find it hard to be assertive.

___ 64. Tricky: can be deceiving toward others to get what you want; able to fool others.

APPENDIX D

INTERNATIONAL PERSONALITY ITEM POOL—INTERPERSONAL CIRCLE

DIRECTIONS. On this page, there are phrases describing people's behaviors. Please use the rating scale below to describe how accurately each statement describes your behavior in the group. Describe yourself as you generally behave now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same gender and roughly your same age. Please read each statement carefully, and then fill in the number that corresponds to your response using the scale below.

Very Inaccurate	Moderately Inaccurate	Neither Inaccurate nor Accurate	Moderately Accurate	Very Accurate
1	2	3	4	5

1. Is quiet around strangers. (FG)
2. Speaks softly. (HI)
3. Tolerates a lot from others. (JK)
4. Is interested in people. (LM)
5. Feels comfortable around people. (NO)
6. Demands to be the center of interest. (PA)
7. Cuts others to pieces. (BC)
8. Believe people should fend for themselves. (DE)
9. Is a very private person. (FG)
10. Lets others finish what they are saying. (HI)
11. Takes things as they come. (JK)
12. Reassures others. (LM)
13 Starts conversations. (NO)
14. Does most of the talking. (PA)
15. Contradicts others. (BC)
16. Doesn't fall for sob-stories. (DE)
17. Doesn't talk a lot (FG)
18. Seldom toots his/her own horn (HI)
19. Thinks of others first (JK)
20. Inquires about others' well-being (LM)
21. Talks to a lot different people at parties (NO)
22. Speaks loudly (PA)
23. Snaps at people (BC)
24. Doesn't put a lot of thought into things (DE)
25. Has little to say (FG)
26. Dislikes being the center of attention (HI)
27. Seldom stretches the truth (JK)
28. Gets along well with others (LM)
29. Loves large parties (NO)
30. Demands attention (PA)
31. Has a sharp tongue (BC)
32. Is not interested in other people's problems (DE)

APPENDIX E

CIRCUMPLEX MEASURE OF INTERPERSONAL ENVIRONMENT

CIRCUMPLEX MEASURE OF INTERPERSONAL ENVIRONMENT

The following is a list of words that are used to describe the characteristics of a group. Please rate how accurately each word describes the group as a whole. As you rate each characteristic, think of the group environment and the ways in which the group conducts itself over time.

You will be asked to rate how accurately each word describes the group on the following scale:

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

For example, consider the word OUTGOING. How accurately does that word describe the group as a whole? If you think this is a quite accurate description of the group, rate the group with a "6" next to the word:

_6_ Outgoing.

If you think this word is a slightly inaccurate description of the group, write the number "4" next to it; if it is very inaccurate, write the number "2" next to it, and so on.

Please be sure to do all of them.

1	2	3	4	5	6	7	8
Extremely Inaccurate	Very Inaccurate	Quite Inaccurate	Slightly Inaccurate	Slightly Accurate	Quite Accurate	Very Accurate	Extremely Accurate

PA: ASSURED/ DOMINANT

___ 1. Assured: the group is self-aware and self-confident.

___ 2. Confident: the group is sure of itself and comfortable when interacting with others.

___ 3. Influential: the group is influential and looked up to.

___ 4 Assertive: the group tends to be aggressive and outspoken.

NO: GREGARIOUS/EXTRAVERTED

___ 1. Extraverted: the group interacts with others and is outgoing and lively.

___ 2. Expressive: the group conveys a great deal of feeling and meaning.

___ 3. Sociable: the group is very confident and friendly in social situations.

___ 4. Talkative: the group tends to talk readily and at length.

LM: WARM/AGREEABLE

___ 1. Easygoing: the group is relaxed, informal, and tolerant.

___ 2. Tender: the group is sensitive and caring toward others.

___ 3. Good-Natured: the group has a pleasant and obliging disposition.

___ 4. Courteous: the group is polite and shows consideration of others.

JK: UNASSUMING/INGENUOUS:

___ 1. Naive: the group is not critical or judgmental.

___ 2. Obedient: the group submits to will or authority.

___ 3. Ingenuous: the group is innocent and unworldly.

___ 4. Docile: the group is quiet and easy to control.

HI: UNASSURED/SUBMISSIVE:

___ 1. Passive: the group tends to submit or obey without arguing or resisting.

___ 2. Yielding: the group tends to obey others.

___ 3. Unconfident: the group is hesitant and unsure of itself.

___ 4. Tentative: the group is slow, hesitant, and careful because it lacks confidence.

FG: ALOOF/INTROVERTED:

___ 1. Introverted: the group is turned into itself and doesn't interact much.

___ 2. Shy: the group is reserved and uncomfortable with others.

___ 3. Unfriendly: the group is cold and unwelcoming.

___ 4. Distrustful: the group treats others as dishonest or unreliable.

DE: COLD-HEARTED / HOSTILE:

___ 1. Antagonistic: the group is hostile and oppositional.

___ 2. Adversarial: the group is oppositional and antagonistic.

___ 3. Coldhearted: the group is unfeeling and unkind.

___ 4. Surly: the group is ill-tempered and rude.

BC: ARROGANT/CALCULATING:

___ 1. Calculating: the group is determined to gain the greatest personal advantage.

___ 2. Manipulative: the group uses clever and devious ways to control or influence others.

___ 3. Competitive: the group is concerned with beating others.

___ 4. Cutthroat: the group is aggressive and merciless in striving for supremacy.

APPENDIX F

RANDOM EFFECTS TABLE

Table 26
Random Effects

Research Question	*SD*	Variance Component	*d.f*	χ^2	*p*
Question One					
Trait and Environment Relation					
CMIE Power	.25	.06	46	67.11	.02
Group Mean Behavior Rating Power	.24	.06	46	67.14	.02
CMIE Affil	.04	.001	46	44.09	>.50
Group Mean Behavior Rating Affil	.01	.0001	46	32.84	>.50
Question Two					
Moderation by Environment					
CMIE Power	.23	.05	46	64.56	.03
Group Mean Behavior Rating Power	.23	.05	46	64.81	.03
CMIE Affil	.05	.002	46	44.55	>.50
Group Mean Behavior Rating Affil	.01	.0001	46	32.26	>.50
Question Three					
Trait and Environment Correspondence					
CMIE Power	.02	.0005	47	39.32	>.50
Group Mean Behavior Rating Power	.02	.0004	47	38.64	>.50
CMIE Affil	.25	.06	47	55.89	.18
Group Mean Behavior Rating Affil	.26	.07	47	56.52	.16
Question Four					
Trait-Behavior Relation Moderated by Interpersonal Flexibility					
CMIE Power	.24	.06	46	63.97	.04
Group Mean Behavior Rating Power	.22	.05	46	62.66	.051
CMIE Affil	.03	.0009	46	43.10	>.50
Group Mean Behavior Rating Affil	.01	.0001	46	31.55	>.50
Question Four					
Environment-Behavior Relation Moderated by Interpersonal Flexibility					

CMIE Power	.21	.04	45	56.06	.12
Group Mean Behavior Rating Power	.22	.05	45	58.06	.09
CMIE Affil	.04	.001	45	42.77	>.50
Group Mean Behavior Rating Affil	.01	.0001	45	27.55	>.50

APPENDIX G

THANK YOU PAGE

Raffle Consideration

Click "Continue" to access the final page and submit your results.

[Survey page break]

Your response has been saved and recorded with ID [number]. If you wish to be considered for the raffle, please email the principal investigator at Dominic.Prime@asu.edu and include Raffle Entry and your participant ID number in the subject line.