THE HEART OF HELPING:
PSYCHOLOGICAL AND PHYSIOLOGICAL EFFECTS OF
CONTRASTING COACHING INTERACTIONS

By

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The Heart of Helping:
Psychological and Physiological Effects of Contrasting Coaching Interactions

By
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Abstract

The disproportionate growth of practice as compared to research has created an urgent need for scientific inquiry into executive coaching. This study addresses this need by providing an empirical examination of Intentional Change Theory, a framework in which two psychophysiological states – the Positive and Negative Emotional Attractors (PEA, NEA) - are used in combination to guide development through the coaching process. Using an experimental design, I tested distinctions in the emotional, relational, physiological, and goal-related mechanisms at play during coaching interactions characterized by a focus on one’s desired future (PEA) as compared to those focused on problem-solving (NEA). Forty-eight graduate-level participants completed one PEA and one NEA coaching session spaced two weeks apart. Measures of emotional experience, quality of the coaching relationship, motivational stance in goal pursuit, and autonomic arousal (respiratory sinus arrhythmia and electrodermal activity) were collected for each session. Findings indicate that the PEA was emotionally uplifting and associated with greater positive affect than the NEA, whereas the NEA was activating, emotion dampening, and associated with greater negative affect than the PEA. Coaching to the
PEA facilitated the development of trust, rapport, and interpersonal closeness in the coaching relationship to a greater degree than the NEA. Additionally, coaching to the PEA fostered a promotion-oriented approach to goal pursuit (aspirational, compassionate, and passionate about goals), whereas coaching to the NEA stimulated a prevention- and performance-oriented approach (instrumental/proximal goals, prevention concerns, external expectations, and unidimensional focus). Participants reported greater willingness to strive toward goals set following the PEA than the NEA. Differences in autonomic functioning were not detected during the coaching conversations, but emerged subsequently as participants completed a goal setting task. Greater vagal withdrawal following PEA coaching indicated a heightened ability to be mindful, or attend to the task at hand. Taken together, these findings point to numerous advantages of the PEA, suggesting that it should be emphasized in relation to the NEA in order to foster development in coaching contexts.
CHAPTER ONE: INTRODUCTION

Introduction

Leadership development is of strategic importance to organizations (Hernez-Broome & Hughes, 2004). As practices for developing leaders have evolved to meet the changing needs of the 21st century workplace, coaching has become increasingly popular. In fact, research suggests that training programs that include a coaching component are up to four times more effective than training alone (Olivero, Bane, & Kopelman, 1997). Generally structured as a series of one-on-one or one-on-group developmental conversations, coaching extends learning into the context of every day work and provides a structure for reflecting, problem solving, goal setting, experimentation with new behaviors, and accountability (Parker, Hall, & Kram, 2008).

As executive coaching seeks to establish itself as a sustainable profession, a strong research base is needed to create legitimacy and inform theory-driven practice (Bennett, 2006; Spence, 2007). Despite a dramatic increase in scholarly literature on the topic of coaching, empirical research still lags behind the burgeoning growth of practice (Grant, 2006). Current research seems to be occupied by the question, ‘does it work?’ This is reasonable since evidence of effective outcomes is critical for establishing legitimacy for the field. However, less attention has been given to the systematic study of theoretical frameworks, methodologies, or approaches that guide the coaching process (Gregory, Levy, & Jeffers, 2008; Segers, Vloepherghs, Hendrickx, & Inceoglu, 2011). This study makes a unique contribution by asking ‘how does it work?’ In other words, the purpose of this study is to better understand how coaching impacts clients’ motivational resources (physiological, emotional, and cognitive) and subsequent goal-
related behavior with the ultimate aim of helping coaches more masterfully facilitate personal and professional change.

The proposed research focuses on a specific framework for *executive coaching*, which Kauffman & Coutu (2009) define as “a confidential, individually-tailored engagement designed to meet the needs both of the executive being coached and the organization paying for the service” (p. 3). Although the title ‘executive’ implies that coaching is designed for members of the upper echelon, the coaching framework examined in this study can be utilized with professionals at any level of an organization. Additionally, executive coaching need not be confined to engagements contracted by a work organization. Individuals often contract directly with a professional coach for their own development. Furthermore, many organizations promote the practice of employee coaching whereby managers use coaching techniques with employees as a talent management strategy (Gregory & Levy, 2011). In this study, the focus on *executive coaching* extends to any conversation that is intended for the purpose of developing others. Given the framing around formalized coaching relationships, the word “client” will be used to refer to individuals being coached but does not require a formal contract.

As a coaching framework, Intentional Change Theory (ICT; Boyatzis, 1999, 2001, 2008) can be considered *developmental* because it adopts a holistic perspective on human growth and behavior change (Segers et al., 2011). Specifically, ICT-based coaching assists individuals in creating sustained, desired change through a process involving articulation of one’s ideal self (values, core identity, dreams, and aspirations), analysis of one’s real self (current realities), formulation of learning goals, implementation of deliberate practices, and the development of a mutually positive
coaching relationship.

**Study Overview**

In this dissertation, I examine the emotional, relational, and physiological dynamics of coaching interactions and their relationship to goal-related behavior. Forty-eight graduate students from a research institution participated in the research, which involved 4 weeks of active study engagement. Using a within-subject design, participants were subjected to two different coaching conversations, each characterizing common elements of the coaching process, spaced two weeks apart. Each coaching session was 30 minutes in length and was conducted by a professional coach trained in the study protocol. Participants completed a survey and physiological baseline readings prior to each coaching session. After the coaching session, participants completed a “post” survey, which included measures of emotion, relationship quality, and goal-related behavior. The results suggest there were significant differences between the two coaching conditions in terms of the participants’ emotional state, perception of the quality of the relationship with the coach, and the nature of and commitment to self-created goals.

**Significance of the Study**

This study bears significant potential to influence the teaching and application of effective coaching, a critical development for a professional field in which the rapid growth of practice has outpaced research. It is the first study to simultaneously explore the physiological, emotional, and goal-related elements of real-time coaching interactions. This research, along with a series of neuroscience studies upon which it builds, provides empirical evidence for a theoretical foundation for coaching - Boyatzis’ Intentional Change Theory. The practical implications of such research are vast: it will
shape how coaches frame coaching conversations and develop coaching relationships; illuminate how clients set and pursue goals under various conditions; help coaches understand and manage the “embodied” coaching experience, which may have long-term health implications for both the coach and client; and inform how to best train and develop coaches.

In addition to advancing the empirical knowledge base related to coaching and ICT, this research makes an innovative contribution of integrating the fields of psychophysiology and organizational behavior. There is an increasing interest in physiological perspectives in organizational research, as evidenced by two recent special issues of journals (Biology of Leadership, Leadership Quarterly; Biological Factors in Organizational Behavior and I/O Psychology, Journal of Applied Psychology). Prior to that, the Academy of Management Review published an article connecting physiology to organizational life (Heaphy & Dutton, 2008a), which ignited a lively scholarly dialogue (Hardy, 2008; Heaphy & Dutton, 2008b). The use of electrocardiography and electrodermal activity represents a methodological advancement in measuring implicit variables, such as stress and emotion regulation, that occur outside one’s conscious awareness and are often inaccurate in self-report data (Becker & Menges, 2013).

Structure of the Dissertation

The dissertation is organized into six chapters. In Chapter 2, I review literature germane to this study. Chapter 3 contains an overview of my methodological approach, including details of the experimental design and my approach to measurement. The results of the data analysis are presented in Chapter 4, and Chapter 5 offers a discussion of the findings, limitations, directions for future research, and implications for practice.
CHAPTER TWO: LITERATURE REVIEW

Helping is a fundamental human activity that exists in different forms across all human cultures (Egan, 2009). In Western civilization, the helping role became formalized and regulated in professions such as medicine, social work, therapy, and ministry. Today, ‘coaching’ has emerged as a new type of formalized helping relationship in which skilled professionals assist clients in making desired life changes (Boyatzis, Smith, & Van Oosten, 2009). Evidence suggests that coaching increases clients’ self-efficacy (Evers, Brouwers, & Tomic, 2006; Baron & Morin, 2009); enhances leader effectiveness (Cerni, Curtis, & Colmar, 2010); fosters stronger relationships and personal development, and facilitates work-family integration (Wasylyshyn, 2003). Yet, little empirical evidence demonstrates how these outcomes are achieved.

A growing body of research supports the efficacy of Intentional Change Theory (ICT, Boyatzis, 2001, 2008) in explaining how coaching leads to sustained, desired change. Over 20 years of longitudinal research suggests that ICT-based coaching is linked to emotional and social competency development during a two-year, full-time MBA program (Boyatzis & Saatcioglu, 2007; Boyatzis, Lingham, & Passarelli, 2009). Buse (2011) found that career longevity among women engineers was predicted by a sense of purpose and feelings of hope that were congruent with their profession, both aspects of ICT. Additionally, key elements of ICT have been found to predict effective doctor-patient relationships (Dyck, 2010) and treatment adherence (Khawaja, 2011). Most recently, a series of studies using fMRI technology have identified neurological mechanisms that underpin the coaching process (Boyatzis, Jack, Khawaja, Cesaro, & Passarelli, 2010; Boyatzis, Passarelli, Koenig, Lowe, Mathew, Stoller, & Phillips, 2012).
The remainder of this chapter reviews current literature in the field of coaching and presents research hypotheses stemming from the application of Intentional Change Theory to coaching. It begins with an overview of ICT, describes Positive and Negative Emotional Attractors and their relationship to key dimensions of ICT, and concludes with a description of the physiological correlates of the previously described relationships.

Coaching

Coaching is a growing profession that represents a wide diversity of sub-disciplines – e.g. executive coaching, performance coaching, life coaching, and wellness coaching. London (2002) reported there were approximately 10,000 self-defined professional coaches worldwide, a number that has grown exponentially in the last decade. According to a 2007 report from the International Coach Federation and PricewaterhouseCoopers, coaching was estimated to be a $1.5 billion industry worldwide (Bennett & Bush, 2014).

Rapid growth in executive coaching can be attributed to a paradigm shift in the development of human capital in organizations. Whereas there was once a focus on remediation of underperforming employees, this focus has shifted to developing high potential leaders (Bennett & Bush, 2014). Executive coaching fills a gap in addressing the developmental needs of high-level leaders by helping them deal with the complex business realities of rapid change and vast amounts of information to assimilate daily. Coaching has also replaced some of the functions of in-house mentors who are no longer available with higher rates of turnover and employment instability (Kauffman & Coutu, 2009). In addition to external professional coaches, internal roles have been created for full-time coaches in organizations and managers are being asked to coach their
employees (Gregory & Levy, 2011). In order to prepare managers for the coaching role, educational programs are now teaching the skills necessary to serve as a coach to others (Hunt & Weintraub, 2004).

There is not shared agreement on a definition of coaching (Bennett, 2006). Based on grounded theory research, Wilkins (2000) defined coaching as “a one-on-one relationship where a coach supports, collaborates with, and facilitates client learning by helping a client to identify and achieve future goals through assessment, discovery, reflection, goal setting and strategic action” (p.5). Kauffman & Coutu (2009) add that a definition of executive coaching must acknowledge the needs of the organization paying for the service, if there is one doing so. It should be noted that the organization’s desires are held in balance, and often in submission to, the desires of the executive or client. Kauffman & Coutu go on to explain “coaching aims to align an executive’s values and vision; it doesn’t help people to contort themselves into a space in which they do not fit” (2009, p. 5).

The form of coaching most often associated with executive and leadership development is developmental coaching, which takes a holistic perspective on human development (Segers et al., 2011). According to Wasylyshyn (2003), this form of coaching results in personal behavior change (56%), enhancing leader effectiveness (43%), fostering stronger relationships (40%), personal development (17%) and work-family integration (7%). Other important outcomes of the coaching process are enhanced self-awareness and self-efficacy. In a field study of a leadership development program, Baron & Morin (2009) found that executive coaching significantly increased managers' self-efficacy, after controlling for pre-program self-efficacy and other training methods
(classroom instruction, action learning groups). Evers, Brouwers, & Tomic (2006) found that a group of managers who received coaching, as compared to a control group who did not, had significant increases in their self-efficacy with respect to setting goals and in expecting to act in a balanced way following coaching. Finally, Cerni, Curtis, & Colmar (2010) found that a 10-week coaching intervention increased transformational leadership in school principals, as rated by their staff. Qualitative results from the principals suggested that gains in transformational leadership stemmed from increased self-awareness and intentionality in their communication strategies supported by the coaching process. The coaching literature suggests that the coaching relationship is a critical success factor in achieving these developmental outcomes (Gregory & Levy, 2011; Gyllensten & Palmer, 2007; Bennett, 2006; Kampa-Kokesch & Anderson, 2001).

**Intentional Change Theory**

Intentional Change Theory provides a model for the change process that occurs in the context of a coaching relationship. ICT holds that sustained, desired change occurs in a dynamic, non-linear process punctuated by five discontinuities: discovery of the ideal self, assessment of the real self as compared to the ideal self, formulation of a learning agenda, practice and experimentation, and the support of resonant relationships (Figure 1, Boyatzis, 2008). Discovery of the ideal self entails articulating one’s deepest aspirations, hopes, and dreams for the future, as well as aspects of one’s core identity. The real self involves examining one’s current strengths and weakness in relation to the ideal self. A learning agenda comprised of broad goals and specific actions is devised in order to bring an individual closer to their ideal self. Practice and experimentation is the step by which the learning agenda is implemented and refined. Finally, the entire process revolves
around a set of trusting, growth-fostering relationships. These discoveries will be explained in greater detail as they relate to the study hypotheses.

Figure 1. Intentional Change Theory

Movement through the intentional change process is stimulated by shifts in one’s psycho-physiological state caused by destabilizing forces called Positive and Negative Emotional Attractors (Howard, 2006; Boyatzis, 2008; Boyatzis, 2013). The label ‘attractor’ derives from the complexity theory concept of strange attractors (Lorenz, 1963), suggesting that the PEA and NEA create a force around which one’s thinking, feeling, and behaviors loop until they are interrupted by a tipping point that moves them toward the other attractor (Boyatzis et al., 2010). Because ICT is rooted in complexity theory rather than a linear or stage-model of change, the process is not always as discrete in practice as is described here (and tested in the research design). In reality, the PEA and NEA both occur at various points during a coaching intervention. However, understanding the isolated effects of coaching to the PEA versus the NEA is critical to skillful implementation of the two approaches alone or in combination. The purposeful
The attempt to evoke PEA or NEA states is referred to as ‘coaching to the PEA (NEA)’ in this research.

The PEA and NEA are associated with distinct emotional, cognitive, and physiological characteristics (Table 1), and have qualities that are both beneficial and detrimental to sustaining personal change. The PEA and NEA also affect the degree to which clients derive energy and inspiration from the coaching relationship (Boyatzis, 2013). Accordingly, ICT holds that the sequencing and salience of the PEA and NEA have a profound effect on coaching effectiveness (Howard, 2006).

Table 1. Characteristics of Positive and Negative Emotional Attractor States

<table>
<thead>
<tr>
<th></th>
<th>Positive Emotional Attractor (PEA)</th>
<th>Negative Emotional Attractor (NEA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological</td>
<td>Greater parasympathetic influence;</td>
<td>Greater sympathetic influence;</td>
</tr>
<tr>
<td></td>
<td>Release of oxytocin &amp; vasopressin associated with social bonding;</td>
<td>Release of epinephrine &amp; norepinephrine to mobilize defenses; Release of cortisol</td>
</tr>
<tr>
<td></td>
<td>Activation of default mode, social network</td>
<td>Activation of task positive network, analytic network</td>
</tr>
<tr>
<td></td>
<td>Decreased blood pressure;</td>
<td>Increased pulse rate, blood pressure, &amp; rate of breathing;</td>
</tr>
<tr>
<td></td>
<td>Higher heart rate variability</td>
<td>Lower heart rate variability</td>
</tr>
<tr>
<td>Emotional</td>
<td>Positive affect: hope, joy, amusement, elation</td>
<td>Negative affect: defensiveness, guilt, shame, fear, anxiety</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Enhanced working memory &amp; perceptual openness; Global attention, promotion focus, learning orientation</td>
<td>Decreased executive functioning; Local attention, prevention focus, performance orientation</td>
</tr>
</tbody>
</table>

According to ICT, the PEA state is associated with the experience of positive emotions, cognitive openness, global attention, and a greater influence of the
parasympathetic nervous system on autonomic functioning (Boyatzis, 2008). The PEA has a calming or energizing effect that is activated by the experience of hope, compassion, mindfulness, and/or playfulness (Boyatzis & McKee, 2005; Ayan, 2009). When the coaching process engages clients in exercises such as envisioning a desired future, reconnecting with personal values, discovering strengths, and expressing gratitude for supportive relationships, positive emotions are evoked (Boyatzis, Smith, & Blaize, 2006). The PEA is often associated with – but not limited to – the first discontinuity in the intentional change process, discovery of one’s ideal self.

The NEA state is in dialectical tension with the PEA. It is associated with the experience of negative emotions, local attention, and a greater influence of the sympathetic nervous system on autonomic functioning (Boyatzis, 2008). The NEA activates the human stress response and negative emotions that arise from a focus on current deficits, fears, problems, or by a values misalignment (Boyatzis, Smith, & Blaize, 2006). The NEA is often invoked by the real or perceived need to comply with social expectations, pressures, and controls – the “ought” self – that suppress one’s ideal self (Higgins, Roney, Crowe & Hymes, 1994; Howard, 2006). Certain situations that arise in the context of executive coaching are known to provoke a stronger NEA response than others. These situations involve the perception of a lack of control, the element of social evaluation, low efficacy or commitment to reaching a goal, and/or anticipation of events involving the previous three characteristics (Dickerson & Kemeny, 2004; Sapolsky, 2004; Boyatzis, Smith, & Van Oosten, 2009). The NEA is often associated with – but not limited to – the second discontinuity in the intentional change process, examining one’s real self and, in particular, a focus on gaps or weaknesses. In the coaching process, the
NEA can occur in evaluative processes, such as receiving and interpreting 360-degree feedback. In its most intense form, coaching to the NEA involves a coach imposing goals that serve the interests of an organization over the interests of the client. For example, the NEA will likely predominate when coaching is conducted with the intention of forcing a client to change against their will or to comply with organizational mandates.

Typically, the limitations of the NEA are easy to identify. Highly intense or prolonged periods of NEA trigger individual defense mechanisms, and may hinder or halt learning and development. However, NEA states can also be beneficial to the change process because they call “attention to behaviors and events that compromise our effectiveness, threaten our safety, drain our resources, increase our stress or require us to improve or protect ourselves” (Howard, 2006, p. 663). Similarly, the PEA also has limitations, such as causing a person to become more easily distracted or overwhelmed by possibilities (Rowe, Hirsh, & Anderson, 2007). Thus, it is the recurrent activation of the PEA and NEA that stimulate the change process.

**The Affective Nature of the PEA and NEA in the Ideal and Real Self**

As the name implies, the PEA and NEA have different emotional valences. In a coaching context, a positive or negative emotional valence arises from the client’s reaction to the content of the coaching conversation as well as his or her perception of social connectedness with the coach, the latter of which will be described in the next section. Emotional responses to content depend on which of the first two discoveries are triggered, the ideal self or the real self. Coaching conversations that emphasize and frequently revisit the ideal self have a more positive valence, whereas conversations that emphasize the real self have a more negative emotional valence (Howard, 2006).
Emotions evoked in a coaching conversation are often magnified through the dynamics of emotional contagion, the tendency to experience and express the emotions of a relationship partner (Hatfield, Cacioppo, & Rapson, 1994). This transfer of emotions occurs through an unconscious process in which individuals perceive and mimic each other’s emotional cues, such as facial expressions, language, and movement (Cattaneo & Rizzolatti, 2009; Iacoboni, 2009). This process is subtle yet powerful and occurs very quickly. Strangers sitting in silence for two minutes will “catch” the emotion of the more expressive individual (Friedman & Riggio, 1981). Emotional contagion does not only occur between strangers. A sense of interpersonal closeness and social connectedness has also been found to foster shared emotional states and physiological arousal (e.g. stress and increased heart rate; Cwir, Carr, Walton, & Spencer, 2011).

The Ideal Self and the PEA. The ideal self is an aspect of self that is comprised of one’s desired future (aspirations, dreams, passions, and purpose), one’s core identity (values, individual characteristics) and the emotional driver of hope (Boyatzis & Akrivou, 2006; Higgins et al, 1994). When the ideal self is activated, it is accompanied by affirming thoughts, a connection to that which is deeply meaningful, and a sense of optimism and self-efficacy that correspond to an increase in positive emotions (Howard, 2006). A coach can activate the PEA through inquiry designed to evoke hope, mindfulness, compassion, or playfulness as one considers the question, Who do I want to be? Questions related to the ideal self encourage the client to reflect on their deepest aspirations and dreams (hope); people who have had a positive impact on their lives (gratitude, compassion); and/or their values and core identity (mindfulness).

Due to the temporary nature of positive emotions (Fredrickson, 2001), coaches
must return frequently to the PEA throughout a coaching conversation in order to ensure an overall tone of the PEA. Even fleeting experiences of positive emotions, such as joy, interest, contentment, and love, build an individual’s resources to respond effectively to more negative emotional experiences (Fredrickson, 1998). Positive emotions support the developmental process in a host of other ways. For example, positive affective states broaden the scope of cognition through an enhanced ability to see interconnections between disparate concepts, more inclusive cognitive categories, and enhanced memory and creativity (Isen, 1987; Fredrickson, 1998). Positive emotions also facilitate persistence in learning to the point of mastery (Fredrickson, 1998). Positive emotions contribute to building social bonds and increase the likelihood of cooperation and reciprocity. Finally, positive emotions can serve as a buffer to chronic stress, providing support for behavioral, cognitive, and biological coping mechanisms (Fredrickson, 2001).

The Real Self and the NEA. The real self is self-knowledge about one’s current level of competence, including both strengths and weaknesses, informed by one’s own assessment and the assessment of others (Taylor, 2006). The real self plays an important role in growth and development because it provides a launching point for change and is critical to goal achievement (Howard, 2006). When the real self is activated, it may be accompanied by self-conscious thought and fears of social evaluation, which give rise to negative emotional states. Exploring the real self question of Who am I now? can be stressful and threatening for clients. Focusing on this assessment in the absence of any exploration of the ideal self is counterproductive to the aims of a coaching intervention because there is no buffer to the inhibitory effects of stress.

Having some negativity in the coaching conversation is natural and necessary for
development; however, the NEA is most effective when recurrently activated with the PEA (Howard, 2006). Despite the best efforts of a coach to help a client focus on the positive, individuals tend to focus on the negative. This is the result of a well-documented ‘negativity bias,’ a psychological phenomenon by which negative events have a greater impact on individuals than positive events (Baumeister, Bratlavsky, Finkenauer, & Vohs, 2001). From an evolutionary perspective, this attunement to the undesirable or harmful stimuli may have been an adaptive advantage. However, it is likely not helpful in sustaining long-term behavior change. Whereas passive negative emotions, such as sadness, lead to greater information processing than positive emotions, more activating negative emotions, such as anger, may lead to snap decision making and self-defeating behaviors that undermine the change process (Leith & Baumeister, 1996). In addition, negative emotions stemming from concerns of social exclusion have also been found to impair executive functioning, critical thinking, and reasoning (Baumeister, Twenge, & Nuss, 2002).

To the extent that the PEA and NEA are associated with the ideal self and real self, respectively, it is expected that one’s emotional experience will vary with the relative emphasis on one of these two components of the change process. The PEA and ideal self should be associated with positive affect whereas the NEA and real self should be associated with greater negative affect.

*Hypothesis 1: A client will experience significantly more positive emotions when receiving coaching to the PEA as compared to receiving coaching to the NEA.*

**Establishing a Coaching Relationship through PEA & NEA Interactions**

Many researchers hold that it is in the context of high-quality relationships that
growth and transformation occur (Miller & Stiver, 1997; Josselson, 1996; Dutton, 2003). In a qualitative study of individuals who had gone through a workplace coaching process, Gyllensten & Parker (2007) found the coaching relationship to be of critical importance. Positive coaching relationships were established on a foundation of trust and transparency, which promoted psychological safety and active participation in the process. Bluckert (2005) added rapport, support, and challenge to trust as key elements of a successful coaching relationship. According to Gregory and Levy (2010), high quality coaching relationships are evidenced by a genuineness and comfort in the relationship, as well as positive communication and the facilitation of development. In the current study, these dimensions are represented as rapport (genuineness), trust (safety), and relational energy (positive communication and development). An additional dimension of interpersonal closeness has also been added to more closely approximate the concept of resonant relationships.

According to ICT, high-quality, resonant relationships are the center around which desired, sustained change revolves (Boyatzis, 2008). Resonant relationships are characterized by an overall positive emotional tone, a subjective sense of being in synchrony with one another, and the physiological effects of PNS activation (Boyatzis et al., 2012). Such relationships have been found to ease career transitions (Ibarra, 2003), assist in growth and development (Boyatzis et al., 2006; Ragins & Verbos, 2006), enhance and enrich identity (Roberts, 2006), and establish interpersonal trust that facilitates learning from failure (Carmeli & Gittell, 2009; Carmeli, Brueller, & Dutton, 2009). Resonant relationships also have physiological benefits, including improved immune system functioning, cardiovascular health, and patterns of neuroendocrine
activity that contribute to resilience and engagement at work (Heaphy & Dutton, 2008a).

The ability to establish resonant relationships is fundamental to coaching practice, and arises from striking the optimal balance between coaching to the PEA and coaching to the NEA. In the PEA, the coach is focused on the person, not the problem. In other words, the coach demonstrates the empathetic attunement, understanding and sharing in the affective-cognitive experience of the client (Jordan, 1986). Sensing this level of acceptance and affirmation, the client experiences safety and positive emotional bonding that enhances the affective state of both parties (Boyatzis, Smith, & Blaize, 2006).

Further evidence suggests PEA states facilitate the formation of trust, rapport, and interpersonal closeness in the coaching relationship. Based on diary studies, those who experience greater positive emotions have more enjoyable social interactions (Berry & Hansen, 1996) and greater friendship closeness (Berry, Willingham & Thayer, 2000). This may be of particular importance when a new relationship is forming. In a study of college roommates who are getting to know each other in the initial weeks of school, Waugh & Fredrickson (2006) found that those who displayed greater positive emotions also experienced greater self-other overlap (interpersonal closeness) and a more complex understanding of one another. This may be attributed to an increased range and depth of self-disclosure associated with greater positive emotionality (Cunningham, 1988; Vittengl & Holt, 2000).

ICT holds that coaching relationships marked by an overall tone of the PEA foster a sense of positive emotional energy or inspiration in the client (Boyatzis, Smith, & Blaize, 2006; Fritz, Lam, & Spreitzer, 2011). This sense of energy can move a client to adopt a new mindset or challenge a deeply held belief, to try a new behavior, to reflect
more deeply, or even to make a major life change. The ability to positively energize others was coined by Owens & Baker (2011) as ‘relational energy.’

From a relationship perspective, the NEA is more likely to arise during real-self conversations when a coach approaches the engagement as though the client is a problem to be solved, or when the coach imposes his or her external view what “should” be rather than unveiling from the client what could be based on the client’s deepest desires (Boyatzis, Smith & Van Oosten, 2009). This stance can be threatening to a client who feels he or she has not been heard by the coach or recognized as a unique individual. It is well documented that social disconnection in the form of rejection, exclusion, isolation, or loss is painful and registers in the body similarly to physical pain (Eisenberger, 2012; MacDonald & Leary, 2005). Pain has an adaptive function in that it produces a rapid response in order to deal with threat in the environment and also a source of learning to avoid that threatening stimuli in the future (MacDonald, Kingsbury & Shaw, 2005). Sensing social disconnection from the coach, then, produces a negative emotional response that not only demands resources that could otherwise be used for change, but also undermines future coaching interactions by producing a negative association with the coach. Hence, a focus on the PEA should be associated with a higher quality coaching relationship.

Hypothesis 2: A client will perceive greater relationship quality with the coach who coaches to the PEA condition than the coach who coaches to the NEA.

PEA, NEA and the Learning Agenda

A learning agenda is a plan for attaining desired change that is anchored in one’s ideal self (personal dreams, values, and aspirations) and balanced by assessment of one’s real self (current reality of strengths and gaps; Boyatzis, 2008). The formulation of
vision-driven goals and action steps are important aspects of the learning agenda because substantial evidence suggests that individuals make more progress toward behavioral outcomes when they set goals (Locke & Latham, 2002). Practice and experimentation with new behavior flow from the learning agenda.

There is evidence to suggest that many forms of coaching – PEA/NEA, solution/problem focused, professional/peer – will assist clients in setting and pursuing goals beyond what they would accomplish without coaching (Howard, 2009; Grant, Green, & Rynsaardt, 2010; Grant, 2012). Howard (2009) found both PEA and NEA-based coaching approaches facilitated goal setting, and goal setting was associated with negative emotions in both conditions. However, negativity associated with goal setting in the PEA condition was significantly milder than in the NEA condition. In addition, Grant (2012) demonstrated that both solution- and problem-based questions helped participants feel they were moving closer to their goals. However, in addition to emotional and efficacy related benefits of solution-based questions, participants in this condition reported feeling significantly closer to achieving their goal and developed more action strategies for attaining it. These studies suggest that the distinction between PEA- and NEA-based coaching approaches is not whether or not clients set goals. Rather, the distinction is in the nature of the goals clients set and the degree to which these differences affect striving toward one’s goals.

Two theoretical frameworks can describe the qualitative difference between goals that arise from coaching to the PEA versus the NEA: regulatory focus and goal orientation. Higgins’ (1997, 1998) theory of regulatory focus holds individuals manage their behavior in pursuit of a goal in one of two ways: (1) they are motivated to achieve
rewards, which is a promotion focus or (2) they are motivated to avoid a negative outcome, a prevention focus. Preference for a particular regulatory focus is both a function of one’s personality (trait) and induced by environmental factors (state). When externally primed with a promotion focus, individuals represent goals as aspirations and accomplishments, utilize approach strategies of goal pursuit, and are concerned with self-fulfillment and growth. Those in a prevention focus represent goals as responsibilities and safety, utilize avoidance strategies of goal pursuit, and are concerned with security and safety (Förster & Higgins, 2005).

There are instances in which a prevention focus is associated with greater performance, such as performing a specialized task requiring careful attention (Förster, Higgins, & Bianco, 2003). However, when it comes to the complex and often ambiguous task of implementing desired change, research suggests a promotion focus is more effective. For example, in studies conducted both in the lab and the field, Sue-Chan, Wood, & Latham (2012) found that promotion-oriented coaching led to greater problem-solving performance than prevention-oriented coaching. According to Boyatzis & Howard (2013), it is the joy and excitement of pursuing promotion-focused goals related to one’s ideal self that sustain a personal change effort, even through periods of difficulty.

A related stream of research on goal orientation further suggests that qualitative differences in the nature of goals are associated with differences in goal pursuit and attainment (Seijts, Latham, Tasa, & Latham, 2004). Performance-oriented goals focus on a short-term outcome and are most effective when the task is routine or straightforward; whereas learning goals focus on the process of knowledge acquisition or skill development, and are most effective when the task is novel or requires creativity (Seijts
& Latham, 2005). Furthermore, Seijts & Latham (2005) suggest that setting a
gain goal early in the change process may actually be detrimental because it
deters cognitive resources from exploration and discovery necessary to the learning
process. A study by van Hooft and Noordzij (2009) supported this assertion. They found
that job seekers who took a learning approach demonstrated greater search intentions,
more search behavior, and had higher re-employment probabilities than those with a
performance orientation. Thus, coaching to the PEA should be associated with
achievement of desired change through a promotion focus and learning-oriented goals.

_Hypothesis 3a. A client will evince a greater promotion-focus and learning-
orientation in goals formulated after receiving coaching to the PEA than coaching to the
NEA._

_Hypothesis 3b. A client will evince a greater prevention-focus and performance-
orientation in goals formulated after receiving coaching to the NEA than coaching to the
PEA._

**Autonomic Correlates of the PEA and NEA**

The PEA and NEA have distinct psychophysiological correlates, which are
outlined in Table 1 (Boyatzis, 2008; Boyatzis et al, 2010; Boyatzis et al., 2012). Of
particular interest in this study is the autonomic nervous system (ANS), which is
responsible for the unconscious modulation of visceral functions of the body (Porges,
2003). The ANS is comprised of three subsystems: the sympathetic nervous system
(SNS), the parasympathetic nervous system (PNS), and the enteric system (Janig &
Habler, 1999). Links between the enteric system, which controls gastrointestinal
functions, and social behavior in humans are largely unknown (Carpenter, 2012).
However, the effects of PNS and SNS functioning on the cardiovascular, immune, and endocrine systems are extremely sensitive to social interaction and relationships (Heaphy & Dutton, 2008a; Kiecolt-Glaser & Newton, 2001). Although both systems act in tandem to regulate bodily functions, they support different adaptive strategies in response to safety and threat cues in the environment (Porges, 2003). The PNS and SNS are associated with coaching to the PEA and NEA, respectively (Boyatzis, Smith, & Blaize, 2006).

The PNS supports the body’s ‘rest and digest’ functions and helps the body recover from periods of heightened SNS arousal (Boyatzis, Smith, & Blaize, 2006). The PNS facilitates nourishment for the body, supports immune system functioning, promotes cardiovascular health, and optimizes the neuroendocrine system (Uchino, Cacioppo, & Kiecolt-Glaser, 1996). The PNS is associated with an enhanced ability to regulate one’s emotions (Yuan, McCarthy, Holley, & Levenson, 2010) and ‘un-doing’ the physiological effects of stress (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000). According to Porges (2003), the PNS facilitates social communication via the ‘social engagement system,’ which includes cortical areas of the brain, brainstem, and facial/head muscles responsible for effective looking, listening, facial gesturing, and vocalizing.

The SNS is typically associated with the human stress response. It is activated by a threat in the environment, which diverts resources away from the bodily core and directs them to the extremities to fuel a fight or flight response. In other words, the SNS supports defensive strategies of mobilization or immobilization in response to experiences of negative emotions such as fear, anger, sadness, and disgust (Levenson,
The SNS suppresses social communication by limiting facial expression, eye gaze, head gesture, and creating difficulty interpreting auditory information (Porges, 2003). Prolonged periods of SNS arousal have deleterious effects on health and wellbeing (McEwen, 1998).

Two theories describe the effect of these autonomic systems on goal-directed and social behavior, hence having explanatory value in coaching contexts - Neurovisceral Integration Theory (NIT; Thayer & Lane, 2000) and Polyvagal Theory (PT; Porges, 1997, 2001). NIT provides a system perspective as to how thoughts, emotions, and physiological responses interact as individuals engage with the environment. PT examines the same phenomena from an evolutionary perspective and focuses on why these phenomena support behavior in social contexts. These two theories are complementary, yet distinct in their neuroanatomical focus and the theoretical framework on which they build. NIT focuses on connections between the autonomic system and correlated brain regions whereas PT focuses on connections between the vagal nerve and other cranial nerves. Additionally, NIT takes a dynamical systems perspective whereas PT is built on an evolutionary perspective. According to Appelhans and Luecken (2006), combining the two theories holds the most promise for advancing knowledge about the role of the autonomic nervous system in emotional responding.

Neurovisceral Integration Theory (Thayer & Lane, 2000) holds that the capacity to regulate autonomic, attention, and affective systems in response to environmental demands is the product of an open-loop, bio-behavioral system. The coordination of these systems originates in the central autonomic network (CAN), "an integrated component of an internal regulation system through which the brain controls visceromotor,
neuroendocrine, and behavioral responses that are critical for goal-directed behavior and adaptability” (Thayer & Lane, 2000, p. 205). The CAN includes cortical, limbic and brainstem regions (Appelhans & Lueken, 2006). Specifically, these include the anterior cingulate, insular, and ventromedial prefrontal cortices, the central nucleus of the amygdala, the paraventricular and related nuclei of the hypothalamus, the periaqueductal gray matter, the parabrachial nucleus, the nucleus of the solitary tract, the nucleus ambiguus, the ventrolateral medulla, the ventromedial medulla, and the medullary tegmental field (Thayer & Lane, 2000). Structurally, the CAN shares substantial overlap with the emotion circuit (Damasio, 1998) and the default mode or social network (Jack, 2012), which provides evidence of the overlap between autonomic functioning, emotionality, and social behavior. Additionally, many of these regions such as the ACC, insula, and VMPFC, emerged as significant neural correlates of PEA and NEA coaching interactions in a recent fMRI study (Jack, Boyatzis, Khawaja, Passarelli, & Leckie, 2013). This suggests that the ANS plays a role in individual responses to different types of coaching interactions.

The goal-directed focus of NIT is complemented by the social-emotional focus of Polyvagal Theory. According to PT, the autonomic nervous systems evolved over time to support social behavior as a survival strategy by providing “the neurophysiological substrates for the emotional experiences and affective processes that are major components of social behavior” (Porges, 2003, p. 505). Autonomic activity determines “the range of emotional expression, quality of communication, and ability to regulate bodily and behavioral state” (Porges, 2003, p. 505).

Parasympathetic activity optimizes the social engagement system and facilitates
self-soothing and calming by inhibiting sympathetic-adrenal influences. The social engagement system includes cortical areas, brainstem, and facial/head muscles responsible for processing and communicating social information (looking, listening, facial gesturing, and vocalizing). This system is enervated via the vagal nerve, which also connects to cardiac and respiratory functions, as well as anatomical structures that interact with the HPA axis, oxytocin, vasopressin, and the immune system (Porges, 2003).

On the other hand, environmental threats evoke either active or passive avoidance response. Mobilization (fight or flight), an active avoidance response, is mediated by the sympathetic nervous system. Immobilization (freezing), a passive avoidance strategy, is mediated by the withdrawal of the parasympathetic nervous system (Porges, 2003). Both mobilization and immobilization are more “primal” responses than the PNS social engagement system and may limit facial expression, eye gaze, and head gesture, and create lack of prosody (because of difficulty distinguishing the human voice from background sounds).

The PNS and SNS innervate many of the same organs and glands in patterns that can be characterized as reciprocal, uncoupled or co-activational (Berntson, Cacioppo, & Quigley, 1991). Autonomic activity in these two divisions is evidenced in bioelectrical signals derived from such processes as electrocardiography (ECG) and electrodermal activity, also known as skin conductance (EDA, SC; Stern, Ray, & Quigley, 2001). ECG and EDA measures will be described in more depth as they are used to quantify autonomic activity in this study.
The CAN innervates the heart via the sympathetic and parasympathetic neurons of the stellate ganglia and the vagus nerve, respectively. The excitatory influence of the SNS on heart rate is relatively slow (seconds) compared to PNS/vagal influences (milliseconds), which inhibit the sympathetic effect and thereby slow heart rate. The ability of the PNS relative to the SNS to rapidly modulate heart rate accounts for the flexibility to respond to environmental and situational demands (Table 2). The coordinated influence of these two systems on the pacemaker in the sino-atrial node of the heart is "the source of the complex variability that characterizes heart rate time series" (Thayer & Lane, 2000, p. 205).

Table 2. Autonomic Influences on the Heart

<table>
<thead>
<tr>
<th></th>
<th>Parasympathetic (PNS)</th>
<th>Sympathetic (SNS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal origin</td>
<td>Cranial, sacral; 10th cranial (vagus)</td>
<td>Thoracic, lumbar</td>
</tr>
<tr>
<td>Effect on heart rate</td>
<td>Inhibitory (slows)</td>
<td>Excitatory (speeds)</td>
</tr>
<tr>
<td>Neuroendocrine</td>
<td>Acetylcholine</td>
<td>Norepinephrine</td>
</tr>
<tr>
<td>Latency</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>Peak effect</td>
<td>0.5 seconds</td>
<td>4 seconds</td>
</tr>
<tr>
<td>Return to baseline</td>
<td>1 second</td>
<td>20 seconds</td>
</tr>
<tr>
<td>Frequency band</td>
<td>High (0.15-0.4 Hz)</td>
<td>Low (0.04-0.25 Hz)</td>
</tr>
</tbody>
</table>

Heart rate time series provide information from which measures of the PNS influence on cardiac control can be derived. One such measure, respiratory sinus arrhythmia (RSA), is “a rhythmical fluctuation in heart periods at the respiratory frequency that is characterized by a shortening and lengthening of heart periods in a
phase relationship with inspiration and expiration, respectively” (Berntson, Cacioppo, & Quigley, 1993, p. 183). RSA is closely related to another common measure, heart rate variability (HRV). RSA and HRV both measure vagal (PNS) control of the heart and are highly correlated. However, only RSA accounts for respiration rate whereas it is assumed within a normal band in HRV (Berntson et al., 1997; Demaree, Robinson, Everhart, & Schmeichel, 2004; Task Force, 1996). Since RSA was the measurement method used in this study, this term will be used in the remainder of the paper.

In psychological terms, RSA can be said to reflect the heart’s adaptive capacity to detect and respond to stimuli, which requires attention regulation, affective information processing, and physiological flexibility (Acharya et al., 2006). Changes in RSA, or RSA reactivity, arise from self-regulatory efforts and shifts in emotional state (Beauchaine, 2001; Porges, 2003). Butler and her colleagues (2004) specify this process:

“Vagally mediated heart rate deceleration, with corresponding increases in RSA, is expected to occur when an organism attends to and engages with an environmental stimulus or when it relaxes in a safe environment. In humans, this may often be driven by self-regulatory efforts designed to facilitate such engagement or relaxation and may be accompanied by corresponding positive mood states. In contrast, decreases in RSA are expected when an organism responds to the environment with a fight-or-flight activation pattern, which involves vagal withdrawal and increased sympathetic activation. Thus reductions in RSA in nonclinical populations have been assumed to index physiological responses to stressors and to be accompanied by negative mood states due to the presence of those stressors” (p. 614).

Stimuli that evoke negative emotions such as worry or anxiety have been associated with decreases in RSA. For example, a cue as subtle as red lettering in a testing context can activate a stress response that decreases PNS activity and hampers test performance (Elliot, Payen, Brisswalter, Cury, & Thayer, 2011). Decreased RSA has also been associated with a deficiency in regulating one's own emotional displays, especially
in response to negative stimuli (Demaree et al., 2004). When these stimuli are present in social interactions, such as in NEA-based coaching sessions, we expect that the body responds in such a way as to restrict one's cognitive and behavioral flexibility. De Wit, Scheepers, and Jehn (2012) demonstrate that conflict in an interpersonal problem-solving conversation creates a physiological stress response that is associated with greater rigidity. Individuals in their study who demonstrated cardiovascular patterns associated with threat were less likely to adjust their initial answer to that suggested by their partner, even though their own answer was incorrect. This relationship held true after controlling for perceived trustworthiness of the partner, task self-efficacy, and gender. Given the heightened self-regulatory demands of the NEA and the restorative effects of positive emotions experienced in the PEA, parasympathetic activity is expected to be greater in the PEA than the NEA.

**Hypothesis 4a: A client will demonstrate significantly higher parasympathetic activity (RSA) when receiving coaching to the PEA as compared to receiving coaching to the NEA.**

Sympathetic nervous system activity is evidenced by electrodermal activity (EDA, skin conductance), electrical signals arising from cholinergic innervation of eccrine sweat glands on the palm of the hand. These signals are responsive to a number of stimuli, including: (1) anticipating or engaging in a task, (2) situations in which strong emotions are elicited, and (3) social interactions (Dawson, Shell & Filion, 2007). Social interactions, such as coaching conversations, constitute the presentation of continuous stimuli that are associated with an increase in skin conductance levels (Schwartz & Shapiro, 1973). Although these signals can be quantified in several ways, Dawson et al.
(2007) recommend using skin conductance level (SCL) or non-specific skin conductance responses (NS-SCR) when one is studying the effects of continuous stimuli.

For example, in a study of patients undergoing psychotherapy, Dittes (1957) found increased NS-SCRs among patients whose therapists were less permissive. Elevated skin conductance was attributed to increased anxiety and a defensive mobilization strategy toward threatening punishment by the therapist. Additional studies provide support for the relationship between elevated skin conductance levels and strained social interactions (Levenson & Gottman, 1983, 1985; Tarrier, Vaughn, Lader, & Leff, 1979). This suggests that whereas both PEA and NEA-based coaching interactions may increase skin conductance levels, NEA-based coaching will do so to a greater degree.

**Hypothesis 4b: A client will demonstrate significantly lower sympathetic activity (skin conductance level) when receiving coaching to the PEA as compared to receiving coaching to the NEA.**

**Conclusion**

In reality, most coaching processes include both PEA and NEA experiences. However, effective coaching relationships have the overall impact of PEA - used first for primacy effect in establishing a positive relational tone and used frequently to activate the benefits of positive emotions. This research sets up an artificial separation in order to test research hypotheses about differences between coaching to the PEA and coaching to the NEA.
CHAPTER THREE: METHOD

Research Questions

This study asks three primary research questions which address the need for empirical inquiry into theories that underpin the coaching process (Bennett, 2006): (1) Are there differences in a client’s emotional and physiological responses to coaching to the PEA versus to coaching to the NEA?, (2) Does coaching to the PEA versus the NEA differentially impact the quality of the coaching relationship?, and (3) What impact does the PEA versus the NEA have on a client’s goal-related behavior? Four hypotheses emerge from these questions and preceding review of the literature:

H1. A client will experience significantly more positive emotions when receiving coaching to the PEA as compared to receiving coaching to the NEA.

H2. A client will perceive greater relationship quality with the coach who coaches to the PEA condition than the coach who coaches to the NEA.

H3a. A client will evince a greater promotion-focus and learning-orientation in goals formulated after receiving coaching to the PEA than coaching to the NEA.

H3b. A client will evince a greater prevention-focus and performance-orientation in goals formulated after receiving coaching to the NEA than coaching to the PEA.

H4a. A client will demonstrate significantly higher parasympathetic activity (RSA) when receiving coaching to the PEA as compared to receiving coaching to the NEA.

H4b. A client will demonstrate significantly lower sympathetic activity (skin conductance) when receiving coaching to the PEA as compared to receiving coaching to the NEA.
Design Summary

This study utilized an experimental, within-subject design in which professional coaches facilitated semi-structured coaching sessions in two conditions that characterize the PEA and NEA, respectively. The semi-structured sessions followed an interview protocol found in previous studies to evoke the PEA and NEA (Jack et al., 2013b). The protocol was adapted slightly to accommodate a different sample population. Each participant completed two coaching sessions, one in each condition, separated by a period of two weeks. Participants completed surveys immediately prior to and following each coaching session. Electrocardiograph (ECG) and electrodermal activity (EDA) data were acquired continuously through the entire experimental period.

Within-subject designs are common in psychophysiological studies because they offer enhanced statistical sensitivity by accounting for variability in physiological measures between individuals (Jennings & Gianaros, 2007). A primary concern of the within-subject design is serial dependency, the degree to which the first condition the participant experiences impacts behavior in the subsequent condition. To address this concern, Jennings and Gianaros (2007) underscore the importance of isolating experimental conditions and varying their order so spillover effects can be analyzed. Both recommendations were followed in the study. First, each participant had a different coach in each condition to isolate the condition from potential spillover effects from the preceding session. Second, the conditions were counterbalanced such that half of the participants received the PEA first and the other half received the NEA first. Participants were randomly assigned to their first condition, which was also counter balanced across gender.
Participants

Participants were recruited through electronic advertising forums to participate in a “career advising study.” Forty-nine graduate students at a mid-Western research institution enrolled in the study (24 male). One female participant was excluded from the analyses because her response to the NEA warranted the coach to abandon the protocol out of concern for her emotional health. The participant was not made aware that the session had been modified. All participants were native English-speakers between the ages of 23-35 years ($M = 26.7$ years), non-smokers, had no history of cardiovascular or respiratory disease, had never been treated for psychiatric illness (depression, anxiety), and were not taking any illicit drugs or prescription medications that would affect their emotional and/or physiological functioning. Most participants were enrolled in a graduate program in the STEM field (63%). Finally, participants who had prior coursework in the theories being tested were excluded from the study. Additional sample characteristics are reported in Table 3. This population was selected to increase generalizability by approximating the life experience of typical executive coaching clients. Participants were financially compensated for their time ($25), received customized results of the Learning Style Inventory, and were entered into a drawing for an iPad Mini.
Table 3. Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percent (count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>50% (n = 24)</td>
</tr>
<tr>
<td>Male</td>
<td>50% (n = 24)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>6.2% (n = 3)</td>
</tr>
<tr>
<td>Asian</td>
<td>14.6% (n = 7)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>68.8% (n = 33)</td>
</tr>
<tr>
<td>Other</td>
<td>10.4% (n = 5)</td>
</tr>
<tr>
<td>Academic Field*</td>
<td></td>
</tr>
<tr>
<td>Arts &amp; Sciences</td>
<td>20.8% (n = 10)</td>
</tr>
<tr>
<td>Biomedical Sciences</td>
<td>31.3% (n = 15)</td>
</tr>
<tr>
<td>Engineering</td>
<td>31.3% (n = 15)</td>
</tr>
<tr>
<td>Law</td>
<td>4.2% (n = 2)</td>
</tr>
<tr>
<td>Other</td>
<td>12.4% (n = 6)</td>
</tr>
<tr>
<td>Work Experience</td>
<td></td>
</tr>
<tr>
<td>&lt; 5 years</td>
<td>81.2% (n = 39)</td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>18.8% (n = 9)</td>
</tr>
<tr>
<td>Average Age</td>
<td>26.7 years</td>
</tr>
</tbody>
</table>

*Note: Arts & Sciences includes Social Work; Biomedical Sciences includes Nursing and Public Health

Measures

Quantitative and qualitative survey measures, as well as physiological measures, were used in this study. These measures are summarized in Table 4 and described in more detail in the following paragraphs. All survey data was collected electronically using the Qualtrics platform.
Table 4. Summary of Measures

<table>
<thead>
<tr>
<th>Time 1</th>
<th>Intervention</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>PEA: “Imagine it is the year 2020 and your life is ideal. What would you be doing?”</td>
<td>Physiological Arousal - HRV, EDA:</td>
</tr>
<tr>
<td>Individual Differences:</td>
<td></td>
<td>T2a = anchor question</td>
</tr>
<tr>
<td>Cognitive style (Kolb &amp; Kolb, 2005), Self-regulatory focus (Higgins et al., 2001), Behavioral inhibition and activation (Carver &amp; White, 1994)</td>
<td>T2b = session end</td>
<td></td>
</tr>
<tr>
<td>Health Behaviors</td>
<td>Physiological Arousal - RSA, EDA</td>
<td>T2c = goal setting</td>
</tr>
<tr>
<td>Emotional Valence &amp; Arousal: Self Assessment Manikan (SAM, Bradley &amp; Lang, 1994)</td>
<td>NEA: “What problems or challenges are you facing at work, school, or home?”</td>
<td>Emotion Measures: SAM, Positive Affect and Negative Affect Scale (PANAS; Watson, Clark, &amp; Tellegen, 1988)</td>
</tr>
<tr>
<td>Physiological Baseline - RSA, EDA:</td>
<td></td>
<td>Relational Measures:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cognitive function / goal setting - Adapted Twenty Statements Test (Kuhn &amp; McPartland, 1954)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Goal Striving (adapted from Emmons, 1986)</td>
</tr>
</tbody>
</table>

* T1 measures to be repeated in alternate coaching condition. All T2 measures will be repeated.

**Pre-Questionnaire and Mental Health Screening.** At the beginning of the first session, participants completed an electronic survey assessing demographic, health, and psychological self-report information, which included the following:

1. **Mental health screening:** After providing informed consent, participants completed the Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995). The 21 items measure the degree to which respondents
experienced mental health symptoms over the past week on a 4-point Likert Scale (0 = did not apply to me at all; 3 = applied to me very much or most of the time.) Sample items include “I felt down-hearted and blue” (depression), “I felt I was close to panic” (anxiety), and “I found it hard to wind down” (stress). In order to protect vulnerable participants from potential harm, responses to the DASS-21 were visually inspected prior to commencing the study. No participant scored ‘severe’ or worse on any of the subscales; thus, none were excluded from the study due to mental health precautions.

2. *Demographic variables* included gender, age, ethnicity, years of work experience, and field of graduate study.

3. *Health behavior measures* included self-reported amount of weekly exercise (i.e. frequency of exercising 30-minutes or more per day) and the number of hours slept last night. These variables were tested and eliminated as potential confounds for the physiological data collected.

4. *Individual differences measures* included behavioral inhibition and activation (BIS/BAS), regulatory focus, and cognitive style. BIS/BAS (Carver & White, 1994) is comprised of 24 items on a 4-point Likert response format that are further nuanced into four subscales: BIS, BAS drive, BAS reward responsiveness, and BAS fun-seeking. Self-regulatory focus was assessed using the Regulatory Focus Questionnaire (RFQ, Higgins, et al., 2001), which is comprised of 11 items on a 5-point scale that yield two subscales: promotion and prevention. Finally, cognitive style was assessed using the first 12 items of the Kolb Learning Style Inventory 4.0 (KLSI, Kolb & Kolb, 2011). These items are comprised of sentence
stems that ask respondents to rank order four learning mode-specific sentence endings. The forced-choice format captures an individual’s relative preference for the four modes of the learning cycle, to be consistent with the theoretical interdependence of learning modes in ELT, and to minimize response bias introduced by a normative, free-choice format (Kolb & Kolb, 2005). The variable of interest to this study is a preference for abstractness over concreteness, determined by subtracting scores for the concrete experience mode from scores for the abstract conceptualization mode. Despite the potential confounding issue of ipsativity, these variables have been established as independent in prior research (Pathi, Manning & Kolb, 1989). Note that the KLSI was completed at the beginning of the second session for timing purposes.

**Emotional Experience Measures.** Emotional experience was measured in two ways. First, measures of emotional valence and intensity of arousal were collected using the Self Assessment Manikan (SAM; Bradley & Lang, 1994), which is comprised of a series of images depicting increasing positive valence and heightened intensity of arousal. By selecting an image, the participant provides a score of 1-7 (1 = low; 7 = high). The SAM was administered prior to and immediately following each coaching session. The non-verbal SAM technique was selected for its speed of use so as to minimize any effect of the emotion report task on the subject’s psychological state and subsequent performance on the cognitive task. Difference scores were calculated by subtracting the pre (or baseline) score from the post (arousal) score.

After the coaching session, participants completed a second measure, the Positive Affect and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988), in a
retrospective format to provide a more detailed account of their emotional experience. The PANAS assesses the extent to which the subject experienced 20 positive and negative emotions on a 5-point Likert scale. Negative Affect and Positive Affect composite scores were calculated by averaging the ten respective items in each condition. Cronbach’s alphas for the composite scores are as follows: PEA positive affect $\alpha = .91$, PEA negative affect $\alpha = .69$, NEA positive affect $\alpha = .89$, and NEA negative affect $\alpha = .78$. Additionally, individual items representing social emotions were also included in the analysis: guilt, shame, pride, and inspiration.

**Relational Measures.** Participants reported their perception of the quality of the relationship with their coach on four measures: trust, rapport, interpersonal closeness, and relational energy.

1. **Trust** was measured by asking participants to rate the degree to which they agreed with three statements about their coach on a scale of 1-5 (1 = strongly disagree; 5 = strongly agree). The items included: “I trusted her,” “She trusted me,” and “I feel safe being open and honest with her.” Cronbach’s alphas ($\alpha$) were .83 (PEA) and .72 (NEA).

2. **Rapport** was measured by a scale comprised of four items using the same item stem and response scale as the trust scale. These items included: “I liked her,” “She cared about me,” “She inspired me about my future,” and “She is a caring person.” Cronbach’s alphas ($\alpha$) were .82 (PEA) and .79 (NEA).

3. **Interpersonal Closeness** was measured by the Inclusion of Other in Self scale (IOS; Aron, Aron, & Smollan, 1992), which indicates the degree to which one individual identifies with another individual and the degree to which their
relationship is part of the first individual’s self image. This is measured with two items. The first instructs participants to choose the image that best represents their relationship with their coach from a series of increasingly overlapping circles. The second item asks participants to rate the degree to which they would use the word “we” when talking about themselves and their coach (we-ness). Both items are rated on a scale from 1-7 (1 = low IOS; 7 = high IOS). Cronbach’s alphas ($\alpha$) were .76 (PEA) and .60 (NEA).

4. **Relational Energy** is a concept that captures the degree to which one perceives a lift in their emotional affect after interacting with another individual (Owens & Baker, 2011). The relational energy scale contains five items (e.g. “I felt invigorated when I interacted with this person.”), which are rated on a scale of 1-7 (1 = strongly disagree; 7 = strongly agree). Cronbach’s alphas ($\alpha$) were .93 (PEA) and .92 (NEA).

**Physiological Measures.** Two measures of autonomic functioning were assessed during the coaching intervention: respiratory sinus arrhythmia (RSA) and skin conductance level (SCL). RSA and SCL are well-established in the biopsychological literature as indicators of the parasympathetic nervous system and sympathetic nervous system, respectively (Stern, Ray & Quigley, 2001). The data were recorded and processed using BioLab 3.0.13 ambulatory acquisition equipment from MindWare Technologies, Inc. (Ghanna, OH). Although the data were recorded continuously, they were processed at four points in time: (1) baseline – prior to coach entering the room, (2) anchor question – after the first standard question was asked, (3) session end – the last three minutes of the coaching session, and (4) at the beginning of the goal setting task.
1. *Respiratory Sinus Arrhythmia.* Electrocardiograph data were recorded using a noninvasive procedure in which pre-gelled Ag-AgCl electrodes were positioned on each subject in a Lead-II configuration (e.g. one on right collarbone and lower left rib, and grounded with one electrode on lower right rib). ECG signals were acquired and digitized at a rate of 500 Hz as recommended by Berntson et al. (1997). Participants also wore a respiration belt, which mechanically calculated the respiration rate based on expansion of the rib cage during inhalation and exhalation. To process the data, the MindWare HRV editing program calculated the inter-beat intervals (IBIs) between R-peaks in the heart period and identified physiologically improbable IBIs based on the overall IBI distribution using a validated algorithm (Berntson, Quigley, Jang, & Boysen, 1990). These were manually edited. The program then detrended the data using a first order polynomial to remove the mean and any linear trends. The residual series was then tapered with a Hamming window and submitted to a Fast Fourier Transform to derive the spectral frequency distribution. RSA was quantified as the integral power within the respiratory frequency band (0.12 to 0.40 Hz). Mean levels of baseline and task RSA values were calculated by averaging across 180-second epochs during the four time-points of interest.

2. *Skin Conductance Level.* Electrodermal activity (EDA) was acquired at a sampling rate of 500 Hz from two electrodes placed on the palm of the participant’s non-dominant hand. The data were processed using MindWare’s EDA 3.0.21 software. Since this design does not call for examining one’s response to a specific stimulus, the measure used in this analysis is mean skin
conductance (MeanSC), or the average level of skin conductance during the event block. This includes both specific responses and conductance during non-response periods.

**Goal-related Measures.** Participants’ goal-related behavior was examined through a goal-setting task at the end of the survey following each coaching session. Both qualitative and quantitative measures were used.

1. **Goal Setting: Regulatory Focus and Goal Orientation.** The effect of each coaching condition on participants’ mental states was examined through qualitative analysis of a written goal setting exercise. Subjects completed a modified version of the Twenty Statements Test (TST: Kuhn & McPartland, 1954) to report coaching-related goals. A similar adaptation was used by Fredrickson & Branigan (2005) to assess thought-action repertoires following emotional films. Grant (2012) also used an open-ended prompt technique to elicit problem-solving goals in a study of coaching questions. In the current study, participants responded to the following prompt: “Based on the conversation you had with your career advisor, please answer the following questions: (1) What goals, if any, do you have for your life and/or career? (2) Why is this goal important to you? (answer for each goal listed).” A large text box was provided for their response. There was no limit on the number of characters, nor the time the participant had to complete the exercise. The data analytic approach for the goal statements is described in the results chapter.

2. **Goal striving.** After completing the goal statement, participants were asked to identify up to three goals that were “most important to you.” For each of the top
goals identified, participants responded to three questions about goal striving: “How much joy or happiness do you or will you feel when you are successful at attaining this goal?” (value); “How much energy or effort are you willing to expend to accomplish this goal?” (effort); “How difficult is it for you to achieve this goal?” (difficulty; items selected from the Striving Assessment Scale, SAS; Emmons, 1986). These items were rated on a scale of 1-7 (1 = none; 7 = a very great extent). An overall goal striving score for value, effort, and difficulty was calculated by averaging the response to these items for all of the goals participants ranked as important. Cronbach’s alphas for these scales are as follows: PEA joy $\alpha = .71$, NEA joy $\alpha = .63$, PEA effort $\alpha = .60$, NEA effort $\alpha = .62$, PEA difficulty $\alpha = .673$, NEA difficulty $\alpha = .71$.

3. **Manifest Measures of Cognitive Task Engagement.** A number of other measures were gathered to assess differences in cognitive functioning between the two coaching conditions while participants were engaged in the goal-setting task. These included (1) time spent on task in seconds; (2) number of modifications made based on number of clicks; (3) word count of goal statements; and (4) percentage of spelling, grammar, and typographical errors per word in goal statements.

**Procedure**

Procedure. Upon arriving at the lab, each participant provided consent to participate in the study, and underwent a final prescreening which included a self-assessment of his or her mental health (DASS-21, described above). The paper DASS surveys were immediately hand-scored as a final screening. No participants were
excluded from the study for mental health reasons, and participants in violation of the other parameters were excluded during the recruitment process (i.e. were never assigned an appointment time). After asking questions regarding the study, the participant was connected to the physiological recording device. He or she then completed the electronic questionnaire on a laptop computer, which took approximately 15 minutes. This allowed the participant to become accustomed to the lab environment before recording baseline physiological measures. The laptop computer was removed and the participant was instructed to “sit quietly and relax” for a baseline recording period of five minutes. At the end of the baseline recording period, the experimenter retrieved the coach who was waiting in a different room. The experimenter and the coach entered the lab together but did not communicate with one another in order to preserve the integrity of the manipulation. The participant was positioned such that s/he was facing the coach with his/her back to the experimenter. The same experimenter conducted all of the experimental sessions in order to limit any bias introduced by the experimenter’s presence during the coaching manipulation. The coaching session entailed a dyadic conversation of approximately 30 minutes based on the intervention described below. During the coaching session, the experimenter flagged key questions common to all sessions based on the semi-structured coaching protocol in the physiological acquisition data. When the coaching session was complete, the coach exited the room and the participant was asked to “sit quietly and reflect on the conversation you just had – the topics you discussed and how it made you feel” for another physiological acquisition period of 3 minutes. He or she was then given a laptop computer by which to complete the post-questionnaire and task described below. Upon completing the electronic task, the
experimenter removed the physiological acquisition apparatus and provided either an appointment reminder or compensation to the participant. Each participant returned within 21 days to complete the second coaching session in the opposite condition with a different researcher-coach. The time between coaching sessions was limited in order to reduce the possibility of participants’ situational factors impacting the study.

Additionally, the participant met with two different coaches (one in each condition) so that the relationship established with the first coach would not contaminate the second experimental condition. Finally, all sessions were conducted in the afternoon (between the hours of 12:00-7:00pm) in order to reduce any potential effect of circadian rhythms on the physiological variables.

**Coaching Intervention.** Every participant experienced two conversations – one focused on the PEA and one focused on the NEA. In the PEA-based coaching conversation, the coach asked a series of questions intended to help the participant formulate a future vision for several aspects of his/her personal life (e.g., “Imagine it is the year 2020 and your life is ideal. What would you be doing?”). This technique was focused on the person and his/her values, hopes, and dreams. The other coach used an NEA approach to guide the conversation. The NEA was problem-focused and sought to remediate current performance concerns (e.g. “What problems or challenges are you facing at work, school, or home?”). All coaches opened the PEA and NEA session similarly and asked the same anchor question to initiate the session within the first four minutes. All sessions lasted approximately 30 minutes.

Initially, four professional coaches served as assistant researchers. A fifth coach was hired to replace one of the original four coaches whose availability was limited for
the second half of data collection. In order to minimize differences in coaching competencies and characteristics, coaches were selected based on the following criteria: (1) educational background (master’s degree in coaching-related field), (2) ICT training/certification, and (3) field-experience as an external coach. All coaches were Caucasian women between the ages of 55-60 years, and age range consistent with the average age of the majority of coaches reported in a recent international survey (Bennett & Bush, 2014). There were no male coaches in this study in order to control for coach gender.

The coaches were trained to use a standard protocol for all PEA and NEA coaching sessions (Appendix A), and practiced with volunteers who had the same characteristics as the study sample. During training, the coaches observed one another practicing the protocol, got feedback from one another and the volunteers, and raised questions about the protocol. Regular email communication and intermittent team phone calls were used to ensure maximum consistency in the coaching intervention throughout the duration of the data collection process. Individual differences in coaching style and primacy effects were controlled by counterbalancing participants by gender across the coach and condition, respectively.

**Questionnaire and Goal-setting Task.** Following each coaching session, participants completed a brief survey and computerized task on a laptop available in the coaching lab. The survey measured the emotional experience of the coaching session, the quality of the coaching relationship, and several aspects of goal-related behavior. Participants also completed the goal setting exercise at this time.
**Closing.** After the coaching intervention and computerized tasks were complete, the experimenter helped the participant remove physiological recording devices, offered a reminder of the follow-up survey, verified his or her email address, and confirmed his or her next appointment. Following the final session, the experimenter paid the participants ($25) and provided information regarding other participation incentives (a customized Learning Style Inventory feedback report and drawing for an iPad Mini). A debriefing sheet was sent to each participant one week following their final session. This delay was necessary to accommodate additional data collection related to different research questions. The entire time commitment for each participant was no more than three hours over the course of 4 weeks.

**Manipulation Check**

In order to determine that the two coaching interventions had sufficiently different effects as perceived by the participant, a 10-item manipulation check scale was included in the post-coaching survey. This scale was derived from the manipulation check used in previous fMRI studies to determine scanner eligibility after the coaching intervention. In addition to items from the trust and rapport scales, other items were “She asked abrasive questions,” “She made me feel guilty about how much effort I put in my work,” and “She made me feel defensive.” All items were rated on a scale from 1-5 (1 = strongly disagree; 5 = strongly agree). To score this scale, negatively stated items were reverse coded and the entire scale was averaged. The internal consistency of this scale was α = .85.
CHAPTER FOUR: RESULTS

Data Analysis

Data from all 48 participants are included in analyses of psychological variables (H1-H3). However, some data is missing in the physiological analyses (H4). In the RSA analyses, one entire case was lost due to a non-correctable ectopic beat and one data point was lost on a single participant due to a bad signal during the NEA condition. The wireless signal dropped during the PEA coaching session, and both ECG and EDA data were unrecoverable for three subjects. Finally, a bad EDA signal affected three participants in the PEA and one participant in the NEA. Since the data analytical approach requires listwise deletion of cases with any missing data points, the sample size was reduced to 44 for RSA and 42 for EDA repeated measures analyses.

Experimental Manipulation Check

Results of a two-tailed, paired t-test on the PEA and NEA manipulation check scores verified that participants experienced the two coaching conditions differently, t(47) = 11.8, p < .001. The PEA condition was perceived more positively (M = 4.33, SD = .45) than the NEA condition (M = 3.10, SD = .64). In addition, the results of a one-way ANOVA demonstrate there were no significant differences between coaches in the NEA condition based on the manipulation check scores. There was a significant difference between two of the four coaches in the PEA condition (Coach 1 & 4 in Table 5; F(44,3) = 3.66, p < .05). The experimental design controlled for these effects by distributing them across conditions and participants in random assignment to counterbalanced conditions. However, all main analyses were rerun excluding Coach 1
and then again excluding Coach 4. The results remained the same in both cases. Thus, the results reported here contain the full sample.

Table 5. Manipulation Check Results by Coach

<table>
<thead>
<tr>
<th>Coach</th>
<th># of sessions</th>
<th>Manipulation Check M(SD)</th>
<th># of sessions</th>
<th>Manipulation Check M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>4.0 (.30)</td>
<td>13</td>
<td>3.2 (.76)</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>4.3 (.46)</td>
<td>12</td>
<td>2.8 (.62)</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>4.4 (.45)</td>
<td>8</td>
<td>2.9 (.70)</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>4.6 (.41)</td>
<td>15</td>
<td>3.3 (.44)</td>
</tr>
</tbody>
</table>

An additional independent samples t-test was conducted to verify that manipulation check results did not differ based on the condition to which a participant was first assigned. No evidence of a carryover effect was found, PEA: \(t(46) = 1.0, p = .32\) (PEA 1\(^{st}\): \(M = 4.27, SD = .38\); NEA 1\(^{st}\): \(M = 4.40, SD = .52\)) and NEA: \(t(46) = .176, p = .86\) (PEA 1\(^{st}\): \(M = 3.08, SD = .65\), NEA 1\(^{st}\): \(M = 3.11, SD = .64\)).

**Hypothesis 1. Emotional Experience**

The first hypothesis, that a client will experience significantly more positive emotions when receiving coaching to the PEA as compared to receiving coaching to the NEA, was supported (Table 6). Paired comparison t-tests of pre and post SAM scores revealed that participants experienced a significant increase in positive emotions following the PEA coaching session, \(t(47) = -3.86, p < .001\) (Pre: \(M = 4.00, SD = .72\); Post: \(M = 4.35, SD = .57\)). There was not a significant change in arousal in the PEA condition, \(t(47) = .248, p = .81\) (Pre: \(M = 2.08, SD = .85\); Post: \(M = 2.04, SD = 1.09\)). Positive emotions decreased and arousal increased significantly following the NEA session, Affect: \(t(46) = 5.14, p < .001\) (Pre: \(M = 3.94, SD = .53\); Post: \(M = 3.32, SD = \))
.86) and Arousal: t(47) = 4.70, p < .001 (Pre: M = 2.00, SD = .92; Post: M = 2.54, SD = 1.03). The difference in these changes was significant between conditions, such that the increase in emotional valence from before to after the PEA was greater than the decrease from before to after the NEA. On the contrary, the increase in arousal from before to after the NEA session was significantly greater than the negligible change in arousal before and after the PEA.

Table 6. Differences in Emotional Experience Between PEA and NEA Conditions

<table>
<thead>
<tr>
<th></th>
<th>PEA Condition M (SD)</th>
<th>NEA Condition M (SD)</th>
<th>Paired t-test (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change (post - pre session)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional valence</td>
<td>0.36 (.64)</td>
<td>-0.62 (.82)</td>
<td>t(46) = 6.1***</td>
</tr>
<tr>
<td>Arousal</td>
<td>-0.04 (1.17)</td>
<td>0.54 (.80)</td>
<td>t(47) = -2.99**</td>
</tr>
<tr>
<td>Positive Affect</td>
<td>3.62 (.74)</td>
<td>2.93 (.77)</td>
<td>t(47) = 5.86***</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>1.23 (.28)</td>
<td>1.68 (.49)</td>
<td>t(47) = -7.13***</td>
</tr>
<tr>
<td>Discrete Emotions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ashamed</td>
<td>1.17 (.66)</td>
<td>1.48 (.77)</td>
<td>t(47) = -2.23*</td>
</tr>
<tr>
<td>Guilty</td>
<td>1.17 (.66)</td>
<td>1.75 (.79)</td>
<td>t(47) = -4.78***</td>
</tr>
<tr>
<td>Distressed</td>
<td>1.23 (.52)</td>
<td>2.13 (.91)</td>
<td>t(47) = -7.05***</td>
</tr>
<tr>
<td>Upset</td>
<td>1.06 (.25)</td>
<td>1.69 (.95)</td>
<td>t(47) = -4.86***</td>
</tr>
<tr>
<td>Hostile</td>
<td>1.02 (.14)</td>
<td>1.41 (.74)</td>
<td>t(47) = -3.73***</td>
</tr>
<tr>
<td>Irritable</td>
<td>1.10 (.37)</td>
<td>1.63 (.79)</td>
<td>t(47) = -4.24***</td>
</tr>
<tr>
<td>Nervous</td>
<td>1.69 (.78)</td>
<td>2.08 (1.05)</td>
<td>t(47) = -2.57*</td>
</tr>
<tr>
<td>Jittery</td>
<td>1.54 (.74)</td>
<td>1.96 (1.09)</td>
<td>t(47) = -2.61*</td>
</tr>
<tr>
<td>Afraid</td>
<td>1.08 (.35)</td>
<td>1.31 (.66)</td>
<td>t(47) = -2.86**</td>
</tr>
<tr>
<td>Scared</td>
<td>1.25 (.60)</td>
<td>1.31 (.55)</td>
<td>NS</td>
</tr>
<tr>
<td>Proud</td>
<td>3.50 (1.09)</td>
<td>2.92 (1.09)</td>
<td>t(47) = 3.50***</td>
</tr>
<tr>
<td>Inspired</td>
<td>3.51 (1.09)</td>
<td>2.10 (1.21)</td>
<td>t(47) = 6.93***</td>
</tr>
<tr>
<td>Interested</td>
<td>4.19 (.73)</td>
<td>3.38 (.89)</td>
<td>t(47) = 5.01***</td>
</tr>
<tr>
<td>Excited</td>
<td>3.52 (1.01)</td>
<td>2.42 (1.16)</td>
<td>t(47) = 5.78***</td>
</tr>
<tr>
<td>Strong</td>
<td>3.25 (1.00)</td>
<td>2.81 (1.07)</td>
<td>t(47) = 2.49*</td>
</tr>
<tr>
<td>Attentive</td>
<td>4.04 (.80)</td>
<td>3.73 (.87)</td>
<td>t(47) = 2.70**</td>
</tr>
<tr>
<td>Enthusiastic</td>
<td>3.98 (.91)</td>
<td>2.83 (1.10)</td>
<td>t(47) = 6.24***</td>
</tr>
<tr>
<td>Active</td>
<td>3.15 (1.13)</td>
<td>2.56 (1.22)</td>
<td>t(47) = 3.65***</td>
</tr>
<tr>
<td>Alert</td>
<td>3.67 (1.04)</td>
<td>3.52 (1.03)</td>
<td>NS</td>
</tr>
<tr>
<td>Determined</td>
<td>3.33 (1.06)</td>
<td>3.00 (1.24)</td>
<td>NS</td>
</tr>
</tbody>
</table>

* = p < .05, ** = p < .01, *** = p < .001, NS = non-significant (two-tailed)
PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor
In addition, individuals felt significantly more positive affect following the PEA condition than the NEA condition and significantly more negative affect in the NEA condition than in the PEA (Table 6). However, in both conditions individuals still reported significantly more positive affect than negative affect \([\text{PEA}: t(47) = 18.9, p < .001; \text{NEA}: t(47) = 9.2, p < .001]\). Since positive affect increased in the PEA condition, this enhanced one’s affect in a congruent direction whereas the increase in negative affect in the NEA condition in an incongruent direction may have created an experience of ‘mixed emotions.’

The affective differences in PEA and NEA conditions also held true among the emotions that comprise the PANAS (Table 6). Participants reported feeling more proud, inspired, interested, excited, strong, attentive, enthusiastic, and active in the PEA condition than in the NEA. Among these emotions, ‘inspired’ and ‘enthusiastic’ showed the strongest differentiation between conditions. In the NEA condition, participants reported feeling more ashamed, guilty, distressed, upset, hostile, irritable, nervous, jittery, and afraid than in the PEA condition. Among these emotions, ‘distressed’ differed most strongly between conditions. Three emotions did not differ significantly between conditions: scared, alert, and determined. However, the pattern was in the predicted direction with ‘scared’ being higher in the NEA and ‘alert’ and ‘determined’ being higher in the PEA.

Considering the average scores on specific emotions reported only after the PEA session, ‘interested’ \((M = 4.19, SD = .73)\) and ‘attentive’ \((M = 4.04, SD = .80)\) were the top two. Interestingly ‘attentive’ was also the highest rated emotion following the NEA
session (M = 3.73, SD = .87) and ‘alert’ was the second highest rated (M = 3.52, SD = 1.03). This pattern of attentiveness being coupled with interest in the PEA but with alertness in the NEA may be evidence of differences in self-regulatory focus, as discussed in the next chapter.

**Hypothesis 2. Quality of the Coaching Relationship**

The second hypothesis, a client will perceive greater relationship quality with the coach in the PEA condition compared to the coach in the NEA condition, was supported (Table 7), indicating that PEA-based coaching contributes to higher quality relationship in at least four key ways. First, coaching to the PEA fosters greater trust and rapport than coaching to the NEA. Second, coaching to the PEA facilitates identification with the coach as evidenced by greater interpersonal closeness, or inclusion of other in self, in the PEA compared the NEA condition. Finally, participants found their relationship with their coach to be a source of positive energy to a greater degree in the PEA condition than in the NEA condition.

**Table 7. Differences in Quality of the Coaching Relationship Between PEA and NEA Conditions**

<table>
<thead>
<tr>
<th></th>
<th>PEA Condition M(SD)</th>
<th>NEA Condition M(SD)</th>
<th>Paired t-test (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>4.12 (.65)</td>
<td>3.29 (.65)</td>
<td>t(47) = 7.05***</td>
</tr>
<tr>
<td>Rapport</td>
<td>4.21 (.58)</td>
<td>2.88 (.66)</td>
<td>t(47) = 11.46***</td>
</tr>
<tr>
<td>Interpersonal Closeness (IOS)</td>
<td>4.31 (1.41)</td>
<td>2.70 (1.08)</td>
<td>t(47) = 7.12***</td>
</tr>
<tr>
<td>Relational Energy</td>
<td>5.27 (1.19)</td>
<td>3.31 (1.28)</td>
<td>t(47) = 7.63***</td>
</tr>
</tbody>
</table>

*** = p < .001 (two-tailed)

PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor
Hypothesis 3. Goal Setting and Striving

The third hypothesis regarding the nature of goal setting in the PEA and NEA conditions was tested using both qualitative and quantitative techniques. This hypothesis has two parts: (1) A client will evince a greater promotion-focus and learning-orientation in goals formulated after receiving coaching to the PEA than coaching to the NEA and (2) a client will evince a greater prevention-focus and performance-orientation in goals formulated after receiving coaching to the NEA than coaching to the PEA. In order to test these hypotheses, participants’ goal statements were analyzed for pertinent themes. Once themes were reliably identified, they were converted to binary presence/absence scores and subjected to statistical analysis. This process yielded support for both hypotheses.

Thematic analysis of goal statements. A codebook was developed in three phases. First, a total of 19 initial themes were identified in goal statements from two subsamples: those written by subjects who were randomly assigned to the PEA-condition first (PEA 1st) and those assigned to the NEA-condition first (NEA 1st). The themes were then compared across the two sub-samples and reduced to a total of 16 themes. Using these themes, I returned to the raw data to create codes consisting of a label, description, indicators, examples, and exclusions. Finally, codes were either combined or eliminated to reach an optimal number (seven in this case). This was important for two reasons. First, research suggests individuals can hold in mind seven plus or minus two items simultaneously. Thus, the optimal number of codes a coder can reliably apply at one time is between five and nine (Boyatzis, 1998). Second, for the sake of parsimony, I wanted to identify the codes that maximally differentiated the two conditions. The final codebook is available in full form in Appendix B and is summarized in Table 8.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Aspirations</td>
<td>refers to (1) the pursuit of long-held dreams and aspirations, OR (2) desire to have a lasting impact or change on a particular field, career, or on the world at large, OR (3) the desire for mastery or lifelong learning (continual personal or professional growth, entering a profession)</td>
<td>“I have always wanted to become a professor”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“change the way we think about disorders in the psychology field”</td>
</tr>
<tr>
<td>2. Compassion</td>
<td>desire (1) for emotional closeness and caring with others and/or (2) to help other people through his/her work or life efforts</td>
<td>“Have caring friends in my life”</td>
</tr>
<tr>
<td>3. Heartfelt connection to goals</td>
<td>use of language that portrays deep enthusiasm, passion, appreciation or love in relation to his/her aspiration or goal</td>
<td>“I would love to see patients”; “I have a passion for solving problems”</td>
</tr>
<tr>
<td>4. Proximal &amp; instrumental goals</td>
<td>desire for short-term achievement or acquisition of skills that impede another accomplishment; these desires represent a means to an end rather than the desired end-state or outcome</td>
<td>“Graduate with my Ph.D.”</td>
</tr>
<tr>
<td>5. Reference to external expectations</td>
<td>the need to conform to external social expectations or fulfill an obligation</td>
<td>“find an internship that is okay with my advisor”</td>
</tr>
<tr>
<td>6. Prevention concerns</td>
<td>participant (1) describes his/her goal as providing a sense of stability or security, OR (2) expresses a desire to avoid an undesirable state or outcome</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“without the funding uncertainty of career in academia”</td>
</tr>
<tr>
<td>7. Uni-dimensional focus</td>
<td>entire goal statement includes goals for only one life sphere (usually the career).</td>
<td></td>
</tr>
</tbody>
</table>
The author first applied codes. A second researcher blind to the condition in which the goal statement was written also coded the data independently. These two individuals achieved an interrater reliability of 90.6% on the presence/absence of codes. After reconciling codes, 100% agreement was achieved. Coded data was then entered as a binary variable into the database (0 = absent; 1 = present).

*Statistical analysis of themes.* The presence of these themes was significantly different in the two conditions, based on McNemar’s repeated measures chi-square tests (Table 9). Participants expressed significantly more aspirations and compassion in goal statements written after the PEA coaching session than after the NEA. They also expressed more heartfelt connection, or passionate enthusiasm, to these goals. Embedded in the theme of “aspirations” is both an orientation toward mastery and a desire to pursue one’s dreams, which evidence a learning-orientation and promotion-focus, respectively. Since this theme occurred at twice the rate in the PEA, H3a was supported.

In the NEA condition, participants set significantly more proximal and instrumental goals than in the PEA condition, which evidences a performance-orientation. Participants in the NEA also expressed greater prevention concerns and referenced a desire to comply with external expectations, or ‘ought selves,’ which supports H3b by providing evidence of a prevention-focus. Finally, participants in the NEA condition were more likely to focus only on one life domain in their goal statement. Most often this domain was work, with no reference to aspects of one’s life outside of work.
Table 9. Differences in Themes Expressed in PEA and NEA Goal Statements

<table>
<thead>
<tr>
<th>Theme</th>
<th>PEA Condition</th>
<th>NEA Condition</th>
<th>McNemar’s RM (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent Present (frequency)</td>
<td>Percent Present (frequency)</td>
<td>$x^2$</td>
</tr>
<tr>
<td>Aspirations</td>
<td>60.4% (29)</td>
<td>29.2% (14)</td>
<td>9.8**</td>
</tr>
<tr>
<td>Compassion</td>
<td>56.3% (27)</td>
<td>18.8% (9)</td>
<td>13.5***</td>
</tr>
<tr>
<td>Heartfelt Connection to Goals</td>
<td>29.2% (14)</td>
<td>10.4% (5)</td>
<td>6.2*</td>
</tr>
<tr>
<td>Proximal &amp; Instrumental Goals</td>
<td>16.7% (8)</td>
<td>50.0% (24)</td>
<td>16.0***</td>
</tr>
<tr>
<td>Reference to External Expectations</td>
<td>2.1% (1)</td>
<td>14.6% (7)</td>
<td>6.0*</td>
</tr>
<tr>
<td>Prevention Concerns</td>
<td>16.7% (8)</td>
<td>37.5% (18)</td>
<td>6.3*</td>
</tr>
<tr>
<td>Unidimensional Focus</td>
<td>6.3% (3)</td>
<td>29.2% (14)</td>
<td>8.1**</td>
</tr>
</tbody>
</table>

* = p < .05, ** = p < .01, *** = p < .001

PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor
Note: Uncorrected chi-square values are reported with 1 degree of freedom; chi-square tests run with Yates correction were significant at the same value of p (Newcombe, 1998)

It should be noted that McNemar’s chi square analyses revealed no significant differences in a theme category based on which condition a participant had first. In other words, those who had the PEA first did not describe significantly more or less “aspirations” in the PEA goal statement than those who had the NEA first. The same held true for all themes in both conditions. However, the first condition did have a spillover effect on the proportion of themes present relative to the other condition (Table 10). Differences in two themes were robust to the condition participants received first: (1) compassion and (2) proximal & instrumental goals. In other words, there were significantly more compassion and fewer proximal/instrumental goals in the PEA goal statements regardless of which condition the participant received first. In addition, having
the NEA first seemed to dampen the difference in promotion-related themes of aspirations and heartfelt connection between the two conditions. This is because these themes were less frequent in the PEA condition and more frequent in the NEA condition among participants who had the NEA first.

Table 10. Spillover Effect of First Condition on Nature of Goals Set

<table>
<thead>
<tr>
<th></th>
<th>PEA 1&lt;sup&gt;st&lt;/sup&gt;</th>
<th>NEA 1&lt;sup&gt;st&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Presence in PEA</td>
<td>Presence in NEA</td>
</tr>
<tr>
<td>Aspirations</td>
<td>65.4%</td>
<td>26.9%*</td>
</tr>
<tr>
<td>Compassion</td>
<td>53.8%</td>
<td>15.4%**</td>
</tr>
<tr>
<td>Heartfelt Connection to Goals</td>
<td>34.6%</td>
<td>7.7%*</td>
</tr>
<tr>
<td>Proximal &amp; Instrumental Goals</td>
<td>15.4%</td>
<td>42.3%*</td>
</tr>
<tr>
<td>Reference to External Expectations</td>
<td>3.8%</td>
<td>11.5%&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Prevention Concerns</td>
<td>19.2%</td>
<td>38.5%</td>
</tr>
<tr>
<td>Unidimensional Focus</td>
<td>7.7%</td>
<td>30.8%</td>
</tr>
</tbody>
</table>

Significance level of McNemar’s chi-square values: * = p < .05, ** = p < .01
<sup>a</sup>Cannot compute because the value of one cell is 0.

PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor

*Engagement in Goal Setting Task.* Although the nature of the goals differed between conditions, it appears participants were equally engaged in the task in both conditions (Table 11). Participants spent a similar amount of time on task, made a similar number of modifications, and wrote a similar number of words in both conditions. There was one exception – participants did make significantly more spelling errors in the NEA
condition. This, coupled with RSA data presented in the post hoc analyses, suggests participants suffered attentional deficits during the goal setting task after the NEA coaching session.

Table 11. Engagement in Goal Setting Task

<table>
<thead>
<tr>
<th></th>
<th>PEA Condition M(SD)</th>
<th>NEA Condition M(SD)</th>
<th>Paired t-test (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time on task</td>
<td>236.9 (130.2)</td>
<td>219.8 (194.0)</td>
<td>t(47) = 0.71 NS</td>
</tr>
<tr>
<td>Modifications (clicks)</td>
<td>4.44 (3.92)</td>
<td>3.42 (3.51)</td>
<td>t(47) = 1.44 NS</td>
</tr>
<tr>
<td>Word count</td>
<td>103.3 (73.8)</td>
<td>96.4 (79.0)</td>
<td>t(47) = 0.67 NS</td>
</tr>
<tr>
<td>Spelling error percentage</td>
<td>0.43%</td>
<td>0.99%</td>
<td>t(47) = -1.96+</td>
</tr>
</tbody>
</table>

+= p = .056, NS = non-significant (two-tailed)
PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor

**Goal Striving.** PEA and NEA coaching also have differential impacts on various aspects of goal striving (Table 12). First, when given an opportunity to rank up to three important goals expressed in their goal statements, participants listed significantly more goals after PEA coaching than after NEA coaching. Participants viewed their goals as being equally difficult in the two conditions, but were willing to expend more effort to achieve them and found more joy in thinking about their goals following the PEA coaching than the NEA coaching. When considering only their most important goal, participants also saw this goal as significantly more difficult to achieve in the NEA condition than in the PEA condition. Their level of effort and joy remained significantly greater in the PEA than the NEA.
Table 12. PEA and NEA-related Differences in Goal Striving

<table>
<thead>
<tr>
<th></th>
<th>PEA Condition M(SD)</th>
<th>NEA Condition M(SD)</th>
<th>Paired t-test (n = 48)</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Important goals listed</td>
<td>2.72 (.54)</td>
<td>2.43 (.68)</td>
<td>t(46) = 3.11**</td>
</tr>
<tr>
<td>Overall Effort</td>
<td>6.20 (.70)</td>
<td>5.95 (.79)</td>
<td>t(47) = 2.07*</td>
</tr>
<tr>
<td>Overall Joy</td>
<td>5.95 (.98)</td>
<td>5.24 (1.4)</td>
<td>t(47) = 3.48***</td>
</tr>
<tr>
<td>Overall Difficulty</td>
<td>4.43 (.94)</td>
<td>4.63 (.97)</td>
<td>t(47) = -1.66 NS</td>
</tr>
<tr>
<td>#1 Goal Effort</td>
<td>6.65 (.64)</td>
<td>6.25 (.81)</td>
<td>t(47) = 2.73**</td>
</tr>
<tr>
<td>#1 Goal Joy</td>
<td>5.92 (1.3)</td>
<td>5.25 (1.6)</td>
<td>t(47) = 2.86**</td>
</tr>
<tr>
<td>#1 Goal Difficulty</td>
<td>4.31 (1.3)</td>
<td>4.69 (1.1)</td>
<td>t(47) = -2.24*</td>
</tr>
</tbody>
</table>

* = p < .05, ** = p < .01, *** = p < .001, NS = non-significant (two-tailed)
PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor

**Hypothesis 4. Autonomic Activity**

It was hypothesized that participants would demonstrate significantly higher parasympathetic activity (RSA) in the PEA coaching condition as compared to the NEA condition, and the opposite would be true of sympathetic activity (skin conductance level). Repeated measures analyses of variance revealed significant differences in neither the main effect of condition nor interaction effects on either measure. The main effect of time was significant for SCL only. Thus, this hypothesis was not supported by the main analyses. However, both hypotheses were supported in part by post hoc analyses presented at the end of this chapter.

*Respiratory sinus arrhythmia (RSA).* A 2 (condition) x 3 (time) repeated measures ANOVA was conducted to compare the effects of the coaching condition on RSA at three points in time: before the coaching session, at the anchor question, and at the end of the coaching session (Figure 2). No significant main effects nor interaction effects were found. Greenhouse-Geisser corrections were used to account for violations of the
assumption of sphericity, Condition (PEA, NEA): F(1, 43) = 0.07, p = .788; Time (baseline, anchor question, end): F(2, 86) = 1.15, p = .305; Condition*Time interaction: F(2, 86) = 0.77, p = .444.

Figure 2. Effect of Condition on RSA During Coaching

Skin Conductance Level (SCL). A 2 (condition) x 3 (time) repeated measures ANOVA was also conducted to compare the effects of the coaching condition on skin conductance level (MeanSC). Only a significant main effect of time was found, F(2, 82) = 81.09, p < .001, $\eta^2 = .664$ (Figure 3). The condition factor and interaction were both non-significant. Greenhouse-Geisser corrections were used to account for violations of the assumption of sphericity, Condition: F(1,41) = .034, p = .855; Condition*Time interaction: F(2, 82) = .556, p = .584.
Figure 3. Effect of Condition on Skin Conductance During Coaching

Post Hoc Analyses

Analysis 1. Individual differences in resting (baseline) RSA, referred to as vagal tone, have been associated with cardiovascular health, emotion and attention regulation, anxiety, and depression (Appelhans & Luecken, 2006). Individuals with lower vagal tone tend to be more emotionally reactive (Butler et al., 2004) and less able to regulate negative affective behavior (Demaree et al., 2004). In addition, individuals with greater social anxiety show less ability to suppress vagal tone in stressful social situations (Movius & Allen, 2005). A post hoc analysis was conducted to determine if individual variations in vagal tone contributed to different parasympathetic responses to PEA and NEA-based coaching,

Vagal tone was calculated by averaging the baseline RSA scores in both conditions. Then the full sample was split along the median resulting in two groups of 24 whose
average vagal tone scores were significantly different, \( t(46) = -7.15, p < .001 \), (lower VT: M = 5.93, SD = .97; higher VT: M = 7.55, SD = .55). ‘Reactivity’ variables were calculated to capture the change in RSA by subtracting baseline RSA from time 1 (anchor question) and time 2 (session end) RSA in each condition. RSA reactivity differed significantly between the lower and higher vagal tone groups, such that RSA increased among the lower vagal tone group and RSA decreased among the higher vagal tone group from baseline at both time 2 and time 3 in both conditions (Table 13).

Table 13. Differences in RSA Reactivity Between Vagal Tone Groups

<table>
<thead>
<tr>
<th></th>
<th>Lower Vagal Tone M(SD)</th>
<th>Higher Vagal Tone M(SD)</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEA Baseline</td>
<td>5.82(1.2)</td>
<td>7.63(0.6)</td>
<td>( t(46) = -6.55*** )</td>
</tr>
<tr>
<td>Anchor Question Reactivity</td>
<td>0.49(1.0)</td>
<td>-0.71(0.8)</td>
<td>( t(45) = 4.47*** )</td>
</tr>
<tr>
<td>Session End Reactivity</td>
<td>0.34(1.0)</td>
<td>-0.70(0.9)</td>
<td>( t(44) = 3.86*** )</td>
</tr>
<tr>
<td>NEA Baseline</td>
<td>6.03(1.0)</td>
<td>7.45(0.7)</td>
<td>( t(45) = -5.748*** )</td>
</tr>
<tr>
<td>Anchor Question Reactivity</td>
<td>0.39(0.9)</td>
<td>-0.81(0.8)</td>
<td>( t(44) = 4.81*** )</td>
</tr>
<tr>
<td>Session End Reactivity</td>
<td>0.40(0.8)</td>
<td>-0.53(1.0)</td>
<td>( t(45) = 3.70*** )</td>
</tr>
</tbody>
</table>

*** = \( p < .001 \) (two-tailed)

PEA = Positive Emotional Attractor; NEA = Negative Emotional Attractor
Note: Reactivity = change in RSA based on difference score (i.e. \( T_{2\text{anchor}} - T_{1\text{baseline}} \) and \( T_{3\text{session \ end}} - T_{1\text{baseline}} \))

Separating these two groups in repeated measures ANOVA analyses revealed further distinctions among individuals who have lower versus higher vagal tone.

Although neither full model was significant, the trends point to group differences in reactions to the PEA and NEA (Figure 5). Among those with lower vagal tone, RSA was higher in the NEA condition than in the PEA condition (opposite the prediction, but not
significant, $p = .098$). In the NEA, RSA continued to rise slightly from the beginning to the end of the coaching session whereas RSA fell during the same time period in the PEA (NS). The slope of this trend was steeper in the PEA decrease than in the NEA increase. Time varied significantly such that RSA was significantly higher at both time points during the coaching session (T1 and T2) than at baseline (T1). There was no significant difference between T2 and T3, Condition (PEA, NEA): $F(1,21) = 3.00, p < .098$, Time (baseline, anchor, end): $F(2, 42) = 5.55, p < .05$, $\eta^2 = .209$, Condition*Time interaction: $F(2, 42) = 0.29, p = .675$.

Figure 4. Effect of Condition on RSA in Vagal Tone Groups

Among those with higher vagal tone, RSA was marginally higher in the PEA condition than NEA condition, $F(1,21) = 3.73, p = .067$, $\eta^2 = .497$. The slope of RSA change in the NEA condition was more extreme than in the PEA condition (RSA decreased from baseline to anchor question at beginning of coaching session and increased from anchor question to end of coaching session in both conditions). Time was significant, such that there were meaningful differences between every time point. RSA
was lowest just after the anchor question was asked, Time (baseline, anchor, end): F(2, 42) = 20.74, p < .001, \( \eta^2 = .497 \), Condition*Time interaction: F(2, 42) = 0.48, p = .606. Note that the vagal tone median split had no effect on the skin conductance analyses.

Correlations of individual difference variables in this study revealed a significant, positive relationship between vagal tone and reward responsiveness (r = .313, p < .05). Consistent with findings from Movius and Allen (2005), vagal tone was not related to other dimensions of behavioral activation or inhibition. Self-regulatory focus and cognitive style were also not related to vagal tone. Higher and lower vagal tone groups differed significantly in reward responsiveness (BAS), t(46) = -2.08, p < .05 (two-way). Those with higher vagal tone demonstrated greater reward responsiveness (M = 4.28, SD = .47), whereas those with lower vagal tone demonstrated lower reward responsiveness (M = 3.99, SD = .48).

Additionally, the results of the other analyses in this study did not differ by vagal tone group with two exceptions. Among those in the higher vagal tone group, no significant difference was found in change in emotional arousal or shame between PEA and NEA conditions. Among those in the lower vagal tone group there was no significant difference in pride between the two conditions. In both cases, these variables differentiated between conditions in the full sample. Since other hypotheses were largely unaffected by vagal tone group, the varying patterns of RSA reactivity may also be a statistical artifact of regression to the mean. This possibility is discussed in more detail in the next chapter.

*Analysis 2.* In order to better account for individual variations in baseline scores, RSA and Skin Conductance data were subjected to general linear model (GLM) mixed
model analysis. This analytical method offers several advantages over repeated measures analysis of variance. Most importantly, it accounts for individual differences at the baseline measure, as well as other controls such as gender and heart rate. It also accounts for missing data (Bagiella, Sloan, & Heitjan, 2000). In order to conduct this analysis, RSA and mean skin conductance were calculated for an additional time point, a 180-second period following the coaching session in which the participants were given the following instructions: “sit quietly and reflect on the coaching conversation you just had, what was discussed, and how it made you feel.”

Mixed model analyses were conducted using the statistical package ‘lmer’ in R. The two statistical models included condition (PEA, NEA), percent change from baseline heart rate, gender, baseline RSA (or skin conductance) and interactions with condition as the predictor variables and either RSA or skin conductance as the outcome variable. Condition was the focal predictor and was not significantly associated with RSA. However, the interaction of condition with baseline skin conductance was suggestive of an association with skin conductance (Table 14).

Looking at the first three measurements post baseline (anchor question, session end, and arousal reflection), the interaction between condition and baseline skin conductance approaches significance (z = 1.710; p = 0.087) in its association with skin conductance. After controlling for change in baseline heart rate (%) and gender in the PEA condition (1), a one unit increase in baseline skin conductance increased post baseline skin conductance by 0.86 units (p < 0.001; 95% CI [0.80, 0.92]). Using the same controls in the NEA condition (0), a one unit increase in baseline skin conductance increased post baseline skin conductance by 0.94 units (p < 0.001; 95% CI [0.86, 1.01]).
Gender was not significantly associated with skin conductance (p = 0.86). These results suggest that participants had a greater stress response (skin conductance) in the NEA condition than the PEA condition, after other factors were controlled.

Table 14. Skin Conductance Mixed Model (Fixed Effects)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Std. Error</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-7.77</td>
<td>1.69</td>
<td>-4.61</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Condition (0/NEA)</td>
<td>-0.51</td>
<td>0.46</td>
<td>-1.11</td>
<td>0.268</td>
</tr>
<tr>
<td>Gender</td>
<td>0.10</td>
<td>0.58</td>
<td>0.18</td>
<td>0.860</td>
</tr>
<tr>
<td>% Change in HR</td>
<td>1.14</td>
<td>0.15</td>
<td>7.57</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Baseline Mean SC</td>
<td>0.86</td>
<td>0.04</td>
<td>23.12</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Condition*Baseline</td>
<td>0.07</td>
<td>0.04</td>
<td>1.71</td>
<td>0.087</td>
</tr>
</tbody>
</table>

**Analysis 3.** Fredrickson’s (2001) broaden and build theory holds that fleeting positive emotions broaden one’s perspective and build a reservoir of resources with which to respond to future stressors. On the other hand, Baumeister et al. (2001) presented compelling evidence that the effects of negative emotions last longer than positive emotions and impair executive functioning (Baumeister et al., 2002). Taking these two perspectives together, one would expect coaching to the PEA to bolster participants’ ability to set goals after the session. On the other hand, participants in the NEA condition may have more difficulty attending to this task because they are pre-occupied with lingering negative emotions.

In order to test this notion, a post hoc analysis of RSA during the goal setting task was conducted. Based on prior research documenting a drop in RSA during tasks that require working memory and sustained attention (Suess, Porges, & Plude, 1994; Hansen,
Johnsen, & Thayer, 2003), it was expected that RSA would drop lower during goal setting in the PEA condition than in the NEA condition. In other words, one would expect an interaction effect of condition and time on vagal withdrawal.

RSA was calculated for a 180-second epoch at the beginning of the goal setting task for 43 participants. Missing data from the remaining five subjects was due to errors in the epoch trigger (2), an uncorrectable ectopic beat (1), and poor signal quality (2) in one condition or the other.

A 2 (condition) x 2 (time) repeated measures ANOVA revealed a significant effect of time and interaction, Condition (PEA, NEA): \( F(1,42) = 2.58, p = 0.12 \), Time (baseline, goal setting): \( F(1, 42) = 43.5, p< .001, \) \( \eta^2 = .509 \), and Condition*Time interaction: \( F(1, 42) = 3.68, p = .056, \) \( \eta^2 = .081 \). As depicted in Figure 4, RSA dropped significantly from baseline to the goal setting task in both conditions. However, this vagal withdrawal was greater in the PEA condition than in the NEA condition. The model was not significant for skin conductance, suggesting the PEA condition facilitated autonomic flexibility stemming from the parasympathetic system but not the sympathetic nervous system.

To further validate that reduced vagal withdrawal in the NEA condition was indicative of attentional deficits, a variable capturing the number of spelling errors as a percent of total word count was calculated for each goal statement. In the NEA condition, participants made a higher percentage of spelling errors than in the PEA condition even though they spent the same amount of time on task, \( t(47) = -1.956, p = .056 \). (PEA: \( M = 0.43\% \), \( SD = 1.0 \); NEA: \( M = 0.99\% \), \( SD = 1.8 \)). This provides partial support for H4a in that coaching to the PEA optimized the PNS to respond to environmental demands.
Figure 5. Vagal Withdrawal from Baseline to Goal Setting
CHAPTER FIVE: DISCUSSION AND CONCLUSION

Discussion

Taken together, these findings provide evidence that PEA and NEA-based coaching interactions do indeed have different emotional, relational, cognitive, and physiological effects. As predicted, the PEA was associated with greater positive affect, higher relationship quality, motivation supportive of complex goal pursuit, and parasympathetic activity. (Albeit, the latter was not as expected). The NEA, on the other hand, was associated with greater negative affect, lower quality relationship, less motivation to pursue complex goals, and greater sympathetic activity (again, not in the expected manner). An expanded interpretation of these findings follows.

Based on the change in emotional valence and self-reported arousal, engaging in the PEA-based coaching conversation was emotionally uplifting whereas the NEA-based coaching conversation was distressing and stimulating (decrease in emotional valence and increase in arousal). Furthermore, the PEA did more to uplift participants’ emotions than the NEA did to dampen them. The NEA conversation was far from devastating.

Although participants reported greater positive affect than negative affect in both conditions, positive affect was higher in the PEA than in the NEA condition and the opposite was true for negative affect. In particular, the strongest differences were in feeling more inspired and enthusiastic after the PEA than after the NEA and more distressed after the NEA than the PEA. These results, coupled with the experience of mixed emotions following the NEA session, suggest the NEA condition may create greater emotion-regulation demands that detract from the aims of coaching.
Given the PEA and NEA were linked through the experimental manipulation to the ideal self and real self, respectively, these findings add to prior work by providing a direct psychological measure of emotional differences in these two aspects of ICT (Howard, 2006). Considering each condition separately, the specific emotion ratings also provide a link between emotional attractors and self-regulatory focus (Higgins et al., 1994). The results of the current study demonstrate that both the PEA and NEA strongly evoke attentiveness. However, attentiveness is coupled with interest in the PEA but with alertness in the NEA as the two strongest emotions in each condition. An attentive-interested emotional state (PEA) can be likened to the eager-approach motivational state associated with a promotion-orientation, whereas an attentive-alerted emotional state (NEA) is akin to the vigilant avoidance state of prevention-orientation. This finding provides further evidence that a coach can evoke different self-regulatory states in clients, which influence subsequent goal-related behavior (Sue-Chan et al., 2012).

Among the three PANAS emotions that did not differ significantly between the PEA and NEA, ‘determined’ is of particular interest because of its relationship to positive-approach motivation and similarity to the expression of anger (Harmon-Jones, Schmeichel, Mennitt, & Harmon-Jones, 2011). Although participants reported feeling slightly more determined following the PEA coaching conversation ($M_{\text{PEA}} = 3.33$, $M_{\text{NEA}} = 3.00$), the difference was not significant. There are two plausible explanations for this. First, participants may have inflated their ratings of the word ‘determined’ in the absence of an option to express anger following the NEA coaching session. Determination has been found to be perceptually similar to anger, an emotion that shares the motivational direction of approach behavior but has a negative rather than positive valence (Harmon-
Jones et al., 2011). In the NEA condition, it could be that the ‘determined’ score was reflective of an anger response to feeling insulted by the coach (Harmon-Jones, Vaughn-Scott, Mohr, Sigelman, & Harmon-Jones, 2004) whereas ‘determined’ reflected true positive affect (approach motivation and positive valence) in the PEA condition. A second explanation could be that the PEA and NEA evoke an equivalent sense of determination. However, ICT holds that if this were true, determination arising from the NEA would motivate behavior only in the short-term and would not be sustainable to the same degree as determination arising from the PEA (Boyatzis, Smith & Blaize, 2006). The two other emotions that did not differentiate, alert and scared, are not discussed in further detail because they do not have a direct relationship to approach-oriented behavior.

This research also links the PEA and NEA to the quality of the coaching relationship. Numerous studies point to relational qualities of trust, rapport, challenge, and support as fundamental to achieving the goals of a coaching engagement (Gyllensten & Parker, 2007; Bluckert, 2005; Gregory & Levy, 2010). In fact, in a pre-post field study of a leadership development program for managers, Baron & Morin (2009) found that the quality of the coach relationship mediated the relationship between the number of coaching sessions and a client’s enhanced self-efficacy. Higher quality relationships achieved the goal of enhancing self-efficacy more rapidly. From a qualitative perspective, Gyllensten & Parker (2007) found that trust and transparency were necessary to establish a positive coaching relationship among individuals who had gone through a workplace coaching process. This relationship promoted clients’ psychological safety and a sense they've been listened to as a basis for the coaching process.
Given that participants in this study perceived greater trust, rapport and closeness with the coach in the PEA condition, it is clear that PEA-based coaching is essential to building a positive, resonant coaching relationship. Coaches can evoke the PEA through compassion, hope, mindfulness, and playfulness. This involves discussing possibilities, dreams, and hopes for the future (Boyatzis, 2006, 2008; Howard, 2006, 2009) and inspiring a sense of joy and excitement about one’s calling, passion, values, and purpose (Boyatzis & Akrivou, 2006). In addition to the positive questioning techniques used in this study, coaches in Gyllensten & Parker’s (2007) study built trust through maintaining confidentiality and transparency through open explanation of theoretical underpinnings of the coaching process. Communicating empathy and compassion also builds coaching relationships (Boyatzis, Smith, & Blaize, 2006).

Building a relationship on solely PEA-interactions is unrealistic. However, resonance arising from PEA provides a foundation that enables coaching relationships to withstand and even grow from certain NEA-interactions. Attachment theory would refer to this as a “secure attachment,” characterized by the ability of both parties to "feel" and appropriately "deal" with emotions in the context of working relationships (Bowlby, 1969; Nielsen, 2008). Secure attachments promote exploration, learning, and collaboration in the workplace, and reduce the likelihood of engaging in defensive behaviors. Acute periods of NEA can be productive in moving a relationship forward because it signals that something in the relationship needs attention and, once resolved, builds relational resilience. In these cases, dissonance is not a static state, but part of the natural evolution of growth-fostering relationships (Jordan & Cooley, 2000).

In the NEA condition, it is important that coaches carefully attend to the fine line
between challenge and threat. Challenge produces the relational benefits described above, whereas threat shuts down relational development. Coaches evoke threatening levels of NEA when they put the client on the defensive or use shame or guilt to elicit compliance (Boyatzis, Smith, & Blaize, 2006). These can have devastating effects on the coaching relationship, as negative emotions affect relationships more strongly than positive ones (Baumeister et al, 2001). In addition to deteriorating the quality of the relationship, dissonance can exhaust a client’s self-regulatory resources, thereby draining executive resources for other functions such as intelligent thought (executive functioning, thinking, and reasoning; Baumeister, Twenge, & Nuss, 2002).

A novel contribution of this research links coaching to the PEA and NEA with goal-related behavior. Thematic analysis of goal statements revealed a difference in regulatory focus between conditions. The PEA was associated with promotion-focused qualities such as articulating aspirations and expressing a heartfelt connection to those aspirations (eager approach). A prevention-focus was more frequent in the NEA condition, as evidenced by expression of prevention concerns, such as a desire for security, and short-term instrumental goals. These relationships held true regardless of whether the participant had the PEA or NEA first. While this finding may appear to suggest that the order does not matter, a more plausible interpretation is that the finding reflects the efficacy of the research design in isolating the two conditions. Measures were taken to eliminate ordering effects through temporal spacing (two weeks between sessions) and by having a different coach in each condition. Thus, one should be cautious in drawing conclusions about ordering effects based on these findings.

Higgins, Shah, & Friedman (1997) hold that individuals’ trait-level of self-
regulatory focus determines their proclivity for setting promotion- or prevention-oriented goals, and that this can be measured by the rate at which they identify and record goals in each category. Given that no differences were found in the time participants spent on the goal-setting task between the PEA and NEA conditions, the present study suggests that the self-regulatory state induced by the coaching conversation overrode individuals’ trait-levels of self-regulatory focus. In addition, post-hoc binary logistic regressions revealed that the presence of these themes in goal statements was not predicted by trait-level self-regulatory focus. Additionally, no correlation existed between self-regulatory focus and time spent completing the goal statement or the number of modifications made. Thus, it can be interpreted that the coaching intervention influenced individuals’ motivational orientation for promotion or prevention during goal setting. This is consistent with findings from a recent fMRI study in which PEA-based coaching was found to activate the same neural network as global visual attention - the same network that is associated with promotion-oriented motivation. Similarly, NEA-based coaching and local visual attention share an overlapping network associated with a prevention-orientation (Passarelli, Abou Zeki, Boyatzis, Dawson, & Jack, 2013; Förster & Higgins, 2005).

That the coach can influence a client’s self-regulatory stance toward goal pursuit connects to and extends work by Fitzsimons & Bargh (2003) which found the psychological presence of a relationship partner – simply thinking about the other person in his or her absence – can activate goals that are congruent with that relationship. Such activations were reported to influence goal-directed behavior at an unconscious level. Given that participants were prompted to set goals “based on your conversation with your coach,” it is likely the mere reminder of the coach influenced participants’ self-regulatory
Furthermore, participants reported differences in their willingness to strive toward the goals they set after the PEA and NEA coaching sessions. This is consistent with results from both a laboratory and field study in which Sue-Chan, Wood, and Latham (2012) found promotion-oriented coaching had a greater effect on performance than prevention-oriented coaching. The exception was that prevention-oriented coaching was associated with greater performance among individuals who had a fixed view of human intelligence (i.e. those who believe people cannot grow or develop). Coaching to the PEA (promotion) was found to inspire striving toward one’s goals to a greater degree than coaching to the NEA (prevention).

Given the striking differences in emotional, motivational, and relational factors between conditions, the lack of differentiation in PNS and SNS activity during the coaching session was surprising. Post hoc analyses suggest that differentiation does occur – once participants are no longer engaged in the coaching conversation. Given the complexity of acquiring physiological data in real-time, it is likely the post hoc analyses represent a more reliable account of physiological arousal between conditions. Results from the main analyses are discussed first, followed by the post hoc analyses.

A possible interpretation of the increase in skin conductance level during the coaching conversation is that both PEA-based and NEA-based coaching conversations are stimulating in real time. The lack of differentiation in cardiovascular reactivity (PNS) may be due to a number of factors. First, discussing one’s ideal future may be equally as stressful in the moment as discussing current problems and challenges. Anecdotal evidence from a group of professional coaches suggests that engaging new clients in the
process of developing a person vision can be quite difficult – especially at the beginning of a coaching relationship. Thus, individuals who find ‘dreaming’ difficult or a surprising aspect of coaching may actually be mildly threatened by a PEA coaching interaction of this nature (Mendes, Blascovich, Hunter, Lickel, & Jost, 2007).

Second, meeting a new coach in each condition might have put participants on high alert such that the demands of interacting with a stranger masked the PNS-enhancing effects of the PEA. With growing familiarity, I predict that PNS would be higher in both conditions, but more so in the PEA assuming a resonant relationship was established.

Third, physiological confounds may exist. For example, there may be systematic differences between conditions in inspiratory depth, which could not be accounted for in the current study. Also, individual differences in vagal tone may give rise to trends in RSA reactivity that complicate the current analysis. Patterns that emerged from the first post hoc analysis suggest individuals with lower vagal tone may be more sensitive to the NEA-based coaching than individuals with higher vagal tone (Table 15). Further research is needed to determine if these individual differences are meaningful and in fact represent greater difficulty of lower vagal tone individuals in regulating their emotional response to the NEA.
Table 15. Summary of RSA Reactivity Patterns by Vagal Tone Group

<table>
<thead>
<tr>
<th>Lower Vagal Tone</th>
<th>Higher Vagal Tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>• RSA increased from baseline to coaching session in both conditions</td>
<td>• RSA decreased from baseline to coaching session in both conditions</td>
</tr>
<tr>
<td>• RSA greater in the NEA than the PEA (NEA &gt; PEA)</td>
<td>• RSA lower in the NEA than the PEA (NEA &lt; PEA)</td>
</tr>
<tr>
<td>• In NEA, RSA increased from anchor to end</td>
<td>• In NEA, RSA increased from anchor to end</td>
</tr>
<tr>
<td>• In PEA, RSA decreased from anchor to end</td>
<td>• In PEA, RSA increased from anchor to end</td>
</tr>
<tr>
<td>• Slope of change from anchor to end steeper in PEA</td>
<td>• Slope of change from anchor to end steeper in NEA</td>
</tr>
<tr>
<td>• Less reward responsive</td>
<td>• More reward responsive</td>
</tr>
</tbody>
</table>

RSA = respiratory sinus arrhythmia (index of parasympathetic nervous system activity)

An alternative interpretation is that the trend simply represents a regression to the mean. Regression to the mean is a well-documented statistical phenomenon that occurs when a non-random subsample is taken from the population (e.g. median split on baseline scores) and modeled against a second, imperfectly correlated variable (Trochim, 2006). In this analysis, even though each case was assigned to their respective vagal tone group because their baseline scores were highest or lowest, it is unlikely that every individual in these groups will remain in the highest/lowest category on subsequent measures. When even a few of these scores move down (in higher VT group) or up (in lower VT group), the group mean will move toward the population average. Based on visual inspection of Figure 4, regression to the mean is a plausible explanation.

Finally, studies of RSA reactivity report inconsistent results and few examine the phenomena in the context of social interaction. This study hypothesized that an increase in RSA would be higher in the PEA condition based on prior research linking increases in RSA to positive emotions (Appelhans & Luecken, 2006). However, an alternate hypothesis that has been empirically validated is that increases in RSA are associated
with emotion regulation efforts in social situations (Butler, Wilhelm, & Gross, 2004). Following the latter line of reasoning, RSA would be higher in NEA because the person is expending more energy controlling their emotions. Additionally, Fredrickson et al. (2000) suggests “perhaps positive emotions do not themselves generate cardiovascular reactivity, but instead quell any existing cardiovascular reactivity caused by negative emotions. Put differently, a prior state of negative emotional arousal may be a necessary backdrop to illuminate the cardiovascular impact of positive emotions” (p. 240). This “undoing effect” of positive emotions explains why coaching is often a source of renewal for executives suffering from sacrifice syndrome and for their coach (Boyatzis, Smith, & Blaize, 2006).

The physiological evidence does not align with the psychological evidence of the impact of real-time PEA and NEA coaching interactions. Given that physiological measures provide unbiased, unconscious information about the participant’s state (Becker & Menges, 2013), it could be that the PEA/NEA paradigm affects individuals at a consciousness level (emotion, cognition), but not at an unconsciousness level (autonomic functioning). Alternatively, it may be that the physiological analyses are less reliable for the reasons outlined above.

The latter interpretation is likely more accurate. When the complexities of social interaction and individual differences in vagal tone were controlled in post hoc analyses, a more distinct pattern of physiological arousal emerged. First, skin conductance was marginally higher in the NEA condition, suggesting participants were more stressed by the NEA coaching conversation than the PEA. Second, analysis of RSA from baseline to goal setting (i.e. vagal withdrawal) suggested that the PEA session heightened
participants’ attentional capacity, allowing them to interact with and respond to the external environment more efficiently. This was supported by their own self-reported ‘attentiveness’ (significantly greater in the PEA) and the behavioral measure of spelling errors (significantly greater in the NEA). In other words, the PEA helped clients achieve a greater state of mindfulness. After the NEA, however, participants were more internally distracted and processing more negative affect than the PEA.

Limitations

There are a number of limitations in this study. First, it should be noted that the group of individuals who self-selected into this study were likely predisposed to respond favorably to any type of conversation regarding their career. Most participants were doctoral-level graduate students who hunger for a space where they can discuss their true career desires and concerns with a willing listener (Astin, 2002). Thus, this population may have reacted more positively in both conditions than other participants. In addition, the choice of a within-subject design had trade-offs in terms of sample size. Whereas the design accounted for individual differences in the physiological measures, the relatively smaller sample size precluded the use of more sophisticated statistical models and reduced power in the current analyses.

Second, measuring RSA during social interaction introduces complexity not typically present in experimental studies where stimuli are presented to a stationary participant. Excessive movement and hand gesturing during time periods of interest in the coaching conversation could not be accounted for due to a lack of a synchronized audio/visual component. Additionally, there is some debate in the literature regarding the respiratory effects of speech on RSA. Kotani et al. (2007) claim talking has no effect on
RSA, but Reilly & Moore (2003) claim talking effects can be accounted for by controlling for respiratory rate and amplitude. In the absence of equipment to gather these measures, paced breathing during the baseline period could be a solution to this issue and should be considered for future research (Grossman et al, 1991, Wilhelm et al, 2004, & Ritz, 2009). The current study assumes these potential confounds were consistent across conditions, but should be controlled in subsequent studies.

Third, the temporal orientation of the two coaching protocols may have contributed to differences in goal setting such that the PEA protocol was more future-oriented than the NEA protocol, which focused on the present or near-future. According to ICT, the PEA extends the time horizon farther into the future than the NEA. In order to account for these differences, it may be useful to examine the impact of proximal versus distal visioning in the PEA and proximal versus distal problematizing in the NEA. It might also be informative to hold the time horizon constant in comparing the two conditions to one another.

Fourth, the paradigm used to manipulate PEA and NEA-based coaching effects had two dimensions: breadth of attention (global, local) and emotional valence (positive, negative). This makes it difficult to ascertain what actually accounts for the differences in psychological and physiological states between the two conditions. Additional research is needed to parse out these dimensions using global-positive, global-negative, local-positive, and local-negative conditions. Global elements of this paradigm would be more holistic, whereas local would be more targeted and focused. Positive entail a more affirming response from the coach, whereas negative would be more critical.
Finally, the 30-minute length of each session presents a potentially confounding issue. In typical coaching practice, it takes clients longer to develop a sense of clarity and commitment to a personal vision (PEA) than it does to articulate current problems or challenges (NEA). Given that both the PEA and NEA sessions were of the same length, it could be argued that participants would be relatively less prepared to articulate goals in the PEA than the NEA. Following the notion that ‘bad is stronger than good’ (Baumeister et al., 2001, Fredrickson & Losada, 2005), it could be argued that several PEA sessions would be necessary to get clients to the same place as one NEA session.

**Future Research**

Future research should address limitations outlined above and extend the current research in several ways. First, the acquisition of physiological data should be enhanced since it offers important information that is not available through self-report data (Becker & Menges, 2013). As described above, the current analysis potentially contains too much variability among ‘real time’ coaching sessions to reliably compare any given 3-minute period to any other 3-minute period. Future research can address this limitation in several ways. Including respiration rate as a covariate in the current analysis may yield a more accurate account of the effect of condition on RSA by accounting for the effects of sighing, coughing, holding one’s breath, or shifts in body posture that can introduce error to measures of RSA. An alternative data analytic approach would be to calculate RSA at 180 second-increments across the entire coaching session and subject it to mixed model or growth-modeling analysis. For new studies using the current approach, an A/V component should be added, and utilizing paced breathing and inspiratory depth measures should be considered in future research. In addition, impedance cardiography
might be a better analytical tool to detect differences in cardiovascular arousal between the two conditions based on the Biopsychosocial (BPS) model of challenge and threat (Tomaka, Blascovich, Kelsey, & Leitten, 1993).

There is also the issue to be studied of whether reflection time would provide the predicted RSA and skin conductance arousal in a pattern similar to fMRI studies using a similar paradigm. In other words, it may be that reminding participants of the PEA or NEA session a few days later without the live presence of the coach would activate the parasympathetic and sympathetic nervous systems, respectively. A possible approach to this would be to present a short video clip of their PEA and NEA coach reminding them of the general theme of the session (future vision or current problem-solving), followed by a task in which they listen to excerpts of their coaching session while continuously rating the valence of their emotional response at the time. Measuring autonomic arousal using this design would more closely approximate the experimental design of the fMRI studies.

Further research is also needed to explore the post hoc finding regarding attentional deficits in goal setting following the NEA. To ensure that vagal withdrawal (reduction in RSA) is indeed indexing executive attention during the goal setting task, a more direct measure of attention should be employed. One such measure might be the response time to orient to an intermittent audio tone (Posner, Rueda, & Kanske, 2007). Furthermore, individuals have different planning styles when it comes to pursuing their goals (McKee, 1991), so it is impossible to know what mental process occurred for participants during the measurement period. For example, some individuals may have been recalling what was discussed with their coach whereas others may have been
planning future action steps. Thus, controls should be put in place to standardize the form of attentional effort being measured.

The current research has also raised new questions to be explored. For example, when both PEA and NEA-related interactions occur within a single session, does the order have an effect on the variables explored here? How might emotional reactivity, relationship quality, and autonomic functioning change over multiple coaching sessions? Would the patterns hold for individuals at different life stages? Of course, the relationship of coaching with on-going goal pursuit calls for longitudinal research designs. Any findings that emerge from laboratory studies should be reproduced (in approximation) in the field.

**Implications for Practice**

This research was not intended to set up a value-laden dichotomy between coaching to the PEA as inherently good and coaching to the NEA as inherently bad. Rather, it was intended to systematically examine the distinctions between two essential components of a change process. The findings have three key implications for the practice of professional coaching, as well as for other ‘helpers’ who engage in developmental conversations in various contexts - the work place, educational institutions, and even around the dinner table.

First, *coaches must attend to clients’ emotions in order to optimize their openness to and motivation for change*. Coaching engagements and developmental conversations are often approached as a logical, linear progression through steps to identify a performance problem and address it. But human development is not linear; it is dynamic. And it is not logical; it is emotional.
Thus, despite good intentions, many efforts to help actually hinder and leave a client feeling stuck, unmotivated, or helpless. The current research suggests that those negative feelings may be the result of an over-emphasis on the real self or other techniques that evoke the NEA. Consequently, the “fix it” approach of leading coaching engagements with a data dump or zeroing in on the problem a client brings to coaching is counterproductive. Instead, this research suggests that interactions that evoke the PEA state, particularly those involving exploration of the ideal self, help clients to be more open and more motivated to change. Coaches who manage clients’ emotions to leverage the benefits of the PEA will more likely foster sustained, desired change. To paraphrase a quote from Immordino-Yang and Damasio (2007) writing about the critical role of emotions in education:

"When we coaches fail to appreciate the importance of clients’ emotions, we fail to appreciate a critical force in their learning. One could argue, in fact, that we fail to appreciate the very reason that clients learn at all" (p. 9; the word ‘coach’ has been substituted for ‘educator’ and ‘client’ for ‘student’).

Second, *PEA interactions provide the building blocks of resonant coaching relationships*. This research documented that a focus on the ideal self and the PEA build trust, rapport, interpersonal closeness, and relational energy to a greater degree than a focus on the real self or NEA. Thus, coaching to the PEA first and frequently will contribute to establishing and maintaining a generative coaching relationship. Coaching interactions that build resonance involve hope,
compassion, mindfulness or playfulness (Boyatzis & McKee, 2005). They provide a sense of mutuality and a secure attachment that enable the relationship to weather necessary periods of NEA. Without the balance of the PEA, coaching relationships overly focused on the NEA will deteriorate.

Third, goal pursuit should be connected to the client’s ideal vision for the future. The current research found that clients are more motivated to pursue goals related to their long-term hopes for the future (ideal self) than goals that address current problems or challenges (real self). Yet, clients often set goals without the context of the bigger picture. While this may work in the short-term, it is not a sustainable strategy. Clients who gain clarity on their ideal self will be better equipped to set productive goals and sustain effort toward making complex changes in their lives.

In summary, these implications call coaches to make the ideal self more central to the coaching process and to balance aspects of the coaching process that are unavoidably NEA with those that are PEA. The toggle between the PEA and NEA is in service of fostering meaningful change in the lives of others thereby creating meaning for the coach.

**Conclusion**

The purpose of this study was to better understand the impact of PEA and NEA-based coaching on (1) clients’ emotional and physiological functioning during the coaching conversation, (2) the quality of the coaching relationship, and (3) subsequent goal-related behavior. An experimental, within subject design was used to test participants’ responses to coaching sessions conducted by trained, professional coaches.
in each condition (PEA and NEA). Overall, the results suggest three key psychological differences between coaching to the PEA and coaching to the NEA.

First, coaching to the PEA and NEA have different emotional effects. The PEA is emotionally uplifting and associated with greater positive affect than the NEA. Coaching to the NEA is activating, dampens positive emotions, and is associated with greater negative affect and more “mixed emotions” than the PEA (H1). Second, coaching to the PEA facilitates the development of trust, rapport, and interpersonal closeness in a coaching relationship to a greater degree than the NEA. The coach in the PEA condition was also perceived as being more energizing than the coach in the NEA (H2). Third, coaching to the PEA fosters a promotion-oriented approach to goal pursuit (aspirational, compassionate, and passionate about goals), whereas coaching to the NEA stimulates a prevention- and performance-oriented approach to goal pursuit (instrumental/proximal goals, prevention concerns, external expectations, unidimensional focus). Additionally, goal striving was greater in the PEA than the NEA (H3). The goal-related findings represent an important contribution in empirically linking self-regulatory focus with positive/negative emotional attractors.

In addition, this study extends a series of fMRI studies examining the neural correlates of coaching to the PEA and NEA (Jack et al., 2013a; Jack et al., 2013b; Passarelli, et al., 2013) by testing the autonomic differences between these conditions in real time and connecting them to subsequent goal-related behavior. The experimental paradigm in this study diverged from that of the fMRI studies in that the current study examined face-to-face interaction whereas the fMRI studies examined a simulated (video-taped) interaction that occurred a few days after the face-to-face coaching session.
The live versus reflective nature of the two experimental paradigms may be the source of conflicting results. Counter to fMRI evidence that PEA and NEA-based coaching simulations activate neural regions associated with the PNS and SNS, respectively (Jack et al., 2013b), the current results suggest no differences in autonomic arousal in real time. This lack of differentiation is consistent with results from Howard (2009) who used salivary cortisol as a measure of sympathetic arousal during coaching. Interestingly, post hoc analyses revealed that differences in autonomic arousal emerged after the coaching conversation ended. Adding a post-coaching reflection period yielded a marginally significant model suggesting the SNS was more active in the NEA than the PEA condition. Additionally, participants in the PEA condition were better able to appropriately regulate the autonomic nervous system through vagal withdrawal during the goal setting task. This is consistent with research linking a decrease in RSA to focused attention (Suess, Porges, & Plude, 1994; Hansen, Johnsen, & Thayer, 2003), as well as the broaden-and-build theory of positive emotions (Fredrickson, 2001).

In conclusion, this study addresses the paucity of research on how coaching works (Bennett, 2006), and adds to a growing body of evidence that supports the efficacy of Intentional Change Theory as a framework for fostering sustained, desired change (Howard, 2009, Jack et al., 2013b, Van Oosten, 2012). The use of ECG and EDA represents an important innovation in integrating psychophysiological perspectives into the field of organizational behavior.
APPENDIX A

PEA & NEA Coaching Protocol

PEA Session Protocol (30 minutes)

1. Hello. [Coach introduces herself as a career advisor.]

2. A key part of personal and professional development is gaining clarity on what you truly want from your life and career – developing a vision of an ideal future. With that in mind, we’re going to spend our time today exploring your hopes for the future. This may require a bit of imagination and dreaming on your part. Imagine it is 10 years from now – how old will you be? So imagine you are ___ years old and life is ideal.

   If everything worked out perfectly in your life, what might your life and work be like in 10 years? [ask probing questions to get them to elaborate or use topics below]

   Again, if your ideal, your dreams came true, where would you be living in 10 years? With whom?

   Again, if your ideal, your dreams came true, how would you be spending your time? What would you be like? What kind of a person would you be?

   [Interviewer should ask questions to get details. These should encourage the subject’s excitement and pursue clarity and details of those elements that appeared most exciting to the subject. Series of follow-up questions to elaborate holistic vision (career, family, community, leisure, spiritual life, physical health, etc.)]

3. Possible follow-up questions:

   Career
   
   • If you could do anything and money was no object, what might you be doing as a career?
• What would most excite you about doing X?

• What would a workday or workweek look like? What would you do?

• What aspects of x would you most enjoy?

• Are there other alternatives for your career? What else could you see yourself doing?

Family

• If everything were ideal, how do you picture your family life?

• Who is involved? (Do you have a family of your own? If so, describe.)

• How, if at all, will you be connected to your family now? (parents, siblings, etc)

• How would you describe your family relationships?

• What do you do together?

• Will pets be part of your family? (if so, ask more about them….)

Community

• What type of community will you be living in?

• What region of the world?

• Describe your ideal surroundings … urban, suburbs, rural, etc?

• In what activities might you be involved?

Leisure

• How will you spend free time? When? With whom?

• What will you find most relaxing and renewing?

• What hobbies or passtimes will you enjoy?

• What else?
Spiritual Life - be careful here b/c many young adults feel guilty or shameful that they’ve strayed from the religious tradition of their families

- Imagine you are feeling spiritually grounded, full and healthy. Describe what that is like for you.
- What will feed your spiritual wellbeing 10 years from now?
- Ask about practices, spiritual communities, religious faith, etc based on subject’s response.

Physical Health

- If everything was ideal, what are your hopes for your physical health 10 years from now?
- How might you be maintaining your physical health?
- What might being physically healthy enable you to do or be?

3. Thank you for sharing this with me. Becoming aware of what you truly desire for your own life is an important step in making the most of your educational journey. [The coach can leave the room after asking the participant to remain seated to finish the session.]

NEA Session Protocol (30 minutes)

1. Hello. [Coach introduces herself as a career advisor.]

2. A key part of personal and professional development is understanding your current reality – which includes your strengths and weaknesses, how you are viewed by others, and situations or circumstances that may interfere with your success. We’re going to talk about this today.

3. What problems or challenges are you currently facing at school or work?
[Note responses & ask about each one individually.]

- What causes this issue?
- What should you be doing differently to avoid or remedy this issue?

4. Along with your studies at Case, do you have ongoing employment – part-time, internships, or practica? Do you have any fears or concerns regarding your work?

- Given the current economic environment, what difficulties might you encounter in the job market? What should you be doing to alleviate those difficulties?

5. How are you balancing work and life?

- Do you spend as much time with family and friends as you would like? If no, what is out of balance?
- What would your family and friends say about it?

6. Now let's talk about your academic performance. What classes are you taking? [note them & discuss each one if time allows]

- How are you doing on your assignments and readings?
- Do you feel prepared for your classes? (If answer is 'no,' ask what haven’t you done?)
- How do you prepare for tests and complete projects?
- How are your grades? Is your GPA what you want it to be? (If no, “what should you be doing differently?”)

Are you satisfied with your graduate experience?

* If subject is giving brief answers, review poor-performance classes in more depth.
6. Thank you for sharing this with me. [The coach can leave the room after asking the participant to remain seated to finish the session.]
APPENDIX B
Goal Statement Codebook

NEA THEMES (derived from NEA first)

1. **Proximal / Instrumental Goals:** This theme is indicated when participant expressed desire for short-term achievement, specific skill acquisition, or to address a current weakness that stands in their way of accomplishing something else (like confidence or balance). These desires represent a means to an end rather than the desired end-state or outcome.
   a. Obtain a degree
   b. Pass exam
   c. Gain licensure or certification
   d. Get a job
   e. Improve a specific skill

Exclusions: Do not code mastery-oriented skills, such as entering a profession (i.e. “become a physician”)

Examples: “Graduate with my Ph.D.,” “Improve my scientific writing ability”

2. **Reference to external expectations:** This theme is indicated when participant alludes to the desire to conform to external social expectations. It is also indicated when an individual alludes to an obligation, even self-imposed, usually identified by the words “need to.”
   a. Parents, supervisor
   b. Religious beliefs
   c. Goals arising from an obligation
Examples: “find an internship that is okay with my advisor,” “to make them proud”; “need to find a job where my spouse can also work”

3. **Prevention concerns:** This theme is indicated when the participant (1) describes his/her goal as providing a sense of stability or security, OR (2) expresses a desire to avoid an undesirable state or outcome
   a. Job security
   b. Financial stability / for the purpose of making money
   c. Minimizes uncertainty
   d. Avoids undesired state

Exclusions: do not code statements that suggest having sufficient money to pursue interests such as “enough money to live comfortably and support my hobbies”

Examples: “obtain a stable position”; “in a career …that makes me feel stable/secure”; “without the funding uncertainty of career in academia”; “my greatest fear is to end up unsatisfied in my job”

4. **Unidimensional focus:** This theme is indicated when the entire goal statement includes goals for only one life sphere. This is usually the career.
   a. Only discusses career goals
   b. States that he/she has no goals

Examples: “we did not talk about goals for my future”

**PEA THEMES (derived from PEA first)**

5. **Aspirations:** This theme is indicated when participant refers to (1) the pursuit of long-held dreams and aspirations, OR (2) desire to have a lasting impact or change on a particular field, career, or on the world at large (aka legacy), OR (3) the desire for
mastery or lifelong learning (continual personal or professional growth, entering a profession)

   a. Uses words “aspire to” or “always wanted to”
   b. Expresses a dream
   c. Change the field in specific way
   d. Motivated by curiosity/discovery
   e. Desire to assume a professional identity

Exclusions: This should NOT be coded if there is a reference to directly “helping” others as their impact.

Examples: “I’ve always wanted to….”; “change the way we think about disorders in the psychology field”; “become a professor”; “continue my education throughout my life”

6. **Compassion:** This theme is indicated when participant expresses (1) relational closeness and caring with others and/or (2) the desire to help others through their work or life efforts. They MUST refer to helping PEOPLE at some level (individuals, special population, community).

   a. Wants to help others
   b. Desires caring, loving relationships

Exclusion: Do NOT apply this code if there is no reference to “helping” or improving the human condition in some way. Impact on a career field and general impact on the world do not necessarily connote helping. Also, do not code a desire to be in close physical proximity to others unless there is a mention of emotional closeness.

Examples: “Allow me to serve others”; “Have caring friends in my life”; “I value my relationships to others”
7. **Heartfelt connection to aspirations**: This theme is indicated by the use of language that portrays deep enthusiasm, passion, appreciation or love in relation to their aspiration or goal.

   a. Use of the words “passion” or “love” to describe the activity
   
   b. Communicates gratitude, thankfulness
   
   c. Communicates appreciation, deep valuing of something
   
   d. Describes beauty

Exclusions: descriptors such as “like” and “happy” do not qualify as strong enough; “fulfilling” and “satisfied” also do not differentiate. *(AP note to self: meaning/purpose might be threshold, passion is different, higher order)*; Do not code general remarks such as ‘doing something I love’ – unless the something is directly expressed.

Examples: “I would love to see patients;” “I have a passion for solving problems;” “I appreciate what I have now and want to maintain that in my life”
References


Boyatzis, R.E. (2013). When pulling to the negative emotional attractor is too much or
not enough to inspire and sustain outstanding leadership. In R. Burke, C. Cooper, & G. Woods (Eds.) *The fulfilling workplace: The organization’s role in achieving individual and organizational health.* London: Grower Publishing.


http://ssrn.com/abstract=1839842 or http://dx.doi.org/10.2139/ssrn.1839842


De Wit, F. R. C., Scheepers, D., & Jehn, K. (2012). Cardiovascular reactivity and


Dyck, L. R. (2010). *Resonance and dissonance in helping relationships: Determining the influence of positive and negative emotional attractors on effective physician-patient communication*. Unpublished Ph.D. dissertation, Case Western Reserve University, Cleveland, OH.


Visioning in the brain: An fMRI study of inspirational coaching and mentoring.

*Social Neuroscience, 8*(4), 369-384.


Janig, W. & Habler, H.J. (1999). Organization of the autonomic nervous system:


*Journal of Positive Psychology, 1*(2), 93-106.


*Biomedical Sciences Instrumentation, 40*, 317-324.
