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MAPPING THE IMPLICIT COMPONENT OF COMPETITIVENESS: A CONDITIONAL REASONING THEORY APPROACH

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ABSTRACT

Unlike other motives, research on competitiveness has stagnated due to an overwhelming focus on investigating and measuring the explicit aspects of competitiveness. Using Conditional Reasoning Theory, I expand the model of dispositional competitiveness to include an implicit component, develop and describe an indirect measure capable of assessing this implicit component, and provide an initial feasibility test of the implicit component using this new measure. Results across the five studies show (1) adequate internal consistency, but poor temporal consistency, (2) good construct validity, and (3) mixed findings for criterion-related validity. More specifically, the newly developed measure performed poorly in predicting self-selection into competitive scenarios, performed moderately in predicting interest in competitive activities, and outperformed a self-report measure of explicit competitiveness in predicting competitive behavior in game exercises. Implications of this research and suggestions for improvement of the measure and future research are also discussed.

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DEDICATION

This dissertation is dedicated to my son, Lincoln, who constantly reminds me not to take myself so seriously. He has been the greatest source of smiles, laughter, and meaning in my life. I truly hope that he finds himself as blessed as I have been to be surrounded by so many people willing to encourage and support his dreams.

Chapter 1

Introduction

"Anything you can do, I can do better than you…Anything you can be, I can be greater than you!"

–Irving Berlin, 1946

Competitiveness, often defined as the need to win in interpersonal situations (Houston, McIntire, Kinnie, & Terry, 2002), is a term that permeates both lay audiences and the scientific community. It is a ubiquitous concept in our society. From major athletic events like the Super Bowl, World Series, and Olympics, to banal reality television shows (e.g., Storage Wars, Master Chef), to critical exams such as the GRE or GMAT, wherever there is something to do, members of society want to know who does it best. It is instrumental to the economy and the growth of both the public and private sectors (Heyne, Boettke, & Prychitko, 2014). Youth and adult sports are even thought to be catalysts that facilitate the socialization of competitiveness and mimic corporate organizational structures (Franken, Hill, & Kierstead, 1994). Scholars seeking to better understand the origins of competitiveness have approached this issue from a variety of disciplines ranging from economics (Heyne et al., 2014) to kinesiology (Fabian & Ross, 1984; Gill & Deeter, 1988) to education (Johnson, Johnson, & Anderson, 1983) to psychology (Newby & Klein, 2014). Given the omnipresence of competition and competitiveness in our society, it is only natural that social scientists have sought to understand the antecedents, correlates, and consequences of this concept.

Within the psychological tradition, research has examined the origins of competitiveness at varying levels of abstraction. Some research has looked into

competition at the societal level (e.g., Ben-Naim, Vazquez, & Redner, 2006; Bond, 2004; Franken et al., 1994; Fujie & Odagaki, 2011). For example, Eitzen (1979), among others (e.g., Sage, 1976; Berlage, 1982) suggested that sports are how children are socialized to internalize American values such as competition, and Kohn (1986) asserted that competitive sports teach individuals to see others in the society as rivals thereby perpetuating the society's competitive status. Other researchers have investigated competition as an organizational or group level phenomenon (e.g., Fletcher, Major, & Davis, 2008; Graziano, Hair, & Finch, 1997; Johnson et al., 2006; Katz, 2001). As examples, Fletcher et al. (2008) found that a competitive climate in the workplace was associated with greater levels of individual stress, and Johnson et al. (2006) reported that it is more difficult for teams to shift from competitive to cooperative reward structures and asserted that this is likely to end in "cutthroat cooperation."

In contrast, other researchers have sought to examine the variability of competitiveness between people (e.g., Houston et al., 2002; Ross, Rausch, & Canada, 2003; Ryckman, Libby, van den Borne, Gold, & Lindner, 1997). Although, some of the research in this area has investigated competition as emergent from social situations, the majority of this work has largely treated competitiveness as a relatively enduring individual difference or personality characteristic (Houston et al., 2002; Newby & Klein, 2014). For example, Houston et al. (1992) reported that individuals higher in trait competitiveness were more likely to choose more competitive and less cooperative occupations. Thus, the importance and pervasiveness of competitiveness as a psychological construct has been borne out at multiple levels of conceptualization, but the primary research focus has been at the individual level.

Similar to other significant human motives—such as the power motive, achievement motive, or the affiliation motive—the competitive motive can also be thought of as a basic human motive. As the research indicates, competitiveness, like other basic motives, is prevalent all throughout our culture and may be useful for understanding the unique psychological makeup of a person (Fletcher et al., 2008; Franken et al., 1994; Franken & Brown, 1995, 1996; Houston et al., 1992, 2002; Newby & Klein, 2014; Ross et al., 2003; Ryckman et al., 1997; Ryckman, Hammer, Kaczor, & Gold, 1990, 1996; Smither & Houston, 1992). An individual's genetics, basic personal tendencies from birth, and the subsequent formative experiences in his or her life coalesce and engender the extent to which a person is competitive when compared to other individuals (see McAdams & Pals, 2006 for review). These developmental processes run parallel to the development of other universal human motives.

In the psychological literature, the study of motives has preceded down two distinct paths. One path has focused primarily on the explicit component of personality. Explicit personality denotes the part of personality which an individual is aware of and is consciously accessible (Bornstein, 2002; McClelland, Koestner, & Weinberger, 1989). Researchers interested in investigating explicit personality most often rely on direct assessment techniques such as self-report measures. Alternatively, other researchers have approached the study of personality by focusing on the implicit component. Implicit personality refers to the part of personality that is not available to the individual for introspection (James & LeBreton, 2012). Subsequently, the implicit component of personality cannot be measured via self-report surveys, but rather must be measured indirectly. Winter and colleagues (1998) asserted that the conceptions of trait (i.e.,

explicit personality) and motive (i.e., implicit personality) represent two fundamentally different components of personality, and their research also asserts that explicit and implicit personality often predict different types of behavior. So, even when assessing the same personality construct, measures of explicit and implicit personality assess different aspects of the construct (Bornstein, 2002; James & LeBreton, 2012; McClelland et al., 1989; Winter et al., 1998).

Although these two research streams have grown separately, over the last 20 to 30 years there has been a growing awareness that both of these components of personality need to be studied together for psychologists to develop a fuller understanding of resulting behaviors and criteria (Bornstein, 2002; James & LeBreton, 2012; McClelland et al., 1989; Winter, John, Stewart, Klohnen, & Duncan, 1998). James and LeBreton (2012) suggested, "…measuring both aspects of personality is instrumental to developing a comprehensive understanding of the dispositional underpinnings of human behavior" (pg. 6). Indeed, the empirical research has begun to bare out the value of integrating these two research streams (Bing, LeBreton, Davison, Migetz, & James, 2007; Bing et al., 2007; Frost, Ko, & James, 2007; James & LeBreton, 2012).

Unlike other motives (e.g., power, achievement, affiliation), research within the domain of competitiveness has been overwhelmingly focused on mapping and measuring the explicit aspects of competitiveness. Thus, much is known about the explicit aspects of competitiveness and a number of self-report measures have been developed to measure explicit competitiveness (see Houston et al., 2002; Newby & Klein, 2014 for reviews). In contrast, there has been limited progress made in understanding the implicit aspects of competitiveness which, by definition, must be measured indirectly (Greenwald & Banaji,

1995; James & LeBreton, 2012). Unfortunately, to date, the implicit counterpart of competitiveness has yet to be conceptually defined and mapped into the broader nomological network of personality constructs, and thus, the implicit component of the motive to compete remains unmeasured and largely absent from psychological research. As discussed, measures of explicit and implicit personality often predict different behaviors, and when they do predict the same behaviors, they tend to augment or increment each other (James & LeBreton, 2012). Subsequently, a sole reliance on the explicit component of competitiveness will lead to a psychologically impoverished model of the dispositional bases of competitiveness. Therefore, it is critical that, like research into other universal human motives, research on competitiveness be advanced by mapping the construct's implicit component.

Thus, the purpose and contributions of my dissertation are as follows: (1) to expand the model of dispositional competitiveness to include an implicit component, (2) to develop and describe an indirect measure capable of assessing this implicit component, and (3) to provide an initial feasibility test of the implicit component of competitiveness using this new measure. Accordingly, in the following sections I first discuss and define the concept of competitiveness. Next, I delineate the implicit aspects of this motive with a specific focus on a set of motive-based cognitive biases that competitive individuals use to enhance the rational appeal of competitive behavior. Then, I review viable indirect measurement systems for capturing the implicit aspect of competitiveness. After settling on a particularly promising measurement system, I discuss steps for building a new test of implicit competitiveness before presenting the results from a set of studies designed to test the viability of my new model of implicit competitiveness.

Competitiveness Defined

In order to make progress in the scientific study of any psychological construct, it is necessary to first clearly and precisely define and describe the concept. To that end, in the following paragraphs, I follow the steps recommended by Podsakoff, Mackenzie, and Podsakoff (2016) to maintain clarity and consistency in the definition of the personality construct of competitiveness. In working my way towards a coherent definition of competitiveness I first looked for major themes related to the concept by (a) surveying the scholarly literature, (b) sampling non-scholarly media (e.g., popular press articles, television/online interviews), (c) interviewing colleagues who strongly identify as competitive/non-competitive, (d) reviewing dictionaries and thesauruses, and (e) comparing the construct with similar and related concepts as well as opposite ideas (e.g., achievement motivation, cooperativeness).

Though the implicit component of competitiveness has been virtually unstudied, competitiveness as a more general personality characteristic, has been the subject of research investigations for decades. The concept of competitiveness may be most closely related to the concept of achievement motivation. McClelland, Atkinson, Clark, and Lowell (1953) defined achievement motivation as "competition with a standard of excellence." The source of this standard of excellence can be related to the task, the self, or to another person (Smither & Houston, 1992). The more an individual sees others as the source of this standard of excellence, the more highly competitive he/she is. Goal setting theory (Locke & Latham, 2002) suggests that an individual's goals or intentions help to direct and sustain his or her behavior. Consequently, highly competitive individuals are likely to set performance goals that are a function of the performance

levels of other individuals versus tasks or the self. These goals will serve to channel one's competitive drives. If individuals choose varying standards by which to set their goals (e.g., the task, the self, another), it follows that their behavior will vary as well. Competitiveness, then, can be defined as: *An individual's dispositional desire to perform an activity at a level that exceeds the performance level of a selected individual (referent) or a group of selected individuals (referents).* This definition is consistent with the majority of research into competitiveness which often defines the construct as a need to win in interpersonal situations (see Houston et al., 2002 for a review).

Although some aspects of this definition will be common to many concepts, there are unique characteristics that separate competitiveness from other similar and related constructs. To begin, prior work conceptualizing competitiveness as an individual difference variable placed it as one anchor point on a spectrum ranging from competitiveness to cooperativeness (Deutsch, 1949). Research suggests, however, that individuals can vary in their degree of competitiveness from highly competitive to having a very low desire for competition, and that cooperativeness is a separate notion, not the other end of the competitive range. As evidence, Johnson and Norem-Hebeisen (1979) found that self-reports from cooperative and competitive scales were essentially independent of each other. A second psychological construct that is related to competitiveness, as previously alluded to, is achievement motivation. Competitiveness is inherently interpersonal whereas achievement motivation can be invoked in the absence of others (e.g., in relation to some objective standard of excellence). Accordingly, Smither and Houston (1992) noted, "…competitiveness can be distinguished at least conceptually from need for achievement: Need for achievement and competitiveness may

occur in the same individual, but competitiveness need not be present in a highly achieving person" (pg. 409). For example, a highly achievement motivated golfer might constantly strive to be under par (i.e., an objective, task-based standard of excellence) or to improve upon his/her previous scores (i.e., self-based standard of excellence), but it is only when the golfer is specifically driven by the goal of performing better than some other referent individual (e.g., a golf buddy) that he/she could be considered competitive.

A thorough description of any construct must include, at the very least, a preliminary sampling of the construct's nomological network: antecedents, consequences, and simple correlates (Podsakoff et al., 2016). Because competitiveness is considered a personality characteristic, the roots of its formation are presumed to be similar to those of other personality variables. Thus, an individual's genetic makeup, basic personal tendencies from birth, and subsequent developmental experiences in his or her life come together and engender the degree to which a person develops a competitive disposition (see McAdams & Pals, 2006 for review). Because these processes have been extensively studied in the personality literature, I will focus my attention on the correlates and consequences of the competitiveness construct.

On the basis of prior research into the nomological network of the competitiveness construct (e.g., Houston et al., 2002), several common correlates have been identified specifically with respect to the explicit component. Competitiveness has been shown to be positively correlated with achievement motivation (r = .20 to .43), self-esteem (r = .22), social affiliation (r = .09 to .20), hedonism (r = .25 to .28), and life excitement/adventure desires (r = .20 to .36) (Houston et al., 2002; Ross et al., 2003; Ryckman et al., 1996, 1997; Smither & Houston, 1992). Furthermore, I expect that the

implicit component of achievement motivation will be correlated with the implicit component of competitiveness and not the explicit component, because prior research has suggested that the two components are fundamentally different and measurements of these components assess different aspects of even the same construct (Bornstein, 2002; James & LeBreton, 2012; McClelland et al., 1989; Winter et al., 1998). This should not be considered an exhaustive list, as other correlates exist, however, the ones listed here appear to be regularly investigated.

For the purposes of the current study, the relevant behavioral criteria (i.e., behavioral manifestations) of the competitiveness motive will consist of categories similar to what have been traditionally investigated in the research literature (e.g., Camerer, 2003; Fletcher, Major, & Davis, 2008; Houston, Farese, & La Du, 1992; Houston, Harris, Howansky, & Houston, 2015; Song, Kim, Tenzek, & Min, 2013; Van Lange, Otten, DeBruin, & Joireman, 1997). Specifically, these categories are (1) decision-making behaviors, (2) self-selection into competitive scenarios, and (3) interest in and attitude towards competitive events. The following paragraphs discuss each of these classes of behavior and summarizes the research in these areas.

Decision-making behavior exercises measuring competitiveness evolved from an integration of game theory and research into social conflict and social motivational preferences (Deutsch, 1958; McClintock, Messick, Kuhlman, & Campos, 1973; Messick & McClintock, 1968; Messick & Thorngate, 1967). Research in this domain investigates how an individual's competitiveness motive affects his/her decision-making. For example, Malhotra (2010) found that an individual's desire to win heavily impacted individuals' decisions in an auction scenario, influencing them to make costly decisions

with no strategic upside. Many of the decision-making exercises used to study competitiveness present individuals with a scenario and typically offer them two or three possible response options. For example, the Prisoner's Dilemma Game (Camerer, 2003; Messick & McClintock, 1968; Pavitt, 1998) gives the individual a choice of betraying a criminal partner to the police or remaining silent, and each option comes with it, its own set of consequences (known to the individual) based on the combination of one's choice and the criminal partner's choice. Messick & McClintock (1968) have shown that each choice is representative of different social motives—either cooperative or competitive/individualistic. A variant of this exercise, called the Decomposed Prisoner's Dilemma Game (Van Lange, Otten, De Bruin, & Joireman, 1997), foregoes the contrived scenario and simply asks the individual which of three options he/she prefers (see Appendix A for a sample item), where the individual chooses the amount of points both he/she and another player will receive. Based on the individual's pattern of responses, he/she can be classified as making decisions in a cooperative, individualistic, or competitive manner. Smither and Houston (1992) found modest correlations ranging from *not significant* to .18 between their self-report measure of competitiveness and the Decomposed Prisoner's Dilemma Game. Because this type of decision-making exercise is a more subtle measure of behavior, in contrast to asking for a direct, self-report of competitive behavior, it may be more highly correlated with an indirect measure of one's competitiveness motive, as will be discussed in more detail in future sections. Other decision-making exercises used to measure competitive behavior are the Ultimatum Bargaining Game (Butler, Burbank, & Chisholm, 2011), the Patent Race Game (Rapoport & Amaldoss, 2000), and the Chicken Game (Rapoport & Chammah, 1966).

A second common category of criteria related to the competitiveness motive is whether or not one self-selects into competitive scenarios. Research in this criterion domain investigates how an individual's level of competitiveness influences the situations that the individual seeks out. For example, Houston et al. (2015) reported that more competitive individuals are drawn to jobs that involve competition and competitive pressure as classified by O*Net. To that point, Houston, Farese, and La Du (1992) found that more competitive individuals were more likely to self-select into competitive occupations (i.e., lawyer) as opposed to less competitive occupations (i.e., nurse). Similarly, Gill and Deeter (1988) found that students who were more competitive were more likely to enroll in competitive physical education classes as opposed to non-competitive physical education classes, and were also more likely to participate in competitive sports than their less competitive counterparts.

Finally, the last category of criteria related to the competitiveness motive is interest in and attitudes toward competitive events. Research in this criterion domain investigates how an individual's competitiveness motive impacts the individual's attitudes toward competitive events and activities. For example, Song, Kim, Tenzek, and Min (2013) found that more competitive individuals evaluated an exercise video game more positively and maintained a better mood throughout the game if it was presented in a competitive context rather than in a non-competitive context. As another example, Fletcher et al., (2008) found that individuals who did not match the competitive climate of their workgroup showed signs of withdrawal via lower job satisfaction, lower organizational commitment, and lower job dedication. Similar to the list of correlates presented above, this list of relevant behavioral criteria should not be considered an

exhaustive list. Rather it represents a list of commonly investigated criteria for the competitive motive.

Evidence for the Incremental Importance of Implicit and Explicit Motives

Many efforts have been taken, over the years to measure individual differences in competitiveness. These measures include: Competitive-Cooperative Attitude Scale (CCAS; Martin & Larsen, 1976), Work and Family Orientation Scale (WOFO-Competitiveness subscale; Spence & Helmreich, 1978), Sport Orientation Questionnaire (SOQ; Gill & Deeter, 1988), Hypercompetitive Attitude Scale (HCA; Ryckman et al., 1990), Personal Development Competition Scale (PDCA; Ryckman et al., 1996), Competitiveness Questionnaire (CQ; Griffin-Pierson, 1990), Competitiveness Index (CI; Smither & Houston, 1992), and the Competitiveness Orientation Measure, (COM; Newby & Klein, 2014), among others. All of these measures, and virtually every other measure of competitiveness that has been developed, to date, is a direct, self-report measure of the explicit component of competitiveness. These efforts have been fruitful in shaping our current understanding of the explicit side of this construct, but are not, by themselves, sufficient for offering a comprehensive understanding of the competitive personality (McClelland et al., 1989; Podsakoff & Organ, 1986; Winter et al., 1998). Rather, it is through the integration of the implicit and explicit personality that psychologists gain better access to the true dispositional underpinnings of behavior.

In a review of the literature, it was very rare for other-reports of competitiveness to be collected along with self-reports. Moreover, when other-reports are collected, their direct relationship with the self-reports are infrequently discussed (e.g., Graziano, Hair, & Finch, 1997). Nevertheless, Hibbard and Buhrmaster (2010) discussed correlations

between self- and parent-ratings of competitiveness and self- and friend-ratings of competitiveness. The authors reported correlations between .07 and .42 between these pairings for three separate measures of competitiveness: Hypercompetitive Attitude Scale (Ryckman et al., 1990), Competitiveness Questionnaire (Griffin-Pierson, 1990), and the Personal Development Competitive Attitude Scale (Ryckman et al., 1996). Given these weak to moderate correlations, it does appear that there is some disagreement about an individual's level of competitiveness. In other words, it is possible that individual's self-perception concerning their competitiveness motives may not always align with how others perceive them.

To form a comprehensive understanding of personality we need to study both its explicit and implicit components (James & LeBreton, 2012). There are two dominant frameworks of combining or integrating information about implicit personality with information about explicit personality: dissociative models and channeling models. Dissociative models (Bornstein, 2002; McClelland et al., 1989; Wilson, Lindsey, & Schooler, 2000) focus on the idea that the implicit and explicit components of personality impact behavior differently and independently. In other words, dissociative models are additive models. Empirical research has found support for this perspective. For example, Bornstein (1998) reported that a combination of implicit and explicit dependency test scores incrementally improved the accuracy of behavioral prediction in an additive fashion. Following McClelland et al.'s (1989) lead, Bornstein argued that by measuring both the implicit and explicit components, prediction was improved because motives for both spontaneous dependent behavior as well as goal-directed dependent behavior could be captured in different contexts. As another illustration of the dissociative model, Bing

et al. (2007) found that including a measure of implicit achievement motivation with a measure of explicit achievement motivation, added to the prediction of final course grades for a sample of college students. Moreover, they also found support for the dissociative model in predicting assessment center performance in a sample of working adults.

In contrast to the dissociative model, channeling models (Bing et al., 2007; James & Mazerolle, 2002; Winter et al., 1998) propose that implicit and explicit components go beyond a simple additive effect, and interact with one another as they impact behavior. In other words, channeling models are multiplicative or interactive models. Like dissociative models, empirical investigations into channeling models have also been fruitful. For example, Bing et al. (2007) found that measures of the implicit and explicit components of aggression interacted in the prediction of counterproductive, deviant, and prosocial work behaviors. Corresponding to Winter et al.'s (1998) original channeling hypothesis, Bing et al. (2007) argue that an individual's implicit motives are channeled into corresponding specific behavioral expressions via their explicit traits. This integration between the implicit and explicit components of personality is the basis of the channeling model. As another example, Frost et al. (2007) found that individuals with a strong implicit motive to aggress were more likely to channel this implicit motive into overt acts of aggression (e.g., physical acts, fighting) if they also had a strong explicit motive to aggress, but were more likely to channel the implicit motive into passive acts of aggression (e.g., obstructionism) if they had a self-perception of being non-aggressive.

In accord with the above discussion, implicit and explicit components of personality, and their corresponding indirect and direct measurement approaches, are best

thought of as complementary to each other (Bing et al., 2007a; Bing et al., 2007b; Frost et al., 2007; James & LeBreton, 2012; McClelland et al., 1989; Schoen et al., 2016; Winter et al., 1998). As mentioned, however, the implicit component of competitiveness has gone virtually unstudied leading us to an incomplete understanding of the psychological construct. Therefore, I now turn to a discussion of the implicit aspect of competitiveness.

The Implicit Aspect of the Competitive Personality

Conditional Reasoning Theory asserts that individuals have a universal motive to hold a favorable self-view—to see one's self and thus, one's actions/behavior, as moral, socially acceptable, rational, reasonable, responsible, and so on—and that other internal motives (e.g., achievement motive, aggressive motive) may come into conflict with this universal motive (James, 1998; James & LeBreton, 2012). As one's motive to behave in a certain way repeatedly comes into conflict with their motive to hold a favorable self-view, they will, over time, develop biased means of reasoning and perceiving their environment that enables them to believe their motive-driven behavior is, in fact, moral, socially acceptable, rational, etc. Over time, individuals develop biased ways of thinking (i.e., perceiving, encoding, inferring) that serve to support the expression of their implicit motives (James, 1998; James & Mazerolle, 2002; James & LeBreton, 2010). In other words, people have characteristic ways of perceiving their social worlds that have developed over the course of their lives, and many of the idiosyncrasies in these perceptual filters operate outside of their conscious awareness. These unseen biases furnish individuals with mechanisms for generating explanations for their actions that appear to be wholly rational and reasonable. Further, these cognitive biases afford individuals the cognitive tools needed to justify particular behavioral actions when those

actions may not always be socially sanctioned (James, 1998; James & LeBreton, 2012). For example, the desire to outperform others combined with the potential for negative social implications due to a negative connotation of competitive behavior, may facilitate the development of cognitive biases that enable someone with a strong motive to compete to nevertheless pursue behaviors that satisfy this underlying motive. It is these cognitive biases that comprise the focal elements of the implicit motive to compete.

As an illustrative example of a prototypical highly competitive individual, consider former professional basketball player, Michael Jordan. Jordan is regarded by many as one of the greatest athletes to ever play basketball, and he is also considered one of the most competitive individuals to have ever played the sport (McGrath, 2009). Stories abound about Jordan relentlessly trash-talking competitive rivals to "get in their head" and hinder their performance (including former President Clinton), forcing rematches with opponents after losing games of golf, and competing against players nearly half his age well after retirement (Manfred, 2014). Jordan was reported to have an intense work ethic (Jackson, 1998). This was so much the case that the Chicago Bulls organization, for which he played the majority of his career, had difficulty finding players challenging enough to compete with him in practice and traded players away who were not considered tough enough. Jordan's competitive spirit was, at times, also directly detrimental to the team's cohesiveness. For example, it was reported that he has physically assaulted teammates to motivate them to practice harder and improve (Herbert, 2013; Manfred, 2014). It did not matter that it was practice, Jordan played with as much energy and focus as he played with in the actual games. Moreover, Jordan also included a special "Love of the Game" clause in his contract that allowed him to compete against

others in basketball at any time outside of his normal duties to the Chicago Bulls (e.g., exhibitions, pickup games in a park, etc.). Such clauses are virtually unheard of, as the owners of professional sports teams wish to minimize the likelihood that a player might suffer a career ending injury (Dorsey, 2012). Yet, it is precisely this extreme competitive spirit that is believed to be the driving force behind his incredible success (Jackson, 1998; Landrum, 1999). This singular desire to be the best, led him to offensive and defensive player of the year awards, six NBA championship titles, and numerous other awards.

The preceding example is not only illustrative of the pros and cons to competitiveness for a single individual, but is also representative of the conflicting perspectives that exist for competitiveness at a societal level. On the one hand, competitive sports are thought to be a form of preparation and socialization into the values of the business world and society as a whole (Franken et al., 1994). Furthermore, competition can be found everywhere in American society—we applaud and revere the great competitors of our time (e.g., Olympics)—and it is thought to drive performance (Crowley, 2004; Sauers & Bass, 1990). However, competitiveness can also take on a negative social connotation because it can become conflated with other undesirable constructs (e.g., aggressiveness, hostility, denigration of others; Ryckman et al., 1990). In fact, these additional attributes can be seen in the Michael Jordan example above. Accordingly, society also extols the virtues of cooperation and working together harmoniously, and rejects adversarial competition (Deutsch, 1949; Johnson & Johnson, 1989; Kohn, 1992; Stanne et al., 1999). Nevertheless, individuals who are motivated to compete and desire to outperform others, in contradiction with social norms that advocate cooperation and harmony, would still like to view themselves and their behavior as

reasonable and logical (James, 1998; James & LeBreton, 2012). These individuals may, in fact, satisfy both of these needs by developing, over time, specific cognitive biases. In the next section I provide a description of these biases that are specific to competitiveness.

The Justification Mechanisms of Competitiveness

As briefly discussed above, the theory of conditional reasoning contends that individuals hold a universal motive to perceive themselves, and their behavior, as rational, acceptable, and appropriate (James, 1998; James & LeBreton, 2012). Conditional reasoning theory further suggests that a strong implicit motive to behave in a specific way (e.g., achievement motive, aggressive motive, competitive motive) may come into conflict with this universal motive for positive self-regard. Over time, if these two motives regularly come into conflict, individuals may develop a unique type of cognitive bias that James (1998) labeled as a justification mechanism or JM. The purpose of these JMs is to enable one to justify and rationalize the pursuit of behaviors that satisfy their motive to compete (even when those behaviors might conflict with the individual's desire to hold a favorable self-view). James (1998) suggested that the rationality of one's reasoning is *conditional* on his or her personality. In other words, the individual can rationalize his or her behavior in a way that allows the individual to do what he or she wants to do, even if it is socially unacceptable, amoral, or something the individual would ordinarily view negatively, and still hold a favorable view of one's self. In the following paragraphs of the current section I will describe the process undertaken to identify the justification mechanisms that make up the implicit component of competitiveness, and their content.

Based on suggestions from prior research (James, 1998; James & LeBreton, 2012; Schoen, DeSimone, Meyer, Schnure, & LeBreton, in press), an extensive literature review was conducted in order to identify competitive justification mechanisms. The literature review began with the scholarly literature focusing on competitiveness, but as is typical when attempting to identify cognitive biases underlying implicit personality, also extended to (a) sampling non-scholarly media (e.g., popular press articles, television/online interviews, fiction, non-fiction), (b) interviewing colleagues who strongly identify as competitive/non-competitive, (c) reviewing dictionaries and thesauruses, and (d) comparing the construct with similar and related concepts as well as opposites ideas (e.g., achievement motivation, cooperativeness).

This literature review served as the foundation for defining the construct (as discussed previously) and also for identifying the justification mechanisms used by highly competitive individuals to rationalize, justify, and/or normalize their unconscious desire to express a strong motive to compete. Although identifying and formally defining justification mechanisms can be a complex and iterative process, it typically unfolds in four major phases: (1) literature review, (2) create a "gist"—one's insight into, and holistic representation of the literature, (3) verify the gist and identify the justification mechanisms, and (4) continuous development and refinement of the justification mechanisms (Schoen et al., in press). This process yielded four justification mechanisms as described below. It should be noted that this list should not be considered exhaustive, but rather illustrative and representing an initial set of JMs that are believed to be closely associated with the motive to compete (see Table 1-1 and Figure 1-1).

Table 1-1: Summary of CRT-C Justification Mechanisms

Justification Mechanism	Description
Admiration (or Man in the Arena) Bias	The tendency to ascribe an inflated or exaggerated sense of importance to the act of engaging in a person-to-person competition. The competitive event is framed as a challenge/opportunity to prove oneself and the mere act of partaking in the event should be respected and admired.
Competitive Attribution Bias	The tendency to see a referent other's behaviors as challenges or attempts to "get ahead" and to attribute the behavior of a referent other as driven by a desire for competition. This leads the individual to see the other as a direct comparator and enhances the desire to overcome and outperform the other. Also, this attribution engenders a sense of excitement and allows the individual to direct his/her behavior into the activities of the referent other.
Winner's Bias	The tendency to believe that outperforming a referent other is evidence of generalized superiority over the referent other even outside of the performance domain. It is as if being a winner is inherent to the individual.
Competence Bias	The belief that an eagerness to challenge others is accompanied by some minimal level of general competence. Consequently, those individuals who lack the drive to compete or challenge others, are perceived as lacking in competence or ability and thus trying to mask those deficiencies from others.

The first justification mechanism belongs to the overarching cognitive mechanism category of differential framing biases (James & LeBreton, 2012; Schoen et al., in press), and is called the *Admiration Bias* (also called the Man in the Arena Bias). The Admiration Bias can be described as a tendency to ascribe an inflated or exaggerated sense of importance to the act of engaging in a person-to-person competition. The competitive event is framed as a challenge/opportunity to prove oneself and the mere act of partaking in the event should be respected and admired. For example, Joe Paterno, Pennsylvania State University's longtime head football coach, is credited with saying,

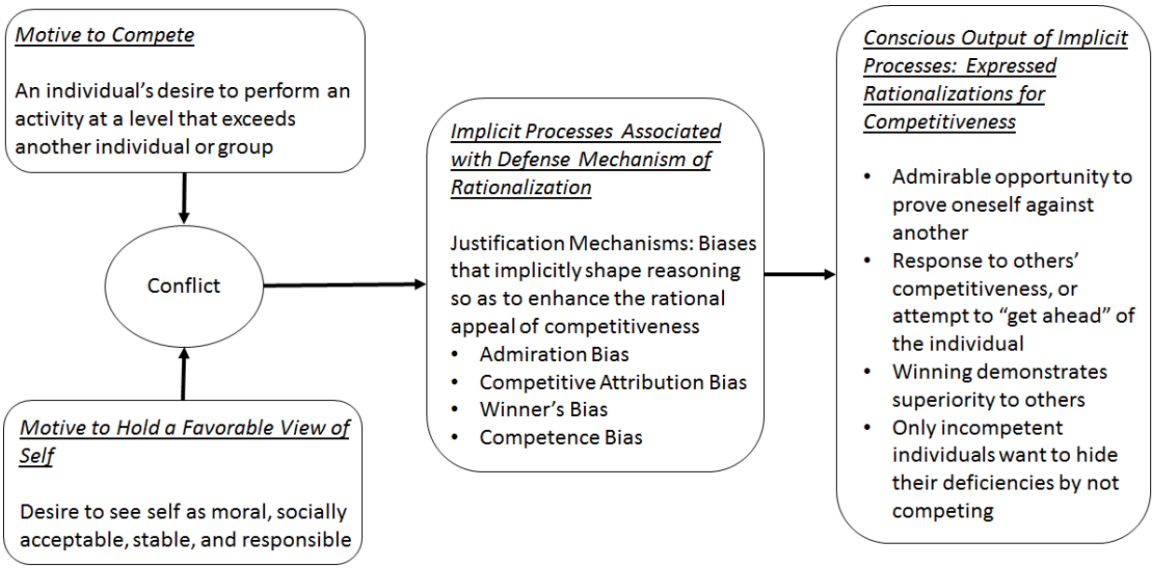

Figure 1-1: Model for Rationalizing Competitiveness

"We strive to be number one…but win or lose, it is the competition which gives us pleasure" (Tutko and Bruns, 1976, pg. 205). Ryckman and colleagues (Ryckman et al., 1996, 1997) assert that some individuals see competitors not as obstacles to be overcome, but as helpers on the path to personal learning and discovery opportunities that should be respected. To that point, Stanne, Johnson, and Johnson (1999) suggested that competitiveness can actually enhance relationships through mutual respect, and positive, enjoyable experiences. A prototypical example of this type of bias can be found in a prominent quote by Theodore Roosevelt (1910):

> "The credit belongs to the man who is actually in the arena…who does actually strive to do the deeds…who at the best knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who neither know victory nor defeat."

Individuals who develop this justification mechanism have a bias toward evaluating competition and competitiveness as exceedingly important, regardless of the outcome. This justification mechanism works to counteract, or override, any potential negative social implications or self-views by way of shifting the focus (i.e., how competitive actions are framed) onto the positive qualities of the behavior.

The second justification mechanism belongs to the cognitive mechanism category of attribution biases (James & LeBreton, 2012; Schoen et al., in press), and will be labeled the *Competitive Attribution Bias*. The psychological basis for this justification mechanism is summed up succinctly by Graziano et al., (1997): "…some individuals may expect social relations to be competitive. Biased expectancies probably influence the way these individuals collect and interpret information, and interpret partner's actions" (pg. 1406). Further, Kelley and Stahelski, (1970) asserted that while those who are lower in competitiveness tend to view others as heterogeneous with respect to competitiveness versus cooperativeness, more highly competitive individuals view others as uniformly competitive. Accordingly, the Competitive Attribution Bias is a tendency for an individual to see a referent other's behaviors—goal-directed behavior in pursuit of a similar goal as that of the individual—as challenges or attempts to "get ahead," and to attribute the behavior of a referent other as driven by a desire for competition. This leads the individual to see the other as a direct comparator and enhances the desire to overcome and outperform the other. Also, this attribution engenders a sense of excitement and allows the individual to direct his/her behavior into the activities of the referent other. Some empirical support for how this JM works is provided by Diekmann, Tenbrunsel, and Galinsky (2003) who found that, in a negotiation setting, when participants expected

an opponent to be very competitive, the participants tended to believe that they themselves would also be competitive. Moreover, after the negotiation exercise, the participants actually believed the other to be highly competitive despite the fact that they were randomly assigned to a partner. Put simply, individuals who develop this justification mechanism have a bias toward seeing and expecting competitive actions and responses from others. Subsequently, this justification mechanism engenders the belief that competition should be met with competition, and allows the individual to justify competitive actions on the basis that others are inclined toward competition.

The third justification mechanism belongs to the cognitive mechanism category of halo biases (James & LeBreton, 2012; Schoen et al., in press), and will be labeled the *Winner's Bias*. More specifically, the Winner's Bias is a tendency to believe that outperforming a referent other is evidence of generalized superiority over the referent other even outside of the performance domain. It is as if being a winner is inherent to the individual. A general example of this type of bias is an aggressive individual who associates a lack of an aggressive manner with weakness or timidity, and expects nonaggressive individuals to act in a humble and deferential manner (James & LeBreton, 2012). Specific to competitiveness, an example of this bias can be found in the common idiom, "may the *best man* win," as well as a quote from the fictional novel, *Ender's Game* (Card, 1991): "You did better. They think you're better. But I don't want a better little brother, Ender." Stanne et al., (1999) stated that, "Many individuals equate…succeeding with winning. They believe that…the best and brightest always rise to the top" (pg. 133). A prototypical real-world example of this JM can be seen in a quote by Tony Dungy, a former head coach in the National Football League, "I just think

winners win. And guys who won all the way through high school and college, the best player at every level, they have a way of making things happen and winning games" (Kerr-Dineen, 2016). As these examples illustrate, individuals who develop this justification mechanism have a bias to see a winner of some competitive event as intrinsically superior to the loser. Accordingly, this justification mechanism defends one's view of him/herself from the negative view associated with competitive behavior by suggesting the potential for direct evidence of superiority over others when striving for successful outcomes in competition.

Finally, the fourth justification mechanism belongs to the cognitive mechanism category of attribution biases (James & LeBreton, 2012; Schoen et al., in press), and is called the *Competence Bias*. The Competence Bias is the belief that an eagerness to challenge others is accompanied by some minimal level of general competence. In other words, individuals who have developed this justification mechanism attribute a desire to avoid competition to a lack of skill or ability; whereas they attribute a desire to compete to having skill or ability. Consequently, those individuals who lack the drive to compete or win or challenge others, are perceived as lacking in competence or ability and thus trying to mask those deficiencies from others. An example of this bias can be seen in the common idiom "You can't compete where you don't compare" (Kerr-Dineen, 2016). Some empirical support for this JM is provided by Diekmann et al. (2003), who found that when individuals were told that they would be negotiating with a non-competitive opponent they behaved more confidently and assertively, but when they were told they would be negotiating with a very competitive opponent, they tended to behave more passively and gave a poorer performance. Diekmann et al. posited that this was because

when the individual was confronted with the reality of a highly competitive opponent, the individual doubted their own skills and presumed their skills were inferior to their opponent's, and the inverse was true for those who were told their opponent was non-competitive. Moreover, Brown, Cron, and Slocum Jr. (1998) reported that more competitive individuals were more likely to have an internal locus of control (r = .35). Weiner (1990) suggests that greater perceived controllability can lead to greater expectancy of success in the individual, and this, in turn, can lead to increased effort and interest in competitive events. Individuals who develop this justification mechanism have a bias to see non-competitors as lacking competence and as trying to hide that incompetence. Consequently, this justification mechanism promotes, and allows the individual to rationalize, competitive behavior by pairing competitiveness with competence and skillfulness.

Highly competitive individuals may have developed any combination of these justification mechanisms. Each one, in their own way, works to justify an individual's competitive behavior, even in the face of conflicting views. By comparison, individuals who are not highly motivated to compete, are unlikely to have developed these justification mechanisms. Subsequently, they do not contain cognitive biases that allow the rationalization of the same competitive behaviors that those with the above JMs can readily justify to themselves; accordingly, their behavior is more constrained with respect to competitiveness. Now that the implicit sub-components of competitiveness have been identified and described, I turn my attention to selecting an appropriate measurement system that might serve to reliably capture these implicit aspects of competitiveness.

Review of Existing Indirect Measurement Systems

The implicit personality refers to the part of personality that the individual does not have conscious access to, and therefore must be measured indirectly (James & LeBreton, 2012). Because this component of personality is not available for conscious introspection, more typical self-report measures are unable to reliably capture this aspect of personality. Currently, there are three major approaches to the measurement of implicit personality: (1) techniques based on response latencies (i.e., response times), (2) techniques based on spontaneous productions or narratives, and (3) techniques that examine systematic response tendencies, or biases, in reasoning (De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Gawronski, 2009; James & LeBreton, 2012; Lilienfeld, Wood, & Garb, 2000; Schultheiss, 2008). Below, these distinct approaches are reviewed with the purpose of selecting the approach that is most relevant for measuring the implicit component of competitiveness in the current study.

To begin, one approach of assessing implicit motives revolves around techniques that employ the measurement of response latencies when confronted with some stimuli. A prototypical test from this tradition is the Implicit Association Test, or the IAT (Greenwald, McGhee, & Schwartz, 1998). For example, Brunstein and Schmitt (2004) present results of an IAT designed to measure an individual's achievement motivation. Stimuli that were presented to participants revolved around discrimination target categories: (1) me (e.g., "I") vs. others (e.g., "They"), and (2) successful (e.g., "Competent") vs. not successful (e.g., "Inefficient"). Participants would see these stimuli presented in pairs on a computer screen and were asked to press one key on a computer keyboard if the pair matched a predetermined set (e.g., me and successful), or another key

if it did not match. Meanwhile, response times and number of correct/incorrect responses were recorded. This task repeated for many trials changing the categories that were presented, the order of presentation, and the predetermined pair to be matched. The idea behind this test, and all IATs, is that pairs that do not match the individual's mental schema, will result in more incorrect answers and slower response times. The IAT is based on the notion that automatic evaluations are representative of more frequently activated attitudes or personality traits (Greenwald et al., 1998; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Nosek, Greenwald, & Banaji, 2005). Although the IAT has become an increasingly popular instrument since its inception, its psychometric quality has undergone criticisms which include: low test-retest reliability, limited evidence of its predictive validity, questions about the basic assumptions of the measure's construct validity, the arbitrary nature of the scores, and questions about the mechanisms by which the measure is purported to work (Blanton & Jaccard, 2006; Blanton, Jaccard, Christie, & Gonzales, 2007; James & LeBreton, 2012; Nosek & Smyth, 2007). Other common measures that fall within the response latency category include the go-no go task (Nosek & Banaji, 2001), and Stroop tasks (Mathews & Macleod, 1985).

Another approach to the measurement of implicit personality is based on participants creating spontaneous narratives (or other productions) in response to some stimulus. Assessments of this type, also labeled projective tests/techniques, typically present a participant with a stimulus of an ambiguous nature (e.g., picture of a scene), and asks them to clarify, or explain, what is happening or generate some product (e.g., a painting) from the prompt (Lilienfeld et al., 2000). The rationale that is the basis for most of these forms of assessment is what is known as the projective hypothesis:

respondents *project* pieces of their unconscious personality onto their interpretation of the ambiguous or vague stimulus (Frank, 1948). Prototypical measures that fall into this category include the Rorschach Inkblot Test (Rorschach, 1921) and the Thematic Apperception Test (TAT; Murray, 1938). The Rorschach Inkblot Test consists of showing several black-and-white and color inkblots, one at a time, to the participant and asking the participant to describe what they see in each inkblot. The TAT, on the other hand, consists of presenting several ambiguous pictures to the participant, and then asking the participant to create a story explaining what is happening in each picture. Empirical evidence for the TAT is mixed. On the one hand, Spangler (1992) conducted a meta-analysis and found that TAT-achievement motivation measures were correlated with operant outcomes (.22; e.g., occupational success, income) and respondent outcomes (.19; e.g., school performance, measured intelligence), and both correlations were higher with the TAT than with explicit self-report measures. On the other hand, Lilienfeld et al. (2000) noted numerous concerns with the psychometric quality and rigor of these measures and others like them. This is true particularly in regard to the scoring of these tests—because they are open-ended techniques, there are innumerable responses that participants can give, and though structured scoring methods have been created, there is still potential for subjectivity in interpretation by the assessor. Other measures that fall within this category include sentence completion tests (Loveinger, 1976), the Draw-A-Person Test (Machover, 1949), and the Luscher Color Test (Luscher & Scott, 1969).

The final approach to the assessment of implicit personality is based on techniques geared toward measuring individuals' response tendencies, and biases in their reasoning. Measures of this type usually present the participant with a decision-making

or reasoning problem to solve, and ask them to choose a correct answer out of the possible response options where at least one of the options represents a response containing a specific bias in reasoning. A set of prototypical tests that belong to this domain are conditional reasoning tests (James, 1998; James & LeBreton, 2012). Conditional reasoning denotes both a theory of personality, as previously discussed, as well as an indirect measurement system. Several conditional reasoning tests of various personality traits are in existence, albeit at various stages of development: achievement motivation (James, 1998), aggression (James et al., 2005), power (James et al., 2013), addiction proneness (Bowler, Bowler, & James, 2011), creativity (Schoen et al., 2016), integrity (Fine & Gottlieb-Litvin, 2013), and psychopathy (LeBreton, Binning, & Adorno, 2006). Conditional reasoning has only limited validation evidence collected, to date, on the various tests that have been created, and most of the validation evidence that exists, has been collected on the conditional reasoning test for aggression. James and LeBreton (2012) summarized a series of criterion-related validity studies for this test and found uncorrected criterion-related validity coefficients ranging from .11 to .64. James and LeBreton (2012) also reported the findings of a meta-analysis on this same conditional reasoning test for aggression, which resulted in an unweighted mean validity coefficient of .28. In addition, several studies have reported validity evidence for a conditional reasoning test of relative motive strength with observed correlations with behavioral criteria ranging from .09 to .57 (Bing, LeBreton, Davison, Migetz, & James, 2007; James, 1998; James & LeBreton, 2012; Schoen, 2015). Overall, while there have not been a tremendous number of conditional reasoning tests developed and validated, what evidence does exist appears to be encouraging.

As discussed, validity evidence varies for the different indirect measures across the three approaches, but in general the validity evidence appears more promising for the newer techniques (e.g., IAT, conditional reasoning measures) than for the older techniques (e.g., TAT). Furthermore, while the IAT has undergone some heavy criticism despite its popularity, relatively less is known about conditional reasoning tests, though the evidence that does exist appears promising. Moreover, the conditional reasoning measurement system allows for the study of the implicit components of competitiveness more precisely by measuring the cognitive biases underlying the implicit motive to compete; whereas the IAT measures temporal lags as indicators of one's concept network proximity and strength, which, as mentioned above, has been criticized for being unclear as to the psychological mechanisms by which the measure operates. James and LeBreton (2012) offer a list of criteria that an indirect measure should aim to achieve; the IAT and TAT, while laudable efforts at measuring the implicit personality, appear to fall short on these benchmarks. Therefore, on the basis of this review I plan to use the conditional reasoning measurement system in order to develop an indirect measure of the implicit component of competitiveness for the current study. In the following section, I will further describe this measurement system and outline the process by which I have developed the new measure of competitiveness.

Conditional Reasoning Theory and Development Plan for a New CR Measure

Conditional reasoning theory asserts that justification mechanisms develop over time and over repeated exposures to the internal conflict between the desire to hold a favorable self-view and the motive to behave in a certain way (e.g., motive to aggress, motive to compete; James, 1998; James & LeBreton, 2012). Furthermore, because of the

unique nature of each internal motive and its behavioral interaction with the environment, each motive is related to different JMs. For example, there is a different set of potential JMs attached to the aggressive motive (e.g., hostile attribution bias, potency bias) than there are to the achievement motive (e.g., opportunity bias, malleability of skills bias). Moreover, because justification mechanisms are believed to operate in a largely implicit manner, they are unavailable to the individual for conscious introspection. Consequently, the typical self-report style personality measures which are designed to measure explicit or consciously accessible self-evaluations are ill-equipped to assess the presence of such unconscious justification mechanisms. Rather, indirect measures are needed to assess these implicit cognitive biases.

James and colleagues (James, 1998; James et al., 2005; James & LeBreton, 2010; James & LeBreton, 2012; James, McIntyre, Glisson, Bowler, & Mitchell, 2004) developed a new system of measurement specifically to assess the existence and strength of an individual's developed justification mechanisms. By assessing the pervasiveness of one's justification mechanisms, a conditional reasoning measure can indirectly evaluate the strength of one's motive that necessitates the need for those justification mechanisms. This is achieved by asking individuals to respond to a number of items that are presented as inductive reasoning problems. In fact, the items actually are bona fide inductive reasoning problems but these items actually include multiple inductively valid solutions, with at least one of the valid solutions being derived from a motive-relevant justification mechanism. Subsequently, when solving these items, individuals are unknowingly confronted with a choice to either endorse reasoning that is based on cognitive biases that defend one's motive-driven behavior or to endorse reasoning that is not shaped by such

biases. Individuals with the respective developed JM are drawn toward the JM-based logical response over the others, yet believe their response is solely based on rational thinking. Individuals with a stronger motive will have developed more robust JMs, and, therefore, will gravitate toward more JM-driven reasoning and responses over the course of the test. Thus, a higher rate of endorsement for the JM-driven responses will indicate a stronger motive in the individual.

As an illustrative example, consider a conditional reasoning problem from the most developed conditional reasoning measure, the CRT-A, a test of aggression (James et al., 2005; James & LeBreton, 2010). An example item is presented in Appendix A. This problem represents a typical inductive reasoning item where specific premises are set up in the item stem and the respondent is asked to draw a conclusion beyond the direct information in the stem. The four possible responses consist of two illogical distractors (response options A and D) which are rarely ever chosen by the respondent, a logical, non-aggressive response (response option C), and a logical, JM-driven, aggressive response (response option B). Response option B for this item was created with the hostile attribution bias in mind, which is a cognitive bias whereby individuals who possess it have a propensity to sense hostility and danger in the actions of others. Individuals who have developed the hostile attribution bias are drawn toward option B, because it allows them to respond in an aggressive manner, which they are intrinsically motivated to do, but in a way that appears reasonable (i.e., under the guise of self-defense). Refer to James and LeBreton (2010) for a more thorough review. Conditional reasoning tests use several items across several justification mechanisms looking for a systematic way of responding from an individual in order to evaluate their personality.

Put another way, a response to one item cannot determine whether or not one is motivated to aggress, or achieve, or seek power, etc. Rather conditional reasoning tests seek to determine if an individual consistently responds in a manner that suggests the individual has developed multiple JMs relevant to the motive of interest.

Although development of conditional reasoning measures are, to some extent, similar to typical test development procedures, it often is a lengthier and more involved process (James & LeBreton, 2012; Schoen et al., in press). Generally, CR test development involves the following steps adapted from both Hinkin (1998) and James and LeBreton (2012): (1) a comprehensive literature review, (2) explication of the construct definition, (3) development of justification mechanisms, (4) item generation, (5) initial item review and revision, (6) pilot test, (7) item reduction/revision, and (8) iterative, ongoing validation studies. A description of the comprehensive literature review, explication of the construct definition, and development of the justification mechanisms have already been described in previous sections. Therefore, in the following studies, I will describe steps four through eight in the development of the current Conditional Reasoning Test for Competitiveness (CRT-C).

Chapter 2

Study 1: Item Generation, Review, and Revision

The purpose of Study 1 is to address Steps 4 (Item Generation) and 5 (Initial Item Review and Revision) in the CR test development process. The four justification mechanisms were developed as previously indicated, and were used to write conditional reasoning items as per the process outlined in James and LeBreton (2012), discussed below.

Method

Sample

Two experts in developing Conditional Reasoning items/tests were recruited to review the developed CRT-C items. Each expert has previously published articles in peer-reviewed journals on Conditional Reasoning topics including the development and validation of a new Conditional Reasoning measure. The two experts were not a part of the same lab as the author, and reside at separate universities.

Procedure

The item writing process consisted of three broad phases: (1) determine evocative scenarios and stimuli that trigger the motive to compete, (2) design a traditional inductive reasoning problem around that stimulus (without integrating justification mechanisms), and (3) convert the problem from inductive to conditional reasoning by writing responses that integrate the justification mechanism(s) of interest. Phase one was conducted primarily during the literature review step of the project. As the literature was reviewed

(mainly the non-academic literature), unique events, circumstances, theories, data, perspectives, and the like that appeared to trigger one's motive to compete were noted. This work constitutes the great majority of stimuli that were used for the items. Using these stimuli, phase two consisted of writing inductive reasoning problems. James and LeBreton (2012) detailed many types of inductive reasoning problems (e.g., inference, evaluation of evidence, relevance of arguments), as well as generic problem prototypes that can be used as templates. Once the general inductive reasoning problems were created, phase three consisted of converting those problems into conditional reasoning items. This phase involved redesigning the inductive reasoning problem so that competitive individuals and non-competitive individuals are directed to different responses, both of which are inductively plausible solutions, but only one of which is based on an identified competitive justification mechanism. Sample items, along with their scoring key, can be found in Appendix A.

Twenty-two items—approximately five items per justification mechanism—were created for the initial test. After the 22 items were constructed and had undergone several rounds of revision, they were given to the experts to review and critique. The experts were given a definition for competitiveness, the list of JMs and their descriptions, and the 22 items. They were asked to (1) determine which item responses were distractors, (2) determine which item responses were competitive/non-competitive responses, (3) determine which JM each competitive response belonged to, and (4) to provide a general critique of the items and suggestions for revisions where necessary.

Results

Both of the expert reviewers, independently, were able to identify the large majority of distractor responses and competitive/non-competitive responses. Specifically, they were able to accurately discern, and were in agreement, on 95.5% (42 of 44) of the distractor responses. By necessity, they were also at the same level of agreement for which responses were competitive/non-competitive. Reviewer 1 correctly distinguished the JMs for 77.3% (17 of 22) of the items as they were intended during the item-writing process. Reviewer 2 correctly distinguished the JMs for 63.6% (14 of 22) of the items—all 14 of these correct classifications overlapped with the items correctly distinguished by Reviewer 1 for a 63.6% correct joint classification.

This process resulted in items that were evaluated as ready for pilot testing with or without minor revision (10 items), items that needed larger revisions based on the experts' recommendations (5 items), and items deemed unsalvageable and therefore discarded (7 items). Of the 15 items that were retained, the two reviewers both correctly distinguished 12 of the intended JMs (80% agreement)—only one reviewer correctly distinguished the JM for the remaining three items. Additionally, both expert reviewers offered helpful revision suggestions pertaining to reading level, subtlety of items, and other general notes.

Study 1 Discussion

Of the 10 items that were placed into the category of ready for pilot testing, three were accepted outright and seven needed only minor revisions. These minor revisions primarily consisted of fixing grammar/typos, awkward wording, or lowering the reading

level of items. The five items that necessitated larger revisions required a more substantive change in the item content, either in the item stem or one or more of the item responses. Typically, these changes related to the subtlety of the inductive inference underlying the logical link from the stem to the competitive response. Of the seven items that were considered unsalvageable, they either contained too many of the above problems or they were thought to be not inductively viable (i.e., too much of an inductive leap for responders to make to arrive at the conclusion). Additionally, based on input from the reviewers two new items were created. The revised test was comprised of 17 items.

Chapter 3

Study 2: Pilot Test and Further Revision of the CRT-C (Pilot)

The purpose of Study 2 was to address Steps 6 (Pilot Test) and 7 (Item Reduction/Revision) in the CR test development process as previously outlined. The set of items used for this study, the CRT-C (Pilot), was determined in Study 1 following the expert review and revisions. The goal of this study is to confirm the readability of the items, determine if there is adequate variability in responses, and to establish that the test is generally working as intended in the population of interest.

Method

Sample

A small pilot sample of 52 student participants were recruited from an undergraduate psychology pool for Study 2. Five participants were removed for missing data—each responded to less than half the CRT-C items. Five additional participants were removed because they endorsed excessive illogical responses (i.e., 6 or more illogicals). Of the final sample of 42 participants, 85.7% were female, and there was an average age of 19.17 years old (*SD* = 2.22). The racial makeup of the sample consisted of 88.1% Caucasian, 4.8% Asian, 2.4% Hispanic, and the remaining 4.8% of participants classified themselves as Other.

Procedure

Participants completed a battery of measures on Qualtrics, an online questionnaire software company. They were first asked to electronically sign the informed consent

form. After providing consent, the participants completed the CRT-C (Pilot) and responded to relevant demographic questions. As recommended by Hinkin (1998), each participant was also asked open-ended questions during and after the CRT-C (Pilot) to help identify problematic, confusing, or offensive phrases and/or wording in the item stems or responses. For example, participants were asked if each item and corresponding response options contained confusing wording, and if so, to elaborate on why the wording was confusing. After the measure had been completed, participants were also asked to select from a list what construct they believed the test measured. When they had completed the measures, the participants were then debriefed and thanked for their participation. The entire process, on average, took participants about 20 minutes to complete.

Measures

The CRT-C (Pilot)—the 17 conditional reasoning competitiveness items that resulted from Study 1—was used in this study along with open-ended questions as previously discussed. Finally, the participants were given a demographics questionnaire which included items pertaining to several categories: age, gender, race, marital status, education, employment, income, and language comprehension.

Results

On the basis of recommendations set forth in Smith, Hoffman, and LeBreton (N.d.), the review of the pilot test data consisted of three steps: (1) the base rates with which the illogical responses were endorsed, (2) the base rates with which the inductively plausible responses were endorsed, and (3) a qualitative review of the participant

Table 3-1: Distractor and JM Base Rate Evaluation, Common Feedback, and Retention Decision

Item	Step 1 – Base Rate Distractors	Step 2 – Base Rate Comp JMs	Step 3 – Participant Feedback Themes	Decision
3	+	0	Confusing wording; too long	Revise
4	-	0	Confusing wording	Revise
5	-	+		Revise
7	+	-		Revise
8	+	+		Keep
9	+	+		Keep
10	+	+	Odd phrasing	Revise
11	+	+		Keep
12	+	+	Lack of information	Revise
13	-	+		Revise
14	+	+		Keep
15	-	+		Revise
16	+	+		Keep
17	+	-		Revise
18	+	+		Keep
19	+	+		Keep
20	+	+		Keep

Note. Items 1, 2, and 6 are actual intelligence items used to increase the appearance of the measure as an intelligence test, not CR items. Distractors: endorsement rates less than 5% are ideal (+), 6%-10% are acceptable (0), and 10% or greater are potentially problematic (-); Competitive JMs: endorsement rates between 25%-75% are ideal (+), 10%-24% or 76%-90% are acceptable (0), and less than 10% or greater than 90% are potentially problematic.

feedback. Refer to Table 3-1 for a summary of these results.

First, Smith et al. (N.d.) suggested that the *p* values of the illogical distractors—the proportion of individuals selecting a specific distractor response—should be evaluated. The distractors for a Conditional Reasoning measure are intentionally written to appear illogical, and are subsequently expected to be selected very rarely by respondents. Therefore, Smith et al. suggested that an endorsement rate for illogical distractors of less than 5% is ideal, less than 10% is acceptable, and greater than 10% may indicate a problem. See Table 3-1 for a summary of the evaluation of CRT-C (Pilot)

response rates. Note that for CR measures, items 1, 2, and 6 are traditional intelligence test items used to increase the face validity of the CRT-C as a measure of cognitive skills; thus, these items are not scored as part of the CRT-C. As summarized in Table 3-1, the endorsement rate of illogical responses for 4 of the 17 CRT-C (Pilot) items exceeded the suggested 10% cutoff. None of the distractors for the other 13 items surpassed a *p* value of 5%, and the majority of illogical responses received 0% endorsement as intended.

Second, Smith et al. (N.d.) suggested that the JM-driven response rates should also be evaluated. Ideally, there should be an approximate balance between the competitive and non-competitive response rates, which would lead to a relatively higher level of information gained on the respondent. For example, at the extremes—0% or 100% endorsement rates—no information can be gained to discriminate between the competitiveness levels of individuals, and the item becomes relatively useless. Nonetheless, somewhat unbalanced items (i.e., more/less difficult items) can be useful in gaining information on respondents across the full competitiveness continuum. Therefore, response rates between 25% and 75% are considered ideal, response rates between 10%-25% and 75%-90% are considered acceptable, and rates less than 10% or greater than 90% may indicate a problem. As shown in Table 3-1, of the 17 CRT-C (Pilot) items, two were flagged as problematic, two met acceptable criteria, and the rest were in the ideal range.

Third, the participant feedback to the open-ended responses for each item was qualitatively reviewed. Themes from the feedback are summarized in Table 3-1. Overall, the feedback was sparse, but the most common feedback across items highlighted some confusing wording/phrasing. This was particularly evident in items 3,

4, and 10. Additionally, some respondents thought that item 3 was too long. Lastly, it was noted that item 12 lacked enough information to make a definitive response, which can be a danger when writing items that have more than one logical response option.

After the quantitative and qualitative reviews were completed, decisions were made on whether items should be kept as they were written, or revised. Refer to Table 3-1 for a summary of these decisions. If an item was in the ideal range for both distractor and JM-response base rates, and received no critical respondent feedback, the item was retained without revision. Eight items were kept without changes. If an item fell outside of the ideal range for either the distractor or JM-response base rates, but was not flagged as problematic in both categories, or if the item received actionable critical feedback, the item was kept but revised. The remaining nine items were placed into this category. Zero items were discarded as it was deemed inappropriate to make major decisions based on a small pilot sample. The discussion section details how items were revised.

Finally, of the 42 participants who were surveyed, 4.8% (n = 2) marked that they believed the test measured competitiveness from a list of 17 psychological constructs. Of the remaining participants 47.6% thought it measured deductive reasoning, 21.4% thought it measured critical thinking, 16.7% thought it measured achievement motivation, 9.52% thought it measured inductive reasoning, and 2.4% thought it measured other personality characteristics.

Study 2 Discussion

As discussed, eight items were kept without revision and nine items received minor revisions. The item revisions typically revolved around clarifying wording that

was deemed to be confusing by the respondents (items 3, 4, and 10) or rewriting distractors to be more obviously illogical and less socially desirable to correct less than ideal base rates (items 3, 4, 5, 7, 13, 15, and 17). Additionally, one item (3) was shortened, and one item (12) was revised to appear more subtle so that the two logical responses did not appear in direct contrast to each other. Although some of the results were considered problematic, it was deemed unnecessary to cut any of the items at this point (or make any major revisions)—particularly because these results were based on a small pilot sample.

Therefore, this process resulted in a final set of items that constituted the initial Conditional Reasoning Test for Competitiveness (CRT-C) as it was used in subsequent studies—the first steps in the empirical validation effort designed to address convergent and discriminant validity as well as criterion validity.

Chapter 4

Study 3: Item Analyses and Reduction

The overall aim of Study 3 was to continue to address Step 7 (Item Reduction/Revision) and to begin to address Step 8 (Ongoing Validation) in the CR test development process as previously outlined. Study 1 and Study 2 were used to design an initial set of test items, and to iterate through successive revisions to refine those items so that they were devoid of obvious errors and looked to measure the competitive JMs. Study 3 now, was be used to rigorously test those items on a large sample to determine which items are performing as intended, and subsequently to remove items that do not effectively contribute to the measurement of competitiveness.

Method

Sample

To test the psychometric properties of the newly revised CRT-C items, a developmental sample of 457 students were recruited from the undergraduate psychology pool. The sample consisted of 66.4% females. Additionally, the sample had an average age of 19.29 years (*SD* = 2.11) and a racial makeup of 71.1% Caucasian, 11.5% Asian, 6.6% Hispanic, 5.1% African American, 1.3% Middle Eastern, 0.4% Native American, and 4.0% other.

In addition to this sample, each of the participants were asked to provide the names of three close others (e.g., parents, siblings, friends) for additional perspectives on their behavior. Each participant, on average, gave 1.8 names (842 total). Of those 842 individuals contacted, responses were collected from 188 giving a response rate of

22.3%—63.8% were female and there was an average age of 33.4 years (*SD* = 16.23). Of these 188 responses, there were ratings on 144 of the participants (i.e., 44 responses were overlapping ratings).

Procedure

After participants signed up for the study they were sent a link to complete the battery of measures on Qualtrics. Once they were redirected to the survey site, they were asked to electronically sign the informed consent form. After providing consent, they completed each of the measures discussed in the next section including providing relevant demographic information (similar to that collected in Study 2). The order of the measures was the same for all participants and were presented in the order they are presented in the next section. Importantly, because some of the explicit measures (which are easy for participants to see through) are aimed at measuring competitiveness, those measures were presented after the indirect measures where the purpose is obscured. After completing the measures, the participants were asked for the name and email address of three people who know the participant well. Additionally, they were asked four validity check items—basic questions about themselves that someone who knew them well should be able to answer correctly. Then the participants were debriefed and thanked for their participation. This process took approximately 90 minutes.

When data collection from the primary sample concluded, emails were sent to all of the close others. Each email contained a brief note explaining the study, and a link to the close other survey. The close other survey, hosted on Qualtrics, consisted of the Competitive Orientation Measure (adjusted to be used as an other-report instrument), and the validity check questions to ensure the individual did know the participant. As

compensation for their time, each individual who responded was entered into a drawing for one of 36 total $25 Amazon gift cards. Once the individual completed the online survey (about 10 minutes), they were debriefed and thanked for their time.

Measures

Conditional Reasoning Test of Competitiveness (CRT-C). The version of the CRT-C, as resulting from Study 2, was used in this study. The newly developed CRT-C was scored such that for each item response that endorses a competitive justification mechanism the individual received a score of +1, and for all other responses the individual received a score of 0. Furthermore, how many times an individual chose an illogical distractor response was recorded. Similar to other developed CRT measures, if the participant chose too many illogical responses (i.e., more than 4) his/her data was removed from analyses as this is an indicator that the participant was not responding thoughtfully or there was some other problem (e.g., lack of English fluency).

Ultimatum Bargaining Game. The first measure of competitive behavior is the Ultimatum Bargaining Game. The current version of the Ultimatum Bargaining Game was adapted from Camerer (2003) and Butler, Burbank, and Chisholm (2011). It is a one-shot game where the participant is presented with a scenario in which some individual, Person X, has something that the participant can sell for exactly $30, but is worthless to Person X. The participant must offer a sum of money between $0 and $30 for that object, and the participant is told that Person X can either accept the offer as-is, or can reject the offer, but there is no haggling allowed. If Person X were to accept the offer then, in this scenario the participant would "win" whatever he/she did not offer. If Person X instead rejects the offer, then neither one receives anything. Camerer (2003)

suggested, "…the ultimatum game is a crisp way to measure social preferences rather than a deep test of strategic thinking" (pg. 43). This game was scored such that the remainder of the money from the offer (i.e., the money that the participant would win) was a continuous measure of competitive behavior. It should be noted that this game does not parse apart competitive versus individualistic social preferences—so it is not a pure measure of competitive behavior, but is a partial indicator nonetheless (Kuhlman & Marshello, 1975; Messick & Thorngate, 1967; Pavitt, 1998; Van Lange et al., 1997).

Patent Race Game. The next measure of competitive behavior is the Patent Race Game. The current version of the Patent Race Game was adapted from Camerer (2003) and Rapoport and Amaldoss (2000). It is a one-shot game where the participant is presented with a scenario in which there are two competing firms that have allotted their R&D departments $5 million. The two firms are competing to be the first to develop some new profitable technology. Both firms will lose their investments regardless of the outcome, but whoever wins the patent will earn $10 million profit from the technology. The firm that invests more in the new technology will obtain the patent and monopoly rights, and the losing firm will gain nothing. If the two firms invest the same amount, neither firm will win the patent (representative of being stuck in costly litigation over the patent). The participant is playing the role of the head of Firm A's R&D department and has been given the endowment of $5 million to do with as he/she wishes and is told they are playing against another, randomly chosen, participant. This game was scored such that the amount of money risked was a continuous measure of competitive behavior.

Prisoner's Dilemma Game. The next measure of competitive behavior is the Prisoner's Dilemma Game. The current version of the Prisoner's Dilemma Game was

adapted from Camerer (2003), Messick and McClintock (1968), and Pavitt (1998). It is a one-shot game where the participant is presented with a scenario in which the police have arrested two people. They believe the two have committed a serious crime, but they only have enough evidence to convict them of a minor offense. Subsequently, they try to get the criminals to testify on each other. The district attorney gives each criminal two options: turn on the other, or remain silent. If neither criminal betrays the other they will be charged equally for the minor crime and each receive one year in prison. If they both betray each other they will each receive five years in prison. Finally, if only one betrays the other, the betrayer will be set free and the other will receive 10 years in prison. The participant will play the role of one of the criminals and make the choice to either betray the other or remain silent. This game was scored such that betraying the other was indicative of the competitive response. Messick and McClintock (1968) have shown that each response is representative of different social motives. The choice to remain silent is in line with cooperative social motives. The choice to betray the other is in line with both individualistic and competitive social motives. Similar to the Ultimatum Bargaining Game, this game cannot completely parse apart these two motives, but can be thought of as a partial indicator of competitiveness.

Chicken Game. The next measure of competitive behavior is the Chicken Game. The current version of the Chicken Game was adapted from Camerer (2003), Butler et al. (2011), and Rapoport and Chammah (1966). It is a one-shot game where the participant is presented with a scenario in which there are two drivers heading for a single-lane bridge from opposite directions. Each driver can either swerve or drive straight ahead. If both drivers drive straight ahead, they both risk crashing and possibly death. If one

driver "chickens out" and swerves away, while the other driver stays straight, the driver who stays straight will win the right of way on the bridge. If both drivers swerve then the outcome is a draw. The participant plays the role of one of the drivers and must choose to swerve or drive straight. This game was scored such that driving straight was scored as the competitive choice. Camerer and Thaler (2003) argued that the Chicken Game might be more appropriate to measuring cooperative versus competitive social motives than the Prisoner's Dilemma Game. Additionally, Butler et al. (2011) assert, "[The option to go straight] is only selected by players who are willing to take on risk and also seek an advantage over the other" (pg. 104).

Maze Payoff Preference Decision. The current version of the Maze Payoff Preference Decision measure was adapted from Gneezy, Niederle, and Rustichini (2003), and Gupta, Poulsen, and Villeval (2005). For this behavioral item, the participant is presented with a scenario in which he/she will be given 15 minutes to complete as many mazes as he/she can, though the participant will not actually be presented with any mazes. They are given the option of being rewarded with points in either a piece rate or tournament style fashion. With the piece rate option they would receive four points for each maze completed in the 15 minutes. With the tournament style option, they would be competing against another randomly chosen person, and if they successfully complete more mazes than the other person they would be awarded six points per maze. If they were unsuccessful in completing more mazes than the other person, they would only receive one point per maze completed. This item was scored such that choosing the tournament style will be scored as a competitive preference.

Decomposed Prisoner's Dilemma Game. The next measure of competitive behavior was the Decomposed Prisoner's Dilemma Game. The current version of the Decomposed Prisoner's Dilemma Game used here is a 9-item measure of an individual's tendency toward competitiveness, individualism, or cooperation developed by Van Lange et al. (1997). Each item is a three-choice, decomposed variant of the traditional Prisoner's Dilemma Game which allows for the separation of the inferred social motives—competitiveness is separated from individualism—which left responses to that game (and other similar games) somewhat ambiguous. With each item, participants are presented with three options of point allocations to him/herself and an "Other" individual, and asked to choose the option he/she most prefers. For example, the participant might see options similar to that of the item in Appendix A. If the participant chooses Option A, he/she would receive 500 points and the other person would receive 100, and so on. In this example, Option A is the competitive response because it is the response that maximizes the relative gain for the participant over the other. Option B is the cooperative response because the total number of points allotted to both the participant and the other exceeds the sums of points from the other two options, respectively. Finally, Option C is the individualistic response because it provides the participant with the most possible points (regardless of what the other person receives). The frequency with which the participant chooses each response type across all items was used to determine the participant's dominant behavioral category.

Competitive Spectating Interests Measure. The competitive spectating interests measure was designed for the current study. Participants were presented with 9 forced-choice items in which they chose one of two television shows that they would be most

interested in watching. The items have been designed so that one of the television shows from each item is competitive (e.g. Hell's Kitchen) in nature and the other is not (e.g., Kitchen Nightmares). Additionally, the pairs of television shows have been carefully selected so that they are highly similar in content. Along with the names of the shows, the items also contain brief descriptions of the shows. Scores consist of the sum of the competitive television shows chosen.

Competitive Background. The competitive background questionnaire was adapted from Newby and Klein (2014). The current version of the questionnaire includes three items that ask how interested the participant is in watching and participating in competitive activities. A sample item is "Generally speaking, how interested are you in participating in competitive activities?" These items use a 5-point Likert-type response scale with 1 representing "not at all interested" and 5 representing "very interested."

Competitiveness Orientation Measure (COM). The Competitiveness Orientation Measure (COM; Newby & Klein, 2014) is a 37 item self-report measure of explicit trait competitiveness that consists of four factors: general competitiveness, dominant competitiveness, competitive affectivity, and self-enhancement competitiveness. Sample items are "I put a lot of effort into beating others at things," and "I think a lot about ways to win." The measure uses a 5-point Likert-type response scale with 1 representing "strongly disagree" and 5 representing "strongly agree." This measure was adapted for the close other survey; the item content remained the same, but instead of being a self-report it was restructured to be an other-report (e.g., "He/she puts a lot of effort into beating others at things").

Basic Demographics. The demographics survey asked participants to respond to basic questions such as items about age, sex, ethnicity, marital status, education, employment, and income.

Results

The developmental sample was used for item analyses to determine the most effective items from the overall set. Because the development of conditional reasoning measures differs substantially from that of self-report measures, Smith et al. (N.d.) have given guidelines for the process of analyzing items specifically for newly developed conditional reasoning measures. The process is made up of four steps: (1) base rate analysis for the illogical distractor responses, (2) base rate analysis for the JM-driven responses, (3) evaluation of item-criterion relationships, and (4) evaluation of item-total relationships. Smith et al.'s guidelines for acceptable metric values and item retention were followed. A summary of the results from these steps as well as final item retention decisions can be found in Table 4-1.

The first step in the item evaluation process is to conduct a base rate analysis for the illogical distractor responses. This process is the same as was conducted in Study 2. As a reminder, distractors that are endorsed by less than 5% are considered ideal, less than 10% are acceptable, and anything greater than 10% is potentially problematic. Based on these evaluation criteria, two items were flagged as problematic, eight items were put into the acceptable category, and seven were considered ideal. See Table 4-1 for reference.

The second step in the item evaluation process is to complete a base rate analysis for the JM-driven responses. Again, this is the same process that was performed in Study 2. The evaluation criteria for this step is response rates between 25% and 75% are considered ideal, response rates between 10%-25% and 75%-90% are considered acceptable, and rates less than 10% or greater than 90% may indicate a problem. As shown in Table 4-1, one item was considered problematic, three were considered acceptable, and the remaining 13 items were deemed ideal.

Step 3 involves an evaluation of the various item-criterion validities. Eight different sets of criterion correlations were calculated, one for each criterion variable. As mentioned previously, all CRT-C items were dichotomously scored. The various criteria, on the other hand, were a mix of dichotomously and continuously scored variables. Therefore, where the criterion was dichotomously scored (i.e., Prisoner's Dilemma, Chicken, Maze Payoff, and Decomposed Prisoner's Dilemma), tetrachoric correlations were calculated. Where the criterion was continuously scored (i.e., Ultimatum Bargaining, Patent Race, Competitive Spectating, and Other-COM), biserial correlations were calculated. Table 4-2 reports the individual item-validity correlations. Items that significantly correlate with two or more of the criteria in the expected direction (i.e., positive) are considered ideal. Items that significantly correlate with one of the criteria in the expected direction are considered acceptable. Items that do not significantly correlate with any of the criteria in the expected direction are considered problematic. The results of these item evaluations are displayed in Table 4-1. In summary, five items were considered problematic, four items were deemed acceptable, and the final eight items were categorized as ideal for this step.

Table 4-1: Evaluation of CRT-C Item Analyses and Final Retention Decisions

Item	JMs	Step 1 - Distractor Base Rate	Step 2 - JM Base Rate	Step 3a - Item-Criterion	Step 3b - Interim Decision	Step 4a - Initial Item-Total	Step 4b - Interim Decision	Step 4c - Iteration 2 Item-Total	Step 4d – Interim Decision	Step 4e - Final Item-Total	Final Decision
3	CAB	+	+	-	Drop						
4	ADM	-	+	0	Drop						
5	WIN	-	-	+	Drop						
7	COMP	0	+	-	Drop						
8	CAB	+	0	+	Retain	.80 (.57)	Retain	.82 (.58)	Retain	.87 (.63)	Retain
9	WIN	0	0	+	Retain	.63 (.35)	Retain	.65 (.36)	Retain	.67 (.38)	Retain
10	WIN	+	+	+	Retain	.44 (.12)	Retain	.46 (.14)	Retain	.49 (.15)	Retain
11	CAB	+	+	-	Drop						
12	COMP	0	+	0	Retain	.53 (.22)	Retain	.54 (.23)	Retain	.53 (.20)	Retain
13	ADM	0	+	-	Drop						
14	WIN	0	+	0	Retain	.31 (-.01)	Drop				
15	WIN	+	+	+	Retain	.34 (.03)	Retain	.35 (.03)	Drop		
16	ADM	+	+	0	Retain	.51 (.20)	Retain	.52 (.20)	Retain	.57 (.25)	Retain
17	CAB	+	+	+	Retain	.65 (.36)	Retain	.66 (.37)	Retain	.66 (.36)	Retain
18	ADM	0	0	+	Retain	.57 (.27)	Retain	.59 (.29)	Retain	.60 (.29)	Retain
19	COMP	0	+	-	Drop						
20	COMP	0	+	+	Retain	.63 (.34)	Retain	.66 (.37)	Retain	.68 (.38)	Retain

Note. CAB=Competitive Attribution Bias, ADM=Admiration Bias, WIN=Winner's Bias, COMP=Competence Bias. + indicates ideal, 0 indicates acceptable, and – indicates problematic. For Step 4, numbers in parentheses are corrected item-total correlations.

At this point, it was necessary to have an interim retention decision step. The last remaining step in the process per Smith et al. consist of calculating item-total correlations. The analyses for that step yields results that are item specific, but that are dependent upon the makeup of the full set of items. For example, an item-total correlation will be different based on the item scores that make up the total composite score. Accordingly, if there are poor items within the composite score that would be later removed, the current item-total correlation would be a much less useful metric to investigate. Therefore, based on the item evaluations for Steps 1 through 3, items that were flagged as problematic for any step were dropped, and all others were retained. This resulted in seven items being dropped and 10 items being retained (see Table 4-1).

Finally, step 4, investigating item-total correlations, was an iterative step. As previously mentioned, the items used for the total composite score impact the item-total correlations. So, although multiple items may show poor item-total correlations it is most prudent to only remove one item at a time and then recalculate all other item-total correlations. On the basis of Smith et al. (N.d.), a corrected item-total correlation—which removes the item score itself from the total composite score prior to correlating—of .10 was used as a cutoff. Items 14 and 15 were dropped because they failed to meet this criterion.

On the basis of these results, nine of the 17 total items failed to meet Smith et al.'s guidelines and were subsequently dropped from the final set of items. Therefore, the items that will be retained and will make up the final CRT-C total composite score are items 8, 9, 10, 12, 16, 17, 18, and 20. Table 4-3 shows that the CRT-C is significantly and positively associated with the patent race game (.24), the decomposed prisoner's

Table 4-2: Developmental Sample – CRT-C Item Validities

Items	Ultimatum Bargaining	Patent Race	Prisoner's Dilemma	Chicken	Maze Payoff	Decomposed Prisoner's Dilemma	Competitive Spectating	Competitive Background - Watch	Competitive Background - Attend	Competitive Background - Participate	Other-COM
3	.08	.00	.06	.07	.01	-.25*	-.17*	.00	.00	-.05	-.07
4	.03	.02	.01	-.08	.02	-.13*	.00	.00	.03	.10*	-.14
5	-.12*	.15*	.15*	-.08	-.12*	.01	-.13*	-.03	.09	.09	-.07
7	-.03	-.01	-.01	-.10*	.01	-.03	.01	.09	.03	.07	-.01
8	-.22*	.33*	.18*	-.21*	-.04	.21*	.01	.04	.13*	.03	.10
9	-.10*	.21*	.11*	-.14*	-.06	.12*	.03	.04	.12*	.03	.17*
10	-.04	.09	.07	.03	.07	.07	.15*	.11*	.07	.16*	-.06
11	-.05	-.03	.05	-.24*	-.12*	.07	-.01	.03	-.04	-.08	-.02
12	-.04	.16*	.01	-.05	.04	.08	.06	.00	.09	.01	-.05
13	-.03	.04	-.06	-.02	-.10*	-.02	-.01	.05	-.01	.00	-.05
14	.05	.02	.08	.02	-.04	-.04	.13*	.03	.05	.00	-.04
15	.09*	-.02	-.01	.02	-.07	.01	.10*	.09	.20*	.12*	.07
16	-.14*	.10*	-.06	-.02	.02	-.14*	.04	-.02	-.02	-.08	-.21*
17	.01	.17*	.03	-.03	.08	.04	-.02	.07	.06	.17*	.09
18	-.03	.05	.06	-.04	-.09	.19*	.00	-.06	-.01	-.01	-.26*
19	.01	.04	-.08	.01	-.03	.05	.05	.00	.03	.04	-.02
20	-.13*	.16*	.02	-.17*	-.07	.19*	-.05	.04	.10*	.04	.09

Note. $N = 451$ for all item-validity correlations except for correlations with Other-COM where $N = 144$.
* $p < .05$

dilemma game (.13), and competitive background-attending (.11), but significantly and negatively associated with the ultimatum bargaining game (-.13), and the chicken game (-.12). The four CRT-C JMs are equally represented in the final eight items—two items each. Table 4-4 displays the correlations between the four JMs (based on using unit-weighted two-item composite scores) and the various criteria.

Finally, reliability for the development sample was calculated on this final set of CRT-C items. A derivative of the KR-20 formula, as described in James & LeBreton (2012), was used to compute internal consistency using the item-total biserial correlations. Using their formula, a reliability estimate of .79 was found for the eight items. This exceeds the typical internal consistency criteria (i.e., .70) for new measures in the early stages of development and validation (Nunnally & Bernstein, 1994).

Study 3 Discussion

The goals of Study 3 were to determine the most effective items from the CRT-C so as to create a more accurate revised version of the measure and to provide initial criterion-related validity evidence for the measure. To that end, the 4-step process outlined in Smith et al. (N.d.) was used to pare down the initial 17 CRT-C items to a final set of eight items. These eight items were then used to show initial criterion-related validity evidence, item cohesiveness via item-total correlations, and finally internal consistency.

The results of the various item and test analyses were somewhat mixed. Interestingly, using an objective decision process for item retention yielded a final set of items that represented the four competitive JMs equally. It does appear, however, that

Table 4-3: Developmental Sample – Correlations, Means, and Standard Deviations

	1	2	3	4	5	6	7	8	9	10	11	12
1. CRT-C Total	--											
2. Ultimatum Barg.	-.13*	--										
3. Patent Race	.24*	-.30*	--									
4. Pris. Dilemma	.07	-.01	.07	--								
5. Chicken	-.12*	.03	-.05	.01	--							
6. Maze Payoff	-.01	.06	-.04	-.02	-.02	--						
7. Decomposed PD	.13*	.01	.05	.03	.03	.03	--					
8. Comp. Spect.	.05	.02	-.04	.00	-.02	.03	.03	--				
9. Comp Back, Watch	.05	-.08	.07	.09	.03	.05	.05	.25*	--			
10. Comp Back, Att.	.11*	-.02	.07	.02	-.01	.02	.11*	.16*	.53*	--		
11. Comp Back, Part.	.07	.02	.06	.01	.09	.07	.11*	.12*	.31*	.52*	--	
12. Other-COM	-.05	-.02	.09	.00	.08	.08	.07	-.08	.05	.16	.34*	--
Mean	4.91	16.86	2574336.28	.46	.29	.42	.23	.61	3.43	3.44	3.31	3.17
SD	1.81	6.59	1506543.23	.50	.46	.49	.42	.20	1.09	1.18	1.29	.72

Note. CRT-C Total includes only items 8, 9, 10, 12, 16, 17, 18, and 20. *N*=452 for variables 1 through 11. *N*=144 for variable 12.
*$p < .05$

Table 4-4: Developmental Sample – Correlations Between JMs and Criteria

Criteria	CAB	WIN	ADM	COMP
Ultimatum Bargaining	-.07	-.07	-.09	-.09
Patent Race	.22*	.15*	.08	.17*
Prisoner's Dilemma	.08	.10*	.00	.02
Chicken	-.10*	-.06	-.03	-.11*
Maze Payoff	.03	.01	-.04	-.01
Decomposed PD	.09*	.10*	.02	.14*
Competitive Spectating	.00	.09*	.02	.01
Comp Background, Watch	.05	.08	-.04	.02
Comp Background, Attend	.08	.10*	-.01	.10*
Comp Background, Participate	.11*	.10*	-.05	.03
Other-COM	.08	.05	-.25*	.01
M	1.51	1.09	1.18	1.12
SD	.64	.73	.74	.74

Note. CAB=Competitive Attribution Bias, ADM=Admiration Bias, WIN=Winner's Bias, COMP=Competence Bias. n=452.
* $p < .05$.

some JMs fared better than others with regard to criterion validity. Specifically, Table 4-4 shows that the Admiration Bias was not significantly and positively correlated with any of the criteria whereas the other three JMs had significant positive relationships with at least three of the criteria. To that point, once the final set of items were decided upon, the composite score did show significant and negative correlations with two of the criteria, which was unexpected.

Nevertheless, the final CRT-C measure also had some positive results. The final item-total and corrected item-total correlations were fairly strong with most exceeding .50 and .20, respectively. Further, the CRT-C also showed significant and positive correlations with three of the criteria. Finally, the internal consistency estimate on this sample was .79. It is important to note, however, that some of these metrics were actually used to determine the final set of items, and, therefore, it is critical to cross-

validate these findings on a new sample to ensure that the results hold, which is the process I will describe in the next study.

Chapter 5

Study 4: Cross-Validation of the CRT-C

This study served to test the feasibility of the new conceptualization of dispositional competitiveness, one that includes a largely implicit aspect of competitiveness using the newly developed measure—the CRT-C. Building on the prior studies focused on developing and revising the test, Study 4 seeks to cross-validate the findings of Study 3.

It is important that any new measure of the competitiveness personality construct, whether it is of the implicit or explicit component, be useful in the prediction of competitive behaviors. Accordingly, as conditional reasoning theory suggests, and the aforementioned CRT-C justification mechanisms bear out, highly competitive individuals have developed cognitive biases to perceive their environment differently from non-competitive individuals and justify their competitive behaviors and decisions in a manner that appears rational to them. Consequently, I predict that individuals who have developed more competitive justification mechanisms, as measured by the CRT-C, will display the types of competitive behavior outlined in the three categories of relevant behavioral criteria previously discussed: (1) competitive decision-making behavior, (2) self-selection into competitive scenarios, and (3) interest in and attitude towards competitive events.

In the decision-making behavioral exercises introduced in Study 3 (e.g., Decomposed Prisoner's Dilemma Game), there are three primary types of social responses possible—individualistic, cooperative, or competitive (Deutsch, 1949, 1958;

Kuhlman & Marshello, 1975; McClintock, Messick, Kuhlman, & Campos, 1973; Messick & McClintock, 1968; Messick & Thorngate, 1967; Pavitt, 1998). Individualistic responses are those that seek only what is best for the individual with a complete disregard for the outcome of the other player (i.e., referent other) in the scenario. Cooperative responses seek to maximize the outcome for both the individual and the referent other. Lastly, competitive responses—because competitiveness is based on using a referent other's performance as a standard of excellence and attempting to outperform the other—seek to maximize the relative gain of the individual over the referent other. Therefore, I expect that individuals who have developed more justification mechanisms that allow them to rationalize competitive behavior will consistently make more decisions using a referent other as their standard of excellence (i.e., competitive responses).

Hypothesis 1: Measures of (a) explicit competitiveness, and (b) implicit competitiveness will be positively correlated with decisions in the behavioral exercises aimed at attaining a relative gain over a referent other.

Hypothesis 2: Measures of implicit competitiveness will provide incremental prediction of behaviors aimed at attaining a relative gain over a referent other above and beyond the measures of explicit competitiveness.

In addition to the above decision-making expectations, another primary way in which an individual high in competitiveness is expected to behave is by showing a tendency to self-select into activities that afford the individual the opportunity to evaluate their performance against a referent other. In other words, while the above hypotheses suggest that individuals scoring highly on the CRT-C will behave competitively when given the chance, I also expect these individuals to seek out and choose to be in situations

in which they will be given the opportunity to behave competitively, more so than their less competitive counterparts. Past empirical support for this hypothesis is presented in a study by Houston et al., (1992) who found that individuals higher in trait competitiveness were more likely to choose competitive professions (i.e., attorney) than were individuals lower in competitiveness (i.e., staff nurses).

Hypothesis 3: Measures of (a) explicit competitiveness, and (b) implicit competitiveness will be positively correlated with one's participation in competitive activities and scenarios (i.e., maze game scenario, competitive background-participate).

Hypothesis 4: Measures of implicit competitiveness will provide incremental prediction of one's participation in competitive activities and scenarios above and beyond the measures of explicit competitiveness.

The final category of criteria relevant to competitiveness is interests and attitudes toward competitive events. As previous research has borne out, more competitive individuals should show greater interest in and preference for competitive situations than for situations consisting of similar events/content that are non-competitive (e.g., Fletcher, Major, & Davis, 2008; Song, Kim, Tenzek, & Min, 2013). Accordingly, I expect that more competitive individuals will show greater interest in spectating competitive events than non-competitive events even when the content in both scenarios is nearly identical.

Hypothesis 5: Measures of (a) explicit competitiveness and (b) implicit competitiveness will be positively correlated with individuals' interest in viewing competitive events over non-competitive events.

Hypothesis 6: Measures of implicit competitiveness will provide incremental prediction of one's interest in viewing competitive events over non-competitive events above and beyond the measure of explicit competitiveness.

It should be noted here that all of the above criteria are generated by the individual him or herself. As mentioned in the preceding pages, there are some aspects of one's personality or motivations that an individual may not have accurate introspective access to (Greenwald & Banaji, 1995; James, 1998; James & LeBreton, 2012; McClelland et al., 1989; Nisbett & Wilson, 1977; Winter et al. 1998). Accordingly, individuals may misattribute their own behavior based on these inaccuracies because their developed justification mechanisms may aid them in believing the source of their behavior is not based in a competitive desire. Subsequently, others may be able to capture aspects of one's behavior that the individual is unaware of.

Hypothesis 7: Measures of (a) explicit competitiveness and (b) implicit competitiveness will be positively correlated with other-reports of the individual's competitive behavior.

Hypothesis 8: Measures of implicit competitiveness will provide incremental prediction of other-reports of the individual's competitive behavior above and beyond the measure of explicit competitiveness.

In addition to showing support for the implicit and explicit components of personality having an additive relationship, previous research has also provided empirical evidence for an interactive relationship between the two components (Bing et al., 2007a; Bing et al., 2007b; Frost et al., 2007; James & LeBreton, 2012; Winter et al., 1998). For

example, Bing et al. (2007b) found that measures of implicit and explicit aggression interacted to predict counterproductive work behaviors. Refer to Figure 5-1 for a summary of the possible relationship between the explicit and implicit component of competitiveness that is described in more detail below.

With regard to competitiveness, individuals lower in its explicit component prefer to view themselves (or at least desire others to view them) as non-competitive. Thus, these individuals are more likely to refrain from overt displays of competitiveness in an attempt to remain consistent with this view. When this is paired in an individual with a low implicit component of competitiveness, the individual will tend to avoid most forms of competitiveness. When it is paired in an individual with a high implicit component of competitiveness, however—one who is implicitly motivated and prepared to justify acts of competitiveness—this individual may be more likely to direct their motivation into more covert, subtle acts of competitiveness. This would allow for the satisfaction of the motive, but in a manner that attempts to remain outwardly consistent with the individual's explicit view of themselves.

With the inverse—when a high explicit component of competitiveness is paired with a low implicit component in an individual—that person may be more likely to avoid the subtle acts of competitiveness. Rather this person may tend to show more interest in viewing competitive events because that allows for the outward and conscious association with competitiveness without the necessity for the individual to enact the behavior. Taken altogether, a low explicit component of competitiveness may act to restrain how the individual enacts competitive behaviors if the person has the motivation to behave competitively. As the explicit component increases, so too should the person's

		Self-reported competitiveness	
		Low	**High**
Implicit preparedness to justify competitiveness	**Low**	• See themselves as non-competitive • Do not have JMs in place and thus lack the implicit capacity to justify competitive behavior • *Behavior: Tend to channel their behavior into non-competitive activities*	• See themselves as competitive • Do not have JMs in place and thus lack the implicit capacity to justify competitive behavior • *Behavior: Are interested in watching, and do not have a negative attitude toward, competitive activities, but tend to avoid enacting the covert competitive behaviors*
	High	• See themselves as non-competitive • Have JMs in place, which denotes that they are implicitly prepared to rationalize competitive behavior • *Behavior: Tend to channel behavior toward subtle acts of competitiveness*	• See themselves as competitive • Have JMs in place, which denotes that they are implicitly prepared to rationalize competitive behavior • *Behavior: Tend to engage in all forms of competitiveness, particularly the more overt acts*

Figure 5-1: Summary of the Relationship Between Implicit and Explicit Competitiveness

willingness to enact more overt behaviors as well as the subtle acts. In other words, in individuals with a high implicit competitiveness, as their explicit competitiveness increases their constraints on how their competitive motive will be enacted should be lifted and the individual may be more likely to enact most forms of competitiveness.

Although the ideas discussed here follow the presumed relationship between implicit and explicit motives as presented in prior research (e.g., Bing et al., 2007a; Bing et al., 2007b; Frost et al., 2007; James & LeBreton, 2012; Winter et al., 1998), these relationships have not been previously explored in the competitiveness domain. Furthermore, when implicit-explicit interactions have been found with other psychological constructs it is noteworthy that the implicit component of the constructs were measured with well-validated, longstanding measures (e.g., the CRT-Aggression). Because of the complex integration of these components of personality, more precise

instruments may be necessary to determine their underlying natures. Accordingly, the following ideas are presented as exploratory research questions.

Research Question 1: Do the implicit and explicit components of competitiveness interact to predict interest in viewing competitive events?

Research Question 2: Do the implicit and explicit components of competitiveness interact to predict self-selection into competitive scenarios?

Overall, the aim of the study and hypotheses is to present the initial efforts in attempting to determine whether or not conditional reasoning theory and the accompanying CR measurement system is a feasible approach to assessing an individual's level of competitiveness. An additional related goal is to determine the validity of using scores from the CRT-C in the prediction of competitive behaviors as outlined above.

Method

Sample

To investigate the above hypotheses a cross-validation sample of 268 student participants were recruited from the undergraduate psychology pool, 53.8% of which were female. This sample had a mean age of 19.68 years (*SD* = 2.73) and a racial makeup of 69.2% Caucasian, 11.9% African American, 8.8% Asian, 5.8% Hispanic, 0.8% Middle Eastern, 0.8% Native American, and 2.7% other.

Similar to the development sample in Study 3, each of the participants were asked to provide the names of three close others (e.g., parents, siblings, friends) for additional

perspectives on their behavior. From the cross-validation sample, each participant, on average, provided 2.1 names (570 total). Of these 570 individuals, 85 people responded, giving a response rate of 14.9%. Of this group, 63.9% were female and there was an average of 32.84 years (*SD* = 16.01). Of these 85 responses, there were ratings on 69 of the participants (i.e., 16 responses were overlapping ratings).

Procedure

The procedure for the current study is identical to that presented in Study 3.

Measures

The measures for the current study are identical to the measures presented in Study 3 with two exceptions: (1) the CRT-C measure for the current study consists of the final set of items described in Study 3, and (2) the current study includes a self-report competitiveness measure (the COM) that was only included as an other-report measure in Study 3.

Results

Correlations between the CRT-C and various criteria can be found in Table 5-1 along with means and standard deviations. It should be noted that all correlations are Pearson Product Moment correlations when the variables are scored continuously, biserial correlations when there are continuously and dichotomously scored variables, and tetrachoric correlations when both variables are dichotomously scored. Table 5-2 displays the correlations between the four JMs and the criterion measures. Internal consistency reliability for the CRT-C, using the formula described in Study 3, was

computed to be .81. Results from regression analyses can be found in Tables 5-3 through 5-8.

Hypothesis 1 asserted that (a) explicit competitiveness and (b) implicit competitiveness would be positively correlated with competitive decisions in the behavioral game exercises—ultimatum bargaining, patent race, prisoner's dilemma, chicken, and the decomposed prisoner's dilemma games. The COM (i.e., explicit) was significantly associated with the chicken game (.20). The CRT-C (i.e., implicit) showed significant positive correlations with the patent race game (.18), the prisoner's dilemma game (.13), and the decomposed prisoner's dilemma game (.19), and a significant negative correlation with the ultimatum bargaining game (-.13) and the chicken game (-.16). Thus, mixed support was obtained for Hypothesis 1a and 1b.

Hypothesis 2 stated that implicit competitiveness would add to the prediction of competitive decisions in the behavioral game exercises above and beyond explicit competitiveness. To test this hypothesis, scores from the behavioral game exercises were independently regressed onto explicit competitiveness and then, in a separate model, both explicit and implicit competitiveness. The change in *F* was then calculated to determine if implicit competitiveness significantly improved the prediction of the behavioral game exercise. The results from these analyses for the five corresponding criteria are presented in Table 5-3. For the continuously scored criteria (i.e., ultimatum bargaining, patent race), OLS linear regressions were performed. For the dichotomously scored criteria (i.e., prisoner's dilemma, chicken, and decomposed PD), logistic regressions were performed. Neither the explicit or implicit competitiveness was a significant predictor of

Table 5-1: Cross-validation Sample – Correlations, Means, and Standard Deviations

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1. CRT-C Total	--												
2. Ultimatum Barg.	-0.13*	--											
3. Patent Race	0.18*	-0.25*	--										
4. Pris. Dilemma	0.13*	-0.12*	0.11	--									
5. Chicken	-0.16*	0.21*	-0.03	-0.17*	--								
6. Maze Payoff	0.10	-0.09	-0.12*	-0.08	-0.04	--							
7. Decomposed PD	0.19*	-0.11	0.01	-0.07	0.00	-0.07	--						
8. Comp. Spect.	-0.04	-0.07	-0.12	-0.06	0.01	0.12	0.16*	--					
9. Comp Back, Watch	0.07	-0.14*	0.07	0.11	0.03	0.11	0.07	0.22*	--				
10. Comp Back, Att.	0.12*	-0.07	0.05	0.10	-0.08	0.18*	0.03	0.16*	0.69*	--			
11. Comp Back, Part.	0.08	-0.07	0.12*	0.03	0.11	0.26*	0.06	0.10	0.59*	0.59*	--		
12. COM	0.00	0.03	0.08	0.00	0.20*	0.25*	0.03	0.12*	0.43*	0.38*	0.65*	--	
13. Other-COM	-0.02	-0.09	0.23*	0.11	-0.09	0.15	0.05	0.04	0.02	0.05	0.35*	0.11	--
Mean	4.68	16.45	2507604.56	0.40	0.36	0.41	0.23	0.58	3.37	3.36	3.38	3.22	3.24
SD	1.95	6.65	1586157.67	0.49	0.48	0.49	0.42	0.21	1.15	1.22	1.27	0.46	0.77

Note. *N*=265 for variables 1 through 12. *N*=69 for variable 13.
*$p < .05$

Table 5-2: Cross-validation Sample – Correlations Between JMs and Criteria

Criteria	CAB	WIN	ADM	COMP
Ultimatum Bargaining	-.15*	-.07	-.11	-.01
Patent Race	.15*	.14*	.09	.11
Prisoner's Dilemma	.12	.09	.04	.11
Chicken	-.22*	-.19*	-.02	.00
Maze Payoff	.01	.05	.09	.12*
Decomposed PD	.13*	.12*	.15*	.12
Competitive Spectating	-.06	-.02	-.06	.13*
Comp Background, Watch	.08	.02	.02	.07
Comp Background, Attend	.16*	.07	.01	.10
Comp Background, Participate	.08	.02	.01	.09
Other-COM	.01	-.21*	.13*	.05
Mean	1.45	1.09	1.11	1.03
SD	.67	.75	.73	.74

Note. CAB=Competitive Attribution Bias, ADM=Admiration Bias, WIN=Winner's Bias, COMP=Competence Bias. n=452.
* $p < .05$.

prisoner's dilemma scores. The results for the ultimatum bargaining and chicken games do show an improvement in prediction with the inclusion of the implicit component, but higher implicit competitiveness predicted a decrease in displaying competitive behavior. For the patent race and decomposed prisoner's dilemma games, on the other hand, implicit competitiveness significantly improved the prediction of competitive behavior beyond that of explicit competitiveness. Therefore, mixed support was provided for Hypothesis 2.

Hypothesis 3 proposed that (a) explicit competitiveness and (b) implicit competitiveness would be positively associated with participation in competitive activities—maze game scenario and the competitive background-participation measure. The COM was significantly correlated with the maze game scenario (.25), and the competitive background-participation measure (.65). The CRT-C, however, was not

Table 5-3: Cross-validation Sample – Results of Regression Analyses for Hypothesis 2

	Ultimatum bargaining		**Patent Race**		**Prisoner's Dilemma**		**Chicken**		**Decomposed Prisoner's Dilemma**	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	14.86 (3.01)***	16.97 (3.15)***	1590375 (704669)*	976335 (734730)*	-.39 (.91)	-.92 (.97)	-2.95 (.98)**	-2.26 (1.03)*	-1.72 (1.08)	-2.54 (1.16)*
COM	.49 (.92)	.49 (.92)	286720 (216511)	285660 (214043)	.00 (.28)	.00 (.28)	.73 (.30)*	.75 (.30)*	.15 (.33)	.15 (.33)
CRT-C		-.46 (.22)*		132349 (50330)**		.11 (.07)		-.17 (.07)*		.17 (.08)*
R^2	.00	.02	.01	.03	.00	.02	.03	.06	.00	.03
ΔR^2		.02		.03		.02		.03		.03
F-change		4.48*		6.91**		2.14		4.81*		4.06*

Note. N = 257; Standard errors are in parentheses. For Ultimatum Bargaining and Patent Race OLS Linear Regression was performed, and for Prisoner's Dilemma, Chicken, and Decomposed Prisoner's Dilemma logistic regression was performed. Where logistic regression was performed, the reported R^2 is Nagelkerke's R^2.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5-4: Cross-validation Sample – Results of Regression Analyses for Hypothesis 4

	Maze Game		**Competitive Background-Participate**	
	Model 1	Model 2	Model 1	Model 2
Intercept	-3.26 (.97)***	-3.64 (1.02)***	-2.45 (.43)***	-2.68 (.46)***
COM	.90 (.29)**	.90 (.29)**	1.81 (.13)***	1.81 (.13)***
CRT-C		.08 (.07)		.05 (.03)
R^2	.05	.06	.42	.43
ΔR^2		.01		.01
F-change		1.04		2.42

Note. N = 257; Standard errors are in parentheses. For Maze Game, logistic regression was performed, and for Competitive Background-Participate, OLS linear regression was performed. Where logistic regression was performed, the reported R^2 is Nagelkerke's R^2.
* $p < .05$; ** $p < .01$; *** $p < .001$.

significantly correlated with either outcome. Accordingly, Hypothesis 3 was only partially supported.

Hypothesis 4 stated that implicit competitiveness would provide incremental prediction of participation in competitive activities, above and beyond that of explicit competitiveness. Similar to Hypothesis 2, the current hypothesis was tested through hierarchical regression. The results of these tests can be found in Table 5-4. For the dichotomously scored criteria (i.e., maze game) logistic regression was performed, and for the continuously scored criteria (i.e., competitive background-participate) OLS linear regression was performed. The results show that the CRT-C did not improve the prediction of scores from either the maze game or the competitive background-participation outcomes beyond the COM. Therefore, Hypothesis 4 was not supported.

Hypothesis 5 asserted that (a) explicit competitiveness and (b) implicit competitiveness would be related to interest in viewing competitive events. The COM

Table 5-5: Cross-validation Sample – Results of Regression Analyses for Hypothesis 6

	Competitive Spectating Interests		**Competitive Background - Watching**		**Competitive Background – Attending**	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	.40 (.09)***	.42 (.10)***	-.08 (.46)	-.25 (.48)	.12 (.50)	-.24 (.53)
COM	.06(.03)	.06 (.03)	1.08 (.14)***	1.07 (.14)***	1.00 (.16)***	1.00 (.15)***
CRT-C		.00 (.01)		.04 (.03)		.08 (.04)*
R^2	.01	.02	.19	.19	.14	.16
ΔR^2		.00		.00		.02
F-change		0.29		1.18		4.70*

Note. N = 257; Standard errors are in parentheses.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5-6: Cross-validation Sample – Results of Regression Analyses for Hypothesis 8

	COM Other-Reports	
	Model 1	Model 2
Intercept	1.06 (.75)	1.14 (.78)
COM	.68 (.23)**	.69 (.24)**
CRT-C		-.02 (.05)
R^2	.12	.12
ΔR^2		.00
F-change		0.16

Note. N = 257; Standard errors are in parentheses.
* $p < .05$; ** $p < .01$; *** $p < .001$.

was significantly and positively related to all three relevant outcomes: competitive spectating interests (.12), competitive background-watching (.43), and competitive background-attending (.38). The CRT-C, was not significantly correlated with competitive spectating interests or competitive background-watching outcomes, but was significantly and positively correlated with competitive background-attending (.12). Thus Hypothesis 5 received mixed support.

Hypothesis 6 proposed that implicit competitiveness would provide incremental prediction of interests in viewing competitive events beyond that of explicit competitiveness. Again, the hierarchical regression method was used to test this hypothesis using OLS linear regression. Results can be found in Table 5-5. The results show that implicit competitiveness did not improve the prediction, beyond explicit competitiveness, for either the competitive spectating or competitive background-watching variables. Implicit competitiveness, however, did show incremental prediction over explicit competitiveness for the competitive background-attending variable. Therefore, Hypothesis 6 was partially supported.

Table 5-7: Cross-validation Sample – Results of Interaction Analyses for Research Question 1

	Competitive Spectating		**Competitive Background-Watch**		**Competitive Background-Attend**	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	.42 (.10)***	.66 (.26)*	-.25 (.48)	-.85 (1.27)	-.24 (.53)	-.70 (1.39)
Main Effects						
COM	.06 (.03)	-.02 (.08)	1.07 (.14)***	1.26 (.39)**	1.00 (.15)***	1.15 (.43)**
CRT-C	.00 (.01)	-.05 (.05)	.04 (.03)	.16 (.25)	.08 (.04)*	.18 (.27)
Interaction						
COM x CRT-C		.02 (.02)		-.04 (.08)		-.03 (.08)
R^2	.02	.02	.19	.19	.16	.16
ΔR^2		.00		.00		.00
F-change		1.03		.26		.13

Note. N = 257; Standard errors are in parentheses.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5-8: Cross-validation Sample – Results of Interaction Analyses for Research Question 2

	Maze Game		Competitive Background-Participate	
	Model 1	Model 2	Model 1	Model 2
Intercept	-3.64 (1.02)***	-.18 (2.63)	-2.68 (.46)***	1.98 (1.20)
Main Effects				
COM	.90 (.29)**	-.16 (.81)	1.81 (.13)***	1.60 (.37)***
CRT-C	.08 (.07)	-.65 (.53)	.05 (.03)	-.10 (.24)
Interaction				
COM x CRT-C		.23 (.16)		.05 (.07)
R^2	.06	.07	.43	.43
ΔR^2		.01		.00
F-change		1.48		.39

Note. N = 257; Standard errors are in parentheses. For Maze Game, logistic regression was performed, and for Competitive Background-Participate, OLS linear regression was performed. Where logistic regression was performed, the reported R^2 is Nagelkerke's R^2.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Hypothesis 7 predicted that (a) explicit competitiveness and (b) implicit competitiveness would be positively associated with other-reports of individuals' competitive behavior. The COM other-report was not significantly related to either the CRT-C or the COM (self-report). Accordingly, Hypothesis 7 was not supported.

Hypothesis 8 stated that implicit competitiveness would add to the prediction of other-reports of COM beyond explicit competitiveness. This hypothesis was also tested with hierarchical regression using OLS linear regression. The results are displayed in Table 5-6, and they show that implicit competitiveness does not add to the prediction of other-reports of COM. Thus, there is no support for Hypothesis 8.

Research Question 1 asked whether implicit and explicit competitiveness would interact in predicting interest in viewing competitive events. Hierarchical regression was used to test whether or not a model with the interaction term included significantly improved a model with only the main effects represented. Results from these regression analyses can be found in Table 5-7 for each of the three outcome variables: competitive spectating interests, competitive background-watch, and competitive background-attend measures. As the table bears out, none of the interaction terms from the three separate models were significant. Subsequently, there was no evidence to support the interactive relationship suggested in Research Question 1.

Finally, Research Question 2 asked whether implicit and explicit competitiveness would interact to predict self-selection into competitive scenarios. This was analyzed in the same manner as Research Question 1 (logistic regression was used for the maze game, which was scored dichotomously). Results of these analyses can be found in Table 5-8 for the maze game scenario and the competitive background-participation measure.

Neither interaction term in the two corresponding models are significant. Accordingly, there was no evidence to support the interactive relationship that is proposed in Research Question 2.

Study 4 Discussion

The purpose of Study 4 was to provide initial criterion-related validity evidence for the CRT-C by demonstrating the measure's ability to predict various categories of competitive behaviors: (1) competitive decision-making behavior, (2) self-selection into competitive scenarios, and (3) interest in and attitude towards competitive events. An additional aim of Study 4 was to show that the CRT-C, a measure of the implicit component of competitiveness, provides value even in the presence of a measure of the explicit component of competitiveness.

In contrast to the Study 3 and the developmental sample, the current study found that the individual JMs were more evenly correlated with the various criteria. Table 5-2 showed that each JM was significantly and positively correlated with at least two of the criterion measures.

When reviewing the relationship between the overall implicit measure of competitiveness and the criteria from the various categories of competitive behavior, the results show that the CRT-C is related to two of the three categories of criteria, at least partially. Interestingly, although the CRT-C did not display a significant correlation with the other-reports of competitiveness, the COM also did not show a significant correlation with the other-reports of competitiveness either. This may indicate a poor other-report measure—as it was adapted from the self-report COM and not specifically validated as

an other-report instrument. It may also be indicative of close-others having difficulty in evaluating an individual's level of competitiveness, as the other-reports also showed a lack of association with most of the other criteria (in both the developmental and cross-validation samples). Finally, the lack of correlation may also suggest that individuals have poor self-awareness of their own competitive motives.

Particularly encouraging from the hypothesis test results are the instances in Hypotheses 2 and 6 where the CRT-C was shown to predict competitive behaviors and interest in viewing competitive events above and beyond the explicit measure. This provides some initial evidence of the value that a measure of implicit competitiveness, and the CRT-C more specifically, can add to research and our understanding of competitive personality.

Finally, exploration into the two research questions found no evidence in the current samples for an interactive relationship between the implicit and explicit components in predicting either interest in viewing competitive events or self-selection into competitive events. Although, evidence for this interaction was not found in the current study, it would be premature to conclude that this type of relationship does not exist. As was noted previously, a more precise measure may be necessary to detect this type of complex relationship between these disparate components of personality. Given that the current study represents the first attempt to validate the CRT-C, further refinement and validation of the tool may be necessary for this type of exploratory analysis.

Chapter 6

Study 5: Construct Validity and Test-Retest Reliability of the CRT-C

Finally, the purpose of Study 5 is to continue to address Step 8 (Ongoing Validation) in the CR test development process as previously outlined. Specifically, I provide initial evidence for the convergent and discriminant validity of inferences drawn from the CRT-C. In addition, Study 5 also serves to assess the test-retest reliability of the measure. Although, measures of internal consistency computed in Study 3 (.79) and Study 4 (.81) were at acceptable levels, the heterogeneity of item content with regard to measuring multiple JMs can often result in an underestimate of reliability. Therefore, it was deemed prudent to also include an analysis of test-retest reliability which may be a more appropriate test of consistency for this measure.

Previous research has asserted that individuals do not have introspective access to their implicit cognitive biases and motivations (Greenwald & Banaji, 1995; James, 1998; James & LeBreton, 2012; McClelland et al., 1989; Nisbett & Wilson, 1977; Winter et al. 1998). These implicit parts of personality are believed to represent substantively different aspects of personality than the explicit components which individuals do have access to. Accordingly, measures of implicit and explicit personality, on balance, are not expected to correlate highly with each other. Furthermore, research using the conditional reasoning methodology has generally supported this idea (Bing et al., 2007a; Bing et al., 2007b; Frost, Ko, & James, 2007; James & LeBreton, 2012; Schoen et al., 2016).

Hypothesis 9: Scores on the CRT-C will not be correlated with scores obtained on measures of explicit competitiveness.

Because achievement motivation is considered "competition with a standard of excellence" (McClelland et al., 1958), and there are multiple sources for this standard of excellence, one of which represents competitiveness (Smither & Houston, 1992), competitiveness is likely correlated, to some extent, with the overarching construct of achievement motivation. Indeed, previous research has observed this relationship—for the explicit components of achievement motivation and competitiveness—with various empirical findings ranging from r = .20 to .43 (Houston et al., 2002; Ross, Rausch, & Canada, 2003; Ryckman et al., 1996; Ryckman et al., 1997; Smither & Houston, 1992). In line with the above argument that measures of the implicit and explicit components of the same personality construct are unlikely to be highly correlated, however, I also posit that a measure of the implicit component of competitiveness is unlikely to be correlated with a measure of the explicit component of achievement motivation, a related, but distinct personality construct.

Hypothesis 10: Scores on the CRT-C will not be correlated with scores obtained on a measure of explicit achievement motivation.

Although my review of the literature did not turn up any studies which investigated implicit measures of both achievement motivation and competitiveness simultaneously, given the above documented conceptual relationship, and explicit empirical relationship, I expect to observe a small to moderate relationship between the two constructs. Further, a close look at the justification mechanisms used in both the CRT-RMS (i.e., achievement motivation) and the newly developed CRT-C shows some conceptual overlap. For example, the Opportunity Bias associated with the CRT-RMS asserts that highly achievement motivated individuals tend to frame challenging tasks as

an opportunity to prove oneself. Conceptually, this is similar to an aspect expressed in the Admiration Bias justification mechanism in the CRT-C, whereby a competitive event is seen as a chance to challenge one's self against another, and those who take part in this chance ought to be respected.

Hypothesis 11: Scores on a measure of implicit achievement motivation will be more highly correlated with scores on the CRT-C (implicit competitiveness) compared to scores on measures of explicit competitiveness.

In order to have confidence in any found relationship between implicit achievement motivation and implicit competitiveness, as both measured via conditional reasoning, it is important to rule out any potential for common method bias. In developing the Conditional Reasoning Test for Addiction Proneness (CRT-AP), Bowler, Bowler, & James (2011) defined addiction proneness as, "an underlying proclivity to initiate, and more importantly, to perpetuate destructive behavioral patterns" (pg. 1061). Given this definition, and a description of the four corresponding justification mechanisms (not summarized here), it is reasonable to believe that any correlation found between the CRT-AP and the CRT-C would likely be due to a common method of measurement, and not to a genuine overlap in construct space.

Hypothesis 12: Scores on the CRT-C will not be correlated with scores obtained on the CRT-AP, a measure of implicit addiction proneness.

Method

Sample

A sample of 145 students were recruited from the undergraduate psychology pool at Time 1 to participate in this study. Of these participants, 77.2% were female, and there was an average age of 19.18 years old (*SD* = 1.13). The racial makeup of the sample consisted of 64.8% Caucasian, 20% Asian, 5.5% African American, 5.5% Hispanic, 4.8 % who identified as Other, and 0.7% Middle Eastern. Of these participants, 104 of them came back to participate in Time 2 of the study giving a retention rate of 71.7%.

Procedure

Participants were first asked to read and electronically sign the informed consent form. Then, they were asked to complete an online battery using Qualtrics survey software: CRT-C, CRT-RMS, Competitive Orientation Measure, International Personality Item Pool-Achievement Striving, and a basic demographics questionnaire. Approximately three weeks later, the participants were invited back to complete the CRT-C for a second time, and the CRT-AP. After completing the measures, the participants were debriefed and thanked for their participation. The process took approximately 75 minutes at Time 1 and 60 minutes at Time 2.

Measures

Conditional Reasoning Test of Competitiveness (CRT-C). The CRT-C as developed and described in Studies 1 through 4 was administered. Example items can be found in Appendix A, and the scoring protocol can be found in the Measures section of Study 3.

Conditional Reasoning Test-Relative Motive Strength (CRT-RMS). The CRT-RMS (James, 1998) is a 15 item measure designed to test which implicit motive is stronger in an individual, the motive to achieve or the motive to avoid failure. Similar to the CRT-C, the CRT-RMS appears to the participant to be an inductive reasoning ability test, but is actually a measure of conditional reasoning based on a number of justification mechanisms specific to the achievement or fear of failure motives (see James, 1998). Each item represents a scenario/stimulus designed to provoke an individual's achievement or fear of failure motive. The item's response options have been designed so that multiple responses follow logically from the stem, but which response appears most desirable depends on the justification mechanisms the individual has developed. A greater rate of systematic endorsement for the justification mechanisms relative to one motive or the other is representative of a more dominant motive. Response options endorsing achievement motivation justification mechanisms are scored +1, response options endorsing fear of failure justification mechanisms are scored -1, and those that do not follow logically from the stem are scored 0. Illogical responses are rarely chosen, and if they are chosen too often (i.e., more than four times) it is an indication that the individual was not paying attention or something else went wrong (e.g., lack of English fluency). An individual's total score is the sum of the scores across the items, with a positive score representing a stronger achievement motive than fear of failure and a negative score representing the inverse. Sample items along with their scoring key can be found in Appendix A. Prior research has linked CRT-RMS scores to numerous academic and non-academic criteria (see James & LeBreton, 2012 for review).

International Personality Item Pool-Achievement Striving (IPIP-AS). The International Personality Item Pool's ("IPIP Scales", 2016) representation of Costa and McCrae's (1992) NEO-PI-R subscale of Achievement Striving is a 10 item self-report measure in which participants report how representative various statements are of themselves. Sample items from this measure are "Do more than what's expected of me," and "Set high standards for myself and others." This measure uses a 5-point Likert-type response scale with 1 representing "Strongly Disagree" and 5 representing "Strongly Agree." The IPIP had a Cronbach's alpha of .90 in the current sample.

Conditional Reasoning Test-Addiction Proneness (CRT-AP). The CRT-AP (Bowler et al., 2011) is a 15 item measure constructed to assess the motive "to initiate…and to perpetuate destructive behavioral patterns" (pg. 1061). Similar to the other CR measures already discussed, the CRT-AP was designed to appear as an inductive reasoning ability test, but actually measures one's developed justification mechanisms relevant to addiction proneness. Scoring protocol is also the same as other CR measures: participants receive a score of 1 for each JM-driven response they endorse and a 0 for all other responses. Additionally, endorsement of more than 4 illogical responses nullifies one's data as it is an indication that there was some issue (e.g., participant not paying attention). Prior validation research has found that this measure is effective in differentiating between individuals with chemical dependencies and those without such dependencies.

Results

On the basis of recommendations for measuring temporal consistency by DeSimone (2014), the following metrics were evaluated for consistency between scores

at the two time points: test-level test-retest correlations, item-level test-retest correlations, comparison of interitem correlation matrices for both test administrations via the $SRMR_{TC}$, and the principal component analyses for both test administrations with their corresponding CL_{TC}—an effect size derived in DeSimone (2014) that indicates the similarity of the two sets of component loadings.

First, the test-level test-retest correlation was calculated. This correlation between the Time 1 and Time 2 total CRT-C scores is typically evaluated similar to traditional internal consistency measures (i.e., .7 and higher considered adequate at early stages of research). Therefore, the CRT-C's test-level test-retest reliability of r = .52 is considered poor.

Second, the item-level test-retest correlations were investigated. To explore these, tetrachoric correlations between item scores at Time 1 and the respective item's scores at Time 2 were calculated. DeSimone (2014) suggests that these correlations should be at .50 or higher to be considered adequate. The eight correlations for the CRT-C items (.60, .83, .57, .58, .51, .63, .61, and .72, respectively) all exceeded this guideline.

Third, the interitem correlation matrices for each test administration were compared by calculating the standardized root mean square residual for temporal consistency ($SRMR_{TC}$) as described in DeSimone (2014). This metric ranges from 0 to 1 with lower SRMR values representing greater similarity between the Time 1 and Time 2 interitem correlation matrices—an $SRMR_{TC}$ of zero indicates perfect agreement between the correlation matrices. DeSimone (2014) suggests that $SRMR_{TC}$ values greater than .08 can be considered high. The current $SRMR_{TC}$ for the two CRT-C test administrations is .18, which signals poor similarity.

Fourth, principal component analyses using a tetrachoric interitem correlation table for the two test administrations were analyzed and the CL_{TC} was evaluated. The CL_{TC} is an effect size representing the temporal consistency, or similarity, of the two sets of component loadings (DeSimone, 2014). It is calculated by taking the squared correlation of each set of the Time 1 and Time 2 component loadings, weighting each of those correlations by their respective eigenvalues, and then taking the sum of this result across all components. The resulting metric is a similarity metric where 1.0 represents perfect similarity between the two sets of component loadings. DeSimone (2014) suggests any values below .70 can be considered low and indicative of inconsistency in component structures. The current CL_{TC} for the two CRT-C test administrations is .07, which signals poor similarity.

After exploring test-retest reliability, the hypotheses were evaluated. Refer to Table 6-1 for overall results. Hypothesis 9 stated that scores on the CRT-C would not be correlated with scores obtained on a measure of explicit competitiveness. As can be seen from Table 6-1, scores on CRT-C at both Time 1 and Time 2 were significantly and negatively correlated with scores on the COM (-.21 and -.24, respectively). Thus, Hypothesis 9 was not supported.

Hypothesis 10 stated that scores on the CRT-C will not be correlated with scores obtained on a measure of explicit achievement motivation. Neither the Time 1 or Time 2 scores on the CRT-C were significantly correlated with the IPIP-achievement striving scale. Therefore, Hypothesis 10 was fully supported.

Hypothesis 11 stated that scores on a measure of implicit achievement motivation (CRT-RMS) will be more highly correlated with scores on the CRT-C (implicit

Table 6-1: Correlations Means, and Standard Deviations

	1	2	3	4	5	6
1. CRT-C (T1)	--					
2. CRT-C (T2)	.52*	--				
3. CRT-RMS	.02	.24*	--			
4. CRT-AP	.04	-.08	-.17	--		
5. IPIP-AS	-.05	-.10	-.18	.13	--	
6. COM	-.21*	-.24*	-.16	.00	.23*	--
Mean	5.47	5.64	8.41	3.32	1.72	2.63
SD	1.14	1.15	3.28	1.65	0.59	0.66

Note. n = 104. CRT-C = Conditional Reasoning Test of Competitiveness (Time 1 and Time 2). CRT-RMS = Conditional Reasoning Test of Relative Motive Strength. CRT-AP = Conditional Reasoning Test of Addiction Proneness. IPIP-AS = International Personality Item Pool-Achievement Striving subscale. COM = Competitive Orientation Measure.
* $p < .05$

competitiveness) than scores on the COM (explicit competitiveness). Zou (2007) presents a method for calculating confidence intervals for the difference between dependent overlapping correlations (i.e., two correlations with one common variable). Two sets of confidence intervals for the difference between correlations were created, one for each CRT-C score (i.e., Time 1 and Time 2). The difference between the two sets of correlations for Time 1 is .17 with a corresponding 95% confidence interval of -.16 to .49. Because the 95% confidence interval includes zero, there is no significant difference. The difference between the two sets of correlations for Time 2 is .40, and the 95% confidence interval is .10 to .67. Since the 95% confidence interval does not include zero, the correlation between CRT-RMS and CRT-C (Time 2; .24) is significantly larger than the correlation between CRT-RMS and COM (-.16). Accordingly, there was partial support for Hypothesis 11.

Finally, Hypothesis 12 stated that scores on the CRT-C will not be correlated with scores obtained on an unrelated measure of addiction proneness (CRT-AP) despite using a common method of measurement (i.e., implicit conditional reasoning). Table 6-1 shows that the CRT-AP's correlation with the CRT-C at Time 1 was .04 (*ns*) and at Time 2 was -.08 (*ns*). Thus, hypothesis 12 was fully supported.

Study 5 Discussion

Overall, despite the acceptable internal consistency scores presented in Study 3 (.79) and Study 4 (.81), the internal consistency for the current sample at Time 1 (.37) and at Time 2 (.47) were quite poor. Moreover, the temporal consistency of the CRT-C in this sample is quite low. Although the item-level test-retest correlations are all in the acceptable range, the test-level test-retest correlation, the $SRMR_{TC}$, and the CL_{TC} were inadequate per the referenced guidelines.

The results of the hypothesis tests, on the other hand, appeared somewhat more encouraging. Although the CRT-C was negatively correlated with the measure of explicit competitiveness, it was not correlated with the measure of explicit achievement motivation as expected. Further, the CRT-C was not correlated with the CRT-AP, an implicit measure of addiction proneness. Moreover, there was some mixed support for the correlation between the CRT-RMS and the CRT-C having a stronger correlation than the CRT-RMS and the COM. This lends some additional credence to the notion that competitiveness is an aspect of achievement motivation. Indeed, the self-report measures of achievement striving and competitiveness (.23) bear out this relationship for the explicit component as well, supporting the prior empirical evidence.

Chapter 7

General Discussion

As many researchers have noted, to develop a more complete understanding of the dispositional foundations of behavior we must study both the explicit and implicit components of personality (Bornstein, 2002; James & LeBreton, 2012; McClelland et al., 1989; Winter et al., 1998). Research into the competitive motive, however, has had an overwhelming focus on the explicit aspect from both a theoretical and a measurement perspective (Houston et al., 2002; Newby & Klein, 2014). Thus, the purpose of the current research was (1) to map the implicit component of competitiveness, (2) to develop and describe a new indirect measure of this implicit component, and (3) to provide an initial feasibility test of the implicit component of competitiveness using this new measure.

Accordingly, across the five studies described in this paper I have outlined and tested a novel theory of competitiveness at the implicit level. In Study 1, an initial set of CRT-C items were generated using the previously described JMs and were subjected to expert review. From this review, several items were revised and two additional items were created, resulting in 17 total items. In Study 2, these 17 items were pilot tested on a small sample. Subsequently, several of the items were further revised. Then, in Study 3, the items were more rigorously tested on a large sample to determine which items were working as intended. This process led to nine of the 17 items being dropped. Study 3 also provided initial validity evidence for the final eight items that were retained. Study 4 sought to cross-validate the findings from Study 3 with a new sample of participants as well as determine the value of the implicit component of competitiveness in relation to

the explicit component when predicting various relevant criteria. Finally, Study 5 provided tests of convergent and discriminant validity and the test-retest reliability of the newly developed measure.

Overall, the findings around the reliability of the CRT-C were mixed. The measure of internal consistency for the CRT-C was .79 and .81 in Study 3 and Study 4, respectively, which is above the often cited .70 guideline for measures in the early stages of development (Nunnally & Bernstein, 1994). Further, the item-level test-retest correlations reported in Study 5 all exceeded DeSimone's (2014) guideline of .50. The CRT-C, however, performed poorly on the majority of the temporal consistency measures. The test-level test-retest reliability, the $SRMR_{TC}$, and the CL_{TC} all showed the CRT-C to be inadequate in terms of the temporal consistency of participant responses. This lack of consistency over time may be due to the small number of items for the CRT-C, a topic considered more in the following sections.

With respect to convergent and discriminant validity, Study 5 showed that the CRT-C performed well overall. Interestingly, the CRT-C did show an unexpected small to moderate negative correlation with the measure of explicit competitiveness. Nevertheless, the CRT-C was not correlated with explicit achievement motivation, but did show some support for being associated with the measure of implicit achievement motivation, the CRT-RMS. Relatedly, the CRT-C was not correlated with the CRT-AP—a CRT measure of addiction proneness—providing some evidence that the correlation with the CRT-RMS was not just due to common method bias.

The initial investigation into the criterion-related validity of the CRT-C produced varied results. The measure of implicit competitiveness was not significantly related to

several of the criteria it was hypothesized to be related to. In particular, the CRT-C did not predict either of the criteria that belonged to the self-selection into competitive scenarios category (i.e., the maze game, competitive background-participation measure). Conversely, the measure of explicit competitiveness outperformed the CRT-C in this area by being a significant predictor of both criteria. Further, the measure of explicit competitiveness also significantly predicted more criteria in the category of interest/attitude towards competitive events. The CRT-C was also related to two criteria (i.e., ultimatum bargaining game, chicken game) in the opposite direction of that which was hypothesized.

On the other hand, the tests on the cross-validation sample from Study 4 provided some encouraging results through partial support for several hypotheses. For example, the CRT-C outperformed the measure of explicit competitiveness, with respect to the competitive decision-making behavior category, by being a significant predictor of more individual criteria. Additionally, the CRT-C was also significantly related to a criterion in the category of interest/attitude towards competitive events. Moreover, the CRT-C added incremental validity beyond the measure of explicit competitiveness in both of these categories of criteria. Though the evidence was not overwhelmingly in favor of the criterion validity of the CRT-C, the evidence shows a foundation that might be improved upon in further iterations of the measure.

Finally, the exploration into the interactive relationship between the implicit and explicit components of competitiveness did not yield any significant findings in the prediction of self-selection into competitive events or interest in competitive scenarios. While the results offered nothing that alluded to an interactive relationship, a test of the

rationale laid out in Study 4 for these relationships may be better served by a more precise instrument. Subsequently, I suggest revisiting these research questions after further refinement of the CRT-C measure as will be discussed in the future research section.

Implications

First, the current research facilitates a more thorough understanding of the individual competitiveness motive through the integration of a new theory of the implicit component into the existing literature, which has primarily focused on the explicit component. Further, I have also demonstrated that this new theory and the corresponding measure of the implicit component of competitiveness can add to the prediction of competitive behavior and interest in and attitude towards competitiveness. This incremental prediction is above and beyond that of the explicit component as measured by the COM, which was a scale designed to "unify the construct of competitiveness into one complete and psychometrically valid measure" (Newby & Klein, 2014; pg. 879).

Second, this research establishes that close-other reports may not be a beneficial method of assessing an individual's competitiveness. The close-other reports did not appear to provide any added insight into either the implicit or explicit component of competitiveness. The close-other reports were unrelated to the vast majority of the various criterion measures as well as both the CRT-C and the self-report COM scores. The only consistent association the close-other responses showed was a moderate correlation with the competitive background-participation scores. It is possible that the measure used was inadequate to capture the close-other reports—it was adapted from the self-report COM, which was not the original intended use of the measure. It seems more

likely, however, that others either do not attend to one's competitiveness or do not form accurate lasting impressions of an individual's competitiveness. Further exploration into this area of research is necessary though.

Third, the current research provides empirical evidence that individuals may not be fully self-aware of their own competitive tendencies. The self-report measure of competitiveness did show small to strong correlation with criteria in the category of self-selection into competitive scenarios. It also showed small to moderate correlations with criteria in the interest in and attitude toward competitive events category. The self-report measure was not very useful, however, in predicting competitive decision-making behavior. Accordingly, individual's may only possess a limited view of their competitive tendencies.

Lastly, this research adds to the growing literature that empirically demonstrates the need to investigate the implicit component of dispositional motives and the value of the conditional reasoning approach to doing so. As was shown in the current paper, the implicit component is necessary to a thorough understanding of dispositional motives and to the prediction of important behavioral criteria hypothesized to be related to the motive. The conditional reasoning approach affords researchers a way to systematically study the implicit component and to measure it.

Limitations

Some important limitations to the current research should be noted. First, in several cases the criteria used to test the validity of the CRT-C were often uncorrelated with each other, even when the criteria resided in the same overall category (e.g., self-

selection into competitive scenarios). Though the individual criteria were constructed separately in prior research (and often different research streams altogether), I would expect greater overlap between the measures since they were designed to get at similar underlying constructs. This overlap only existed for one of the three criterion categories, interest in and attitudes toward competitive events. This lack of correspondence between measures may allude to disjointed criterion categories, which could be problematic when trying to show a pattern of prediction across the criteria.

Second, the final number of items on the CRT-C (8) is much lower than other conditional reasoning measures (e.g., CRT-AP, 15 items; CRT-RMS, 15 items; CRT-CP, 30 items). This is important because with more well-written items, it is likely that the poor temporal consistency of the overall measure would improve. Study 3 and Study 4 showed that the internal consistency of the CRT-C was satisfactory, and Study 5 showed that the item-level test-retest correlations were adequate. Thus, if more psychometrically sound items were added to the measure, the temporal consistency would be likely to improve.

Finally, it is likely that the CRT-C does not capture all of the JMs that are relevant to competitiveness. Though the four steps for identifying JMs has been thoroughly described in Schoen et al. (N.d), it is a very complex and lengthy process. Further, the final step in this process is continuous development and refinement of the JMs. So, while great effort was taken to identify and describe the most central JMs to the competitive motive, this should not be considered an exhaustive set of JMs, and the development of new JMs (and refinement of the current ones) could lead to an improvement in the measure overall.

Future Research

While the current research provides an initial set of competitive JMs, items, and reliability and validity analyses, the CRT-C should continue to be improved in future studies. As just discussed in the limitations section, one area that is ripe for further investigation is the development of additional JMs. This is a domain within conditional reasoning research, more generally, that could greatly benefit from the diversity of perspective that only comes when additional researchers enter the arena. Because of the complexity of phase two in the JM identification process—creating a "gist," one's insight into the literature—bringing multiple individual's perspectives to bear on the same psychological construct would be very advantageous for the research stream, particularly the development of new JMs.

CRT-C items should also continue to be developed and included in updated versions of the measure. As mentioned, this would have the likely benefit of improving the temporal consistency of the CRT-C. Moreover, each JM is only represented by two items. As was shown in Study 3 and Study 4, this led to a lot of inconsistency in the relationships between the specific JMs and the criteria. With more items to measure each of the respective JMs, the results would likely be more stable, and potentially offer greater insight into the value of each JM to predict various types of criteria. Additionally, the current CRT-C items appear to represent a strong core to build on, but future research may also work to improve these as well. For example, Smith et al. (N.d.) suggest using a nominal response model from Item Response Theory to explore the likelihood of respondents endorsing specific item responses at varying levels of theta (i.e.,

competitiveness). They also delineate how this information can be used to guide revisions to items and item responses to improve the accuracy of the measure.

Lastly, given the prior discussion around the lack of overlap between the various criteria across the studies in the current research, future research should look to explore the criterion validity of the CRT-C in new ways. For example, known groups research could prove beneficial (e.g., college athletes, competitive clubs—debate, chess, etc.). Prior research has used this method to add to the validity evidence for a measure of explicit competitiveness by administering the measure to nurses (less competitive) and lawyers (more competitive), and showing that lawyers were likely to score higher on the measure (Houston et al., 1992). Alternatively, lab studies could be designed to assess competitive decision-making behaviors in the presence of an actual opponent. Having a salient "other" presence in the room might prove to offer a more robust test of a competitive measure than the hypothetical scenarios presented to participants in the current research.

Conclusion

Taken together, the five studies presented here represent a critical first step in measuring the implicit component of competitiveness, which to my knowledge has not been investigated to this point. Despite the dearth of research in this area of competitiveness, the implicit component can add to our understanding of the competitive motive and to our prediction of relevant behavior as the current paper has shown. Moreover, this research has shown that the measurement system developed here goes beyond simply adding predictive accuracy to the criteria that the explicit component of

competitiveness already predicts by also predicting different behavioral criteria than the explicit component.

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Appendix: Sample Items

Sample Item from the Decomposed Prisoner's Dilemma Game

	Option A	**Option B**	**Option C**
You get…	500	500	550
Other gets…	100	500	300

Sample CRT-Aggressiveness Item

A large number of business partnerships break up. One reason for the large number of breakups is that dissolving a partnership is quick and easy. If the partners can agree on how to split the assets of the partnership fairly, then they can break up simply by filling out the appropriate forms. They do not need to engage lawyers.

Which of the following is the most reasonable conclusion based on the above?

a. The longer a partnership has existed, the less likely it is to break up. **[illogical distractor]**
b. If one's partner hires a lawyer, then he/she is not planning to play fair. **[aggressive response; JM: hostile attribution bias]**
c. Partners might resolve their differences if breaking up was harder and took longer. **[non-aggressive response]**
d. The younger partner is more likely to initiate the break up. **[illogical distractor]**

Sample CRT-Competitiveness Items

1. Generally speaking, there are two broad types of graduate school programs regardless of the field: collaborative and competitive. In collaborative programs, students are expected to help each other with studying, gaining resources (e.g., assistantships, scholarships, grants), and they often publish research articles together. In competitive programs, students are expected to be much more independent and often find themselves at odds with each other for resources and publications. Because this can be an important difference between universities, graduate programs are very straightforward about their culture with prospective students.

   Which of the following about graduate programs can most reasonably be inferred given the above passage?
   - A. Collaborative graduate programs tend to be located on the East Coast
   - B. Competitive graduate programs tend to produce smarter, more prepared students **[competitive response: competence bias]**
   - C. Competitive graduate programs typically provide more course offerings
   - D. Collaborative graduate programs offer students a better chance at a successful career **[non-competitive response]**

2. John really enjoys watching football on the weekends with his friends. On Saturday, they spend all day watching college football together, and on Sunday they spend all day watching the professionals. If asked, he would say it is his favorite sport. However, when his high school held tryouts among students for the football team, John chose not to try out.

   What inference can most reasonably be made?
   - A. The team mascot is a blue and gold eagle named rocket
   - B. John did not want his friends to see him fail at tryouts **[competitive response: competence bias]**
   - C. The football team's head coach is also the physical education teacher
   - D. Given all of the injuries to football players, John felt the sport was too dangerous **[non-competitive response]**

3. A recent article in a prominent newspaper reported that there was a strong positive correlation between the number of gold medals a country has won in the most recent Olympics and the country's immigration numbers for the following 2 years. In other words, the more gold medals that a country wins, the more people come to that country seeking citizenship. The author of this article speculated that there was a causal relationship between the two.

   Which one of the following most **strengthens** the author's argument?
   - A. Most people typically emigrate to countries near their original home country
   - B. More positive media coverage is given to countries who win more gold medals during the Olympics **[non-competitive response]**

- C. Countries who win more gold medals tend to be more influential, financially stronger, and generally superior **[competitive response: winner's bias]**
- D. The author of the article won a bronze medal in the 400 meter backstroke swimming event in 2004

Sample CRT-Relative Motive Strength Items

1. Students are often separated by academic ability. For example, fourth-grade students might be split into higher, middle, and lower ability classes. Students are separated in order to design a specific plan of study that meets the needs of the students in each ability level. This grouping by ability has become a source of debate. Students in the lower-ability groups tend to have lower self-esteem and motivation than students in the higher-ability groups. Some people argue that grouping by ability should be stopped. Instead, every class should include students from all ability levels.

   Which one of the following is most likely to occur if every class includes students from all ability levels?
   - A. The higher-ability students would serve as role models for the lower-ability students and many of the lower-ability students would try harder. **[Fear of Failure Motive Response]**
   - B. Many advanced materials now given in the higher-ability classes could not be given to classes comprised of students from all ability levels. **[Achievement Motive Response]**
   - C. Putting lower-ability students in classes with higher-ability students would require more classrooms because more classes would have to be taught.
   - D. Higher-ability students would be more likely to register for nonacademic courses such as shop and art.

2. Many corporations have increased the use of "assessment centers." Employees are sent to the centers for 1 or 2 days. Experts assess their potential to become leaders in the corporation. People who do well in assessment centers have a much better chance of being chosen to go into management. This is because people who do well in assessment centers also tend to do well in management.

   A reasonable inference based on this information is:
   - A. Employees who do not do well in assessment centers will probably make poor managers. **[Achievement Motive Response]**
   - B. Corporations are selecting fewer of their employees to become managers. **[Fear of Failure Motive Response]**
   - C. Corporations have become more concerned with people's finances and less concerned with how motivated they are.
   - D. People can afford to slack off once they have done well in assessment centers.

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