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The Integrative Model of Personality Assessment for Achievement Motivation and Fear of Failure: Implications for the Prediction of Effort and Performance

Mark Nathaniel Bing
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Mark Nathaniel Bing entitled "The Integrative Model of Personality Assessment for Achievement Motivation and Fear of Failure: Implications for the Prediction of Effort and Performance." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Dr. Lawrence R. James, Major Professor

We have read this dissertation and recommend its acceptance:

Dr. William H. Calhoun, Dr. Warren H. Jones, Dr. Kathleen A. Lawler

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Dr. Anne Mayhew
Vice Provost and
Dean of Graduate Studies

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THE INTEGRATIVE MODEL OF PERSONALITY ASSESSMENT FOR ACHIEVEMENT MOTIVATION AND FEAR OF FAILURE: IMPLICATIONS FOR THE PREDICTION OF EFFORT AND PERFORMANCE

A Dissertation

Presented for the

Doctor of Philosophy

Degree

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Mark Nathaniel Bing

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DEDICATION

This dissertation is dedicated to H. Kristl Davison, and her steadfast support and devotion that made the writing of this manuscript worthwhile. This dissertation is also dedicated to my parents, John Daniel Bing and Patricia Bethke Bing, whose devotion to excellence and exemplary behavior most certainly instilled within me the achievement strivings that are at the heart of this work in both substance and spirit.

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ABSTRACT

While both self-report (SR) and conditional reasoning (CR) measures of achievement motivation (AM) and fear-of-failure (FF) have been shown to be predictive of academic and organizational outcomes (James, 1998; Spangler, 1992), substantial criterion variance is often left unaccounted for by either measurement system when used in isolation. The current work proposes a new, theoretical model of AM and FF created by integrating information on explicit cognitions gathered from SR with information on implicit cognitions gathered from CR. This "integrative model" of assessment provides an enhanced understanding of the approach-avoidance conflicts people experience when they are faced with challenging tasks. Predictions derived from the model are supported in two student samples and one managerial sample. Specifically, the explicit and implicit AM/FF cognitions combine additively or multiplicatively in the prediction of effort and performance. It is concluded that in order to advance our understanding and prediction of behavior, psychologists should integrate explicit personality components with implicit components in theoretical and practical pursuits.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Allport (1937) and many later psychologists (e.g., Goldberg, 1990; Hogan, Hogan, & Roberts, 1996; John, 1990) have described and investigated personality in terms of stable, explicit traits. Alternatively, Murray (1938) and his intellectual descendants (e.g., McClelland, 1951; Winter, 1996) have conceptualized and explored personality in terms of dynamic, implicit motives. These different conceptualizations of personality have also been accompanied by two different techniques of personality measurement. Traditionally, trait theorists have preferred the use of direct, self-reports elicited in response to standardized questionnaires whereas those interested in implicit motives have preferred the use of indirect, projective descriptions elicited in response to ambiguous stimuli (Winter, John, Stewart, Klohnen, & Duncan, 1998).

Occasionally, these two separate streams of personality theory and measurement have crossed to form integrative and multiplicative investigations of personality (McClelland, 1985; McClelland, Koestner, & Weinberger, 1989; Winter et al., 1998). The current work is one of these crossings, and although self-report is utilized in this integrative model as it has been in the past to provide the explicit, *conscious* component of personality for the integration, a new technique is used to provide the implicit, *unconscious* component. The new technique is founded in "conditional reasoning," which serves to provide an indirect measurement system for the assessment of implicit social cognitions (James, McIntyre, Glisson, Green, Patton, LeBreton, Mitchell, & Williams, under review). Prior to describing this new measurement system and the integrative model of personality central to the current work, former integrative investigations of personality relevant to the current investigation are reviewed below.

Past Integrative Investigations of Personality

In 1985 McClelland reviewed investigations of achievement and affiliation outcomes relevant to Atkinson's (1964) multiplicative theory of the tendency to achieve success. Atkinson (1964) used the following formula to predict an achieving tendency:

$$Ts = Ms \times Ps \times INs.$$

In the above formula, the tendency to achieve success (Ts) is seen as a multiplicative function of the motive to achieve success (Ms), the expectancy of success (Ps), and the incentive value of success (INs). In the studies reviewed by McClelland (1985), Ms was either experimentally manipulated as a situational variable via instructional sets, or assessed in terms of individual differences via the Thematic Apperception Test (TAT). Expectancy of success was either experimentally manipulated as a situational variable via increased practice, or assessed in terms of individual differences via the self-report of skill level. Incentive value of success was measured via self-report attitude questionnaires. The various investigations reviewed demonstrated that as the motive to achieve increased, a corresponding increase in achievement performance would be observed *as long as* achievement was valued. Alternatively, when achievement was *not* valued, then little to no change in achievement performance would be observed across increases in the motive to achieve. Figure 1 (all figures/tables are located in the appendix) provides a basic illustration of this 2-way interaction (see Figure 2, p. 816 in McClelland, 1985).

The results for the prediction of affiliation outcomes took this basic form as well (see Figures 3 & 4, pp. 818 & 822, respectively, in McClelland, 1985). Indeed, with respect to the affiliation outcomes McClelland (1985, pp. 822-823) drew the following conclusions:

> [A] person's belief that he or she is likely to be successful in social interaction does not lead to more [social] interaction unless that individual is motivated to use the skill…Affiliative choices may also be conceived of as responses to specific eliciting stimuli, that is, to contrived stimulus situations represented by questionnaire items. *Conscious self-referent responses of this type are determined almost entirely by values deriving from the same cognitive source as the choices*…[C]ognitive schemas…organize…feelings, attitudes, and choices in a particular area such as affiliation or achievement. When people are asked whether they would like doing something "with friends," the question taps a value associated with liking for people that determines how they answer the question.[1]

Clearly, in his review of integrative investigations of personality, McClelland (1985) concluded that the self-report methodology tapped cognitive schemas of the self to which the self had *conscious* access. McClelland (1985) used the term "values" to label these explicit, conscious components of personality in accordance with Atkinson's (1964) multiplicative model. However, with respect to the "motives" of the multiplicative model, in which McClelland (1985, p. 823) historically had been more interested, he drew different conclusions: "[T]he frequency with which people

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[1] Italics are added for emphasis and are not found in the original text.

converse with someone else is determined primarily by the pleasure they more or less *unconsciously* receive from such interactions, *as reflected in the strength of the affiliative motive measured in imaginative thought*."[2] As the TAT was used exclusively to code imaginative thought in the studies reviewed, with this conclusion McClelland (1985) ascribed to the TAT the power to measure the implicit, *unconscious* components of personality.

In 1989 McClelland et al. abandoned the term "value" in the description of attitudinal or self-reported motives in favor of "self-attributed motives" (p. 690). They also argued that both self-attributed motives (i.e., stable emotive/behavioral patterns or conscious traits) and implicit motives (i.e., dynamic changes in unconscious goals) were required to accurately describe personality. Once again, McClelland et al. (1989) reiterated the conceptualization of personality at the level of self-attributed and thus conscious motives when measured via self-report, and as implicit and thus unconscious motives when derived from stories given in response to the pictures of the TAT. Also in this work McClelland et al. (1989) formalized the major premise of the integrative model of personality as follows: "Self-attributed motives, more often than implicit motives, are allied to explicit goals that are normative for a particular group and that channel the expression of implicit motives for members of that group (pp. 692-693)." Here was the origin of the channeling hypothesis that would be more formally articulated and tested by Winter and his colleagues.

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[2] Italics are added for emphasis and are not found in the original text.

Winter, John, Stewart, Klohnen, and Duncan (1998, p. 231) proposed the "fundamental hypothesis that motives involve wishes, desires, or goals (often implicit or nonconscious), whereas traits channel or direct the ways in which motives are expressed in particular actions throughout the life course." Winter et al. (1998) integrated the trait of extraversion-introversion with the affiliative motive to provide a theoretical model of this proposition from which testable hypotheses could be derived. Table 1 presents the prototypical and hypothesized outcomes of the theoretical model generated by Winter et al. (1998, p. 238) when integrating low and high affiliative motives with introverted and extraverted behavioral tendencies (i.e., traits).

The model illustrates that both an introvert and an extravert may desire affectionate, close interpersonal relationships (i.e., have a high affiliative motive), but the reserved tendencies of the former may hinder the development of these relationships whereas the gregarious tendencies of the latter may facilitate their formation. Alternatively, both an introvert and an extravert may lack the desire for affectionate, close interpersonal relationships, and the reserved tendencies of the former may lead to hours of comfortable solitude whereas the gregarious tendencies of the latter may lead to generating a well-liked reputation for ulterior motives (e.g., the desire for power and influence). Clearly, the integration of the trait and motive concepts allows for a much more complex and richer picture of personality than any previous attempts to explain personality with one concept at the expense or exclusion of the other.

The empirical evidence presented by Winter et al. (1998) strongly supported their theoretical integrative model reproduced in Table 1. Figure 2 illustrates one of the interactions between extraversion-introversion and the affiliative motive found by Winter et al. (1998, p 245) in the prediction of interpersonal outcomes. Notice that introverts desiring close interpersonal relations as indicated by a high affiliative motive are much more likely than others to experience relationship difficulties (i.e., increased divorces and remarriages), which is precisely what is predicted from the theoretical model. Specifically, it appears that introverts desiring close relations lack the behavioral repertoire (i.e., trait) needed to "channel" their desire in a direction that prevents relationship difficulties in comparison to their extraverted counterparts. Alternatively, when introverts have a low affiliative motive, they are as adaptive as their extraverted counterparts in terms of generating positive relationship outcomes and avoiding negative ones (see Figure 2). Consequently, it would appear that when a motive is supported by a trait that facilitates the motive's expression with ease, positive outcomes follow. Otherwise, if there is a lack of congruence between the motive and the trait, then positive outcomes are impeded. Various other interactions were found by Winter et al. (1998) in support of this channeling hypothesis.

At the end of his review, in which the multiplicative integration of traits and motives was shown to explain as much as 75% of the variation in affiliative behavior, McClelland (1985, p. 824) called for "more studies of this sort." It is surprising that this call has been answered so rarely, and then primarily by one of McClelland's own direct intellectual descendants, David Winter (see Winter, et al., 1998). Obviously, the pursuit of an integrative model of personality can be difficult as it requires independent measures of conscious and unconscious components of personality, and the TAT has been the instrument of choice for the assessment of the unconscious components. Consequently, one can certainly speculate that both the administrative and psychometric difficulties encountered when using the TAT (Aiken, 1994; Anastasi, 1982; Dana, 1982; James, 1998; James & Mazerolle, 2002; Koestner & McClelland, 1990) have contributed to a *practical* reluctance on the part of psychologists to pursue integrative models of personality. Specifically, the TAT must be administered and scored by a highly trained professional in a serial and one-on-one fashion to study participants. Consequently, it is time consuming and costly to use for research purposes. Additionally, the TAT relies on the unstructured, free-response of participants' descriptions of the fantasies they generate in response to evocative pictures. Not only may participants generate different fantasies on different occasions, but also the scoring of a particular response may be a function of the scorer and/or whether the response is in oral or written form (cf. Dana, 1982; James, 1998). Consequently, the TAT can be psychometrically unreliable and can lack criterion-related validity (Dana, 1982; Entwisle, 1972; James, 1998; Koestner & McClelland, 1990; McClelland, 1985, p. 820), although this certainly is not always the case (e.g., see McClelland & Boyatzis, 1982; Spangler, 1992; Winter, et al., 1998).

Given the aforementioned difficulties with the TAT, the current work attempts to pursue an integrative model of personality, specifically one for achievement motivation (AM) and fear-of-failure (FF), that utilizes a new measure of the implicit

AM and FF cognitive components within personality. This new measure is founded in "conditional reasoning," which is described below.

Conditional Reasoning

The conditional reasoning technique was designed to circumvent the ego-enhancing biases that detract from the accuracy of self-reports of personality by making the self-justificatory components of these biases the subject of measurement. This is possible because people with different dispositional tendencies tend to use different *unconscious* biases in their reasoning when attempting to justify their actions. These biases are *unconscious* to the extent that people are typically not aware of their own tendency to grant rationality to reasoning that sustains the expression of their own motives while discounting reasoning that supports the expression of motives incompatible with their own (James et al., under review). Reasoning is said to be "conditional" when the likelihood that a person will consider a behavior to be reasonable depends upon the strength of that person's inclination to engage in the behavior (James, 1998).

People typically want to believe the best about themselves, and therefore they often reason conditionally because they want to believe that their behavior is reasonable and justified, as opposed to irrational and unwarranted. Thus, within the context of AM and FF, people unconsciously or implicitly reason in ways that justify either approaching or avoiding achievement-oriented tasks (James, 1998). Consequently, when attempting to justify an achievement-oriented behavior people may rely on certain *implicit cognitions* that bias their reasoning in a way that enhances the behavior's rational appeal. One such bias in reasoning that is used by achievement-oriented persons to justify achievement-oriented behavior is the *positive connotation of achievement striving bias*. The positive connotation of achievement striving bias is the tendency to associate effort (i.e., intensity, persistence) on demanding tasks with admirable qualities and outcomes such as “dedication,” “concentration,” “commitment,” and “success.” The juxtaposed bias in reasoning used by fear-of-failure persons to justify the avoidance of achievement-oriented behavior is the *negative connotation of achievement striving bias*. The negative connotation of achievement striving bias is the tendency to associate effort (i.e., intensity, persistence) on demanding tasks with negative qualities and outcomes such as “overloaded,” “stressed,” “obsessed,” and “burnout.” For example, a college student high in AM may very well utilize positive connotations of achievement striving and frame the activity of studying for hours and hours on the weekends, in place of pursuing the campus social life, as “rewarding” and as evidence of “commitment” to higher learning. Alternatively, a college student high in FF may very well utilize negative connotations of achievement striving and frame the exact same behavior as “compulsive” and “obsessive.” Furthermore, by not studying as much as the AM counterpart, the student high in FF has an a priori excuse for not doing as well on the same test, which serves to protect the ego and self-image when and if failure is encountered. Certainly, the reader can recall the occasional student’s excuse for poor test performance that resembles the following: “I would have ‘aced’ that test if I had studied as much as everyone else.”

Thus, there are implicit cognitions that serve as the foundations of various justification mechanisms (JMs) that people high in FF use to maintain a positive self-image even when experiencing failure, as in the above example. Conversely, there are alternative implicit cognitions that serve to provide the foundations of the various justification mechanisms (JMs) used by those high in AM to maintain a positive self-image when devoting long hours to accomplishing demanding tasks in place of pursuing other activities. The positive connotation of achievement striving is just one of five primary justification mechanisms used in the reasoning of those high in AM to enhance the logical appeal and justifiability of their achievement-oriented behavior. The negative connotation of achievement striving is just one of six primary justification mechanisms used in the reasoning of those high in FF to enhance the logical appeal and justifiability of their avoidance of achievement-oriented behavior (James, 1998). Each AM and FF justification mechanism (JM) is listed and described in Table 2.

In sum, when deciding whether or not to approach demanding situations, individuals high in AM reason in ways that are very different from individuals high in FF. Whether or not an achievement-oriented behavior is deemed to be reasonable is thus conditional upon who is doing the reasoning, someone high in AM as opposed to someone high in FF. An assessment technique designed by James (1998) is now available to measure this conditional component of the reasoning process.

Measurement of Conditional Reasoning

Given the propensity of individuals *to believe* that their reasoning is rational and objective, and the corresponding tendency for them *to engage* in a form of reasoning that is conditionally biased in favor of their behavioral tendencies, it is possible to design reasoning items that elicit the conditional tendency. These items appear to respondents as logical, inductive reasoning problems, but are designed such that respondents with different implicit cognitions tend to solve the problems in different ways. Once the conditional tendency is reliably elicited from these items, a motive to behave in a certain way can be reliably inferred.

As noted earlier, individuals high in AM typically want to believe that their devotion of effort to accomplishing demanding tasks is reasonable and justified as opposed to wasteful and obsessive. Alternatively, individuals high in FF typically want to believe that their avoidance of demanding tasks is sensible and justified as opposed to lazy and foolish. Consequently, inductive reasoning problems can be designed around culturally salient, achievement-oriented themes (e.g., the price of success in terms of health and happiness) that are intended to evoke the respondent's reliance on JMs. For each problem *at least* two equally viable and logical response alternatives are embedded among one or more illogical alternatives to create a conditional reasoning test (CRT) item. For each CRT item an evocative stem with a set of premises is given, and at least one of the logical response alternatives is designed to reveal the implicit motive to approach challenging tasks, whereas at least one other logical alternative is designed to reveal the implicit motive to avoid challenges. The former is called the AM alternative whereas the latter is called the FF alternative. Therefore, when AM item responses are counted, and the number of FF responses is subtracted from this count, the extent of the respondent's reliance on the JMs that enhance the logical appeal of achievement-oriented behaviors (e.g., intensity and persistence of effort) is revealed. The resulting score is labeled the respondent's Relative Motive Strength (RMS), and is representative of the strength of the respondent's implicit motive to achieve.

Each CRT item is typically designed around one or more AM JMs, which stand juxtaposed to respective and contrasting FF JMs. Consider the following example CRT item with its stem and response alternatives:

> Studies of the stress-related causes of heart attacks led to the identification of the Type A personality. Type A persons are motivated to achieve, involved in their jobs, competitive to the point of being aggressive, and eager, wanting things completed quickly. Interestingly, these same characteristics are often used to describe the successful person in this country. It would appear that people who wish to strive to be a success should consider that they will be increasing their risk for a heart attack.
>
> Which one of the following would most **weaken** the prediction that striving for success increases the likelihood of having a heart attack?
>
> A. Recent research has shown that it is aggressiveness and impatience, rather than achievement motivation and job involvement, that are the primary causes of high stress and heart attacks.
>
> B. Studies of the Type A personality are usually based on information obtained from interviews and questionnaires.
>
> C. Studies have shown that some people fear being successful.
>
> D. A number of non-ambitious people have heart attacks.
>
> E. People tend to be highly ambitious during the early parts of their careers.

To answer questions such as the one above, each respondent must utilize one or more implicit assumptions. The CRT items are designed such that the implicit assumption arrived at in solving the problem may very well be conditional upon the disposition of the respondent. Response alternatives are designed to capture this conditional component of reasoning.

For this particular item respondents are given the task of determining which of the response alternatives serves to *most weaken* the causal link between striving to achieve and increasing the risk of a heart attack that is presented in the item's stem. Notice first that alternatives B, C, and E are not reasonable responses and thus serve as distracters. These alternatives, which cannot be used to logically weaken the causal link presented in the stem, help to make CRT items actual reasoning items on which it is possible to be illogical. Although alternatives B, C, and E are easily identified as illogical, their presence serves to make the measurement system "indirect." An indirect measurement system is one that appears to be measuring one attribute, when in fact it is measuring a different attribute. Thus, to respondents the CRT appears to measure inductive reasoning capacity or critical thinking skills, whereas in fact it measures the extent of the respondents' reliance on JMs that enhance the logical appeal of achievement striving behaviors. This indirect nature of the measurement system is critical as the CRT is used to measure implicit cognitions indicative of the motives to achieve and to avoid failure that are not accessible to respondents' introspections. As such, the CRT measures an implicit component of personality not accessible to self-report.

By eliminating the three illogical alternatives the respondent is left with alternatives A and D. It should be noted that both alternatives A and D serve to weaken the prediction that striving for success increases the risk of cardiovascular disease. However, alternative A posits that an entirely different causal chain is responsible for cardiovascular disease, whereas alternative D simply acknowledges the fact that achievement strivings and ambitious tendencies do not correlate perfectly with the development of cardiovascular disease. The causal implications of these alternatives and the resulting response tendencies of those high in achievement motivation and those high in fear-of-failure are described below.

By eliminating the three illogical alternatives the respondent is left with alternatives A and D. Alternative A states that "…it is aggressiveness and impatience, rather than achievement motivation and job involvement, that are the primary causes of high stress and heart attacks." This answer can be logically inferred from the information given as Type A persons have been described in the stem as "competitive to the point of being aggressive" and as "wanting things completed quickly." Furthermore, alternative A serves to fulfill a requirement of the problem, which is to select the response alternative that *weakens* the causal link between achievement striving and increased risk of cardiovascular disease. Indeed, implied in response A is the possibility that the causal link between achievement striving and cardiovascular disease is negligible, because it posits that two other characteristics, *aggressiveness* and *impatience*, are the *primary* causes of heart attacks. Thus, alternative A is very logically appealing to those high in AM as it supports the "positive connotation of achievement striving" JM by *dis*associating achievement strivings with negative outcomes, such as stress and increased risk of cardiovascular disease. For this same reason alternative A is *not* logically appealing to those high in FF as it contradicts the "negative connotation of achievement striving" present within their implicit cognitive framework. In other words, those high in FF would like to maintain the "negative connotation of achievement striving" present in the stem, and alternative A is not appealing because it is in opposition to this JM. In sum, those high in AM are likely to pick this response whereas those high in FF are not likely to pick this response to solve the problem. The causal model implied in the stem of this CRT problem is made explicit in Figure 3, as are the changes to the model that follow from selecting alternatives A and D, respectively.

As those high in FF will tend to be repelled by the causal implications of alternative A, they will typically seek an alternative more in harmony with their own biases. Alternative D provides them with an opportunity to fulfill the requirement of the problem, which is to *weaken* the statement that "striving for success increases the likelihood of having a heart attack," while still maintaining the positive causal direction between achievement striving and cardiovascular disease. Specifically, alternative D maintains the positive causal direction between achievement striving and cardiovascular disease that coincides with the "negative connotation of achievement striving" JM contained within the implicit cognitive framework of those high in FF. As can be seen in Figure 3, alternative D weakens the causal implications of the stem by simply acknowledging the fact that cardiovascular disease is multiply determined, and so some "nonambitious people have heart attacks" as well as those striving to achieve. Thus, alternative D provides those persons high in FF with the opportunity to avoid the selection of alternative A, which threatens assumptions within their cognitive framework. Selection of alternative D also allows those high in FF to maintain their implicit cognitive biases while acknowledging other determinants of cardiovascular disease. Thus, selection of alternative D allows those high in FF to maintain their implicit biases while still solving the requirement of the CRT problem, which is to weaken the positive link between striving to achieve and the risk of cardiovascular disease. As a consequence, alternative D should seem logically appealing to those high in FF, which should lead them to select it in solving the CRT problem.

Therefore, either response alternative A or D could be logically inferred from the information provided, but which alternative is given logical priority, and subsequently chosen, is conditional upon the implicit assumptions of the respondent. One alternative is based on a JM that implicitly defends, excuses, or otherwise justifies approaching demanding tasks. The other answer is grounded in a JM that implicitly defends, excuses, or otherwise justifies avoiding demanding tasks. *Which of the two alternatives a respondent selects to solve the reasoning problem provides a measure of his/her propensity to reason in terms of AM or FF JMs*.

A paper-and-pencil CRT has been developed to measure Relative Motive Strength. Respondents are instructed that the test is designed to assess the ability to reason using inference. However, the CRT assesses whether an individual *consistently* prefers AM or FF response alternatives when solving inferential reasoning problems. Respondents who consistently attribute logical priority to alternatives based on JMs for AM are regarded as cognitively prepared to engage in demanding tasks. Respondents who consistently attribute logical priority to alternatives based on JMs for FF are regarded as cognitively prepared to avoid demanding tasks. Respondents who consistently select illogical alternatives are considered to be lacking in attention, understanding, or cooperation. Conditional reasoning test items are scored by assigning +1 for each AM response alternative selected, 0 for each illogical alternative, and -1 for each FF response alternative. A few CRT items have, along with the AM and FF logical alternatives, logical response alternatives that are *not* scored, and like illogical alternatives these alternatives are also assigned a value of 0. Scored item responses are then summed to create a composite score termed Relative Motive Strength (RMS).

The composite score is an indicator of the extent to which an individual is cognitively prepared (1) to justify approaching or avoiding challenging situations and (2) to devote intense effort or to withhold effort when faced with demanding tasks. A high score on the CRT (e.g., 1 *SD* above the mean) occurs when an individual tends to select AM responses over FF responses, and from this high score it is inferred that the individual has a corresponding motive to approach challenging situations and to put forth large amounts of effort when faced with demanding tasks. A low score (e.g., 1 *SD* below the mean) on the CRT occurs when an individual tends to select FF responses over AM responses, and from this low score it is inferred that the individual has a corresponding propensity to avoid challenging situations and to typically withhold effort when faced with demanding tasks.

In sum, the conditional reasoning test of RMS is an *indirect* measure of a generally unrecognized proclivity to rationalize approach or avoidance of challenging situations from which the motive to achieve is inferred. Respondents may thus reveal in the conditional reasoning test implicit cognitions of which they are unaware, and thus cannot describe in self-report (Greenwald & Banaji, 1995; James et al., under review). Consequently, the integration of self-report and conditional reasoning methodologies should allow for an assessment of the complexities of AM and FF that cannot be captured via the independent use of these techniques.

Integrative Model of Achievement Motivation and Fear-of-Failure

I turn now to a proposal of how conditional reasoning might be joined with the most popular measure of personality, self-report, to predict behavior. Multiple avenues are available for pursuing this subject. The current approach expands on recent theory and research by Winter et al. (1998), who demonstrated that self-reports of consistencies in behaviors (i.e., traits) served to channel the emotional and behavioral expression of latent motives as measured by the TAT. As mentioned above, Winter et al. (1998) focused on integrating power and affiliation motives with the trait of extraversion, and although the current research is similar to that of Winter et al. (1998) and McClelland (1985), there are several important aspects on which these pursuits differ.

First, the current work extends the concept of the integrative model of assessment to a personality construct examined only briefly in this fashion by McClelland (1985), namely achievement motivation (AM). In the integrative works on AM reviewed by McClelland (1985), the motive to achieve *was manipulated experimentally* via situational cues and *was not measured in terms of individual differences as it is in the current work*. Consequently, the integrative model presented here for AM and FF is original and unique in that it has not been described elsewhere, utilizes a new measure of AM, and proposes new explanations of approach-avoidance conflicts.

Second, Winter et al. (1998) utilized the TAT to measure latent motives independently of the component assessed by self-reports, whereas the current work utilizes the CRT. As noted above and by James (1998), there are a number of differences between these two measurement systems. The TAT emphasizes individual differences in fantasy for the purposes of assessment, whereas the CRT emphasizes individual differences in reasoning. The TAT utilizes a free response format and is scored on the basis of a subjective content analysis, whereas the CRT utilizes a standardized response format and is scored on the basis of theoretically fixed, and empirically confirmed procedures (James, 1998). Finally, a highly trained technician must administer the TAT in a serial and one-on-one fashion to respondents, whereas the CRT can be administered in parallel and group fashion to multiple respondents like other standardized tests, making the CRT more applicable to organizational settings and thus useful to those involved in personnel selection. Therefore, the following investigations shall focus on how self-reports can be integrated with conditional reasoning to provide a fuller understanding of personality, specifically AM and FF, which cannot be provided by either measurement system when used in isolation.

As stated earlier, RMS measures implicit cognitions, or a generally unrecognized cognitive preparedness to approach demanding tasks, from which the motive to achieve may be inferred. However, RMS *does not* measure the explicit cognitions that are relevant to achievement motivation. Alternatively, self-reports have been used for some time now to obtain measures of achievement motivation. Unlike the TAT and the CRT, self-reports are "direct" in that they ask respondents to recognize their own characteristic behaviors, preferences, and emotions in order to give accurate item responses. As such, responses to self-reports must pass through self-perceptions and introspections that may be influenced by self-presentation biases, such as self-deception and impression management (Paulhus, 1984; Rosse, Stecher, Miller, & Levin, 1998). Consequently, self-reports often serve to access the *explicit cognitions* relevant to achievement motivation, and even though self-presentation biases may alter their accuracy, self-perceptions of behaviors, preferences, and emotions remain substantial components of personality (see Hogan, Hogan, & Roberts, 1996). Thus, for the adequate assessment of achievement motivation it is simply important to consider how individuals view themselves, even though the lens for viewing may be rosy.

In sum, self-reports assess self-attributed traits and motives that are available to introspection. The CRT, on the other hand, is a relatively new indirect measure of personality that assesses latent motives (James, 1998). The CRT is based on the assumption that individuals have latent justification mechanisms (JMs) that they use to justify, defend, and explain their behavior. These JMs are part of the individual's underlying or implicit cognitive belief structure. Therefore, as these methodologies assess different components of personality, their integration may allow for a unique assessment of personality that cannot be captured via the independent use of these techniques.

In pursuit of the integrative model I became especially intrigued with the question of what happens when explicit cognitions of behavioral tendencies (i.e., self-attributed traits and motives), as measured by self-reports, are congruent or incongruent with implicit cognitions (i.e., latent motives), as measured by the CRT. To wit, I built a theoretical model of AM and FF that integrated explicit cognitions from self-reports with implicit cognitions from conditional reasoning. This model is presented in Table 3. At the left side of the model are presented items from self-reports (e.g., Jackson's PRF, 1984; Costa & McCrae's NEO-PI-R, 1992) that are used to measure self-perceptions of goals, work efforts, and desires that are indicative of achievement motivation. Below these items are those that reflect a fear-of failure. At the top of the model are the JMs for people whose RMS indicates FF as well as the JMs for those whose RMS indicates AM.

The four inner cells of the model reflect an attempt to build a typology for achievement motivation and fear-of-failure via integrating these two sources of information. This integration resulted in the creation of descriptions of pure types, or of prototypical individuals within each cell (e.g., a clear RMS of AM versus a clear RMS of FF crossed with high versus low self-perceptions of achievement motivation). In truth, a continuum exists for both self-reports of achievement motivation and RMS, and crossing these two continua generates a large number of cells representing degrees of variation between the prototypes presented in the cells. However, for simplification purposes intermediate cells have been left out of Table 3 as well as the discussion of the model provided below.

The upper-right cell consists of persons who view themselves as achievement motivated and who possess the corresponding JMs to enhance the logical appeal of achievement behaviors. Members of this cell were designated “Congruent AMs” to denote that motives revealed by reasoning proclivities are compatible with self-descriptions of behavioral/emotional propensities. These individuals are predicted to be ambitious, aspiring, and industrious. They are also predicted to put forth a lot of effort when faced with demanding tasks, and to interpret failure as both temporary and an opportunity to learn via increased effort (Dweck & Leggett, 1988). Moreover, they have a personal responsibility bias that favors the attribution of success and failure to internal rather than external factors (cf. Bandura, 1982, 1986a, 1986b; James, 1998; McClelland & Boyatzis, 1982). Specifically, they tend to believe that internal factors, such as self-efficacy, self-discipline, and volitional effort, can be controlled and utilized to overcome the obstacles faced when attempting to accomplish challenging tasks, and to eventually achieve their goals. Their achievement striving behaviors are supported by their reliance on AM JMs that encourage the framing of demanding goals as opportunities worthy of effort and sacrifice, where enthusiasm and perseverance will eventually produce success (James, 1998; McClelland, 1985; McClelland et al., 1989).

The lower-left cell contains individuals who consciously view themselves as low in achievement motivation and anxious in challenging situations, and who reason on the basis of FF JMs to rationalize avoiding challenging situations that could cause them psychological damage (e.g., feelings of incompetence) should they fail in those situations. In other words, the FF JMs that dampen enthusiasm for achievement and justify avoidance of challenging achievement activities serve to protect self-perceptions (i.e., self-reports) that are suggestive of a fear-of-failure. These individuals interpret failures as being indicative of fixed, inadequate levels of ability (Dweck & Leggett, 1988). Thus, when encountering setbacks and failures, these individuals attribute those failures to their embodiment of a fixed, inadequate level of ability, and this internalized attribution causes them to experience subsequent aversive psychological states (e.g., feelings of inadequacy, anger, guilt, helplessness, lowered self-esteem; Abramson, Seligman, & Teasdale, 1978; Bandura, 1982; Crocker & Major, 1989; Weiner, 1979, 1985). Consequently, these persons have a propensity to frame demanding, achievement-related tasks as personal liabilities and threats (see Atkinson, 1957; James, 1998) because attempts to complete demanding tasks are likely to involve setbacks that could lead to eventual failure, and this failure will lead to the experience of aversive psychological states. As a result, these persons often prevent these aversive psychological states proactively by not approaching demanding, challenging tasks and by avoiding challenging situations altogether. Thus, these individuals are "Congruent FFs" and are predicted to generally avoid achievement-oriented activities, to be anxious when in challenging situations, and to perhaps withdrawal from challenge when failure appears likely, as long as such withdrawal is not also psychologically damaging. Consequently, when faced with challenging situations in which withdrawal is not feasible or withdrawal would be psychologically damaging, individuals in this cell may generate high levels of effort to succeed and thus avoid the feelings of incompetence and the negative emotions that would result from failure.

The lower-right cell involves individuals who see themselves as nonachievers but who, incongruously, reason in ways that enhance the rational appeal of achievement. These individuals are predicted to have conscious concerns for the stress that high achievers can encounter, and for the obsessions that can result from the devotion to achievement. These concerns may dampen and even inhibit their strong latent motive to achieve. The tendency of those in this cell to reason in ways that justify approaching demanding tasks is likely to produce strong approach-avoidance conflicts with the self-perception of being cautious and stress avoidant. When their underlying reasoning proclivities are manifested, approach of achievement-oriented tasks and situations will occur, but this approach will likely be a careful, deliberate one. Furthermore, this approach should also be subject to termination if stress is encountered. Consequently, the individuals in this lower-right cell were labeled "Hesitant AMs."

Finally, the upper-left cell of Table 3 contains individuals who see themselves as high achievers but who incongruously have FF JMs in place. Thus, these individuals are predicted to experience conscious pressure to approach achievement-oriented tasks, but to feel nervous and anxious when so doing. Thus, like Congruent FFs, these individuals are also predicted to be nervous and anxious when faced with demanding tasks. However, for these individuals the FF JMs are predicted to play a proactive role in reducing this anxiety by leading them to approach only those achievement-oriented tasks for which an external attribution for failure can easily be made. They may also purposely avoid responsibility for failure by engaging in the unnecessary delegation of responsibility to others, such as when an executive forms a team for the generation of a decision that he or she should make alone (James & Mazerolle, 2002). Also, when faced with demanding tasks, they may simply withhold effort to rationalize subsequent and likely failure. Consequently, these individuals may withdrawal from challenging situations altogether when failure becomes likely. Thus, the individuals in this upper-left cell were labeled “AM Pretenders” because they fear failure but want to be viewed by themselves and by others as achievement-oriented.

Empirical Predictions of the Integrative Model

In 1983 Cooper reviewed and conducted several studies to assess whether seven standard dependent variables belonged within the nomological network of achievement motivation: initial task choice, persistence, performance, valence of success, valence of failure, task difficulty estimates, and the Zeigarnik effect. Initial task choice, persistence, performance, and the Zeigarnik effect were measured objectively and independently of the predictor motives, that is the motives to approach success and to avoid failure. Alternatively, valence of success, valence of failure, and task difficulty estimates were measured subjectively and with the same method used to assess self-reported predictor motives. Cooper's (1983) results indicated that all of the dependent variables, save the Zeigarnik effect, belonged within the network. Additionally, the results revealed difficulties in the prediction of initial task choice. Therefore, for the current tests of the integrative model both persistence and performance were chosen as dependent variables because they can be assessed objectively and independently of the study predictors, especially self-report predictors, and they remained clearly within the nomological network of achievement motivation according to Cooper's (1983) findings.

However, the current work took the perspective that the dependent variable of persistence is only one of three behavioral components that combine to form an overall level of effort. Figure 4 displays this multidimensional view of effort as being a function of the particular task one chooses to engage in, how intensely one works on that task, and how long one persists in accomplishing the task. Thus, for example, in the figure Person 1 can be seen as putting forth less effort on Task 1 than Person 2. Furthermore, Person 1 stops working on Task 1 before Person 2, and thus is less persistent than Person 2 in accomplishing the task. However, Person 3 is working harder than both Person 1 and Person 2, but on a different task (i.e., Task 2). It should be noted that task choice, intensity, and persistence are often correlated, as one can *choose* a certain task to work on at the expense of another task, *choose* to work with little or no intensity, and *choose* to persist or to quit.

Therefore, both persistence and intensity were measured to provide an indication of an overall level of effort, and performance measures were also used to complete the set of dependent variables pursued in the current work. It should be noted here that the performance measures used in these studies were certainly tainted with effort as *one must almost always put forth effort in order to perform well (e.g., one must typically concentrate and read a test item to answer it correctly, one must attend class lectures and tests to perform well in a course, one must show up to work to perform well on the on-site work tasks, etc.)*. Two general predictions were derived when considering the prototypes of the integrative model in conjunction with the findings of past research. These predictions are displayed in Figure 5, and described below.

By continually setting mastery as opposed to performance goals, over time Congruent AMs tend to approach challenging tasks in which they may fail because incidents of failure are interpreted as opportunities to improve a *malleable* level of ability (Dweck & Leggett, 1988). Thus, due to their adaptive tendencies, over time Congruent AMs acquire the habit of putting forth high levels of effort when faced with challenging tasks and thus acquire the requisite skills for obtaining high levels of performance. Alternatively, Hesitant AMs are more calculating in their approach of challenging tasks, and typically do so only when a return-on-investment from expended effort is clearly evident. Hesitant AMs are also more likely than Congruent AMs to discontinue the pursuit of completing challenging tasks when stress is encountered. Thus, they were predicted to put forth less effort than Congruent AMs, and to have lower levels of performance in comparison to Congruent AMs.

By continually setting performance as opposed to mastery goals, over time Congruent FFs tend to avoid challenging tasks in which they may fail because incidents of failure are interpreted as indicating a *fixed* level of *inadequate* ability, and subsequently cause psychological damage (e.g., lower self-esteem). Thus, due to their avoidant, maladaptive tendencies, over time Congruent FFs do not acquire the skills necessary for obtaining high levels of performance in comparison to Congruent AMs (Dweck & Leggett, 1988). However, when faced with challenging situations in which withdrawal is not feasible, or in which withdrawal would be as psychologically damaging as failure, Congruent FFs may put forth *levels of effort* comparable to Congruent AMs in order to avoid failure and the negative affect that it generates (Jones, 1973). As AM Pretenders sometimes experience conscious pressure to approach challenging tasks, they may not be quite as historically avoidant as Congruent FFs, and thus AM Pretenders may develop more performance-relevant skills than Congruent FFs. Thus, AM Pretenders were predicted to reach levels of effort and performance generally above that of Congruent FFs, but levels of effort and performance below that of Congruent AMs.

The above predictions were used to generate the relationships depicted in Figure 5. In the case in which withdrawal from challenge *is* feasible, Congruent AMs were predicted to reach the highest levels of effort and performance in comparison to the other prototypes, and Congruent FFs were predicted to attain the lowest levels of effort and performance. These expectations are displayed in the upper graph of Figure 5, where an additive pattern between RMS and self-reported achievement motivation in the prediction of effort and performance is shown. However, in the lower graph of Figure 5 is displayed the case in which Congruent FFs perceive the situation to be one in which withdrawal would be psychologically damaging or unfeasible (e.g., socially unacceptable), and thus they would generate high levels of effort to avoid failure. Consequently, the relationship between RMS and self-reported achievement motivation in the prediction of effort *when withdrawal is not feasible* is displayed as disordinal and multiplicative.

In each empirical investigation described below, measures of cognitive ability were obtained because past research has demonstrated its importance in the prediction of effort and performance (see Dollinger & Orf, 1991; Hunter, 1986; Hunter & Hunter, 1984; Judge, Higgins, Thoresen, & Barrick, 1999; Maqsud, 1997; Pajares & Kranzler, 1995; Pearlman, Schmidt, & Hunter, 1980; Schippmann & Prien, 1989; Schmidt, Gast-Rosenberg, & Hunter, 1980; Schmidt & Hunter, 1998; Schmidt, Hunter, & Caplan, 1981; Youngstrom, Cogos, & Glutting, 1999). Thus, incorporating cognitive ability into the empirical tests of the integrative model allowed for the determination of the incremental validity of the model in predicting effort and performance above and beyond that predicted by cognitive ability. A number of researchers have suggested that a new assessment technique (e.g., the integrative model) should demonstrate incremental validity above and beyond established assessments (e.g., cognitive ability) to be deemed pragmatic and value-added in application (see Cronbach & Gleser, 1957; Day & Silverman, 1989; Sechrest, 1963). As such, the incremental validity of the integrative model, and thus the theoretical and practical value-added nature of the model, could be determined.

Three studies were conducted to test the predictions of the integrative model. In all three studies a self-report of achievement motivation and the CRT were administered to the research participants. A measure of cognitive ability was also obtained in each study. Studies 1 and 2 utilized college student samples, whereas Study 3 utilized working adults competing for managerial positions.

Study 1a tested the integrative model by measuring persistence and intensity of effort devoted to completing problems (i.e., cryptoquote puzzles) that were unknown by the participants to be impossible to solve. Study 1b tested the integrative model by measuring performance on increasingly difficult math problems. Study 1c tested the model by assessing academic performance in terms of final course grade and cumulative grade point average (GPA). Study 2 was conducted as a replication of Study 1c, and as such also assessed academic performance in terms of final course grade and cumulative GPA. Study 3 tested the integrative model by assessing in-basket performance and overall performance in an assessment center.

CHAPTER 2

STUDY 1A

The first study was conducted to determine the ability of the integrative model to predict both persistence and intensity of effort devoted to a task performed under severe time constraints (i.e., a total of 15 minutes to solve seven problems). Each problem was known to be impossible to solve by the experimenters, but *not* by the student participants. Indeed, the participants were given practice problems with simple solutions prior to beginning the unsolvable problems in order to make the latter problems appear solvable. Additionally, each participant was required to attempt to solve the problems sequentially, and not allowed to return to a previous problem once it was abandoned. Therefore, for the seven unsolvable problems, attempting to solve the second problem indicated that the participant *did not persist* in attempting to solve the first problem, and attempting to solve the third problem indicated that the participant *did not persist* in attempting to solve the second, and so forth. Consequently, participants who attempted fewer problems were more persistent (Burger, 1985). The amount of time devoted to solving an impossible problem has been used in past research as a measure of persistence, and this persistence has been linked with higher levels of achievement motivation (Burger, 1985; Cooper, 1983; Feather, 1961).

However, in the current study the participants were unaware that they would be faced with problems that they could not solve and thus were placed in a very challenging situation. Additionally, the experimenters made the task evocative by emphasizing in the instructions that being able to solve mental problems "reveals mental abilities." Consequently, in this study Congruent FFs were faced with a challenging situation that they might normally avoid, but one in which they might be likely to set high performance goals to demonstrate an adequate level of what they believe to be a 'fixed' ability (Dweck & Leggett, 1988). Alternatively, given their habit of putting forth effort when faced with challenge, Congruent AMs were predicted to set equally high, yet mastery-oriented goals to increase what they believe to be a 'malleable' level of ability (Dweck & Leggett, 1988). As Hesitant AMs and AM Pretenders were not expected to set such goals in comparison to the Congruent AMs and FFs, the multiplicative pattern shown in the bottom of Figure 5 was predicted to emerge.

Alternatively, the possibility that Congruent FFs would not set high performance goals, and instead simply discount the experimental task by withholding effort must also be considered. In other words, by withholding effort from tasks Congruent FFs can create an ego-protecting a priori reason for failure (i.e., the fact that they did not try), and the subsequent *rationalization that had they tried they would have met success instead of failure*. Under this condition, Congruent FFs might remain on the first unsolvable problem while waiting for the experimental session to end instead of devoting effort to its solution, and thus *appear* to persist in solving the first problem. This possibility would also lead to the multiplicative pattern in Figure 5 *with respect to the prediction of persistence.* As a result, Congruent FFs could set high performance goals and truly persist to avoid failure, or discount the task altogether to rationalize subsequent failure. Either strategy could be used to protect them from experiencing the negative affect that failure generates (e.g., feelings of having an *inadequate* level of *fixed* ability), and a multiplicative prediction of persistence via the integrative model could not be unambiguously interpreted were persistence to be the only dependent variable measured.

However, *intensity of effort* devoted to solving each problem was also measured in order to resolve this theoretical quandary. Consequently, were Congruent FFs to discount the experimental task in comparison to other prototypes, and yet remain on the first problem without attempting a solution, then *the measure of intensity* would reveal this lack of effort via producing the additive pattern shown in the top of Figure 5. Such an additive pattern for the prediction of intensity of effort would indicate that the "persistence" of Congruent FFs, if found, was not a function of pursuing a high performance goal, but instead a dismissal of the task in order to rationalize subsequent task failure. Thus, whether Congruent FFs would set strong performance goals resulting in true persistence and intensity of effort, or simply discount the experimental task in order to rationalize subsequent failure, was a central question of Study 1a, and the measure of intensity of effort was used to provide an answer.

Method

Participants

The sample consisted of 110 undergraduate students attending an introductory database management course in the college of business administration at a university in the southeastern United States. The students participated in the study for the purpose of earning extra credit applicable to their course grade. With participants' permission, final course grade and cumulative GPA were obtained from the university's registrar at the end of the semester. The sample was roughly 30% female, and had an approximate mean age of 21 years (*SD* = 3.00).

Predictor Measures

Relative Motive Strength (RMS). The paper-and-pencil conditional reasoning test (CRT) of achievement motivation (AM) and fear-of-failure (FF) was used to measure RMS. The instructions for the CRT present it as a test that "is designed to assess reasoning skills," and at no time did the participants give any indication that they believed the test to be assessing anything other than reasoning skills. The CRT consists of 15 inductive reasoning items designed to assess a generally unrecognized proclivity for engaging in achievement-related tasks versus avoiding such tasks (James, 1998). Conditional reasoning test items are scored by assigning +1 to each AM response alternative selected, 0 to each illogical alternative, and -1 to each FF response alternative. A few CRT items have logical response alternatives that are not scored, and like illogical alternatives these are also assigned a value of 0 (James, 1998). Scored item responses are then summed to create a composite score termed Relative Motive Strength (RMS). Relative motive strength composite scores have a potential range of –15 to +15, with higher scores indicating an orientation toward achievement motivation and lower scores indicating an orientation toward fear-of-failure.

Past research has indicated a satisfactory level of internal consistency for RMS composite scores. For example, in an investigation by James (1998), internal consistency reliability estimates for RMS ranged from .81 to .89. In the current study, the Kuder-Richardson (Formula 20) coefficient based on the average of the item-total polyserial correlations produced an internal consistency reliability estimate of .73 for the RMS composite scores.[3] Past research has also demonstrated that RMS is a valid predictor of behavioral indicators of achievement, such as mean level of performance on in-class exams and overall grade point average (see James, 1998).

Self-Report of Achievement Motivation. A six-item scale using a semantic differential format was used to measure the explicit, self-perceived component of achievement motivation. An example item from this scale is the following semantic differential:

"I would like to be a high achiever at school, but am not hung up about it.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	I have a burning desire to be a high achiever at school."

An additional example item is shown below.

"I prefer to set reasonable goals for myself at school.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	I always try to set very challenging goals for myself at school."

The instructions indicated that when providing responses to the items the participants should consider how they typically act, think, and feel at school when attending class and when doing homework. The participants responded to this semantic differential

[3] The item-total polyserial correlations were used in place of item-total Pearson correlations to estimate scale reliability because the trichotomous item responses were assumed to be the result of a continuous

item format by checking the box next to the number in the 5-point Likert scale that best represented where their preference or behavior stood in relation to the opposing, paired statements. Specifically, participants were instructed to select the number "3" if undecided or neutral about the statements, "1" if the statement on the left strongly represented their preference or behavior, "2" if the statement on the left represented their preference or behavior somewhat more accurately than the statement on the right, and so forth. Items responses were coded and averaged such that higher composite scale scores represented higher levels of self-perceived achievement motivation.

An internal consistency reliability estimate of .69 was obtained via coefficient alpha for this measure of self-perceived achievement motivation. Although this measure of self-reported achievement motivation was developed for the current study, and thus has no prior evidence of validity given its novelty, as shown below (see Table 5) it correlated significantly with course grade (.20, $p < .05$) and in the direction one would expect between motivation and performance (i.e., in the positive direction).

Cognitive Ability. In order to control for individual differences in cognitive ability, and to determine the capacity of the integrative model to predict variance in effort and performance above and beyond cognitive ability, ACT and SAT scores were collected from the university's registrar with the permission of the participants. When only the SAT score was available for a participant that score was converted to an equivalent ACT score via conversion tables (Schneider & Dorans, 1999).

Criterion Measures

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latent construct, and re-estimation of item-total Pearson correlations via item-total polyserials provides

Unsolvable cryptoquote puzzles have been used in past research to provide a behavioral measure of persistence (see Burger, 1985). In the current study, the cryptoquote task was presented as a test of verbal and problem solving ability. Appendix C presents the instructions for the cryptoquote task, the first of the three solvable cryptoquote practice puzzles, and the first of the seven unsolvable cryptoquote test puzzles. The practice cryptoquote puzzles consisted of a series of coded letters that represented well-known quotes or phrases. To solve these practice cryptoquote puzzles, one must figure out the code for each letter, and thereby determine the correct letter that each coded letter in the series actually represents. By substituting the correct letters for the coded letters in the practice cryptoquote, the well-known phrase can be deduced. For example, within a practice cryptoquote puzzle the letter U may represent the letter T, and thus every time the letter U appears in the puzzle the letter T should be substituted in order to deduce the correct phrase. Test cryptoquote puzzles appeared in the same format as practice cryptoquote puzzles, with the difference being that test puzzles did not represent quotes or phrases, and thus could not be solved.

The participants were given seven minutes to solve the three practice cryptoquotes, and fifteen minutes to solve the seven test cryptoquotes. A workspace beneath each puzzle was provided for the participants to work through the solution and deduce the correct phrase (see Appendix C). Following Burger (1985), practice cryptoquotes were partially solved for the participants, such that a few correct letters

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for increased generalizability of the resulting reliability coefficient to other samples.

were already presented in the workspace below the practice cryptoquotes. Participants were not given any such aid on the unsolvable test cryptoquote puzzles. The lack of aid provided on the test puzzles served to make the shift from solving three practice puzzles to total failure on the test plausible. Over 98% of the participants solved all three practice puzzles, and at no time did the participants give any indication that they believed the test puzzles to be unsolvable.

Within the practice and test sessions the participants could allocate the total amount of time given to solve the problems however they chose within the following restrictions. First, participants had to check a box in the upper right-hand corner of the page before attempting to solve the cryptoquote puzzle that appeared on that page. Second, once the participants began a new puzzle they were not allowed to return to any of the previous puzzles. In this fashion the experimenters could determine whether or not the participants worked on a puzzle even if they did not write in the workspace below the puzzle, and could also count how many puzzles the participants attempted.

The above methodology allowed the experimenters to record the number of cryptoquotes attempted by each participant. Recall that because the test cryptoquotes were unsolvable, attempting to solve later test cryptoquotes indicated that the participant *did not persist* in attempting to solve earlier test cryptoquotes. Test cryptoquote puzzles were scored as attempted (1) and not attempted (0). Thus, this methodology allowed for a measure of persistence by summating the number of puzzles attempted and subtracting this value from the number eight. This resulting variable was termed "persistence," and had a range from 1 to 7 with higher scores indicating higher levels of persistence. Using coefficient alpha, an internal consistency reliability estimate of .81 was obtained for the cryptoquote measure of persistence.

Additionally, the amount of work participants performed in attempting to solve each test cryptoquote puzzle was measured by counting the number of characters written in and outside the workspace for each puzzle. For example, if the participant wrote "a = t" and "c = e" anywhere on the page when trying to solve a particular puzzle, then the participant received a six for that puzzle to indicate the level of *intensity of effort* the participant devoted to solving that puzzle. Two experimenters independently counted the number of characters written on each cryptoquote puzzle page. A discrepancy occurred in only two instances (i.e., in only 0.26% of the possible comparisons), and in each instance the discrepancy was resolved via consensus. The total number of characters written when attempting to solve the seven test cryptoquotes was then summed to create a dependent variable termed "total intensity," with higher scores on this variable indicating higher levels of intensity of effort devoted to solving cryptoquote problems. However, as some participants attempted only the first test cryptoquote (i.e., they spent the entire allotted 15 minutes on the first test cryptoquote puzzle), their intensity on later problems was scored as zero, and for these individuals the total intensity variable might have appeared abnormally low considering their persistence. Thus, the total intensity variable was also divided by the number of cryptoquotes attempted to provide the average level of intensity of effort expended per problem attempted. As this final dependent variable was a function of both persistence and intensity, it was simply termed "effort."

Procedure

The opportunity to earn extra credit by serving as a research participant was announced in class. The participants were told that they could choose to attend one of several identical research sessions that would be offered, and that each session would last approximately 2 hours and involve completing several paper-and-pencil tests. The same tests were administered at each session, and the order of test administration did not vary across the sessions.

Participants completed informed consent forms at the beginning of each session. The CRT was the first test administered at each session, and took approximately 45 minutes to complete. The CRT was followed by a brief math test (see Study 1b), which took approximately 20 minutes to complete. The math test was followed by the cryptoquote task, which took approximately 45 minutes to complete, and was followed by a short survey that took approximately 10 minutes to complete.[4]

Following the methodology utilized by Burger (1985), the cryptoquote instructions were read aloud to the participants. The instructions presented the cryptoquote task as a test of "verbal and problem solving abilities," and provided a definition of a cryptoquote. An example cryptoquote puzzle was then presented and

[4] The Study 1a, 1b, and 1c data were part of a larger validation study for the conditional reasoning test of AM and FF. As such, although I pursued the theoretical development of the integrative model and its predictions and results independently, the data were gathered in cooperation with other graduate students in Dr. Lawrence R. James' research laboratory. These graduate students of Dr. Lawrence R. James (e.g., Jennifer Burgess, Debrah Zegelbone-Migetz, William Walton, & David Vermillion) conducted other studies on the same sample of research participants.

described to illustrate how the cryptoquotes can be solved. At this point in the instructions the experimenters stated that “solving mental puzzles reveals mental abilities” in an attempt to make the cryptoquote task evocative to the participants.

The instructions also informed the participants that prior to working on a cryptoquote’s solution, they should place a check mark in a box in the upper right-hand corner of the page on which the cryptoquote was located. The instructions stated that the cryptoquotes were to be worked on in the order in which they were presented, that a cryptoquote problem should not be skipped, and that a cryptoquote problem should not be returned to once it had been passed. The participants were told they could use the workspace below each cryptoquote as well as the rest of the space on the page to generate a solution. Several strategies and guidelines were provided to help the participants solve the cryptoquotes. The practice session began at the experimenter’s signal once it was determined that all of the participants understood the task. The participants were told to stop working on the practice puzzles at the end of seven minutes. At the end of the practice session the following instructions for the test session were read to the participants:

> Attached to this page are seven test cryptoquotes. You will have fifteen minutes to solve them. Please note that each cryptoquote has its own page. Prior to working on a cryptoquote please check the box in the upper right hand portion of the page on which the cryptoquote is located. Please solve the cryptoquotes in order, without skipping one. Once you have turned the page to work on the next cryptoquote please do not return to ones that you have already passed. You can only go forward to work on additional cryptoquotes, and only in the order in which they are presented. Beneath each cryptoquote are several blanks with which you can test out various

> solutions. Feel free to use these blanks, as well as the rest of the page, for scratch paper.

At the experimenter's signal the test session began. Once fifteen minutes had passed the participants stopped working on the cryptoquotes, and turned to the back of the booklet where they completed a brief survey that included the self-report of achievement motivation. The final survey took approximately 10 minutes to complete. Once the participants completed the final survey all of the materials were collected, and the participants were told that debriefing forms would be made available at the end of the semester once the last session had been held. At the end of the semester the debriefing forms were made available to the participants, and final course grades, cumulative GPAs, ACT scores, and SAT scores were obtained from the university's registrar.

Results

Table 4 presents the means and standard deviations of the Study 1a variables. The mean RMS composite score was 2.67 (SD = 4.79), and the mean self-report of achievement motivation was 2.88 (SD = .70). The mean ACT composite score was 23.13 (SD = 3.54). The mean level of persistence was 4.39 (SD = 1.54), and the mean level of effort (i.e., total intensity divided by the number of cryptoquotes attempted) was 23.31 (SD = 16.30).

Table 5 presents the intercorrelations of the Study 1a variables. As can be seen from the table, RMS did not correlate significantly with self-reported AM (r = .09, p > .10). This supports the earlier assertion that the CRT serves as a measure of generally unrecognized *implicit* achievement motives that are often not significantly related to self-reported, and thus self-attributed, *explicit* achievement motives. This finding is entirely consistent with past empirical research (James, 1998; McClelland et al., 1989, p. 691). Further, RMS correlated significantly with ACT composite scores ($r = .35$, $p < .01$), whereas self-reported AM did not ($r = -.03$, $p > .10$). The nonsignificant relation between self-reported AM and ACT composite scores might suggest that the covariation between RMS and ACT scores could be due to method variance in that both the CRT and the ACT entrance exam require levels of reading comprehension above those required by self-report measures. However, the covariation between RMS and ACT composite scores is more likely due to a cyclical nonrecursive model of the development of *implicit* achievement motivation and critical intellectual skills because a concerted effort was made to insure logical parity between CRT AM and FF response alternatives (cf. James, 1998).

RMS did not obtain significant correlations with the Study 1a criteria (i.e., persistence, intensity on the 1^{st} cryptoquote, total intensity, and effort). The self-report of achievement motivation obtained significant and *negative* correlations with two of the Study 1a criteria. Specifically, self-report correlated with persistence ($r = -.17$, $p < .10$) and effort ($r = -.15$, $p < .10$). ACT composite correlated significantly with intensity on the 1^{st} cryptoquote ($r = .16$, $p < .10$) and total intensity ($r = .28$, $p < .01$), but did not correlate significantly with the other Study 1a criteria.

Central to Study 1a was the hypothesis that the integrative model would predict variance in persistence, intensity, and effort beyond that predicted by RMS and self-reported AM when used in isolation. Specifically, were Congruent AMs to set high mastery goals and Congruent FFs to set high performance goals in comparison to the other prototypes (i.e., Hesitant AMs and AM Pretenders), then the multiplicative interaction depicted in the lower graph of Figure 5 would be obtained, and variance in the criteria would be predicted by the interaction of RMS and self-report AM above and beyond that explained via their main effects. Alternatively, were Congruent AMs to set high mastery goals and Congruent FFs to discount the task in comparison to the other prototypes, then the multiplicative pattern would still hold for the prediction of persistence (see above), but the additive pattern displayed in the upper graph of Figure 5 would be obtained for intensity. Finally, because cognitive ability is known to be a powerful predictor of achievement-related behaviors (e.g., Schippmann & Prien, 1989; Schmidt & Hunter, 1998), it was controlled for statistically to determine the incremental validity of the integrative model.

To test the predictions of the integrative model I utilized a moderated hierarchical multiple regression (MHMR) procedure. The MHMR procedure is usually a more powerful detector of interactions between continuous predictors in comparison to the artificial categorization of those predictors and subsequent ANOVA or subgroup-based correlation coefficient procedures (Cohen, 1983; Stone-Romero & Anderson, 1994). Specifically, the ANOVA procedures conducted on continuous predictors are *typically* inadequate because they require an arbitrary categorization of the predictors, which results in a loss of information in the predictors and a subsequent reduction in statistical power (Cohen, 1983, 1990; Humphreys, 1978; Stone-Romero & Anderson, 1994; however, see McClelland & Judd, 1993, for an opposing viewpoint).

MHMR was used to determine whether or not the relationship between RMS and each criterion was contingent upon the level of self-reported AM. Consequently, all measures were standardized and the product between RMS and self-reported AM was calculated to form the interaction term. Each criterion was subsequently regressed onto RMS and self-reported AM in Step 1, and then onto both predictors and their interaction term (i.e., cross-product) in Step 2. Moderated hierarchical multiple regression assessed whether or not the interaction term entered in Step 2 made a unique contribution to the explanation of variance in the criterion above and beyond the main effects of the predictors that were entered in Step 1 and subsequently partialled from the interaction term in Step 2 of the procedure (Cohen & Cohen, 1983).

Every MHMR analysis was conducted twice, first *without* controlling for cognitive ability, and then *with* controlling for cognitive ability via entering cognitive ability scores on the first step of the regression equation along with RMS and self-reported AM. This procedure served to determine whether or not the integrative model could demonstrate incremental validity above and beyond cognitive ability. Were the validity of the integrative model to deteriorate substantially in the presence of cognitive ability, then the value-added nature of the model would be called into question.

The results of the Study 1a MHMR analyses conducted without and with ACT scores entered on the first step are presented in Table 6. Persistence was the first criterion analyzed via MHMR. In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 did not lead to a significant increase in the amount of variance explained (i.e., R^2) in persistence, $F(2, 79) = 1.23$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 78) = 9.10$, $p < .01$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in persistence (i.e., 10%) above and beyond the variance explained by the main effects. In the analysis in which cognitive ability was controlled for, entry of RMS, self-reported AM, and ACT composite scores on Step 1 did not lead to a significant increase in R^2, $F(3, 75) = 1.13$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 74) = 9.35$, $p < .01$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in persistence (i.e., 11%) above and beyond the variance explained by their main effects as well as the main effect of cognitive ability.

Using these MHMR results, I graphed the relationship between RMS and persistence at high and low levels of self-reported AM (i.e., using one standard deviation above and below the mean of the self-report scores) without and with controlling for cognitive ability. This graphing procedure followed that recommended by both Aiken and West (1991) and Cohen and Cohen (1983), and it was used to determine if the observed interaction pattern resembled the one predicted by the integrative model for effort when withdrawal was not feasible (see lower graph of Figure 5). Additionally, by graphing the results first without and then with controlling for cognitive ability, a determination could be made as to whether or not controlling for cognitive ability weakened the incremental validity of the integrative model.

The resulting graphic representations produced from the regression analyses conducted without and with cognitive ability controlled for are presented the upper and lower graphs of Figure 6, respectively. Notice that the two graphs are essentially identical, indicating that the inclusion of cognitive ability in the MHMR analysis did not attenuate the validity of the integrative model. In both graphs, persistence *increased* as RMS increased only under the condition in which self-reported AM was high. Conversely, as RMS increased there was a corresponding *decrease* in persistence when self-reported AM was low (i.e., under the condition of self-reported FF). These empirical results displayed in Figure 6 match the theoretical multiplicative and disordinal interaction depicted in the lower graph of Figure 5, which supports the earlier hypothesis that Congruent AMs and Congruent FFs would set strong goals in comparison to the other two prototypes, and thus be more persistent on the cryptoquote task than the other prototypes.

In order to conduct an objective test on the ability of the integrative model to remain value-added when controlling for cognitive ability, the statistical significance of the simple slopes for RMS at low (-1 *SD*) and high (+1 *SD*) levels of self-reported AM was determined without and with ACT composite scores as a covariate. Were the simple slopes to be statistically significant without ACT composite scores as a covariate, and then nonsignificant in the presence of ACT, the incremental validity of the integrative model could be called into question. Table 7 presents the results for these tests of the simple slopes. As can be seen from the table, the simple slope for RMS at a low level of self-reported AM in the prediction of persistence was nonsignificant without and with ACT controlled. However, the simple slope for RMS at a high level of self-reported AM in the prediction of persistence was significant (.39, $p < .01$), and remained so in the presence of ACT (.43, $p < .01$). Therefore, the inclusion of cognitive ability as a covariate did not decrease the incremental validity of the integrative model in the prediction of persistence.

Intensity on the first cryptoquote puzzle was the next criterion analyzed via MHMR (see Table 6). The level of intensity devoted to attempting to solve the first cryptoquote was analyzed because it was the *only* cryptoquote puzzle which every participant attempted (i.e., some participants persisted in attempting to solve the first cryptoquote during the entire test session and thus did not attempt later cryptoquotes). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 did not lead to a significant increase in R^2, $F(2, 79) = 1.14$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 78) = 6.84$, $p < .05$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in intensity devoted to attempting to solve the first cryptoquote (i.e., 8%) above and beyond the variance explained by the main effects. In the analysis in which cognitive ability was controlled for, entry of RMS, self-reported AM, and ACT composite scores on Step 1 did not lead to a significant increase in R^2, $F(3, 75) = 1.07$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in

R^2, $F(1, 74) = 6.21$, $p < .05$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in intensity on the first cryptoquote (i.e., 7%) above and beyond the variance explained by their main effects as well as the main effect of cognitive ability.

Using these MHMR results, I graphed the relationship between RMS and intensity on the first cryptoquote at high and low levels of self-reported AM (i.e., using one standard deviation above and below the mean of the self-report scores) without and with controlling for cognitive ability. This is the exact same graphing procedure used for persistence above, and for all of the criteria in all studies (i.e., Studies 1, 2, & 3). The graph was used to determine if the observed interaction pattern resembled the one predicted by the integrative model for effort when withdrawal was not feasible (see lower graph of Figure 5). Once again, by graphing the results first without and then with controlling for cognitive ability, a determination could be made as to whether or not controlling for cognitive ability weakened the incremental validity of the integrative model.

The resulting graphic representations produced from the regression analyses conducted without and with cognitive ability controlled for are presented the upper and lower graphs of Figure 7, respectively. Notice that the two graphs are essentially identical, indicating that the inclusion of cognitive ability in the MHMR analysis did not attenuate the validity of the integrative model. In both graphs, intensity on the first cryptoquote *increased* as RMS increased only under the condition in which self-reported AM was high. Conversely, as RMS increased there was a corresponding *decrease* in intensity on the first cryptoquote when self-reported AM was low (i.e., under the condition of self-reported FF). These empirical results displayed in Figure 7 also match the theoretical multiplicative and disordinal interaction depicted in the lower graph of Figure 5, which supports the earlier hypothesis that Congruent AMs and Congruent FFs would set strong goals in comparison to the other two prototypes, and thus devote greater intensity to the first cryptoquote than the other prototypes. Therefore, it should be noted that Congruent FFs *did not* discount the experimental task by simply remaining on the first cryptoquote without attempting a solution, and instead clearly *persisted* in attempting to solve the cryptoquotes, and certainly devoted a high level of intensity of effort to the first cryptoquote.

Once again, in order to conduct an objective test on the ability of the integrative model to remain value-added when controlling for cognitive ability, the statistical significance of the simple slopes for RMS at low (-1 *SD*) and high (+1 *SD*) levels of self-reported AM was determined without and with ACT composite scores as a covariate. As discussed earlier, were the simple slopes to be statistically significant without ACT composite scores as a covariate, and then nonsignificant in the presence of ACT, the incremental validity of the integrative model could be called into question. As can be seen in Table 7, the simple slope for RMS at a low level of self-reported AM in the prediction of intensity on the first cryptoquote was nonsignificant without and with ACT controlled. However, the simple slope for RMS at a high level of self-reported AM in the prediction of intensity on the first cryptoquote was significant (.41, $p < .01$), and remained so in the presence of ACT (.36, $p < .05$).

Therefore, the inclusion of cognitive ability as a covariate did not attenuate the incremental validity of the integrative model in the prediction of intensity on the first cryptoquote.

Total intensity was also analyzed to provide confirmation of the assertions made on the basis of the results for intensity devoted to the first cryptoquote. Furthermore, were some prototypes to choose a strategy of devoting high levels of intensity to multiple cryptoquotes, then this criterion would reveal such a strategy in comparison to the other Study 1a criteria. Thus, total intensity was also analyzed via MHMR in the same fashion as above (see Table 6). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 did not lead to a significant increase in R^2, $F(2, 79) = 0.32$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 78) = 3.49$, $p < .10$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in total intensity devoted to attempting to solve the cryptoquotes (i.e., 4%) above and beyond the variance explained by the main effects. In the analysis in which cognitive ability was controlled for, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a significant increase in R^2, $F(3, 75) = 2.29$, $p < .10$. Additionally, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 74) = 3.09$, $p < .10$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in total intensity devoted to solving the cryptoquotes (i.e., 4%) above and beyond the variance explained by their main effects as well as the main effect of cognitive ability.

Using these MHMR results, the relationship between RMS and total intensity was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations produced from the regression analyses conducted without and with cognitive ability controlled for are presented the upper and lower graphs of Figure 8, respectively. Notice that the two graphs are almost identical, indicating that the inclusion of cognitive ability in the MHMR analysis most likely did not attenuate the validity of the integrative model. In both graphs, total intensity *increased* as RMS increased only under the condition in which self-reported AM was high. Conversely, as RMS increased there was a corresponding *decrease* in total intensity when self-reported AM was low. These empirical results displayed in Figure 8 match the theoretical multiplicative and disordinal interaction depicted in the lower graph of Figure 5, which supports the earlier hypothesis that Congruent AMs and Congruent FFs would set strong goals in comparison to the other two prototypes, and thus devote greater intensity to the cryptoquote task than the other prototypes. Therefore, once again it should be noted that Congruent FFs *did not* discount the experimental task by simply remaining on the first cryptoquote without attempting a solution, and instead clearly *persisted* in attempting to solve the cryptoquotes, and certainly devoted a high level of intensity of effort to the cryptoquote task.

Once again, in order to conduct an objective test on the ability of the integrative model to remain value-added when controlling for cognitive ability, the statistical significance of the simple slopes for RMS at low (-1 *SD*) and high (+1 *SD*) levels of self-reported AM was determined without and with ACT composite scores as a covariate. As can be seen in Table 7, the simple slope for RMS at a low level of self-reported AM in the prediction of intensity on the first cryptoquote was nonsignificant without and with ACT controlled. Additionally, the simple slope for RMS at a high level of self-reported AM in the prediction of total intensity was significant (.25, $p < .10$), but did not remain so in the presence of ACT (.12, $p > .10$). Therefore, the inclusion of cognitive ability as a covariate *partially attenuated* the incremental validity of the integrative model in the prediction of total intensity. However, *this attenuation was only partial*, as it must be recalled that the *pattern* of the disordinal interaction in the prediction of total intensity *remained statistically significant when controlling for cognitive ability* as noted in the above analyses of the change in R^2. In other words, although the simple slope for RMS in the prediction of total intensity when self-reported AM was high dropped from significance to nonsignificance in the presence of cognitive ability, the *pattern* of the disordinal interaction *remained significant in the presence of cognitive ability*, and continued to explain 4% of the variance in total intensity. In sum, although the incremental validity of the integrative model in the prediction of total intensity was slightly attenuated when controlling for cognitive ability, the model nonetheless obtained incremental validity above and beyond all main effects, including that of cognitive ability, when considering the overall pattern of the interaction.

The fourth criterion examined in Study 1a was effort. Recall that effort equaled total intensity divided by the number of cryptoquotes attempted. This criterion served to provide the most comprehensive test of the integrative model with respect to its ability to predict an overall level of effort, which serves as a primary dependent variable and construct in the nomological net of achievement motivation (Cooper, 1983; Feather, 1961). Effort was also analyzed via MHMR in the same fashion as above (see Table 6). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 did not lead to a significant increase in R^2, $F(2, 79) = 1.12$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 78) = 12.22$, $p < .01$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in effort on the cryptoquote task (i.e., 13%) above and beyond the variance explained by the main effects. In the analysis in which cognitive ability was controlled for, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a nonsignificant increase in R^2, $F(3, 75) = 1.06$, $p > .10$. However, entry of the RMS by self-reported AM interaction term on Step 2 led to a significant increase in R^2, $F(1, 74) = 11.85$, $p < .01$. Therefore, RMS and self-reported AM interacted to explain a significant amount of variance in total intensity devoted to solving the cryptoquotes (i.e., 13%) above and beyond the variance explained by their main effects as well as the main effect of cognitive ability.

Using these MHMR results, the relationship between RMS and effort was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations are presented in Figure 9. Notice that the two graphs are identical, indicating that the inclusion of cognitive ability in the MHMR analysis did not decrease the validity of the integrative model. In both graphs, effort *increased* as RMS increased only under the condition in which self-reported AM was high. Conversely, as RMS increased there was a corresponding *decrease* in effort when self-reported AM was low. These empirical results displayed in Figure 9 match the theoretical multiplicative and disordinal interaction depicted in the lower graph of Figure 5, which supports the earlier hypothesis that Congruent AMs and Congruent FFs would set strong goals in comparison to the other two prototypes, and thus devote greater amounts of effort to the cryptoquote task than the other prototypes. Finally, it should be noted once again that Congruent FFs *did not* dismiss the experimental task by simply remaining on the first cryptoquote without attempting a solution, and instead clearly put forth high levels of effort toward the cryptoquote task.

Once again, the statistical significance of the simple slopes for RMS at low (-1 *SD*) and high (+1 *SD*) levels of self-reported AM was determined without and with ACT composite scores as a covariate. As can be seen in Table 7, the simple slope for RMS at a low level of self-reported AM in the prediction of effort was nonsignificant without ACT controlled, but became significant when ACT was controlled (-.28, $p < .10$). Additionally, the simple slope for RMS at a high level of self-reported AM in the prediction of total intensity was significant (.45, $p < .01$), and remained so in the presence of ACT (.40, $p < .01$). Therefore, the inclusion of cognitive ability as a covariate *did not decrease* the incremental validity of the integrative model in the prediction of the overall level of effort devoted to the cryptoquote task. In sum, the incremental validity of the integrative model in the prediction of effort above and beyond all main effects, including that of cognitive ability, was confirmed via these analyses.

Discussion

The above results for Study 1a provide unambiguous evidence for the incremental validity of the integrative model above and beyond not only CRT and self-report when used in isolation, but also above and beyond cognitive ability. Clearly, the multidimensional view of achievement motivation and fear-of-failure provided by the integrative model serves to enhance our understanding of why persons put forth different levels of effort. Specifically, the evidence supports the viewpoint that Congruent AMs and Congruent FFs set high goals in comparison to the other prototypes. Congruent AMs are in the habit of setting strong mastery goals when faced with challenging tasks (Dweck & Leggett, 1988), and thus are more persistent and put forth more effort than Hesitant AMs and AM Pretenders faced with these demanding situations. Alternatively, when faced with challenging tasks, and when the possibility of withdrawal from those tasks is very limited and such withdrawal could also cause psychological damage (e.g., being labeled a "quitter" by oneself and others when exiting an experiment prematurely), Congruent FFs tend to set high performance goals. As a consequence, they also demonstrated persistence and put forth more effort on the task than Hesitant AMs and AM Pretenders.

To clarify these results in terms of prototypes, median splits were performed on RMS and self-reported AM. Specifically, participants who scored above the median on both measures were labeled as Congruent AMs, those who scored below the median on both measures were labeled as Congruent FFs, those who scored above the median on RMS and below the median on the self-report were labeled Hesitant AMs, and those who scored below the median on RMS and above the median on the self-report were labeled as AM Pretenders. Figure 10 displays the pattern of persistence on the cryptoquote task for each of these four prototypes. For each of these prototypes, the percentage of participants reaching each cryptoquote puzzle is shown. The eighth cryptoquote is actually the last page of the test session, and does not contain a cryptoquote puzzle. However, if participants reached this page of the cryptoquote task it indicated that they did not persist in attempting to solve the seventh puzzle as well as the preceding puzzles.

Figure 10 illustrates that none of (i.e., 0%) of the Congruent FFs, Hesitant AMs, and AM Pretenders *persisted in attempting to solve the first puzzle, and thus all of them reached the second puzzle*. In contrast, approximately 15% of Congruent AMs *persisted in attempting to solve the first puzzle, and thus did not reach the second puzzle*. This illustration provides some evidence that Congruent AMs were more persistent than all other prototypes. Also important, but not quite as interesting, is the fact that 20% of the Hesitant AMs and 10% of the AM Pretenders reached the eighth page of the cryptoquote task, and thus *did not persist in attempting to solve any of the cryptoquote puzzles.*[5] Alternatively, approximately 5% of both Congruent AMs and Congruent FFs reached the sixth cryptoquote puzzle, and thus the other 95% of both congruent prototypes persisted in attempting to solve the fifth puzzle or a preceding puzzle before the test session ended.

Further clarification is provided by Figure 11, in which the results for the mean level of intensity devoted to attempting solve the cryptoquotes is displayed for each prototype. Note that if a participant did not reach a particular cryptoquote then an attempt was not made to solve that cryptoquote by the participant, and that participant's data was not used to calculate the mean level of intensity *for that particular cryptoquote*. However, if a participant reached a particular cryptoquote *but did not utilize any part of the workspace* in attempting a solution for that cryptoquote, then that participant received a zero intensity score on that cryptoquote. Also, recall that 100% of every prototype attempted the first puzzle, and 100% of all prototypes *except* Congruent AMs attempted the second puzzle. Consequently, the mean level of intensity results for the first puzzle displayed in Figure 11 are based on the entire sample, whereas the results for the second puzzle lack 15% of the Congruent AMs, and so forth. As can be seen in Figure 11, on the average, Congruent AMs reached a much higher level of intensity than all other prototypes when attempting to solve the first puzzle. It is also interesting to note that once Congruent FFs quit attempting to

[5] The eighth page of the cryptoquote task did *not* contain a cryptoquote puzzle, and simply instructed the participants to check the box in the upper right-hand corner of the eight page, and to stop and wait for further instructions from the experimenter.

solve the first cryptoquote and attempted the second, they reached a comparable average level of intensity as Congruent AMs in attempting to solve the second cryptoquote. Finally, an examination of the average level of intensity devoted to solving the last cryptoquote indicates that all prototypes *save the Congruent AM prototype* essentially ceased in their attempts to solve the puzzle. Figure 12 illustrates the mean level of effort expended on the cryptoquote task by the four prototypes. As the figure shows, Congruent AMs appeared to dedicate more effort to the cryptoquote task than all other prototypes. It would also appear that Congruent FFs devoted more effort than the incongruent prototypes (i.e., Hesitant AMs and AM Pretenders).

These results, in combination with the MHMR findings, support the earlier assertions made regarding the four prototypes of the integrative model with respect to the prediction of persistence, intensity, and effort. Further, the integrative model clearly demonstrated incremental validity in the explanation of persistence, intensity, and effort above and beyond that explained by implicit (i.e., RMS) and explicit (i.e., self-reported) achievement-related cognitions when used in isolation, as well as beyond that explained by cognitive ability. In order to test the earlier assertions made regarding the four prototypes of the integrative model with respect to the prediction of performance Study 1b was conducted.

CHAPTER 3

STUDY 1B

Study 1b tested the integrative model by measuring performance on increasingly difficult math problems. Study 1b utilized the same student participants who completed the cryptoquote task in Study 1a. However, for this task the integrative model was expected to generate an additive pattern in the prediction of math performance. Specifically, because Congruent AMs tend to put forth high levels of effort when faced with challenging tasks and subsequently acquire the requisite skills for obtaining high levels of performance, they were predicted to reach higher levels of performance on the math test than the other three prototypes. As Congruent FFs tend to avoid challenge, they typically do not acquire the skills necessary for obtaining high levels of performance, and thus they were predicted to attain lower levels of performance on the math test than the other three prototypes. This predicted additive pattern is displayed in the upper graph of Figure 5.

Method

Participants

The sample consisted of the *same* 110 undergraduate students attending the database management course in Study 1a. The students participated in the study for the purpose of earning extra credit applicable to their course grade.

Predictor Measures

The same scores for RMS, self-perceived achievement motivation, and cognitive ability that were obtained in Study 1a served as predictors in Study 1b.

Criterion Measure

In this study, performance on increasingly difficult math problems was assessed. Each math problem was selected from the quantitative section of a Graduate Record Examination (GRE) by dividing the section, which contained a total of 20 problems, into 5 sets with 4 items each. The quantitative section was divided into five sets as follows: set 1 contained problems 1 through 4, set 2 contained problems 5 through 8, set 3 contained problems 9 through 12, set 4 contained problems 13 through 16, and set 5 contained problems 17 through 20. One math problem was chosen from each set, and the participants were presented with the problems in the same order as they appeared in the sets. Specifically, the problem from the first set was the first problem on the test; the problem from the second set was the second problem on the test, and so forth. Finally, each math problem appeared in its original multiple-choice format and was scored by assigning +1 for a correct answer and 0 for an incorrect answer. Scored items were summed to create a composite score that was labeled "math total performance," with higher scores representing higher levels of performance. Using coefficient alpha, an internal consistency reliability estimate of .40 was obtained for this performance measure.

Procedure

As stated above in Study 1a, the math test was administered after the CRT, and took approximately 20 minutes to complete. Once each participant had completed the CRT, the participants were instructed that they would be taking a brief math test. The instructions were read aloud and encouraged the participants to attempt to solve each problem to the best of their ability. The majority of the participants took approximately 10 to 15 minutes to finish the test, and at the end of 20 minutes the participants were required to stop working, and proceeded to the cryptoquote task at the experimenter's direction.

Results

Table 4 presents the means and standard deviations of the Study 1b variables. The mean math total performance was 3.65 (SD = 1.08). Table 5 presents the intercorrelations of the Study 1b variables. As can be seen from the table, RMS was significantly correlated with math total performance ($r = .19$, $p < .05$). The self-report of AM did not correlate significantly with math total performance. ACT composite correlated significantly with math total performance ($r = .38$, $p < .01$).

Central to Study 1b, as well as every study which investigated *performance* as the criterion, was the hypothesis that the integrative model would predict variance in performance beyond that predicted by RMS and self-reported AM when used in isolation. Specifically, Congruent AMs were predicted to have acquired more performance-relevant skills than the other three prototypes due to the tendency of Congruent AMs to *approach* challenging tasks. In contrast, Congruent FFs were predicted to have acquired fewer performance-relevant skills than the other three prototypes due to the tendency of Congruent FFs to *avoid* challenging tasks. Thus, the additive pattern depicted in the upper graph of Figure 5 was predicted to emerge with performance criteria. Specifically, both RMS and self-reported AM were predicted to have significant main effects in the prediction of performance, and to contribute to the explanation of performance above and beyond their isolated effects. As before, because cognitive ability is known to be a powerful predictor of achievement-related behaviors (e.g., Schippmann & Prien, 1989; Schmidt & Hunter, 1998), it was controlled for statistically to determine the incremental validity of the integrative model.

As in Study 1a, I utilized the MHMR procedure to test the predictions of the integrative model with respect to math total performance (see Table 6). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 did not lead to a significant increase in R^2, $F(2, 79) = 1.30$, $p > .10$. Further, entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 78) = 0.85$, $p > .10$. Therefore, the additive model for RMS and self-reported AM was not supported in this analysis. In the subsequent analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a significant increase in R^2, $F(3, 75) = 7.98$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 74) = 1.15$, $p > .10$. An examination of the beta weights in Step 1 of this analysis revealed that neither RMS nor self-reported AM served as a significant predictor of math total performance in the presence of ACT composite scores. Therefore, once again the additive pattern hypothesized for the integrative model in the prediction of performance was not supported.

Nonetheless, the relationship between RMS and math total performance was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations produced from the regression analyses are presented in Figure 13. Notice that although an additive pattern was predicted, the two graphs are more suggestive of an interaction between RMS and self-reported AM, *albeit nonsignificant*. In both graphs, math total performance *appeared to increase* as RMS increased only under the condition in which self-reported AM was high. Conversely, there did not appear to be a relationship between RMS and math total performance when self-reported AM was low.

In order to examine these results further, the statistical significance of the simple slopes for RMS at low and high levels of self-reported AM was determined without and with ACT composite scores as a covariate. As can be seen in Table 7, the simple slope for RMS at a low level of self-reported AM in the prediction of math total performance was nonsignificant without and with ACT controlled. However, the simple slope for RMS at a high level of self-reported AM in the prediction of math total performance was at first significant (.28, $p < .05$), but did not remain so in the presence of ACT (.15, $p > .10$).

Clearly, these results *did not* support the a priori theoretical predictions of the integrative model with respect to performance criteria. However, subjective examination of Figure 13 suggested the possibility that Congruent AMs performed at a higher level than all other prototypes. This possibility was borne out in part by the significant simple slope found for RMS under the condition of a high level of self-reported AM without controlling for cognitive ability. As noted earlier, although the MHMR procedure is *usually* a more powerful detector of interactions between continuous predictors in comparison to the artificial categorization of those predictors and subsequent ANOVA or subgroup-based correlation coefficient procedures (Cohen, 1983; Stone-Romero & Anderson, 1994), there are those who have noted that this is not always the case (e.g., see McClelland & Judd, 1993). In order to explore the possibility that a subgrouping procedure and a subsequent general linear model (GLM) analysis would reveal this potential interaction, the aforementioned median splits were utilized. The main effects and the interaction of these dichotomous representations of RMS and self-reported AM were tested without and with ACT as a covariate in a GLM analysis. In the GLM analysis *without* ACT as a covariate the means and standard deviations for the four prototypes were as follows: for Congruent AMs, 4.13 (*SD* = 0.92); for Congruent FFs, 3.70 (*SD* = 1.14); for Hesitant AMs, 3.37 (*SD* = 1.07); and for AM Pretenders, 3.21 (*SD* = 0.98). Additionally, there were no significant main effects, but there was a significant interaction, $F(1, 84) = 7.93$, $p < .01$.

In the GLM analysis *with* ACT as a covariate the means and standard deviations for the four prototypes were as follows: for Congruent AMs, 4.19 (*SD* = 0.81); for Congruent FFs, 3.70 (*SD* = 1.14); for Hesitant AMs, 3.35 (*SD* = 1.11); and for AM Pretenders, 3.21 (*SD* = 0.98). Additionally, there were no significant main effects, but once again there was a significant interaction, $F(1, 79) = 4.74$, $p < .05$, and this time it occurred when controlling for cognitive ability.

Discussion

These exploratory results support the possibility that a multiplicative and disordinal interaction occurred in the prediction of math total performance, even when controlling for cognitive ability. It should be emphasized that this interaction *was not predicted, and is contrary to the a priori additive prediction of the integrative model for performance criteria*.

Figure 14 clarifies these results by displaying the percentage of each of the four prototypes correctly answering each of the five math problems. This figure certainly supports the interpretation that Congruent AMs reach higher levels of performance than the other prototypes. By extension, Figure 14 supports the interpretation that Congruent AMs have acquired more performance-based skills than the other prototypes, most likely as a result of the tendency of Congruent AMs to approach challenging tasks relative to the other prototypes. However, it would appear from the figure that Congruent FFs outperformed the incongruent prototypes (i.e., Hesitant AMs and AM Pretenders), especially on the last and most difficult math problem. It is possible that with this math test, as with the cryptoquote task, Congruent FFs set strong performance goals in order to avoid the aversive psychological states that would follow from failure.

Consequently, as in Study 1a, here in Study 1b a significant disordinal interaction was obtained in the prediction of the dependent variable, in this case total math performance, *if the results of the GLM analyses are to be trusted*. Specifically, although subgrouping procedures utilized for GLM analyses are typically criticized for lacking statistical power and thus incapable of detecting *true interactions* (see Stone-Romero & Anderson, 1994, for increases in Type II errors from subgrouping procedures), the subgrouping procedures may also *lead to spurious significance when* *interactions, in truth, do not exist* (see Maxwell & Delaney, 1993, for increases in Type I errors from subgrouping procedures). Indeed, MacCallum, Zhang, Preacher, and Rucker (2002) recently demonstrated that spurious statistical significance and overestimation of effect size are likely to occur in the current particular case, in which *two* predictors have been artificially dichotomized via median splits and subjected to ANOVA or GLM analyses. In sum, because these analyses were exploratory, and because they utilize an error-prone subgrouping procedure, the above conclusions for Study 1b must be considered tenuous, although they are somewhat consistent with the findings of Study 1a, which utilized the same research participants.

CHAPTER 4

STUDY 1C

Study 1c tested the integrative model by measuring performance under considerably less time pressure than in either Study 1a or 1b. Specifically, Study 1c assessed academic performance in terms of final course grade and cumulative GPA. Once again, Study 1c utilized the same students who participated in the previous studies (i.e., in Studies 1a & 1b). Additionally, like in Study 1b, in the current study the integrative model was expected to generate an additive pattern in the prediction of academic performance for the same reasons that an additive pattern was expected in the prediction of math performance. Specifically, Congruent AMs were predicted to reach higher levels of academic performance than the other three prototypes, and Congruent FFs were predicted to attain lower levels of academic performance than the other three prototypes. This additive pattern is displayed in the upper graph of Figure 5.

Method

Participants

The sample consisted of the *same* 110 undergraduate students attending the database management course in Study 1a.

Predictor Measures

The same scores for RMS, self-perceived achievement motivation, and cognitive ability that were obtained in Studies 1a and 1b served as predictors in Study 1c.

Criterion Measures

In this study, academic performance was assessed in terms of final course grade for the introductory database management class as well as cumulative GPA.

Procedure

As stated above, the participants completed the RMS and self-report predictor measures at one of the sessions held earlier in the semester. Final course grades, cumulative GPAs, ACT scores, and SAT scores were obtained from the university's registrar at the end of the semester with the permission of the participants.

Results

Table 4 presents the means and standard deviations of the Study 1c variables. The mean course grade was 84.67 (SD = 7.74), and mean overall GPA was 3.23 (SD = 0.54). Table 5 presents the intercorrelations of the Study 1c variables. As can be seen from the table, RMS was significantly correlated with both course grade ($r = .27$, $p < .01$) and overall GPA ($r = .22$, $p < .05$). The self-report of AM correlated significantly with course grade ($r = .20$, $p < .05$), but did not correlate significantly with overall GPA. ACT composite scores correlated significantly with both course grade ($r = .33$, $p < .01$) and overall GPA ($r = .48$, $p < .01$).

Central to Study 1c was the hypothesis that the integrative model would predict variance in school performance beyond that predicted by RMS and self-reported AM when used in isolation. Specifically, Congruent AMs were predicted reach the highest levels of school performance, and Congruent FFs were predicted to reach the lowest levels for the same reasons mentioned in Study 1b. Once again, the additive pattern depicted in the upper graph of Figure 5 was predicted to emerge.

The MHMR procedure was utilized as before to test the predictions of the integrative model with respect to course grade (see Table 6). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 led to a significant increase in R^2, $F(2, 79) = 4.90$, $p < .01$. However, entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 78) = 0.06$, $p > .10$. Therefore, the additive model for RMS and self-reported AM was supported in this analysis, and accounted for 11% of the variance in course grade. In the subsequent analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a significant increase in R^2, $F(3, 75) = 5.32$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 74) = 0.47$, $p > .10$. An examination of the beta weights in Step 1 of this analysis revealed that RMS did not remain a significant predictor of course grade in the presence of ACT composite scores. However, self-reported AM remained a significant predictor of course grade. Therefore, although the additive pattern hypothesized for the integrative model in the prediction of performance (i.e., course grade) was supported in the first analysis, the incremental validity of the integrative model attenuated in the presence of cognitive ability.

The relationship between RMS and course grade was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations produced from the regression analyses are presented in Figure 15. Notice that the empirical results displayed in the upper graph of Figure 15 match the additive pattern predicted, and thus provide empirical support for the integrative model in the prediction of performance. Additionally, although the empirical results shown when controlling for cognitive ability in the lower graph of Figure 15 are similar to those shown in the upper graph, they are not identical. Specifically, the difference between Congruent AMs and Hesitant AMs on course grade is lessened when controlling for cognitive ability. Nonetheless, the relation between RMS and course grade, which was significant and positive in the first MHMR analysis, clearly remained positive, albeit nonsignificant, at low and high levels of self-reported AM in the presence of cognitive ability (i.e., in the second MHMR analysis).

To clarify these results, tests of the significance of the simple slopes were pursued. The statistical significance of the simple slopes for RMS at low and high levels of self-reported AM was determined without and with ACT composite scores as a covariate. As can be seen in Table 7, the simple slope for RMS at a low level of self-reported AM in the prediction of course grade was significant without (.26, $p < .10$), but not with ACT controlled. The simple slope for RMS at a high level of self-reported AM in the prediction of course grade was nonsignificant, and remained so in the presence of ACT. Clearly, these results provided only partial support for the a priori theoretical predictions of the integrative model with respect to performance criteria.

The MHMR procedure was also utilized to test the integrative model with respect to overall GPA (see Table 6). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 did not lead to a significant increase in R^2, $F(2, 79) = 2.34$, $p > .10$. Additionally, entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 78) = 0.07$, $p > .10$. Therefore, the additive model for RMS and self-reported AM was not supported in this analysis. In the subsequent analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a significant increase in R^2, $F(3, 75) = 7.98$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 74) = 1.15$, $p > .10$. Both sets of analyses in this case failed to support the integrative model (see Figure 16 for graphic representations of the results), and in this case the tests of simple slopes did not reveal any significant findings (see Table 7).

Discussion

Clearly, the results for course grade provided some, although not much support for the a priori additive predictions of the integrative model, and the results for overall GPA provided no support. Study 2 was performed as a replication of Study 1c, using a much larger sample to increase statistical power. Thus, Study 2 might allow for the detection of the ability of the integrative model to be value-added in the prediction of school performance, in particular above and beyond cognitive ability as this covariate clearly absorbed significant amounts of joint variance in the performance criteria, whereas its prediction of the effort criteria was not as powerful.

CHAPTER 5

STUDY 2

Study 2 was conducted as a replication of Study 1c. Two semesters after Study 1c was conducted, students were once again recruited from the introductory database management course. Thus, in Study 2, the predictor and criterion measures were collected on a *different* sample of students taking the *same* course. As in Study 1c, here in Study 2 the integrative model was expected to obtain an additive pattern in the prediction of academic performance.

Method

Participants

The sample consisted of 300 undergraduate students attending the *same* introductory database management course utilized in Study 1c.[6] As mentioned above, the students in Study 2 took the course a year after the students who participated in the first study. These students also participated in the research for the purpose of earning extra credit, and with their permission ACT scores, SAT scores, final course grades and cumulative GPAs were obtained from the university's registrar at the end of the semester. The sample was approximately 44% female, and had a mean age of 20.84 years (SD = 3.01).

Predictor Measures

Relative Motive Strength (RMS). The paper-and-pencil conditional reasoning test (CRT) of achievement motivation (AM) and fear-of-failure (FF) was used to measure RMS, and at no time did the participants give any indication that they believed the test to be assessing anything other than reasoning skills. Once again, CRT item responses were scored and summed to create RMS composite scores and higher RMS scores indicated stronger orientations toward achievement motivation. In the current study, the Kuder-Richardson (Formula 20) coefficient based on the average of the item-total polyserial correlations obtained an internal consistency reliability estimate of .60 for the RMS composite scores.

Self-Report of Achievement Motivation. In this study the eight-item self-report scale of achievement striving from the Conscientiousness factor of the NEO Personality Inventory-Revised (NEO-PI-R; Costa & McCrae, 1992) was used to measure self-perceived achievement motivation. This instrument was chosen in place of the semantic differential scale used in the first study because the achievement striving facet of the NEO-PI-R has prior evidence of reliability and validity with respect to school performance (e.g., see Schmit, Ryan, Stierwalt, & Powell, 1995). Additionally, this achievement striving scale was chosen for the pragmatic reason that its response format (i.e., a 5-point Likert scale) was compatible with the other items of the omnibus survey that was administered to the study participants. An example item from this scale is "I strive for excellence in everything I do." The participants were instructed to indicate the extent to which they agreed with each item using a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. Items were coded and summed such that higher composite scale scores represented higher levels of self-

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[6] It should be noted that of the 300 participants in Study 2, 248 (82.67%) completed *both* the CRT *and*

perceived achievement motivation. An internal consistency reliability estimate of .79 was obtained via coefficient alpha for this measure.

Cognitive Ability. ACT and SAT scores were collected from the university's registrar in order to control for individual differences in cognitive ability, and to determine the capacity of the integrative model to predict variance in performance above and beyond cognitive ability. When only the SAT score was available for a participant that score was converted to an equivalent ACT score via conversion tables (Schneider & Dorans, 1999).

Criterion Measures

Academic performance was assessed in the same fashion as before by obtaining final course grades for the introductory database management class and cumulative GPAs.

Procedure

The opportunity to earn extra credit was announced in class. The participants were told that they could attend one of several identical research sessions that would be offered, and that each session would last approximately 1 hour and 30 minutes. Several instruments were administered at each session, and the order of administration as well as the nature of the instruments did not vary across the sessions.

Informed consent forms were completed at the beginning of each session. The CRT was the first instrument administered at each session, followed by an omnibus survey that contained the self-report of achievement striving. With the consent of the

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the self-report of achievement motivation.

participants, course grades, cumulative GPAs, ACT scores, and SAT scores were obtained from the university's registrar at the end of the semester.[7]

Results

Table 8 presents the means and standard deviations of the Study 2 variables. The mean RMS composite score was 2.63 (SD = 4.05), and the mean self-report of achievement motivation (i.e., achievement striving) was 28.37 (SD = 4.73). The mean ACT composite score was 23.60 (SD = 3.70). The mean course grade was 79.17 (SD = 14.37), and the mean overall GPA was 3.01 (SD = 0.57).

Table 9 presents the intercorrelations of the Study 2 variables. As can be seen from the table, RMS did not correlate significantly with self-reported AM ($r = .01$, $p > .10$). Once again, as in Study 1, this nonsignificant correlation supports the earlier assertion that the CRT serves as a measure of generally unrecognized *implicit* achievement motives that are often not significantly related to self-attributed (i.e., self-reported), *explicit* achievement motives. Further, RMS correlated significantly with ACT composite scores ($r = .30$, $p < .01$), whereas self-reported AM did not ($r = .02$, $p > .10$).

RMS obtained significant correlations with course grade ($r = .09$, $p < .10$) and overall GPA ($r = .21$, $p < .01$). The self-report of achievement motivation also obtained significant correlations with course grade ($r = .27$, $p < .01$) and overall GPA

[7] The Study 2 data were part of a larger validation study for the conditional reasoning test of AM and FF. Once again, although I pursued the theoretical development of the integrative model and its predictions and results independently, the data were gathered in cooperation with another graduate student in Dr. Lawrence R. James' research laboratory. This graduate student of Dr. Lawrence R. James (i.e., LeBreton) conducted another study on the same sample of research participants.

($r = .21$, $p < .01$). ACT composite correlated significantly with course grade ($r = .37$, $p < .01$) and overall GPA ($r = .48$, $p < .01$).

As in Study 1c, here in Study 2 Congruent AMs were predicted reach the highest levels of school performance, and Congruent FFs were predicted to reach the lowest levels for the same reasons mentioned above. Once again, the additive pattern displayed in the upper graph of Figure 5 was predicted to emerge.

The MHMR procedure was utilized as before to test the predictions of the integrative model with respect to course grade (see Table 10). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 led to a significant increase in R^2, $F(2, 236) = 14.30$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 also led to a significant increase in R^2, $F(1, 235) = 4.00$, $p < .05$. Therefore, as with math total performance, the results were not identical to the additive pattern predicted. However, the interaction explained 2% of the variance in course grade above and beyond the main effects, and the overall R^2 was .12 (i.e., 12% of the variance in course grade was explained via the main effects and interaction combined).

In the MHMR analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a significant increase in R^2, $F(3, 206) = 26.27$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 once again led to a significant increase in R^2, $F(1, 205) = 3.16$, $p < .10$. Although the additive pattern hypothesized for the integrative model in the prediction of course grade was not supported in these analyses, the incremental validity of the integrative model was demonstrated in the sense that a significant interaction between RMS and self-reported AM was obtained when controlling for cognitive ability. In order to examine the nature of this interaction, the relationship between RMS and course grade was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations produced from the regression analyses are presented in Figure 17.

Notice that the empirical results displayed in both the upper and lower graphs of Figure 17 *are not entirely inconsistent* with the predictions of the integrative model made with respect to performance. Specifically, the interaction was *not disordinal*, and thus in both cases (i.e., without and with ACT) Congruent AMs obtained *higher* course grades than Congruent FFs and Hesitant AMs. Additionally, Congruent FFs obtained *lower* course grades than AM Pretenders without and with controlling for cognitive ability. These rank orders on course grade *are consistent* with the rank orders predicted by the a priori additive pattern of the integrative model when used to explain differences in performance. The surprising result came in the comparison of course grades for AM Pretenders and Congruent AMs when controlling for cognitive ability. In this case, the level of course grades for these two prototypes were nearly identical.

In order to more clearly understand these results, tests of the significance of the simple slopes were pursued. The statistical significance of the simple slopes for RMS at low and high levels of self-reported AM was determined without and with ACT composite scores as a covariate. As can be seen in Table 11, the simple slope for RMS at a low level of self-reported AM in the prediction of course grade was nonsignificant without but significant with ACT controlled (-.09, $p < .05$). The simple slope for RMS at a high level of self-reported AM in the prediction of course grade was at first significant (.13, $p < .01$), but dropped to nonsignificance in the presence of ACT. Clearly, these results provided partial support for the theoretical predictions of the integrative model with respect to performance criteria.

The MHMR procedure was also utilized to test the integrative model with respect to overall GPA (see Table 10). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 led to a significant increase in R^2, $F(2, 236) = 13.47$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 235) = 0.73$, $p > .10$. Therefore, the additive model for RMS and self-reported AM was supported in this analysis. In the subsequent analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and ACT composite scores on Step 1 led to a significant increase in R^2, $F(3, 206) = 34.47$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 205) = 0.11$, $p > .10$. Both sets of analyses in this case provided some support for the integrative model.

The resulting graphic representations produced from the regression analyses for overall GPA are presented in Figure 18. Notice once again that the empirical results displayed in both the upper and lower graphs of Figure 18 *are consistent* with the predictions of the integrative model made with respect to performance. Specifically, there was no interaction, and in both cases (i.e., without and with ACT) Congruent AMs obtained *higher* overall GPAs than Congruent FFs and Hesitant AMs. Additionally, Congruent FFs obtained *lower* overall GPAs than AM Pretenders without and with controlling for cognitive ability. These rank orders on overall GPA *are consistent* with the rank orders predicted by the a priori additive pattern of the integrative model. Once again, the surprising result came in the comparison of overall GPAs for AM Pretenders and Congruent AMs when controlling for cognitive ability. In this case, the level of overall GPAs for these two prototypes were nearly identical.

Once again, tests of the significance of the simple slopes were conducted. The statistical significance of the simple slopes for RMS at low and high levels of self-reported AM was determined without and with ACT composite scores as a covariate. As can be seen in Table 11, the simple slope for RMS at a low level of self-reported AM in the prediction of overall GPA was significant (.14, $p < .10$) without controlling for cognitive ability, but nonsignificant when controlling for cognitive ability. The simple slope for RMS at a high level of self-reported AM in the prediction of overall GPA was at first significant (.24, $p < .01$), but dropped to nonsignificance in the presence of ACT. As before, these results provided partial support for the theoretical predictions of the integrative model with respect to the rank orders of prototypes hypothesized for performance criteria.

Discussion

Clearly, these results provide some support for the ability of the integrative model to predict variance in performance above and beyond cognitive ability.

Congruent AMs obtained higher performance levels than Congruent FFs and Hesitant AMs on both criteria, and Congruent FFs obtained lower performance levels than AM Pretenders on both criteria. These rank orders are consistent with the predictions of the integrative model when used to explain differences in performance.

Moreover, these results are consistent with the assumption that over time Congruent AMs tend to approach challenging tasks whereas Congruent FFs avoid such tasks, leading to differences in ability and subsequent differences in performance between these two prototypes. Additionally, it would appear that there is evidence for the assumption that Hesitant AMs are more conflicted in their approach of challenging tasks, which leads them to perform at levels below those of Congruent AMs. Unexpected findings came in the form of the high level of performance generally obtained by AM Pretenders in relation to Hesitant AMs.

In 1989, McClelland et al. asserted that implicit motives (measured indirectly via the TAT) generally sustain repeated behaviors because of the intrinsic pleasure derived from those behaviors, whereas explicit motives (measured directly via self-report) are "allied to explicit goals that are normative for a particular group and that channel the expression of implicit motives for members of that group (pp. 692-693)." This assertion serves to explain the current results of the above test of the integrative model. Clearly, AM Pretenders may tend to outperform Hesitant AMs due to the social rewards that follow from higher levels of school performance (e.g., better jobs and more money, see Roth & Bobko, 2000). Thus, the self-attributed (i.e., self-reported) explicit motive to achieve of AM Pretenders may drive them to excel in comparison to Hesitant AMs, whose self-attributed motive to achieve is certainly weaker. In this sense, the current findings support McClelland et al.'s (1989) assertion.

It is also interesting to note that from these results one can infer that Hesitant AMs are conflicted in their approach of achievement-related activities that are *clearly* linked to *social* incentives, but may instead be pursuing nonacademic activities from which they derive intrinsic rewards due to their *implicit* motive to achieve. This pursuit of nonacademic activities by Hesitant AMs would also help to explain a reduction in the academic performance of Hesitant AMs in relation to AM Pretenders, and this speculation should be examined in future studies.

The above speculation regarding the stronger pursuit of social rewards by AM Pretenders in relation to Hesitant AMs, and subsequent higher levels of performance of AM Pretenders in relation to Hesitant AMs, was examined in Study 3. Specifically, the assessment center performance was known by the participants of Study 3 to be used for decisions about organizational opportunities for leadership training, and thus increased *social* status. As a consequence, the finding that AM Pretenders outperformed Hesitant AMs might be replicated in the results of Study 3. However, it should be noted that once again Congruent AMs were predicted to reach the highest levels of performance, and Congruent FFs were predicted to obtain the lowest levels of performance. Generally, this would generate the additive pattern displayed in the upper graph of Figure 5, and thus the additive pattern was still predicted.

CHAPTER 6

STUDY 3

Study 3 tested the integrative model by assessing in-basket performance and overall performance in an assessment center. This study was notable from the standpoint that it served to test the *generalizability* of the integrative model to the prediction of performance in an organizational setting among working adults. Here, as in the previous studies that used performance as the criterion, an additive pattern was predicted. Specifically, Congruent AMs were predicted to attain the highest level of performance while Congruent FFs were predicted to attain the lowest level of performance.

Method

Participants

Two hundred and sixty-three working adults (31% female) employed at a large utility company in the southeastern United States participated in the current study. These employees were competing for the opportunity to become trainees in an organizational leadership development program. As such, the employees volunteered to participate in an assessment center, and their performance in this center was used to select the leadership trainees. Assessment center performance was not used to make termination or promotion decisions.

Predictor Measures

Relative Motive Strength (RMS). The paper-and-pencil conditional reasoning test (CRT) of achievement motivation (AM) and fear-of-failure (FF) was used to measure RMS. Here, as in the other studies, at no time did the participants give any indication that they believed the test to be assessing anything other than reasoning skills. Conditional reasoning test item responses were scored and summed to create RMS composite scores and higher RMS scores indicated stronger orientations toward achievement motivation. In the current study, the Kuder-Richardson (Formula 20) coefficient based on the average of the item-total polyserial correlations obtained an internal consistency reliability estimate of .62 for the RMS composite scores.

Self-Report of Achievement Motivation. The achievement via independence (Ai) scale of Form 343 of the California Psychological Inventory (CPI; Gough & Bradley, 1996) was used as the measure of self-perceived achievement motivation in the current study. This measure of self-reported achievement motivation was utilized in place of the 8-item achievement striving facet of the NEO-PI-R because the CPI is routinely administered as part of the assessment center from which the data were gathered. The CPI is a self-report questionnaire, and the Ai scale is composed of 32 items. Participants answered these items on a true-false response format, and higher composite scale scores represented higher levels of self-perceived achievement motivation. Evidence for the reliability and validity of this scale is provided in the test manual (Gough & Bradley, 1996). Past research has demonstrated that the Ai scale is a valid predictor of performance (e.g., see Barnette, 1961; Trites, Kurek, & Cobb, 1967).

Cognitive Ability. The Watson-Glaser Critical Thinking Appraisal (WGCTA) was used as the measure of cognitive ability. The WGCTA is a well-know measure of general mental ability and logical reasoning, and evidence for its reliability and validity is provided in the test manual (Watson & Glaser, 1964, 1980). This measure was obtained in order to control for individual differences in cognitive ability, and to determine the capacity of the integrative model to predict variance in performance above and beyond cognitive ability.

Criterion Measures

In-Basket Exercise. The in-basket exercise was designed as a workplace simulation to measure performance on various dimensions. The participants were required to read and then respond appropriately to stimuli typically encountered in the workplace, such as memos, phone calls, and letters. Critical, job-relevant information was presented among less important distracter information in the stimuli. In order to obtain a high score the participants had to identify information in the stimuli relevant to organizational performance, and subsequently act (i.e., make decisions, delegate responsibility, plan meetings, return phone calls, etc.) in a manner that would protect and enhance the organization's performance. These tasks required the accurate evaluation of data in the stimuli, and the development and implementation of appropriate responses. The in-basket exercise assessed a total of six dimensions, which were as follows: analysis, judgement, initiative, decisiveness, planning/organizing, and customer orientation. The participants had a total of two hours to complete the exercise.

Two or more trained assessors scored the in-basket exercise. In-basket performance ratings were first made independently by each assessor via a behavioral checklist. Subsequently, the assessors discussed their ratings to assign a score for each of the six dimensions. Disagreements between assessors were resolved via consensus, and if necessary, the assistance of a third assessor. Scores for each dimension had a possible range of 1 to 5, with higher scores representing higher levels of performance. The scores were subsequently averaged to create an Overall In-Basket Performance rating. Using these six dimensions as individual items, an internal consistency reliability estimate of .90 was obtained via coefficient alpha for this measure.

Assessment Center Consensus. In addition to the in-basket exercise the assessment center included one-on-one subordinate performance counseling simulations, a leaderless group discussion, a customer negotiation exercise, and other workplace role playing scenarios. Each of these exercises is scored in the same fashion as the in-basket dimensions, and higher scores indicate higher levels of performance. These exercises are used to assess the following additional dimensions of work performance: leadership, negotiation, teamwork, confrontation, sensitivity, innovation, stress tolerance, and oral and written communication. An internal consistency reliability estimate of .90 was obtained via coefficient alpha for these exercises. Along with performance on the in-basket exercise, scores from these simulations are used in a consensus evaluation to generate an Assessment Center Consensus rating that serves as an indicator of overall performance.

Procedure

The exercises of the assessment center required approximately eight hours for completion. Participants completed the CRT, CPI, and WGCTA first, and then proceeded to the various exercises. During the exercises the participants were rated by at least two assessors. Assessor consensus meetings were held either shortly after the participants had completed the relevant exercise or once the participants exited the center. All of the assessor ratings were made *without knowledge of the participants' scores on the CRT, CPI, and WGCTA, and all consensus decisions were also made without this knowledge.*[8]

Results

Table 12 presents the means and standard deviations of the Study 3 variables. The mean RMS composite score was 2.31 (*SD* = 4.02), and the mean self-report of achievement motivation (i.e., AM via independence) was 54.85 (*SD* = 6.08). The mean Watson-Glaser score was 59.70 (*SD* = 8.83). The mean overall in-basket performance was 2.78 (*SD* = 0.54), and the mean assessment center consensus was 2.86 (*SD* = 1.06).

Table 13 presents the intercorrelations of the Study 3 variables. As can be seen from the table, RMS correlated significantly with self-reported AM ($r = .31$, $p < .01$). Although unlike Studies 1 and 2 in that the correlation here between RMS and self-reported AM was significant, their shared variance amount to less than 10% (i.e., $r^2 = .096$). Thus, although *implicit* achievement motives can be significantly related to *explicit* achievement motives, they are clearly not redundant, and the correlation

[8] The Study 3 data were part of a larger validation study for the conditional reasoning test of AM and FF. Once again, although I pursued the theoretical development of the integrative model and its predictions and results independently, the data were gathered in cooperation with another graduate student in Dr. Lawrence R. James' research laboratory. This graduate student of Dr. Lawrence R. James (i.e., Migetz) conducted another study on the same sample of research participants (see Migetz, James, & Ladd, 1999).

between the two is typically low and often nonsignificant. Further, RMS correlated significantly with Watson-Glaser (r = .57, $p < .01$), as did self-reported AM (r = .46, $p < .01$).

RMS obtained significant correlations with overall in-basked performance (r = .39, $p < .01$) and assessment center consensus (r = .54, $p < .01$). The self-report of AM also obtained significant correlations with overall in-basked performance (r = .38, $p < .01$) and assessment center consensus (r = .55, $p < .01$). Watson-Glaser correlated significantly with overall in-basked performance (r = .51, $p < .01$) and assessment center consensus (r = .82, $p < .01$).

As in Study 2, here in Study 3 Congruent AMs were predicted reach the highest levels of performance, and Congruent FFs were predicted to reach the lowest levels for the same reasons mentioned above. Once again, the additive pattern depicted in the upper graph of Figure 5 was predicted to emerge.

The MHMR procedure was utilized as before to test the predictions of the integrative model with respect to overall in-basket performance (see Table 14). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 led to a significant increase in R^2, $F(2, 257) = 37.57$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 also led to a significant increase in R^2, $F(1, 256) = 3.41$, $p < .10$. Therefore, as with the other performance criteria examined thus far, the results were not identical to the additive pattern predicted. However, the interaction explained 1% of the variance in overall in-basket performance above and beyond the main effects, and the overall R^2 was .24, and as such 24% of the variance in overall in-basket performance was explained via the main effects of RMS and self-reported AM together with their interaction.

In the MHMR analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and Watson-Glaser on Step 1 led to a significant increase in R^2, $F(3, 256) = 35.93$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 255) = 1.42$, $p > .10$. Here, with cognitive ability controlled for, the additive pattern hypothesized for the integrative model in the prediction of overall in-basked performance was supported, with 30% of the variance in overall in-basket performances explained via the covariate and study predictors (i.e., $R^2 = .30$). In order to examine these additive effects, the relationship between RMS and overall in-basket performance was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations produced from the regression analyses are presented in Figure 19.

Notice that the empirical results displayed in both the upper and lower graphs of Figure 19 *are, in general, consistent* with the predictions of the integrative model made with respect to performance. Specifically, the interaction in the upper graph was *not disordinal*, and thus in both cases (i.e., without and with ACT) Congruent AMs obtained *higher* overall in-basket performances than Congruent FFs and Hesitant AMs. Furthermore, in these graphs Congruent AMs also appeared to outperform AM Pretenders, but as before (i.e., as with school performance in Studies 1c and 2) this difference in performance between these two prototypes was reduced when controlling for cognitive ability.

Importantly, as predicted *a priori*, Congruent FFs obtained *lower* overall in-basket performances than all other prototypes. These rank orders on overall in-basket performance *are entirely consistent* with the rank orders predicted by the a priori additive pattern of the integrative model when used to explain differences in performance. Indeed, when cognitive ability was controlled for, the additive pattern was obtained in this case.

To clarify these results, tests of the significance of the simple slopes were pursued. The statistical significance of the simple slopes for RMS at low and high levels of self-reported AM was determined without and with Watson-Glaser scores as a covariate. As can be seen in Table 15, the simple slope for RMS at a low level of self-reported AM in the prediction of overall in-basket performance was significant without (.39, $p < .01$) and with (.20, $p < .05$) Watson-Glaser controlled. The simple slope for RMS at a high level of self-reported AM in the prediction of overall in-basket was at first significant (.20, $p < .05$), but dropped to nonsignificance in the presence of Watson-Glaser. Clearly, these results provided support for the theoretical predictions of the integrative model with respect to performance criteria, especially in light of the fact that controlling for cognitive ability did not eliminate the significance of the simple slope for RMS under a low level of self-reported AM.

The MHMR procedure was also utilized to test the integrative model with respect to the assessment center consensus (see Table 14). In the analysis without controlling for cognitive ability, entry of RMS and self-reported AM on Step 1 led to a significant increase in R^2, $F(2, 257) = 107.18$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 256) = 0.59$, $p > .10$. Therefore, the additive model for RMS and self-reported AM was supported in this analysis. In the subsequent analysis that controlled for cognitive ability, entry of RMS, self-reported AM, and Watson-Glaser scores on Step 1 led to a significant increase in R^2, $F(3, 256) = 219.87$, $p < .01$. Entry of the RMS by self-reported AM interaction term on Step 2 did not lead to a significant increase in R^2, $F(1, 255) = 1.55$, $p > .10$. Thus, both sets of analyses for assessment center consensus provided support for the integrative model. Indeed, in the absence of cognitive ability, 46% of the variance in the assessment center consensus performance ratings was predicted the additive effects of both RMS ($\beta = .40$, $p < .01$) and self-reported AM ($\beta = .43$, $p < .01$). In the presence of cognitive ability, 72% of the variance in the assessment center consensus performance ratings was predicted by the additive effects of the covariate, RMS ($\beta = .09$, $p < .05$), and self-reported AM ($\beta = .21$, $p < .01$).

In order to examine these additive effects, the relationship between RMS and assessment center consensus ratings was graphed at high and low levels of self-reported AM without and with controlling for cognitive ability. The resulting graphic representations produced from the regression analyses are presented in Figure 20. Notice that the empirical results displayed in both the upper and lower graphs of Figure 20 *are consistent* with the predictions of the integrative model made with respect to performance. Specifically, there was no interaction in either case (without and with cognitive ability), and thus in both cases Congruent AMs obtained *higher* assessment center consensus ratings than Congruent FFs and Hesitant AMs. Furthermore, in these graphs Congruent AMs also appeared to outperform AM Pretenders, but as before (i.e., as with school performance in Studies 1c and 2, and overall in-basket performance in the current study) this difference in consensus performance ratings between these two prototypes was reduced when controlling for cognitive ability.

Importantly, as predicted *a priori*, Congruent FFs obtained *lower* assessment center consensus performance ratings than all other prototypes, although the difference between Congruent FFs and Hesitant AMs became marginal in the presence of cognitive ability. In sum, these rank orders on the assessment center performance ratings *are consistent* with the rank orders predicted by the a priori additive pattern of the integrative model when used to explain differences in performance. Indeed, when cognitive ability was controlled for, the additive pattern was maintained in this case.

Once again, to clarify these results, tests of the significance of the simple slopes were pursued. The statistical significance of the simple slopes for RMS at low and high levels of self-reported AM was determined without and with Watson-Glaser scores as a covariate. As can be seen in Table 15, the simple slope for RMS at a low level of self-reported AM in the prediction of assessment center performance ratings was significant without (.43, $p < .01$), but became nonsignificant with Watson-Glaser controlled. The simple slope for RMS at a high level of self-reported AM in the prediction of assessment center performance ratings was significant (.37, $p < .01$), and remained so (.13, $p < .05$) in the presence of Watson-Glaser scores. Clearly, these results provided support for the theoretical predictions of the integrative model with respect to performance criteria, especially in light of the fact that controlling for cognitive ability did not eliminate the significance of the simple slope for RMS under a high level of self-reported AM.

Discussion

These results provide support for the ability of the integrative model to predict variance in performance above and beyond cognitive ability. Once again, Congruent AMs obtained higher performance levels than Congruent FFs and Hesitant AMs on both criteria, and Congruent FFs obtained lower performance levels than AM Pretenders on both criteria. Further, Congruent FFs also obtained lower performance levels than Hesitant AMs on the in-basket task. Again, these rank orders are consistent with the additive predictions of the integrative model when used to explain differences in performance.

As in Study 2, here it appeared that Hesitant AMs obtained slightly lower levels of performance than AM Pretenders, again suggesting that AM Pretenders are more motivated than Hesitant AMs when in pursuit of rewards that are socially oriented (cf. McClelland et al., 1989). Most importantly, this study demonstrated the generalizability of the integrative model to the prediction of performance among working adults in an organizational setting.

CHAPTER 7

GENERAL DISCUSSION

At the end of McClelland's (1985, p. 824) review he called for additional studies on integrative models of personality: "We need more studies of this sort that show the joint effect of motives, skills, and values or schemas as joint determinants of what people do (i.e., their operant behaviors) as well as what they consciously say they choose to do (i.e., their respondent behaviors)." This research has attempted to answer that call with respect to achievement motivation and fear-of-failure.

Three studies tested the ability of the integrative model to explain individual differences in effort and performance. In examining the change from a multiplicative disordinal pattern of results for the prediction of effort that was found when a feasible opportunity for withdrawal was not available, to an additive pattern of results for the prediction of performance obtained under various conditions with various samples, several general conclusions can be drawn regarding the utility of the integrative model and its prototypes for explaining human behavior.

Regardless of the task and the setting studied, Congruent AMs appeared to exert high levels of effort and obtained high levels of performance. According to the integrative model, Congruent AMs have the tendency to approach challenging tasks, and perhaps do so in multiple settings especially when considering the aggregate findings for the participants of Study 1. It is assumed that the tendency to approach challenging tasks on the part of Congruent AMs arises, in part, because the difficulties (e.g., failures) encountered when approaching challenge do not lead to aversive psychological states for Congruent AMs (e.g., see Dweck & Leggett, 1988), and thus do not lead to avoidance of challenge. Although the current studies did not test this developmental assertion and those below directly, the correlational evidence provided by these studies is supportive of these developmental possibilities. Thus, perhaps as a result of continually approaching challenging tasks, Congruent AMs appear to learn to put forth high levels of effort needed to succeed at these tasks, and thus develop the requisite skills for high levels of performance. Therefore, not only were Congruent AMs able to exert high levels of effort as evidenced in Study 1a, but they were also able to combine high levels of effort with their acquired skills to reach higher levels of performance than the other prototypes. In sum, the congruency of their implicit and explicit motives appears to lead to their cross-situational consistency in terms of effort and performance, perhaps due to having simply developed the *habit of striving to achieve for both the intrinsic pleasure derived from the strivings themselves and the social rewards (e.g., recognition) that result from these strivings* (see McClelland et al., 1989). Future research should expand upon the correlational evidence provided here for these developmental possibilities by assessing school children with longitudinal time series designs.

Although Congruent FFs can obviously put forth levels of effort as high as Congruent AMs, they clearly do not tend to reach the same high levels of performance. Consequently, the assumption of the integrative model that Congruent FFs have not acquired the requisite skills for high levels of performance in comparison to Congruent AMs was supported by the findings. Moreover, the reason for the lack of skill acquisition among Congruent FFs is most likely based in their tendency to avoid the challenging tasks that may lead to failure, and for them in particular, subsequent feelings of inadequacy that arise from their implicit *belief* that skills are fixed (cf. Dweck & Leggett, 1988). As a consequence, for Congruent FFs failure is interpreted as revealing inherent inadequacies within the self, and thus they develop a strategy of avoiding situations that may lead to failure or even setbacks that resemble failure, which leads to a lack of skill acquisition. In sum, due to their avoidance of challenging tasks, Congruent FFs do not acquire the skills that come from continually approaching challenging tasks, and thus they do not obtain high levels of performance.

It is also important to note that although Congruent FFs have very different self-perceptions of motivation in comparison to Congruent AMs as revealed by self-reports, Congruent FFs will put forth comparable levels of effort when the task is made purposely evocative, and withdrawal from the task could also cause psychological damage (see findings of Study 1a). Therefore, under pressure Congruent FFs may exert effort in order to avoid failure, as they have a *fear of failure rather than an apathy toward failure*. However, over time and in the absence of this imposed situational pressure, they most likely withdrawal into their natural tendency to avoid challenge, and consequently learn fewer skills and thus obtain lower levels of performance in comparison to Congruent AMs. Again, these developmental assertions, although supported by the correlational data presented here, were not tested directly by the current studies and should be in future research.

Although Hesitant AMs put forth less effort than Congruent FFs in Study 1a, they generally obtained higher levels of performance in subsequent studies. It would appear that Hesitant AMs have the latent motive to achieve, and yet have conscious concerns about the stressors and sacrifices associated with achievement-strivings. They appear to be conflicted in their approach of challenging tasks, which serves to explain the low levels of effort in the experimental session. Indeed, in accordance with their CRT scores, their interpretation of failure does not lead to aversive psychological states in comparison to Congruent FFs, and thus Hesitant AMs exerted much less effort on the cryptoquote task as they did not *need* to avoid failure to avoid psychological damage. Their conflicted nature with respect to approaching challenge also explains the lower level of performance they attained in comparison to Congruent AMs.

To interpret the results for AM Pretenders it should be noted that social incentives were not present in the cryptoquote task and the math test given the experimental nature of the settings. However, for course grade and GPA, as well as for assessment center performance, certainly social incentives for high performance were present. Thus, under nonexperimental conditions, AM Pretenders clearly try to reach high levels of performance, most likely because they desire the resulting socially laden rewards that generally follow high performance. Indeed, in accordance with their self-reports, they appear very driven to excel in comparison to Congruent FFs, and indeed do tend to outperform Congruent FFs *when* socially laden rewards may follow, but not *when* these rewards are absent, such as in the experimental setting (see

Studies 1a & 1b). This speculation helps to explain the dramatic change in the findings for AM Pretenders as the research moved from studying effort in an experimental setting to studying performance in an academic setting, and then performance in an organizational setting. Future research should test this speculation more directly by varying the socially laden nature of rewards for the same group of study participants, and perhaps by crossing these rewards with tasks of varying levels of challenge as well.

In sum, it would appear that AM Pretenders experience conscious pressures to achieve (as revealed in self-reports), but have a high latent fear-of-failure (as revealed in the CRT). They are thus conflicted in their approach of challenging tasks, and the dramatic *shift* from their *low* level of effort in the experimental setting to *higher* levels of performance in the school and organizational settings *suggests* that they are responding to socially-laden rewards present in the latter situations (i.e., school and work; cf. McClelland, et al., 1989).

One weakness of the current research came in the form of the change in the self-reports used to measure explicit achievement motives across the various studies. This change in self-reports serves as an alternate explanation for some of the differences in results found across the studies. However, it should be noted that in Studies 1a, 1b, and 1c, as the criterion moved from effort to performance the pattern of results moved from being multiplicative to one that was more additive in form while the self-report (i.e., the semantic differential) remained the same. Additionally, when performance indicators were utilized in Studies 2 and 3 the pattern basically remained additive *in spite of the change in the self-reports used to measure explicit motives*. Consequently, the additive pattern found for performance indicators appears to generalize across samples and self-reports *when withdrawal on the part of the participants is feasible*. From this standpoint, the change in the self-reports across the studies serves as a strength in that it suggests an enhanced generalizability of the findings as they are not restricted to the self-report utilized.

It should be reiterated that the performance measures used in these studies were tainted with effort as *one must almost always put forth effort in order to perform well (e.g., one must typically concentrate and read a test item to answer it correctly, one must attend class lectures and tests to perform well in a course, one must show up to work to perform well on the on-site work tasks, etc.)*. Consequently, the two general predictions that were derived when considering the prototypes of the integrative model in conjunction with the findings of past research were generally supported in this series of studies.

Specifically, the additive prediction of effort and performance derived from the integrative model for conditions in which withdrawal is feasible and people can typically work at their own pace (e.g., during the semester in a course), was generally supported. Implicit motives measured via the CRT generally combined in an additive fashion with explicit motives measured via self-reports to predict effort and performance, *save* when withdrawal was not feasible, or could lead to psychological damage. Specifically, the multiplicative and disordinal prediction of effort derived from the integrative model for the condition in which withdrawal is *not* feasible, or would lead to psychological damage (e.g., lower self-esteem), was generally supported. Implicit motives measured via the CRT interacted strongly with explicit motives measured via self-report in the prediction of effort *when withdrawal was not feasible*.

Further, the predictions of the integrative model generally held even when controlling for cognitive ability, and thus incremental validity for the integrative model was generally demonstrated. However, it should be mentioned that in the regression analyses when variance in cognitive ability was partialled from variance in RMS, the reason some of these study participants became achievement-motivated to begin with may have been partialled out as well, and that reason being the desire to increase their mental ability (personal communication, Anthony L. Hemmelgarn, October 6, 1997). This speculation is consistent with the circular nonrecursive and developmental model of achievement motivation and cognitive ability proposed by James (1998), and should be tested more directly via a repeated measures time-series design in future research.

The results also illustrated that although *implicit* achievement motives, as measured by the CRT, can be significantly related to *explicit* achievement motives, as measured by self-reports, they are clearly not redundant, and the correlation between the two is typically low and often nonsignificant. Consequently, when considered in conjunction with the overall findings, these low correlations between RMS and self-reports of AM indicate that the CRT measures an implicit component of achievement motivation *that is distinct* from the explicit achievement motives measured via self-reports. This finding is entirely consistent with past empirical research (James, 1998; McClelland et al., 1989, p. 691).

As they are not totally redundant, the combination of these implicit and explicit components of personality should lead to improved prediction of human behavior in school and at work. In fact, when concentrating on the performance results (i.e., Studies 1c, 2, & 3), it seems clear that selection specialists *who rely only on self-report tests when hiring* may very well (1) tend to correctly select Congruent AMs, (2) accurately reject Congruent FFs, and yet (3) often *incorrectly* select AM Pretenders while (4) occasionally *incorrectly* assuming a lack of employability of Hesitant AMs. Thus, given additive incremental validity observed in these studies, an integration of self-report with conditional reasoning methodologies for selection purposes may be more advantageous than the application of either methodology *when used in isolation*.

Some of the more impressive results from the current integrative model of personality assessment for achievement motivation and fear-of-failure certainly also "encourage us to believe that a science of personality is indeed possible" (McClelland, 1985, p. 824), and with the introduction of the conditional reasoning methodology, more convenient (Greenwald & Banaji, 1995; James, 1998). In sum, the CRT, when combined with self-reports, allows for opportune and affordable pursuits of integrative models of personality, which, until recently, were not easily pursued (Greenwald & Banaji, 1995), but certainly led to the impressive prediction of behavior, as well as to its *scientific explanation*.

LIST OF REFERENCES

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Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87,* 49-74.

Aiken, L. R. (1994). *Psychological testing and assessment* (8th ed.). Needham Heights, MA: Allyn & Bacon.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Newbury Park, CA: Sage.

Allport, F. H. (1937). Telenomic description in the study of personality. *Character and Personality, 5,* 202-214.

Anastasi, A. (1982). *Psychological testing* (5th ed.). New York: Macmillan.

Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review, 64,* 359-372.

Atkinson, J. W. (1964). *An introduction to motivation.* Princeton, NJ: Van Nostrand.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37,* 122-147.

Bandura, A. (1986a). Fearful expectations and avoidant actions as coeffects of perceived self-inefficacy. *American Psychologist, 41,* 1389-1391.

Bandura, A. (1986b). *Social foundations of thought and action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall.

Barnette, W. L. (1961). A structured and a semi-structured achievement measure applied to a college sample. *Educational and Psychological Measurement, 21,* 647-656.

Burger, J. M. (1985). Desire for control and achievement-related behaviors. *Journal of Personality and Social Psychology, 48,* 1520-1533.

Cohen, J. (1983). The cost of dichotomization. *Applied Psychological Measurement, 7,* 249-253.

Cohen, J. (1990). Things I have learned (so far). *American Psychologist, 45,* 1304-1312.

Cohen, J., & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cooper, W. H. (1983). An achievement motivation nomological network. *Journal of Personality and Social Psychology, 44*, 841-861.

Costa, P. T., Jr., & McCrae, R. R. (1992). *NEO-PI-R professional manual*. Odessa, FL: Psychological Assessment Resources.

Crocker, J., & Major, B. (1989). Social stigma and self-esteem: The self-protective properties of stigma. *Psychological Review, 96,* 608-630.

Cronbach, L. J., & Gleser, G. C. (1957). *Psychological tests and personnel decisions.* Urbana, IL: University of Illinois Press.

Dana, R. H. (1982). *A human science model for personality assessment with projective techniques*. Springfield, IL: Thomas.

Day, D. V. & Silverman, S. B. (1989). Personality and job performance: Evidence of incremental validity. *Personnel Psychology, 42*, 25-36.

Dollinger, S. J. & Orf, L. A. (1991). Personality and performance in "personality": Conscientiousness and Openness. *Journal of Research in Personality, 25,* 276-284.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95,* 256-273.

Entwisle, D. (1972). To dispel fantasies about fantasy-based measures of achievement motivation. *Psychological Bulletin, 77,* 377-391.

Feather, N. T. (1961). The relationship of persistence at a task to expectation of success and achievement-related motives. *Journal of Abnormal and Social Psychology, 63,* 552-561.

Goldberg, L. R. (1990). An alternative "description of personality:" The Big Five factor structure. *Journal of Personality and Social Psychology, 59,* 1216-1229.

Gough, H. G., & Bradley, P. (1996). *CPI manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Greenwald, A.G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102,* 4-27.

Hogan, R., Hogan, J., & Roberts, B. W. (1996). Personality measurement and employment decisions: Questions and answers. *American Psychologist, 51,* 469-477.

Humphreys, L. G. (1978). Research on individual differences requires correlational analysis, not ANOVA. *Intelligence, 2,* 1-5.

Hunter, J. E. (1986). Cognitive ability, cognitive aptitudes, job knowledge, and job performance. *Journal of Vocational Behavior, 29,* 340-362.

Hunter, J. E. & Hunter, R. F. (1984). Validity and utility of alternative predictors of job performance. *Psychological Bulletin, 96,* 72-98.

Jackson, D. N. (1984). *Personality research form manual*. Port Huron, MI: Research Psychologists Press, Inc.

James, L. R. (1998). Measurement of personality via conditional reasoning. *Organizational Research Methods, 1,* 131-163.

James, L. R. & Mazerolle, M. D. (2002). *Personality in work organizations*. Thousand Oaks, CA: Sage.

James, L. R., McIntyre, M. D., Glisson, C. A., Green, P. D., Patton, T. W., LeBreton, J. M., Mitchell, T. R., & Williams, L. J. (under review). Conditional reasoning: An indirect measurement system for implicit social cognitions. *Organizational Research Methods.*

John, O. P. (1990). The "Big five" factor taxonomy: Dimensions of personality in the natural language and in questionnaires. In L.A. Pervin (Ed.), *Handbook of personality theory and research* (pp. 66-100). New York: Guilford Press.

Jones, S. C. (1973). Self- and interpersonal evaluations: Esteem theories versus consistency theories. *Psychological Bulletin, 79,* 185-199.

Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The big five personality traits, general mental ability, and career success across the life span. *Personnel Psychology, 52,* 621-652.

Koestner, R., & McClelland, D. C. (1990). Perspectives on competence motivation. In L. A. Pervin (Ed.), *Handbook of personality: Theory and research* (pp. 527-548). New York: Guilford.

MacCallum, R. C., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods, 7,* 19-40.

Maqsud, M. (1997). Effects of metacognitive skills and nonverbal ability on academic achievement of high school pupils. *Educational Psychology, 17,* 387-397.

Maxwell, S. E. & Delaney, H. D. (1993). Bivariate median splits and spurious statistical significance. *Psychological Bulletin, 113,* 181-190.

McClelland, D. C. (1951). *Personality*. New York: Sloane, Dryden, Holt.

McClelland, D. C. (1985). How motives, skills, and values determine what people do. *American Psychologist, 40,* 812-825.

McClelland, D. C., & Boyatzis, R. E. (1982). Leadership motive pattern and long-term success in management. *Journal of Applied Psychology, 67,* 737-743.

McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review, 96,* 690-702.

McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and moderator effects. *Psychological Bulletin, 114,* 376-390.

Migetz, D. Z., James, L. R., & Ladd, R. T. (1999). A validation of the conditional reasoning measure of achievement motivation. The Society for Industrial and Organizational Psychology, 14th Annual Conference, Atlanta, GA.

Murray, H. A. (1938). *Explorations in personality.* New York, NY: Oxford University Press.

Pajares, F., & Kranzler, J. (1995). Self-efficacy beliefs and general mental ability in mathematical problem-solving. *Contemporary Educational Psychology, 20,* 426-443.

Paulhus, D. L (1984). Two-component models of socially desirable responding. *Journal of Personality and Social Psychology, 46,* 598-609.

Pearlman, K., Schmidt, F. L., & Hunter, J. E. (1980). Validity generalization results for tests used to predict job proficiency and training success in clerical employees. *Journal of Applied Psychology, 65,* 373-406.

Rosse, J. G., Stecher, M. D., Miller, J. L., & Levin, R. A. (1998). The impact of response distortion on preemployment personality testing and hiring decisions. *Journal of Applied Psychology, 83,* 634-644.

Roth, P. L., & Bobko, P. (2000). College grade point average as a personnel selection device: Ethnic group differences and potential adverse impact. *Journal of Applied Psychology, 85,* 399-406.

Schippmann, J. S., & Prien, E. P. (1989). An assessment of the contributions of general mental ability and personality characteristics to management success. *Journal of Business and Psychology, 3,* 423-437.

Schmidt, F. L., Gast-Rosenburg, I., & Hunter, J. E. (1980). Validity generalization results for computer programmers. *Journal of Applied Psychology, 65,* 643-661.

Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin, 124*, 262-274.

Schmidt, F. L., Hunter, J. E., & Caplan, J. (1981). Validity generalization results for two job groups in the petroleum industry. *Journal of Applied Psychology, 66*, 261-273.

Schmit, M. J., Ryan, A. M., Stierwalt, S. L., & Powell, A. B. (1995). Frame-of-reference effects on personality scale scores and criterion-related validity. *Journal of Applied Psychology, 80,* 607-620.

Schneider, D., & Dorans, N. (1999). Concordance between SAT I and ACT scores for individual students. *Research Notes (RN-07).* New York, NY: The College Board.

Sechrest, L. (1963). Incremental validity: A recommendation. *Educational and Psychological Measurement, 23,* 153-158.

Spangler, W. D. (1992). Validity of questionnaire and TAT measures of need for achievement: Two meta-analyses. *Psychological Bulletin, 112,* 140-154.

Stone-Romero, E. F., & Anderson, L. E. (1994). Relative power of moderated multiple regression and the comparison of subgroup correlation coefficients for detecting moderating effects. *Journal of Applied Psychology, 79,* 354-359.

Trites, D., Kurek, A., & Cobb, B. (1967). Personality and achievement of air traffic controllers. *Aerospace Medicine, 38,* 1145-1150.

Watson, G. & Glaser, E. M. (1964). *Watson-Glaser Critical Thinking Appraisal.* New York: Harcourt, Brace and World.

Watson, G. & Glaser, E. M. (1980). *Watson-Glaser Critical Thinking Appraisal.* New York: Harcourt Brace Jovanovich.

Weiner, B. (1979). A theory of motivation for some classroom experiences. *Journal of Educational Psychology, 71,* 3-25.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92,* 548-573.

Winter, D. G. (1996). *Personality: Analysis and interpretation of lives.* New York: McGraw-Hill.

Winter, D. G., John, O. P., Stewart, A. J., Klohnen, E. C., & Duncan, L. E. (1998). Traits and motives: Toward an integration of two traditions in personality research. *Psychological Review, 105,* 230-250.

Youngstrom, E. A., Kogos, J. L., & Glutting, J. J. (1999). Incremental efficacy of Differential Ability Scales factor scores in predicting individual achievement criteria. *School Psychology Quarterly, 14,* 26-39.

APPENDICES

APPENDIX A

TABLES

Table 1

Integrative Model of the Affiliative Motive with Extraversion—Introversion and Resulting Hypotheses (adapted from Winter et al., 1998, Table 3, p. 238)

	In conjunction with	
	Motive	
Trait	Low Affiliation	High Affiliation
Extraversion	Respected and proficient at interpersonal relationships, but not dependent upon them	Unconflicted quest of various interpersonal relationships, comfortable in social settings
Introversion	Contented and most capable when working alone, and not affected by opinions of others	Warmth and companionship are desired, but uncomfortable in many social settings

Table 2

Justification Mechanisms for Achievement Motivation and Fear-of-Failure (adapted from James, 1998, pp. 134 & 137)

Justification Mechanisms	
Achievement Motivation	Fear-of-Failure
Personal Responsibility Bias – inclination to prefer personal factors such as motivation, intensity, and persistence as the primary causes of performance on challenging tasks	External Attribution Bias – inclination to prefer external factors such as a deficiency of resources as the primary causes of performance on challenging tasks
Opportunity Bias – disposition to interpret demanding tasks on which it is possible to fail as opportunities to acquire new skills	Liability/Threat Bias – inclination to view challenging tasks as liabilities or risks because one may fail and be seen as incapable
Positive Connotation of Achievement Striving – inclination to associate effort on challenging tasks with dedication and commitment	Negative Connotation of Achievement Striving – inclination to view effort on challenging tasks as stressful and potentially harmful
Malleability of Skills – inclination to assume that the skills needed to master challenging tasks can be acquired through practice and experience	Fixed Skills – inclination to assume that skills are static and cannot be improved with practice and experience
Identification with Achievers – inclination to identify with the eagerness, vigor, and striving that characterize people who accomplish challenging tasks	Identification with Failures – inclination to identify with the fear and apprehension of persons who fail on challenging tasks
	Indirect Compensation – inclination to associate less challenging tasks and situations with positive or socially-desirable qualities

Table 3

Integrative Model of Personality Assessment for Achievement Motivation and Fear of Failure

	CONDITIONAL REASONING	
SELF-REPORT	**JMs for FF** - External Attribution Bias - Liability/Threat Bias - Negative Connotation of Achievement Striving - Fixed Skills - Identification with Failures - Indirect Compensation	**JMs for AM** - Personal Responsibility Bias - Opportunity Bias - Positive Connotation of Achievement Striving - Malleability of Skills - Identification with Achievers
AM - I enjoy doing things which challenge me. - I strive to achieve all I can. - I often set goals that are very difficult to reach. - I have a burning desire to be a high achiever at school.	**AM PRETENDERS** - Perceive themselves as high achievers but are disposed to reason based on FF JMs. - Experience conscious pressure to approach achievement-oriented tasks, but actually approach those tasks on which they can deflect responsibility for failure.	**CONGRUENT AMs** - Approach demanding and achievement-oriented tasks - Ambitious - Aspiring - Industrious
FF - I really don't enjoy hard work. - I am easy-going and lackadaisical. - I would rather do an easy job than one involving obstacles which must be overcome. - I don't feel like I'm driven to get ahead.	**CONGRUENT FFs** - Avoid achievement-oriented tasks - Fearful - Nervous - Anxious	**HESITANT AMs** - Have conscious concerns about stress and avoiding obsessions - Underlying enthusiasm for plunging into achievement-oriented tasks - Approach-avoidance conflicts

Table 4

Study 1: Descriptive Statistics for Study Variables

Variable Name	Descriptives *M*	*SD*
RMS	2.67	4.79
Self-Report of AM	2.88	.70
ACT Composite	23.13	3.54
Number of Cryptoquotes Attempted	3.61	1.54
Persistence	4.39	1.54
Intensity on 1st Cryptoquote	22.00	20.74
Total Intensity	74.65	40.19
Effort	23.31	16.30
Math Total Performance	3.65	1.08
Course Grade	84.67	7.74
Overall GPA	3.23	.54

Table 5

Study 1: Correlations Among Study Variables

Variable Name	1	2	3	4	5	6	7	8	9	10	11
1. RMS	----										
2. Self-Report of AM	.09	----									
3. ACT Composite	***.35***	-.03	----								
4. Number of Cryptoquotes Attempted	-.08	*.17*	.04	----							
5. Persistence	.08	*-.17*	-.04	***-1.00***	----						
6. Intensity on 1st Cryptoquote	.13	-.09	*.16*	***-.42***	***.42***	----					
7. Total Intensity	.05	-.04	***.28***	-.11	.11	***.67***	----				
8. Effort	.08	*-.15*	.13	***-.58***	***.58***	***.81***	***.73***	----			
9. Math Total Performance	**.19**	.06	***.38***	-.11	.11	.14	.08	.10	----		
10. Course Grade	***.27***	**.20**	***.33***	-.04	.04	.04	.02	-.04	***.31***	----	
11. Overall GPA	**.22**	.07	***.48***	-.03	.03	.06	.12	-.03	***.35***	***.56***	----

Note. *N* size ranged from 84 to 110 due to missing data. Correlations in *italics* are significant at $p < .10$, correlations in **bold** are significant at $p < .05$, and correlations in ***bold italics*** are significant at $p < .01$. All tests were one-tailed.

Table 6

Study 1: Effects of Latent (RMS) and Self-Reported (SR) Achievement Motivation and Their (In)congruence on Persistence, Intensity, Effort, and School Performance with and without Controlling for Cognitive Ability (ACT Composite) on Step 1

	Without ACT Composite on Step 1				
	Beta Weights			R-Squared Values	
Dependent Variable Name	RMS	SR	RMS × SR	ΔR^2 Interaction	Total R^2
Persistence	.10	-.11	***.32***	***.10***	**.13**
Intensity on 1st Cryptoquote	.14	-.06	**.28**	**.08**	**.11**
Total Intensity	.06	-.04	*.21*	*.04*	.05
Effort	.11	-.09	***.37***	***.13***	***.16***
Math Total Performance	.18	.02	---	.01	.04
Course Grade	**.26**	*.19*	---	.00	**.11**
Overall GPA	*.21*	.09	---	.00	.06

	With ACT Composite on Step 1				
	Beta Weights			R-Squared Values	
Dependent Variable Name	RMS	SR	RMS × SR	ΔR^2 Interaction	Total R^2
Persistence	.12	-.14	***.33***	***.11***	**.15**
Intensity on 1st Cryptoquote	.10	-.07	**.28**	**.07**	*.12*
Total Intensity	-.06	-.00	*.20*	*.04*	**.12**
Effort	.06	-.11	***.37***	***.13***	***.17***
Math Total Performance	.06	.05	---	.01	**.14**
Course Grade	.16	*.19*	---	.01	***.18***
Overall GPA	.05	.08	---	.01	***.25***

Note. *N* size equaled 82 for analyses without ACT and 79 for analyses with ACT due to missing data and listwise deletion. Beta weights in *italics* are significant at $p < .10$, those in **bold** are significant at $p < .05$, and those in ***bold italics*** are significant at $p < .01$. The beta weights reported for RMS, SR, and RMS × SR were obtained from the final model. The final model was defined by the last step for which the R-squared change was significant. Recall that Step 1 tested main effects and Step 2 tested the interaction. Therefore, when the interaction term was nonsignificant the beta weights for RMS and SR were obtained from the first step of the model. This was performed in order to avoid loss of covariance with the dependent variable from these main effects as a result of their multicollinearity with the nonsignificant interaction term.

Table 7

Study 1: Significance Tests of Simple Slopes with RMS as the Predictor and Self-Report as the Moderator

	Self-Report at – 1 *SD*		Self-Report at + 1 *SD*	
Dependent Variable Name	Without ACT	With ACT	Without ACT	With ACT
Persistence	-.20	-.18	***.39***	***.43***
Intensity on 1st Cryptoquote	-.13	-.16	***.41***	**.36**
Total Intensity	-.13	-.23	*.25*	.12
Effort	-.24	*-.28*	***.45***	***.40***
Math Total Performance	.07	-.01	**.28**	.15
Course Grade	*.26*	.21	.22	.09
Overall GPA	.24	.16	.19	-.05

Note. *N* size equaled 82 for analyses without ACT, and 79 for analyses with ACT. "Without ACT" refers to the regression equations without ACT as a covariate, and "With ACT" refers to the regression equations that include ACT as a covariate to control for cognitive ability. Simple slopes in *italics* are significant at $p < .10$, those in **bold** are significant at $p < .05$, and those in ***bold italics*** are significant at $p < .01$.

Table 8

Study 2: Descriptive Statistics for Study Variables

Variable Name	Descriptives *M*	*SD*
RMS	2.63	4.05
Self-Report (Achievement Striving)	28.37	4.73
ACT Composite	23.60	3.70
Course Grade	79.17	14.37
Overall GPA	3.01	.57

Note. The 8-item achievement striving self-report was obtained from the NEO-PI-R.

Table 9

Study 2: Correlations Among Study Variables

Variable Name	1	2	3	4	5
1. RMS	----				
2. Self-Report (Achievement Striving)	.01	----			
3. ACT Composite	***.30***	.02	----		
4. Course Grade	*.09*	***.27***	***.37***	----	
5. Overall GPA	***.21***	***.21***	***.48***	***.62***	----

Note. *N* size ranged from 226 to 299 due to missing data. The 8-item achievement striving self-report was obtained from the NEO-PI-R. Correlations in *italics* are significant at $p < .10$, correlations in **bold** are significant at $p < .05$, and correlations in ***bold italics*** are significant at $p < .01$. All tests were one-tailed.

Table 10

Study 2: Effects of Latent (RMS) and Self-Reported (SR) Achievement Motivation and Their (In)congruence on School Performance with and without Controlling for Cognitive Ability (ACT Composite) on Step 1

	Without ACT Composite on Step 1				
	Beta Weights			R-Squared Values	
Dependent Variable Name	RMS	SR	RMS × SR	ΔR^2 Interaction	Total R^2
Course Grade	*.12*	***.31***	**.12**	**.02**	***.12***
Overall GPA	***.21***	***.24***	---	.00	***.11***

	With ACT Composite on Step 1				
	Beta Weights			R-Squared Values	
Dependent Variable Name	RMS	SR	RMS × SR	ΔR^2 Interaction	Total R^2
Course Grade	-.05	***.31***	*.11*	*.01*	***.29***
Overall GPA	.07	***.25***	---	.00	***.34***

Note. N size equaled 239 for analyses without ACT and 210 for analyses with ACT due to missing data and listwise deletion. The 8-item achievement striving self-report was obtained from the NEO-PI-R. Beta weights in *italics* are significant at $p < .10$, those in **bold** are significant at $p < .05$, and those in ***bold italics*** are significant at $p < .01$. The beta weights reported for RMS, SR, and RMS × SR were obtained from the final model. The final model was defined by the last step for which the R-squared change was significant. Recall that Step 1 tested main effects and Step 2 tested the interaction. Therefore, when the interaction term was nonsignificant the beta weights for RMS and SR were obtained from the first step of the model. This was performed in order to avoid loss of covariance with the dependent variable from these main effects as a result of their multicollinearity with the nonsignificant interaction term.

Table 11

Study 2: Significance Tests of Simple Slopes with RMS as the Predictor and Self-Report as the Moderator

	Self-Report at – 1 *SD*		Self-Report at + 1 *SD*	
Dependent Variable Name	Without ACT	With ACT	Without ACT	With ACT
Course Grade	-.00	**-.09**	***.13***	.03
Overall GPA	*.14*	.05	***.24***	.08

Note. *N* size equaled 239 for analyses without ACT, and 210 for analyses with ACT. "Without ACT" refers to the regression equations without ACT as a covariate, and "With ACT" refers to the regression equations that include ACT as a covariate to control for cognitive ability. Simple slopes in *italics* are significant at $p < .10$, those in **bold** are significant at $p < .05$, and those in ***bold italics*** are significant at $p < .01$.

Table 12

Study 3: Descriptive Statistics for Study Variables

Variable Name	Descriptives *M*	*SD*
RMS	2.31	4.02
Self-Report (AM via Independence)	54.85	6.08
Watson-Glaser Critical Thinking	59.70	8.83
Overall In-Basket Performance	2.78	.54
Assessment Center Consensus	2.86	1.06

Note. The AM via Independence self-report was obtained from the CPI.

Table 13

Study 3: Correlations Among Study Variables

Variable Name	1	2	3	4	5
1. RMS	----				
2. Self-Report (AM via Independence)	***.31***	----			
3. Watson-Glaser Critical Thinking	***.57***	***.46***	----		
4. Overall In-Basket Performance	***.39***	***.38***	***.51***	----	
5. Assessment Center Consensus	***.54***	***.55***	***.82***	***.69***	----

Note. *N* size ranged from 260 to 263 due to missing data. The AM via Independence self-report was obtained from the CPI. Correlations in *italics* are significant at $p < .10$, correlations in **bold** are significant at $p < .05$, and correlations in ***bold italics*** are significant at $p < .01$. All tests were one-tailed.

Table 14

Study 3: Effects of Latent (RMS) and Self-Reported (SR) Achievement Motivation and Their (In)congruence on Assessment Center Performance with and without Controlling for Cognitive Ability (Watson-Glaser Critical Thinking) on Step 1

	Without Watson-Glaser on Step 1				
	Beta Weights			R-Squared Values	
Dependent Variable Name	RMS	SR	RMS × SR	ΔR^2 Interaction	Total R^2
Overall In-Basket	***.30***	***.28***	*-.10*	*.01*	***.24***
Assessment Center	***.40***	***.43***	---	.00	***.46***

	With Watson-Glaser on Step 1				
	Beta Weights			R-Squared Values	
Dependent Variable Name	RMS	SR	RMS × SR	ΔR^2 Interaction	Total R^2
Overall In-Basket	**.14**	***.18***	---	.00	***.30***
Assessment Center	**.09**	***.21***	---	.00	***.72***

Note. *N* size was 260 for analyses without and with Watson-Glaser due to missing data and listwise deletion. Beta weights in *italics* are significant at $p < .10$, those in **bold** are significant at $p < .05$, and those in ***bold italics*** are significant at $p < .01$. The beta weights reported for RMS, SR, and RMS × SR were obtained from the final model. The final model was defined by the last step for which the R-squared change was significant. Recall that Step 1 tested main effects and Step 2 tested the interaction. Therefore, when the interaction term was nonsignificant the beta weights for RMS and SR were obtained from the first step of the model. This was performed in order to avoid loss of covariance with the dependent variable from these main effects as a result of their multicollinearity with the nonsignificant interaction term.

Table 15

Study 3: Significance Tests of Simple Slopes with RMS as the Predictor and Self-Report as the Moderator

Dependent Variable Name	Self-Report at – 1 *SD* Without W-G	Self-Report at – 1 *SD* With W-G	Self-Report at + 1 *SD* Without W-G	Self-Report at + 1 *SD* With W-G
Overall In-Basket Performance	***.39***	**.20**	**.20**	.08
Assessment Center Consensus	***.43***	.04	***.37***	**.13**

Note. *N* size was 260 for analyses with and without W-G. "Without W-G" refers to the regression equations without the Watson-Glaser as a covariate, and "With W-G" refers to the regression equations that include the Watson-Glaser as a covariate to control for cognitive ability. Simple slopes in *italics* are significant at $p < .10$, those in **bold** are significant at $p < .05$, and those in ***bold italics*** are significant at $p < .01$.

APPENDIX B

FIGURES

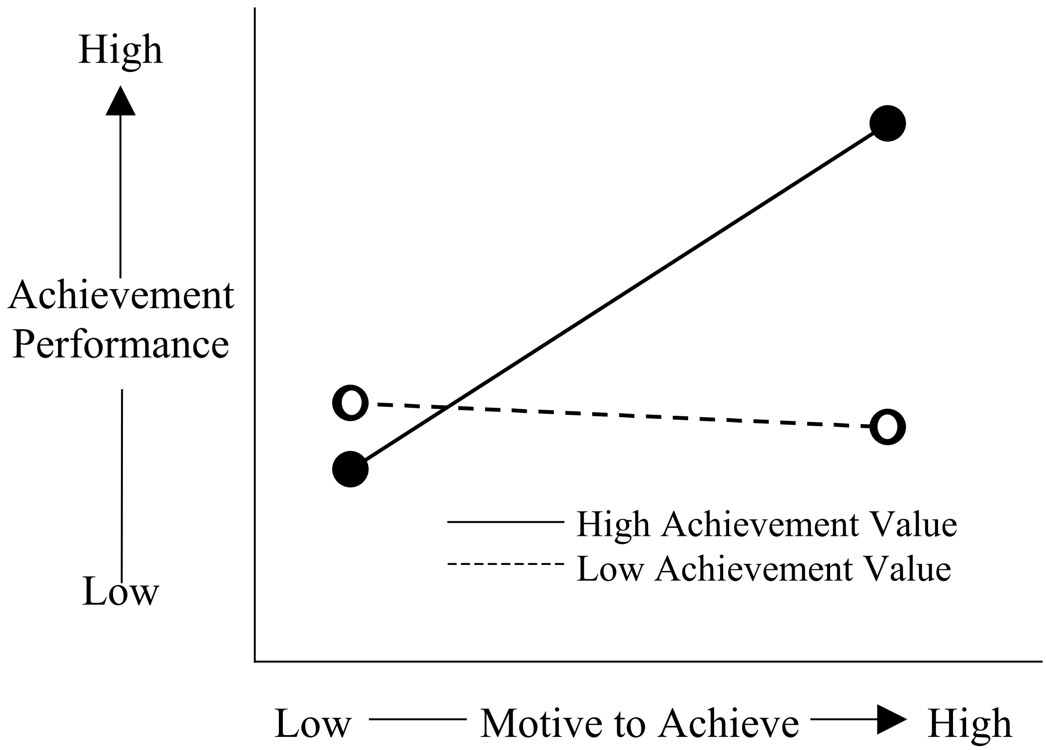


Figure 1. *The Basic Form of the Two-Way Interaction between Self-Reported Value of Achievement and the Motive to Achieve in the Prediction of Achievement Performance (adapted from McClelland, 1985, p. 816)*

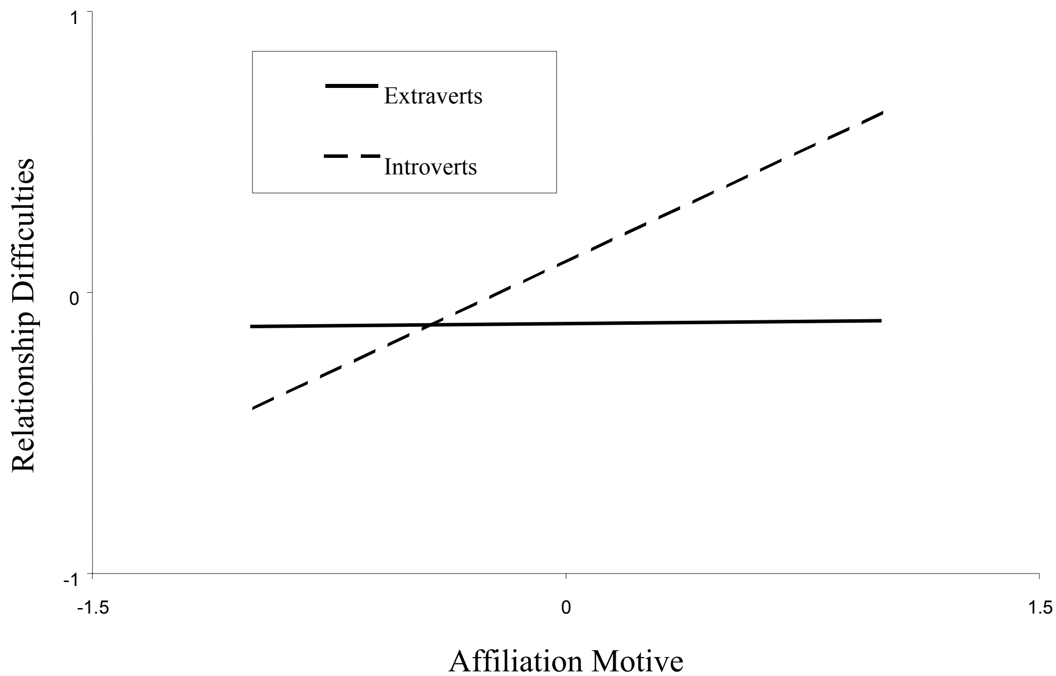


Figure 2. *Prediction of Relationship Difficulty from the Interaction of the Extraversion-Introversion Trait with the Affiliative Motive (adapted from Winter et al., 1998, p. 245)*

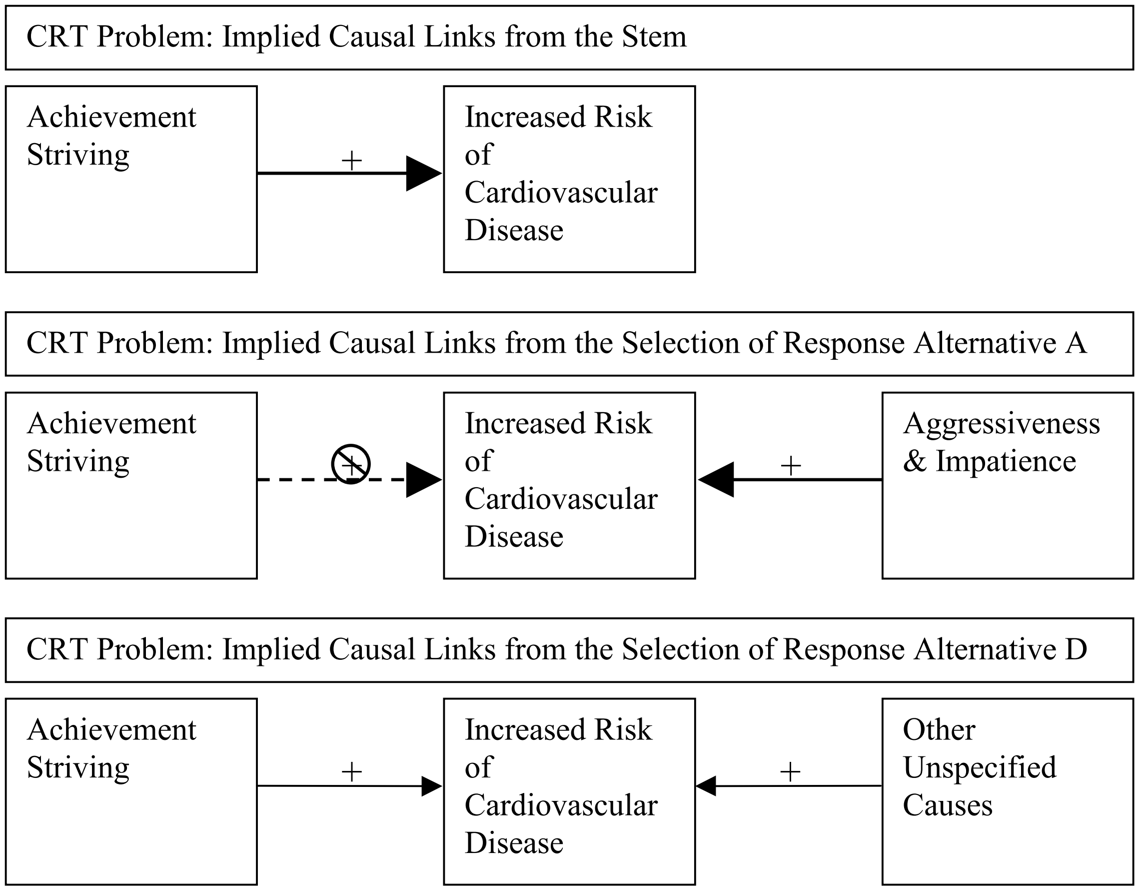


Figure 3. *Conceptualization of the Example CRT Problem in Terms of Causal Attributions and the Changes to those Causal Attributions that Are Implied by the Different AM and FF Response Alternatives to the Problem*

Note. The "+" symbol above a solid, *large* arrow symbolizes a positive causal link between preceding and subsequent variables, where increases in the former lead to increases in the latter. The "⃠" symbol over the "+" symbol above a dashed, *large* arrow symbolizes a negation of the positive causal link between preceding and subsequent variables, where increases in the former have a negligible effect on changes in the latter. The "+" symbol above a solid, *small* arrow symbolizes a weakening of the positive causal link between preceding and subsequent variables, where increases in the former typically lead to increases in the latter, but the latter may also have other unspecified causes.

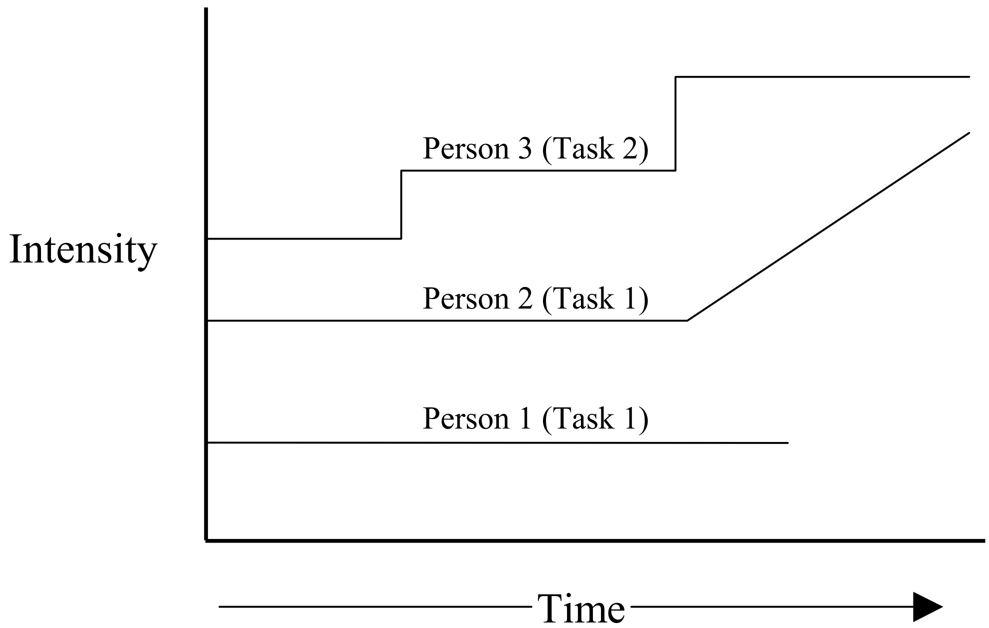


Figure 4. *Conceptualization of Effort as a Function of Task Choice, Intensity, and Persistence*

Note. In the above figure effort is conceptualized as a function of intensity (i.e., how hard one is working), time (i.e., whether or not one persists until successful), and task choice (i.e., devotion of effort to one task instead of another). Thus, for example, in the figure Person 1 can be seen as putting forth less effort on Task 1 than Person 2. Furthermore, Person 1 stops working on Task 1 before Person 2, and thus is less persistent than Person 2. However, Person 3 is working harder than both Person 1 and Person 2, but on a different task (i.e., Task 2).

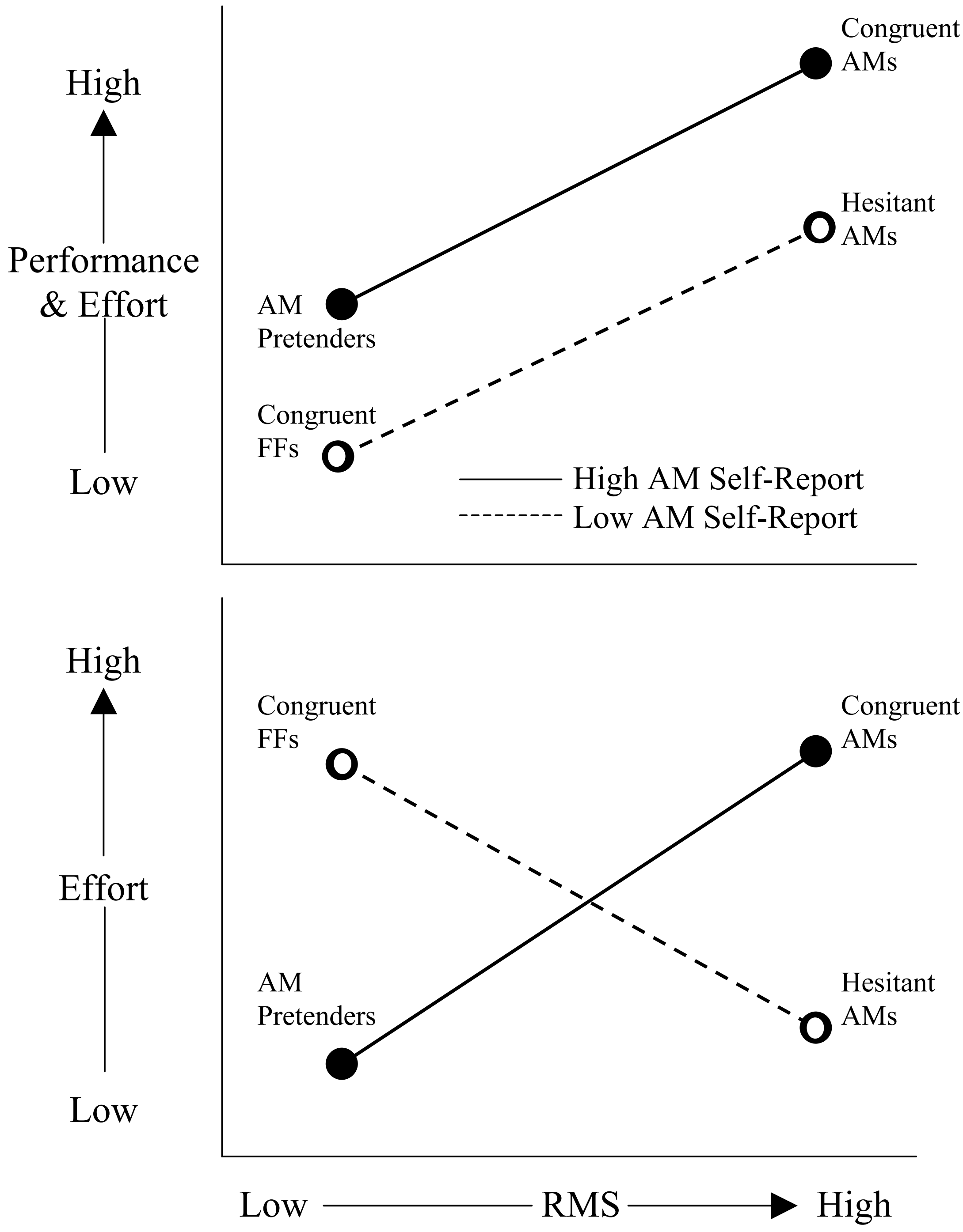


Figure 5. *The Basic Form of the Additive Prediction of Performance and Effort by the CRT and Self-Reported Achievement Motivation When Withdrawal Is Feasible (Above), and the Interactive Prediction Made for Effort When Withdrawal Is Not Feasible (Below*

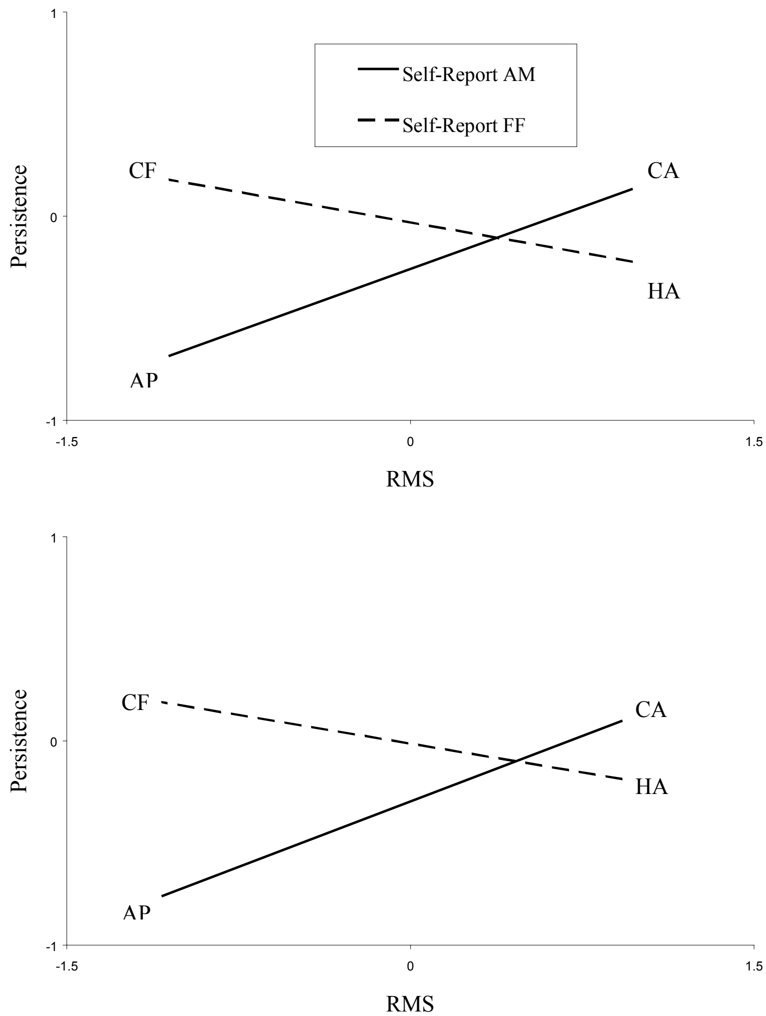


Figure 6. *Study 1a: Persistence on Cryptoquote Task*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. Moderated hierarchical multiple regression (MHMR) was used for statistical tests of the integrative model. Consequently, the CA, CF, HA, and AP labels in the figures displaying simple slopes are provided for convenience of interpretation. All plots of interactions are based on unstandardized regression weights. Persistence equals 8 minus the number of cryptoquote problems attempted. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

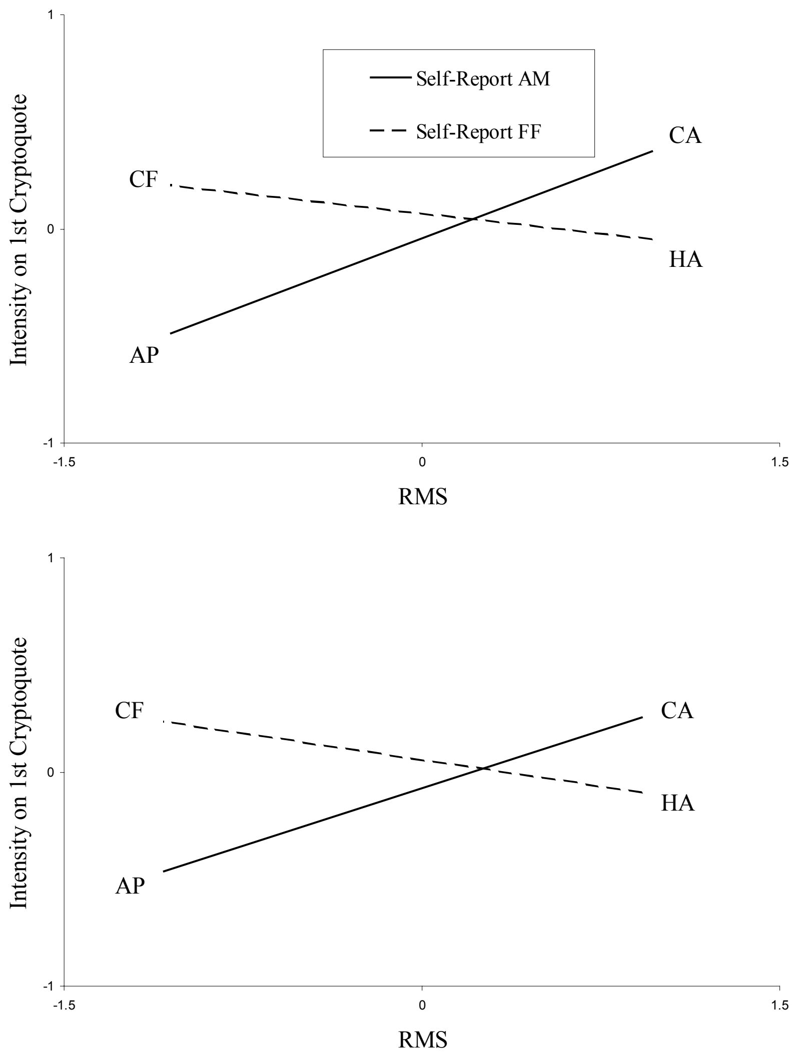


Figure 7. *Study 1a: Intensity on 1st Cryptoquote*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

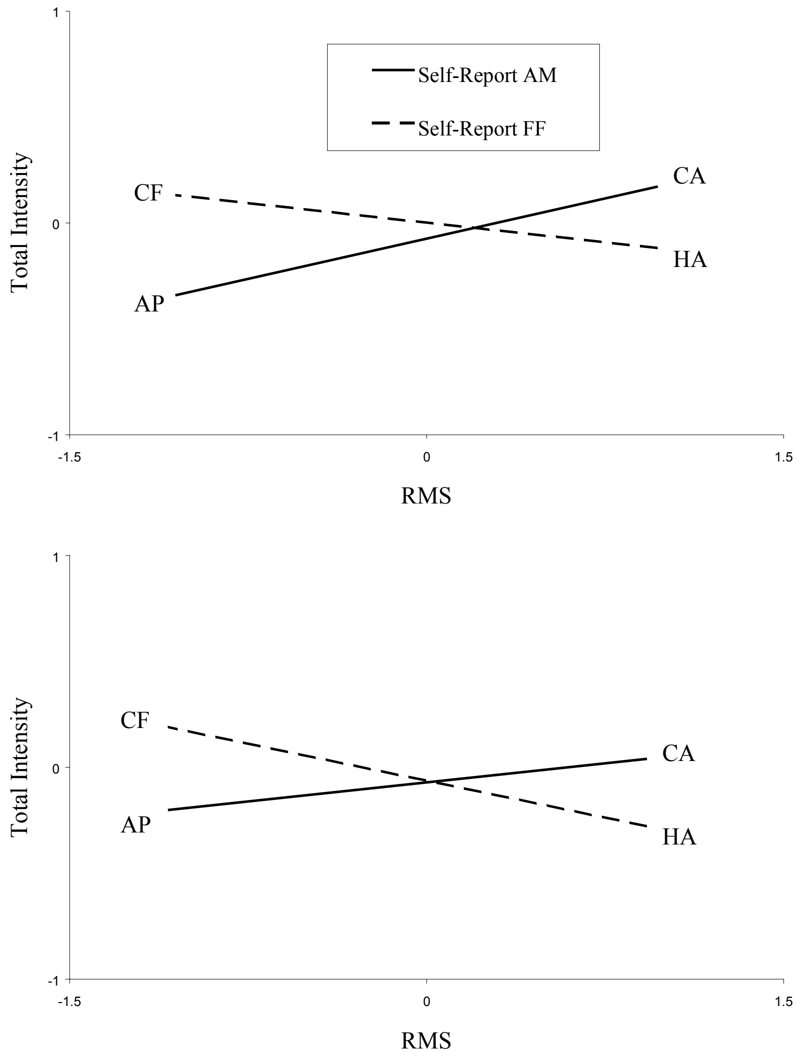
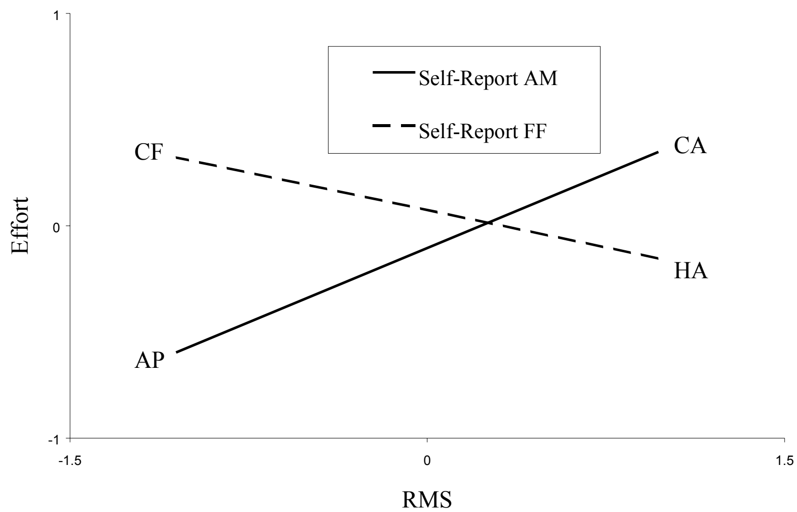


Figure 8. *Study 1a: Total Intensity on Cryptoquote Task*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.



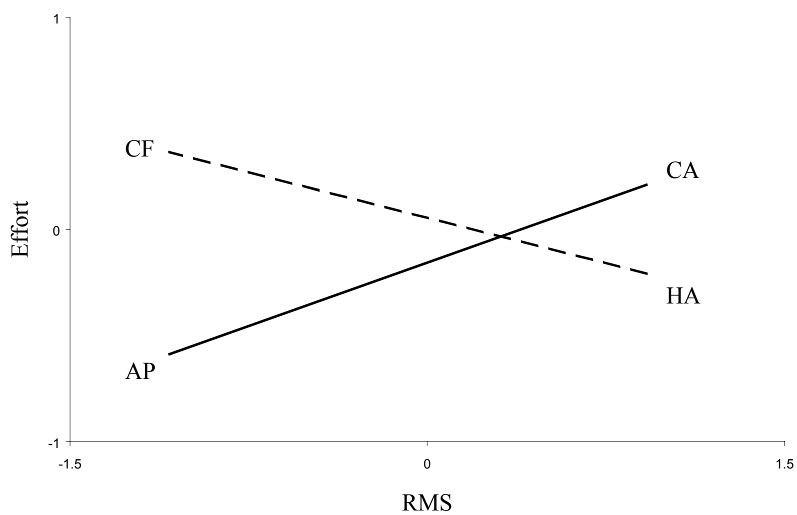


Figure 9. *Study 1a: Effort on Cryptoquote Task*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. Effort equaled total intensity divided by the number of cryptoquotes attempted. Thus, the average level of intensity of effort expended per cryptoquote puzzle attempted created the "effort" criterion. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

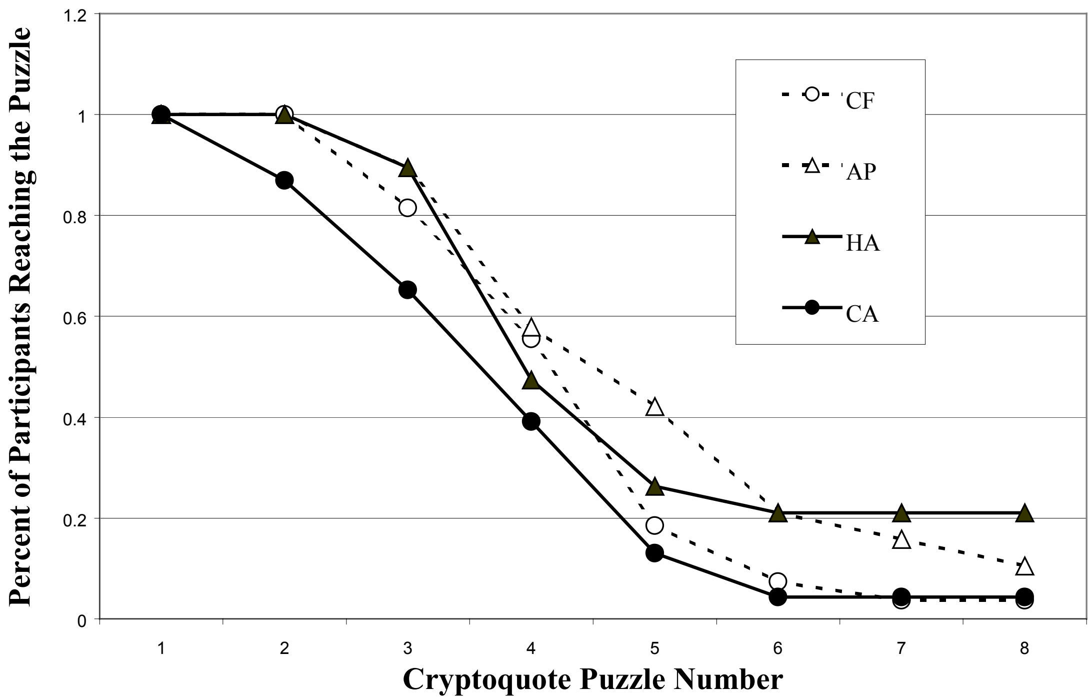


Figure 10. *Study 1a: The Four Integrative Model Prototypes and Persistence on the Cryptoquote Puzzles*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The integrative model prototypes were created via median splits on RMS and self-reported AM. Specifically, participants who scored above the median on both measures were labeled as Congruent AMs, those who scored below the median on both measures were labeled as Congruent FFs, those who scored above the median on RMS and below the median on the self-report were labeled Hesitant AMs, and those who scored below the median on RMS and above the median on the self-report were labeled as AM Pretenders.

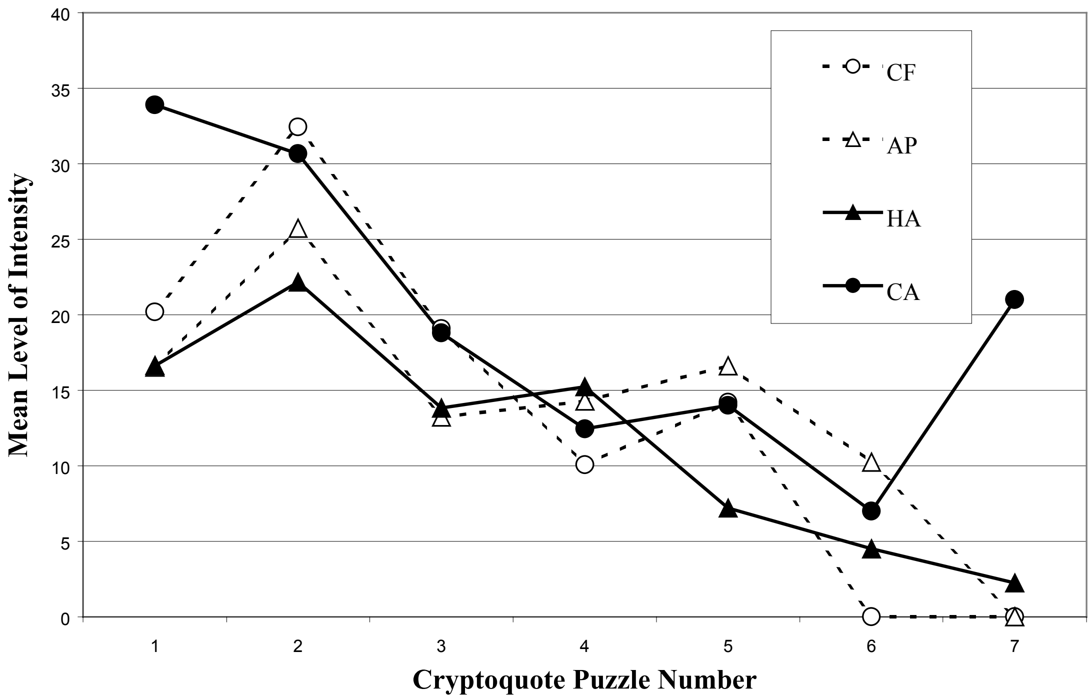


Figure 11. *Study 1a: The Four Integrative Model Prototypes and Intensity on the Cryptoquote Puzzles*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders.The integrative model prototypes in Figure 11 were created via the same mean splits on RMS and self-reported AM that were described in Figure 10. Recall that the full sample is available for analysis *only for the first cryptoquote problem* as some CAs persisted in their efforts to solve the first problem, and thus did not proceed to subsequent problems. Thus, in this figure the *very* persistent CAs, who worked at a high level of intensity on the first cryptoquote problem, do not contribute to mean level of intensity calculated on the second cryptoquote problem, nor on subsequent problems.

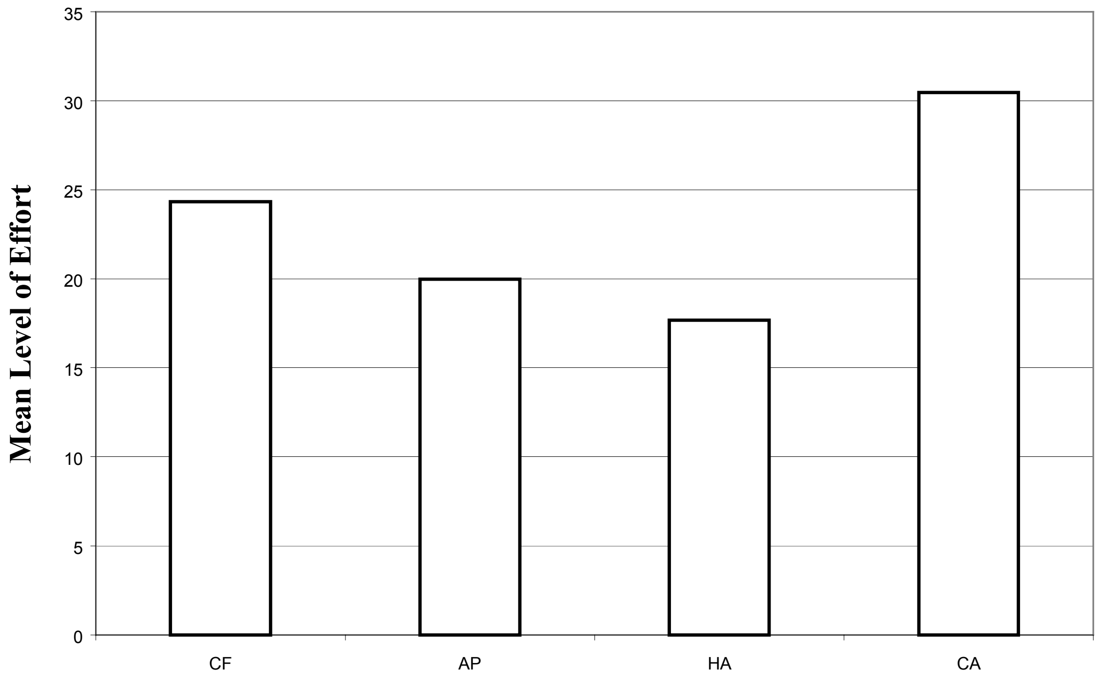


Figure 12. *Study 1a: Mean Level of Effort on the Cryptoquote Task for the Four Integrative Model Prototypes*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The integrative model prototypes in Figure 12 were created via the same mean splits on RMS and self-reported AM that were described in Figure 10.

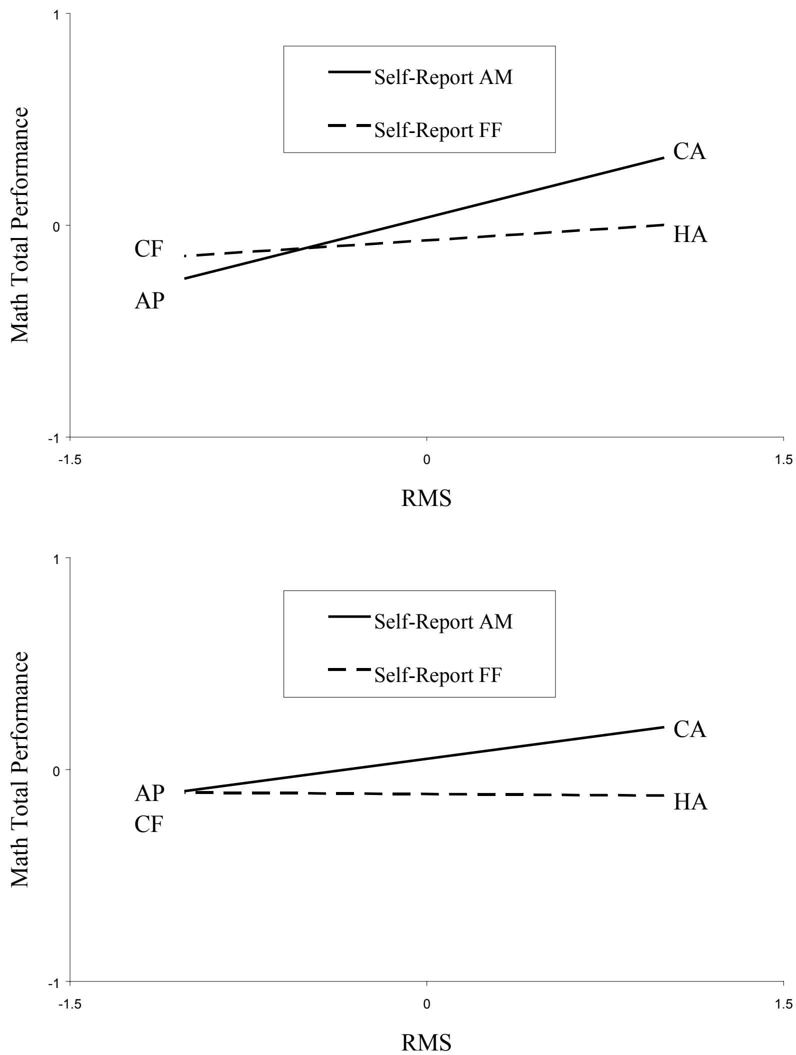


Figure 13. Study 1b: The Prediction of Math Total Performance via the Integrative Model

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

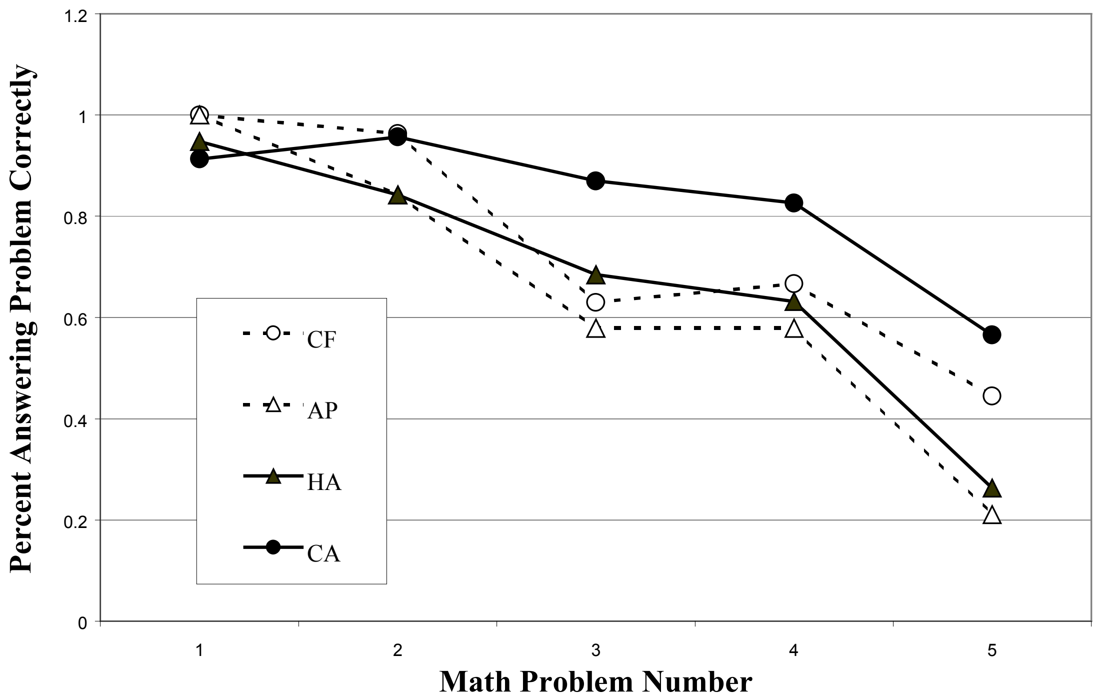
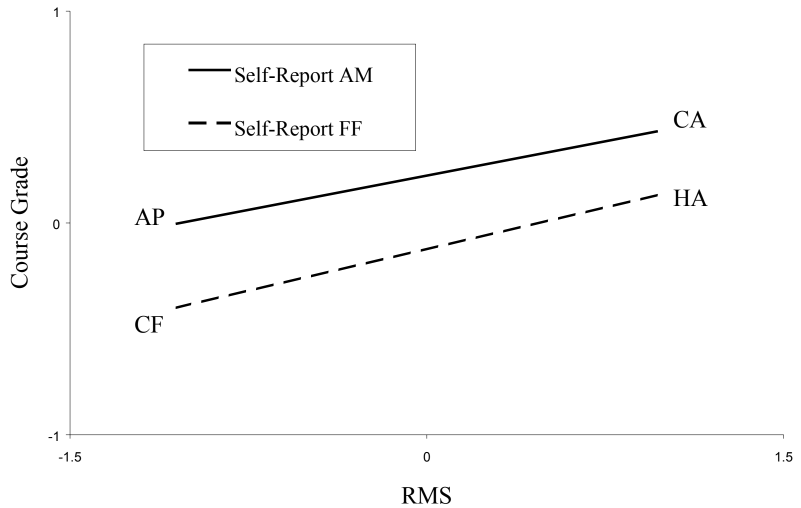


Figure 14. Study 1b: The Four Integrative Model Prototypes and Performance on Math Problems of Increasing Difficulty Level

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The integrative model prototypes in Figure 14 were created via the same mean splits on RMS and self-reported AM that were described in Figure 10.



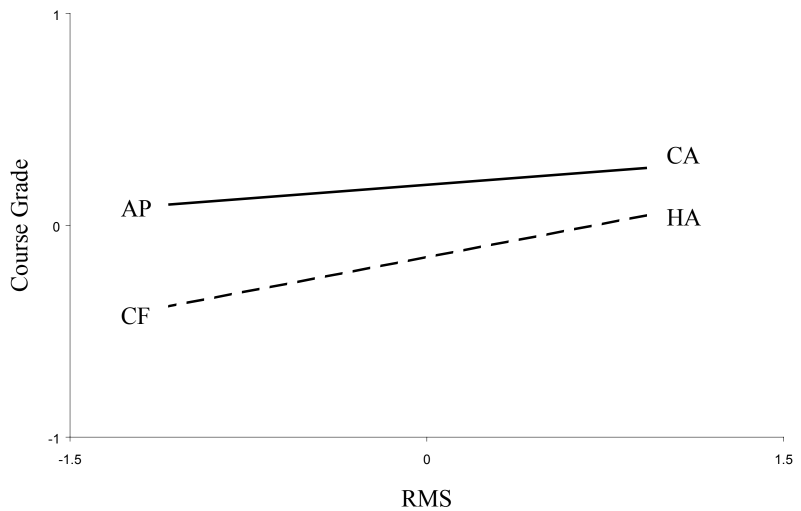


Figure 15. Study 1c: The Prediction of Course Grade via the Integrative Model

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

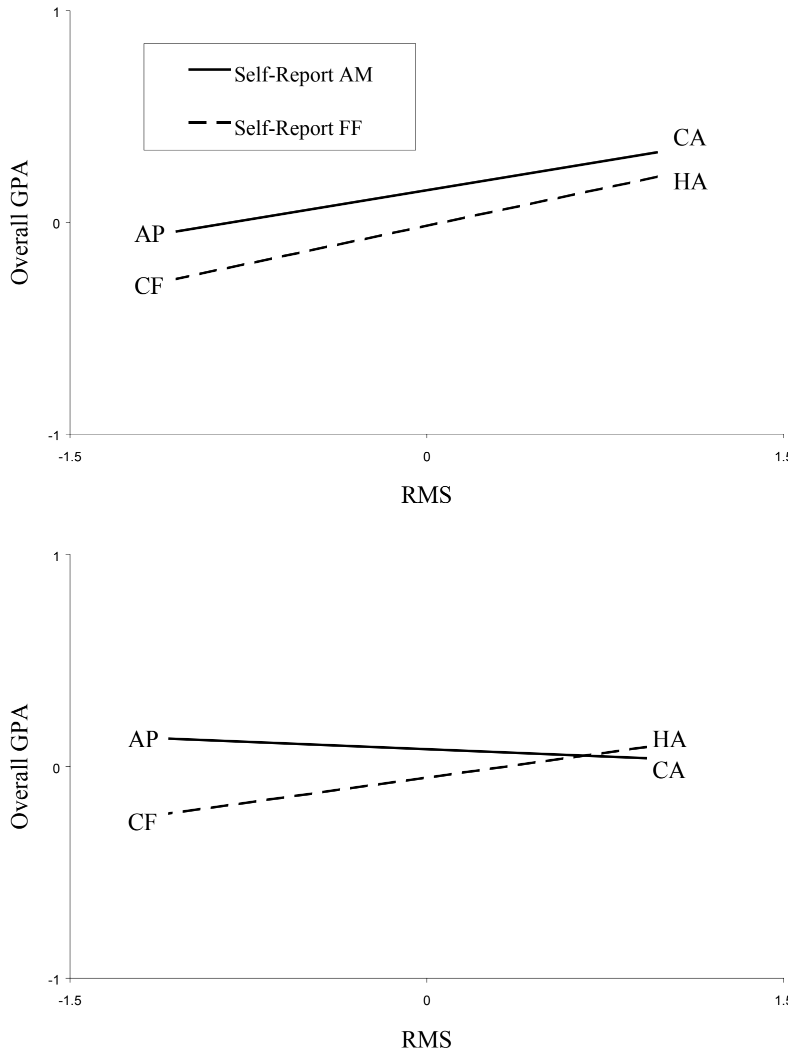


Figure 16. *Study 1c: The Prediction of Overall GPA via the Integrative Model*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

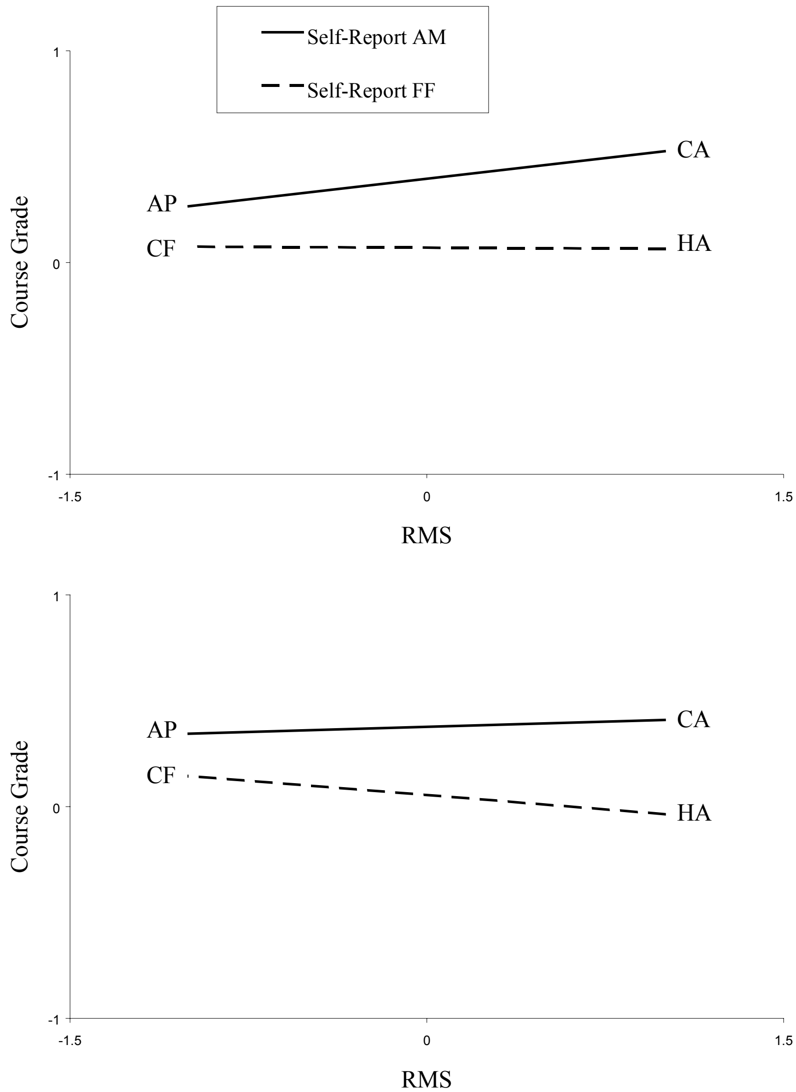


Figure 17. *Study 2: The Prediction of Course Grade via the Integrative Model*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

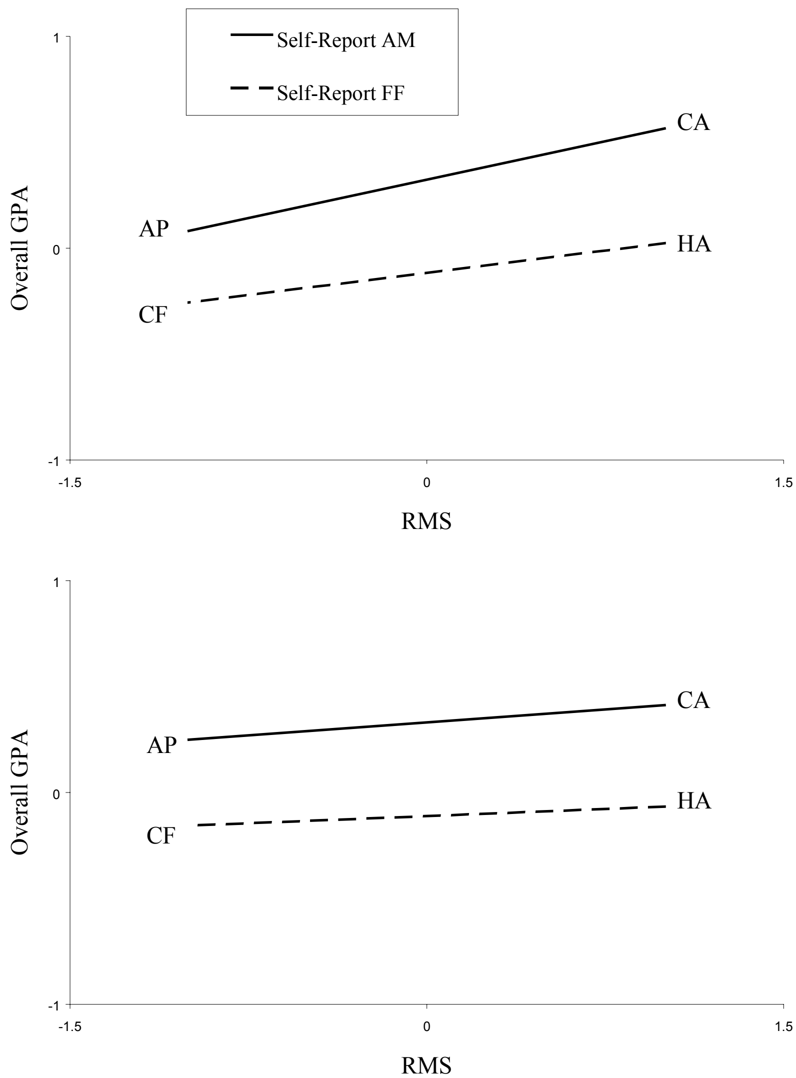


Figure 18. *Study 2: The Prediction of Overall GPA via the Integrative Model*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

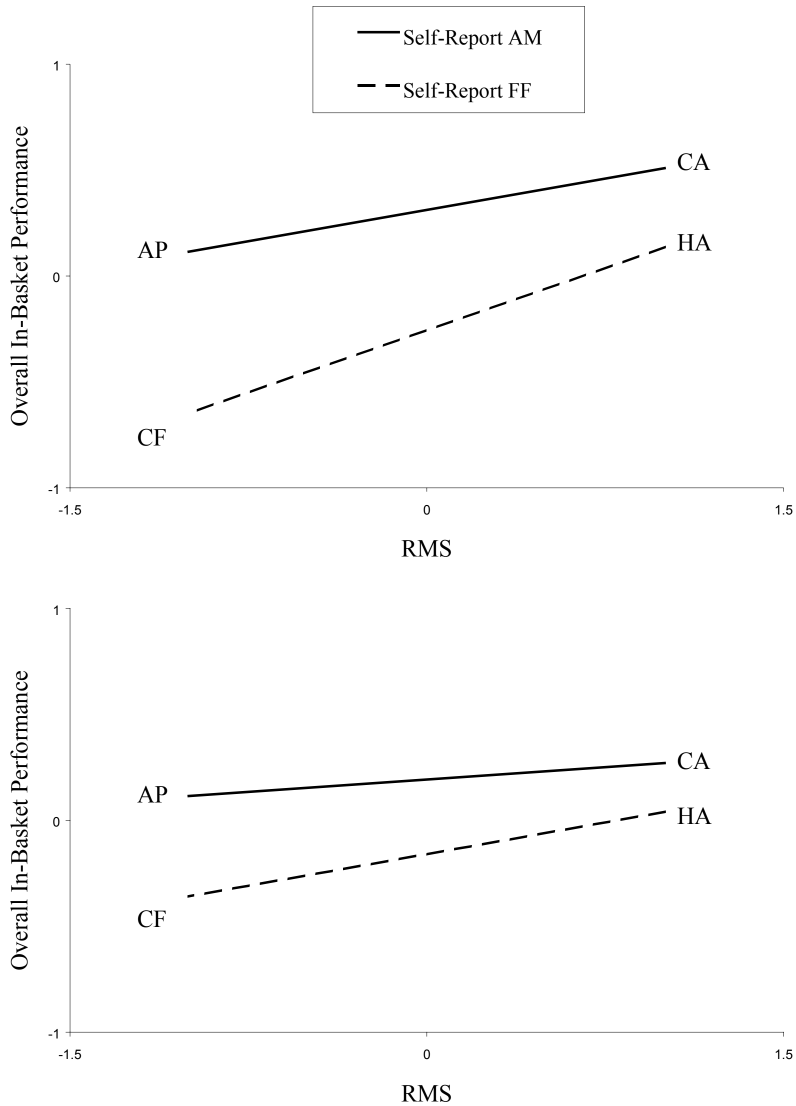
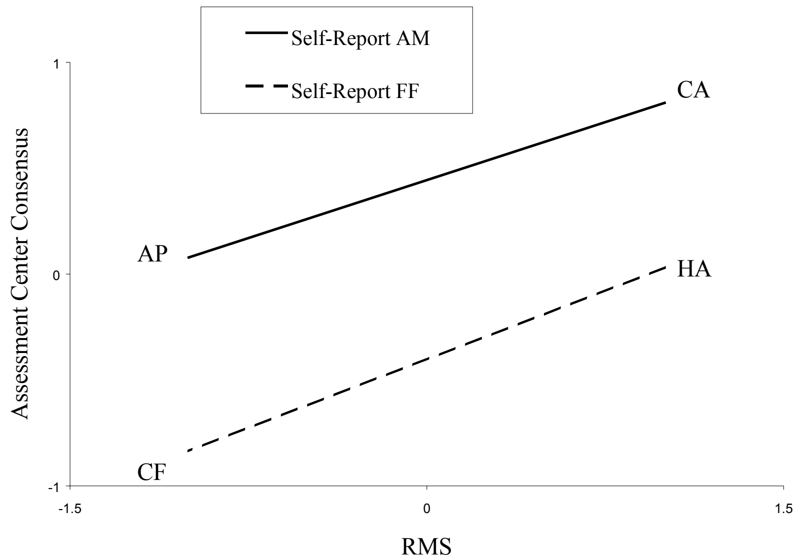


Figure 19. Study 3: The Prediction of Overall In-Basket Performance via the Integrative Model

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.



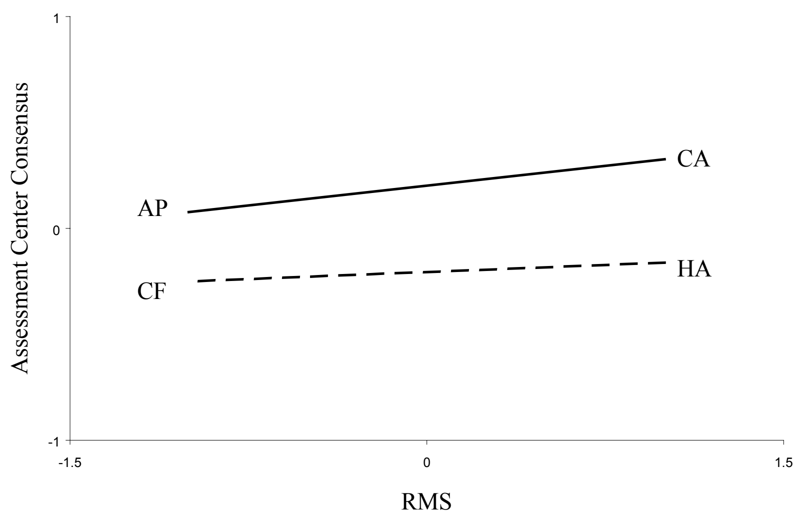


Figure 20. *Study 3: The Prediction of Assessment Center Consensus via the Integrative Model*

Note. CA = Congruent AMs, CF = Congruent FFs, HA = Hesitant AMs, and AP = AM Pretenders. The upper graph displays the results without controlling for cognitive ability, and the lower graph displays the results when controlling for cognitive ability.

APPENDIX C

CRYPTOQUOTE TASK

Cryptoquote Instructions

This is a test of verbal and problem solving abilities which uses cryptoquotes. A cryptoquote is a name, phrase, or sentence which has been encoded. The code is created by substituting each letter of the alphabet with a different letter of the alphabet. The cryptogram is solved by cracking the code to uncover the phrase or sentence hidden within it. In order to clarify what a cryptoquote actually is, consider the following example.

The phrase, "Solving mental puzzles reveals mental abilities," can be transformed into the cryptoquote, "Tpmwjoh nfoubm qvaamft sfwfbmt nfoubm bcjmjujft," with the following code:

A=B, B=C, C=D, D=E, E=F, F=G, G=H, H=I, I=J…Z=A

Notice that in some cases once part of the code is solved the phrase may become identifiable. For instance, if in the above example you found that "u," "o," "f," "m," "t," "p," "a," "n," "q," "j," and "b" represented the letters "t," "n," "e," "l," "s," "o," "z," "m," "p," "i" and "a," respectively, then the phrase would look like:

Solwinh mental pvzzles seweals mental acilities.

and a guess could be offered for the solution to the cryptoquote without additional work on the code.

There is only one rule used for the creation of a cryptoquote code, which is as follows: A code letter can stand for only one other letter of the normal alphabet. Therefore, in the above example, the letter "d" could not be used to substitute for both "a" and "p." Aside from this rule any letter may be used as a substitute for any other letter in the creation of the cryptoquote code.

Here is another example:

I   k t a o   p l l   h t b   p f g   e f p k c

_   _ _ _ _   _ _ _   _ _ _   _ _ _   _ _ _ _ _

As the letters are correctly deciphered the phrase becomes apparent.

A   k h i o   p f f   t h b   p l g   e l p k c

A   c h i o   p f f   t h e   p l g   b l p c k

A   c h i p   o f f   t h e   o l d   b l o c k

Here is the code used for the above example.

A=I, I=A, C=K, K=C, H=T, T=H, P=O, O=P, F=L, L=F, E=B, B=E, D=G

Cryptoquote Instructions

You will now do several practice cryptoquotes. You will have seven minutes to solve them. Please note that each cryptoquote has its own page. Prior to working on a cryptoquote please check the box in the upper right hand portion of the page on which the cryptoquote is located. Please solve the cryptoquotes in order, without skipping one. If you have difficulty cracking the code to a cryptoquote then you may cease working on that cryptoquote and go on to the next one. Once you have turned the page to work on the next cryptoquote please do not return to ones that you have already passed. You can only go forward to work on additional cryptoquotes, and only in the order that they are presented. Beneath each cryptoquote are several blanks with which you can test out various solutions. Feel free to use these blanks, as well as the rest of the page, for scratch paper.

Here are a few hints to help you solve the cryptoquotes: (1) The word, "the," is the most common three-letter word in the English language. Therefore, take a look at some of the three-letter codes in the cryptoquote to see if they actually represent the word "the." (2) The five vowels, A, E, I, O, and U comprise 40% of the letters used in the English language. (3) The letters L, N, R, S, and T comprise 30% of the letters used in the English language. (4) The letter E appears more frequently than any other letter.

Please Wait For The Instructor's Signal To Begin

Student Identification Number ____

Cryptoquote Practice Task

U f o o f t t f f   W p m v o u f f s t

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

_ _ _ _ _ s s _ _   V _ _ _ _ _ _ _ _ s

Cryptoquote Practice Task

☐

If you reach this page then please place a check mark in the above box.

STOP

You have finished the practice session.

Please wait for further instructions.

Cryptoquote Test Instructions

Attached to this page are seven test cryptoquotes. You will have fifteen minutes to solve them. Please note that each cryptoquote has its own page. Prior to working on a cryptoquote please check the box in the upper right hand portion of the page on which the cryptoquote is located. Please solve the cryptoquotes in order, without skipping one. Once you have turned the page to work on the next cryptoquote please do not return to ones that you have already passed. You can only go forward to work on additional cryptoquotes, and only in the order in which they are presented. Beneath each cryptoquote are several blanks with which you can test out various solutions. Feel free to use these blanks, as well as the rest of the page, for scratch paper.

Please Wait For The Instructor's Signal To Begin

Cryptoquote Test

N b e u i b e g n x i l y s a o l

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

k j m i p l i x x .

_ _ _ _ _ _ _ _ _ .

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

_ _ _ _ _ _ _ _ _ .

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

_ _ _ _ _ _ _ _ _ .

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

_ _ _ _ _ _ _ _ _ .

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

_ _ _ _ _ _ _ _ _ .

VITA

Mark Nathaniel Bing was born on November 12, 1968, in Knoxville, Tennessee. He attended Bearden High School, graduating in 1987. He subsequently attended the University of Colorado at Boulder. While pursuing his undergraduate degree he elected to study French at L'Université de Savoie, Chambéry, France, in the spring of 1990, and spent the summer bartending in Paris. He returned to Boulder to graduate Magna Cum Laude with a Bachelor of Arts in Psychology in 1992, and was admitted to Phi Beta Kappa in the same year.

Mark began his graduate studies in General Experimental Psychology at Villanova University in 1993. While at Villanova he decided to specialize in Industrial/Organizational Psychology, and entered the University of Tennessee's Ph.D. program in 1995. While a graduate student he published his first article as senior author in the *Journal of Business and Psychology*, and consulted for various companies such as Michelin North America, Job Files, and Bank of America. In 1999 he published his first solo article in the *Journal of Personality Assessment*, and became an Assistant Professor in the Master of Science Program in Industrial and Organizational Psychology at the University of Tennessee at Chattanooga. While there he finished his Master of Science Degree from Villanova, and published his second article as senior author in the *Journal of Organizational Behavior*. He left the University of Tennessee at Chattanooga in the summer of 2001 to work as an independent contractor for the United States Navy, specializing in personality assessment and the ongoing screening of prospective submariners, which he continues today. To date, Mark Nathaniel Bing has seven articles in peer-reviewed journals and has over fifteen presentations at national conferences, including the Society for Industrial and Organizational Psychology, the Academy of Management, and the American Psychological Association.