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The Development and Validation of Implicit Measures for Power Motivation

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THE DEVELOPMENT AND VALIDATION OF IMPLICIT MEASURES FOR POWER MOTIVATION

A Master's Thesis

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By

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ABSTRACT

Power motivation has been operationalized and explicitly measured both as a global and a multi-dimensional construct. However, implicit measures have focused on evaluating power motivation as a unidimensional construct. Thus, it is worth evaluating whether an implicit measure of power motivation can also measure power motivation as three distinct constructs – Dominance, Prestige, and Leadership (Social) motivation. This study used Implicit Association Test (IAT) measures to develop implicit measures for power motivation both as a global and multi-dimensional construct. A multitrait-multimethod design was used to examine the construct validity evidence for the new measures. Confirmatory Factor Analyses provided moderate evidence for convergent and discriminant validity.

KEYWORDS: power motivation, Implicit Association Test, implicit measure, multitrait-multimethod, dominance, prestige, leadership

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INTRODUCTION

Power motivation is defined as an individual's desire to influence behaviors or emotions of another party to achieve certain goals (McClelland, 1975, 1985; Winter, 1973). The recurrent concern of impacting others, incentivized by successfully influencing others, more precisely describes power motivation. This concern and incentive interaction energizes, orients, and selects behavior. Researchers have distinguished between personalized power and socialized power (Maliszewski et al., 2014). McClelland, for example, describes personal power as individual motivation to use their authority or status to influence others to follow their will or achieve their personal goals. Social power, on the other hand, is described as individual motivation to influence others through helping and leadership behaviors. Individuals with high socialized motives are also more likely to have high inhibition (Chusmir & Parker, 1984). Others posit that power motivation can be decomposed into three autonomous constructs: dominance, prestige, and leadership (Schultheiss & Brunstein, 2010). Power motivation, in this study, will be defined in accord with this approach – an individual's desire to influence behaviors or emotions of another through dominance, prestige, and leadership.

There is an abundance of explicit and implicit measures of power motivation as a global construct. These measures are products of decades spent on power motive studies, defining its nomological network, and understanding its impact from sociological and psychological perspectives. Explicit measures include the Personal Values Questionnaire (PVQ; McClelland, 1991), the Personality Research Form (PRF; Jackson, 1967), and the Unified Motives Scale (UMS; Schönbrodt & Gerstanberg, 2012). Implicit measures include the Thematic Apperception Test (TAT; Winter & Stewart, 1978), the Operant Motive Test (OMT; Kuhl & Sheffer, 1999),

the Multi-Motive Grid (MMG; Sokolowski et al., 2000), and the Implicit Association Test (IAT; Schnabel et al., 2009).

Some explicit power measures treat power as a multidimensional construct, like the Dominance, Prestige, and Leadership Scale (DoPL; Suessenbach et al., 2019) and the Need for Power Scale (NPS; Lee, 2018). However, there are no implicit measures of the three autonomous constructs that these explicit measures target. It has long been known that implicit and explicit measures of motives are dissociated (Atkinson, 1958; McClelland et al., 1953). Because of this dissociation, the two types of measures are described as measuring different constructs that predict different types of behavior (McClelland et al., 1989). Greenwald and others suggest that the dissociation of implicit and explicit measures of many psychological attributes (like social attitudes and personality traits) is due in part the implicit measures' resistance to the contaminating effects of impression management and inaccurate self-knowledge artifacts (Greenwald et al., 2002; Olson & Fazio, 2004). Thus, the development of implicit measures of power motives using the IAT should allow for opportunities to observe any differences between implicit and self-report measures, control for self-insight and social desirability bias, and afford possible applications of implicit motive tests in the workplace.

Implicit Measures and the Power Motive

Observed discrepancies in the zero-order correlations between implicit and explicit measures of motives support the need for implicit measures (Spangler, 1992). Several theories explain the relationship between implicit and explicit measures. One that stands out in the study of power motivation is the Information Processing Model (John et al., 2010). According to this model, implicit motives are more primitive and are aroused by task incentives, while social

incentives encourage the self-attributed motive. Moreover, implicit motives lead to pleasure from completing the task, while explicit motives result from higher cognitive functions driven by social incentives (Perugini et al., 2020). The theory was further defined two processes that result in a dual system. He proposed that nonverbal stimuli arouse implicit motives and impact intrinsic processes not accessible to an individual's self-concept. Verbal-symbolic cues, which are representations stored in our declarative memory, arouse explicit motives.

Referential processing is a mechanism that explains the information-processing model. It is "the process through which verbal labels are retrieved and assigned to nonverbal percepts, and conversely, mental images are generated in response to words" (Paivio, 1986). This model supports the use of different measures for implicit and explicit motives. Explicit motives should be measured by questionnaires that employ our verbal-symbolic system and arouse our desire for social incentives. Implicit motives should be measured by activating the emotional system through stimuli that elicit task completion. The most popular implicit measure of power motive is the Thematic Apperception Test (TAT).

Murray (1943) developed the TAT in conjunction with his comprehensive inventory of needs. The original test includes 31 achromatic cards containing scenes portraying both individuals by themselves or in groups and landscapes. The test is administered by having the examinee create a story describing what the card depicts. The assumption is that these stories reflect the examinee's motives, needs, and emotions (Salkind & Rasmussen, 2007). Dominance is one of the needs that he described. He defined it as the need to control one's human environment, influence or direct the behavior of others, and dissuade, restrain, or prohibit; a definition that most resembles how the power motive is defined by subsequent scholars (Hall & Lindzey, 1957).

Veroff (1957) defined power as one's control of the means of influence. He measured power motivation (*n* Power) through the TAT by analyzing stories written by students seeking office while waiting for election results. He found that power arousal resulted in the experimental group's stories containing more mention of influence. Moreover, he found that those with high *n* Power were trying harder to convince others than those with low *n* Power. However, subsequent research showed inconsistencies since those high in *n* Power showed assertive and unassertive behavior. In response, Veroff and Veroff (1972) reported that *n* Power measured the fear of appearing weak. This explanation resembles the theory that power motive is driven by our need to compensate for our weaknesses (Adler, 1917).

Uleman (1971) further developed the measure of *n* Power as it relates to influence through an experiment where one group was given the legitimate power of controlling a gambling game because they were told to use tactics like marked cards. The other group was told they were just participating in a gambling game. He theorized that this activity would arouse the power motive of those given power, which should be reflected on a four-picture TAT. His model showed more of a reciprocal relationship between the groups instead of just one individual seeking to gain control. Thus, he ultimately concluded that he was estimating *n* Influence and not *n* Power through this measure.

The n Power measure was revised by using images or films of influential figures to arouse participants' power motive. An example is John F. Kennedy's inaugural speech address. He then developed a scoring system by identifying elements that empirically differentiated between the TAT protocols of the aroused and non-aroused subjects. Later, Winter re-examined his measure and created a revised *n* Power scoring system with sources from various scoring systems (1994). This procedure came to be called the Picture Story Exercise (PSE), where power

was scored for any indication that one party has an impact, control, or influence over another party.

While the TAT and PSE have been the primary measures of implicit motives, the Implicit Association Test (IAT) was selected for this study because of the interest in finding any automatic associations based on the power motive source. In addition, the IAT potentially provides an opportunity to develop an implicit measure that is quickly, easily, and inexpensively administered. The PSE is cumbersome (individually administered and time consuming) and it requires expertise to score (expensive).

Implicit Association Test

The Implicit Association Test (IAT) measures the strength of association between pairs of categories (Lane et al., 2007, pp. 59-102). The IAT procedure involves presenting stimuli (words, in our case) in the middle of a computer screen, one at a time. The subject's task is to sort the stimuli into alternative categories by pressing a letter on the keyboard. The category labels into which the stimuli are to be sorted are displayed in the upper left and upper right corners of the screen. Subjects are instructed to press the "e" key with the index finger of their left hand or the "i" key with the index finger of their right hand, according to which category the stimulus item belongs. The participants are asked to respond as fast as they can without making mistakes The procedure consists of blocks of trials, with 20 to 40 presentations per block. The IAT score is a function of the mean reaction times on the sorting task for alternative pairings of categories. The assumption is that sorting should be faster and more accurate the stronger the association between concepts that share the same response key.

The standard IAT structure includes a series of seven blocks (Table 1). The test begins with a practice block designed to familiarize subjects the two target categories and their corresponding stimuli. For example, in the Racial Attitude IAT, the first block consists of 20 trials where subjects classify images of white and black faces by pressing the “e” key if the image is that of a black person or the “i” key if the image is that a white person. It is important to familiarize participants with the process because accuracy and speed are analyzed. The second block consists of 20 trials that familiarize participants with the attribute categories and their stimuli. Subjects press the “e” key when negative words are presented and the “i” key when positive words are presented. The third (20 trials) and fourth (40 trials) blocks combine the categories and attributes. Black and negative are paired, where participants press the “e” key when a black image *or* negative word is presented, or the “i” key when either a white image *or* positive word is presented. The target category assignment keys are reversed for the fifth block (the “e” key is pressed for white images and the “i” key is pressed for black images).

The sixth (20 trials) and seventh (40 trials) blocks combine the categories and attributes, but on these trials, the pairing is reversed (white+bad and black+good). The IAT score is a function of the mean difference in response times for the original pairing versus the reversed pairing. The greater the score, the stronger the association in the original pairing, relative to the reverse pairing. Thus, individuals with implicit prejudice against White people should respond faster and more accurately when "White" and "negative" are assigned to the same key (Teige-Mocigemba et al., 2010).

Power Motives Implicit Association Tests

The revised Thematic Apperception Test by McClelland has been used to measure motives for decades. Thus, it is vital to understand the similarities and differences between the TAT and the IAT. Sheldon et al. (2007) compared the TAT and the IAT measures of power (with intimacy as the opposing category) and found a weak significant correlation between the two measures ($r = 0.26$). They presumed a modest correlation because both measures focus on automatic responses, but there are crucial differences between how and what the TAT and IAT measure. For instance, the TAT tries to evaluate implicit and fundamental *meaning-making systems*. The IAT measures *automatic associations* on competitive behavioral choices.

During the development of the current IATs, one of the concerns was the possible ambiguity between the stimuli for "leadership" vs. "intimacy." For example, some participants might categorize the stimulus *support* under "leadership" instead of "intimacy." This was a potential issue because ambiguity could affect reaction times and increase errors, distorting the IAT effect and resulting in measurement error. The criteria for the Intimacy IAT stimuli were words that are easily envisioned as behaviors of those with “a mutual, simultaneous, and compassionate emotional effect on each other,” following Winter’s definition of intimacy. Whereas power stimuli should reflect a serial effect from an actor to an influenced other.

The apparent variation on how power is exhibited, following Winter’s Basic Forms of Power Imagery (Table 2), raises the question of whether implicit power motivation has sub-factors that should be measured separately and if individuals respond differently in answering an explicit measure based on their preferences on power sources. Arguably, the same question was asked during the development of the Dominance, Prestige, and Leadership scale.

Dominance, Prestige, and Leadership

McDougall identified an instinctive propensity (motive) called "self-assertive propensity," which is the motivation to dominate, display oneself before one's fellows, or lead (1932). A parallel can be drawn between his definition and how the power motive was broken down for the DoPL Scale. The DoPL researchers found evidence that the general power motive should be decomposed into three autonomous motives related to individuals' desire to leverage the social hierarchy. These autonomous motives are dominance (dominate), prestige (display oneself before one's fellows), and leadership (lead).

Dominance (D). This is the desire to force others into following one's will. “Dominant or coercive desires and actions” has been a universal definition of the power motive and needs related to power. For example, this definition mirrors that of Murray’s (1938) *n* Dominance as the need to control one's human environment, influence or direct the behavior of others, or to dissuade, restrain, or prohibit. According to his definition of motives, the autonomous dominance motive involves a recurrent concern of coercing others to follow one’s will and is incentivized by the submission of the other party.

Prestige (P). This is the desire to be admired by others. The admiration is often directed towards knowledge and skills but can be a general desire for admiration. Autonomous prestige need also relates to the theory that power comes from our need to be more important from others' perspectives. Thus, the autonomous prestige motive involves a recurrent concern of wanting admiration from others and is incentivized by receiving admiration.

Leadership (L). This is the desire to take responsibility for directing a group toward a common goal. This definition of leadership relates to Socialized *n* Power, or the desire to influence by taking responsibility, serving, and empowering others (Moon et al., 2021a). It

contrasts Personalized *n* Power, which is a desire to influence others through self-serving means and prestige. Thus, the autonomous leadership motive involves a recurrent concern of owning responsibility and is incentivized by group goal success driven by the leader's efforts. This study will use the terms *leadership* and *social* interchangeably because social behaviors go beyond typical leadership behaviors. However, many of the social measures in this study are focused on leadership (i.e., DoPL, HPI Leadership, etc.)

Social hierarchy theories support the decomposition of the power motive into three categories because people can be in different levels on different hierarchies (Maner & Case, 2016). For example, someone could have a strong desire for power through dominance (i.e., coercion, force) but not be perceived as having high power in the context of leadership (i.e., empowering, serving). The IAT may prove useful in measuring these facets of power motivation because it may mitigate the effects of impression management caused by negative connotations on the overt pursuit of power and the lack of insightful self-awareness by individuals.

Hypothesis

The measures of different power motivation should be relatively unrelated (evidence of discriminant validity). Implicit and explicit measures should also be relatively unrelated, although dominance, prestige, and social IATs should show a positive relationship to their respective DoPL scales and other relevant explicit scales. The three Single-Target IATs (excluding overall) are hypothesized to be unrelated to each other (discriminant validity). Three trait factors (dominance, prestige, and social) and two method factors (implicit and explicit) should explain the variance/covariance in the MTMM.

Table 1. Racial Attitude Implicit Association Test Structure.

Block	*N* trials	Task	Response key assignment	
			Left key	Right key
1	20	Target discrimination	Black	White
2	20	Attribute discrimination	Negative	Positive
3	20	Initial combined task	Black, negative	White, positive
4	40	Initial combined task	Black, negative	White, positive
5	20 or 40	Reversed target discrimination	White	Black
6	20	Reversed combined task	White, negative	Black, positive
7	40	Reversed combined task	White, negative	Black, positive

Table 2. Basic Forms of Power Imagery assigned to a DoPL classification.

Basic Form of Power Imagery
Strong, forceful actions that inherently impact others
Control or reputation, especially through gathering information or checking up on others.
Attempts to influence, persuade, convince, or prove a point
Giving help, advice, or support that is not explicitly solicited
Impressing others or the world at large (fame, prestige, reputation)
Any strong emotional reaction in one person to the action of another person.

METHOD

Sample

The Missouri State University Institutional Review Board's Protection of Human Subjects Committee approved this research (Appendix A) on January 4, 2021 (Study Number FY2021-296). Introductory Psychology students signed up and completed the study (N = 207). Participants were recruited through Missouri State University's Psychology Department Research Participation System (SONA). Students received participation credit after voluntarily attending a data collection session. A post hoc power analysis indicated that the sample size meets the size necessary for adequate power (.80), given a hypothesis of close fit (H0: RMSEA = .05) and the alternative hypothesis of poor fit (HA: RMSEA = .10) (MacCallum et al., 1999).

Explicit Measures

DoPL Scale. The Dominance, Prestige, and Leadership (DoPL) scale was used to measure individual power motives. The authors of the measure described 6-item, 8-item, and 12-item versions of each subscale. This study employed the 6-item version, which has reliabilities that range from .81 to .94. The questionnaire has 18 statements (6 per factor) and is answered with a 6-point Likert-type scale from Strongly Disagree to Strongly Agree. An example Dominance item is, "I enjoy bending others to my will." An example Prestige item is, "I am happy when I can present my achievements to others." An example Leadership item is, "I feel confident when directing the activities of others. See Appendix B for the full scale.

IPIP Scales. Several theoretically related explicit measures were obtained from IPIP: manipulativeness (CAT-PD; Simms, et al., 2011), leadership (HPI-Leadership; Hogan & Hogan,

2002; VIA; Peterson & Seligman, 2004;), Modesty (HEXACO; Ashton et al., 2007), and Machiavellianism (JPI; Jackson, 2004). Public Self-Consciousness (Fenigstein et al., 1975). See Appendix C for the full scales.

Need for Power Scale. Developed by Moon et al. (2021b), this measure targets two factors. There are 9 questions that measure the personalized need for power ($\alpha = .68$) and 9 questions that measure the socialized need for power ($\alpha = .85$). Personalized need for power relates to dominance and prestige with questions like, "It doesn't matter why people listen to me, as long as they do," and "I desire to go down in history as a famous person and powerful individual." Socialized need for power relates to leadership and helping behavior with questions like, "I want to be successful while making those around me successful as well," and "I want to be able to have the power to help others succeed."

Implicit Measures

Implicit Association Test. Four seven-block IATs were developed for this study (see Table 3). The categories selected were based on the structure of the DoPL explicit scale (i.e., Dominance, Prestige, and Leadership). The fourth IAT is a global measure of 'Power' with stimuli that represents dominance, prestige, and leadership. It aims to measure implicit attitudes toward power as a unidimensional construct. All four of the IATs have intimacy as the contrasting category for each power category, in accord with the procedure used by Sheldon and colleagues. “Pleasant” vs. “unpleasant” were the targets selected for this measure. The IATs were pilot tested and the overall power IAT showed the most variance. Thus, it was the only standard IAT used for data collection in the major study.

Single-Target Implicit Association Test. Unlike the Standard IAT, the ST-IAT does not present two opposing categories and employs a 5-block procedure. A single category (power attribute) is paired with “me” versus “not me.” The ST-IAT has shown internal consistencies of .70 or higher, correlations with explicit measures of .43 (corrected for attenuation), and convergent validity with related implicit measures (Bluemke & Friese, 2008). The “me” vs. “not me” categories were used for all ST-IATs (Table 4). Four Single-Target IATs (ST-IAT) were developed for the study (Table 5). The categories selected were based on the structure of the DoPL scale (i.e., Dominance, Prestige, and Leadership).

Emotional Stroop Task. J. Ridley Stroop's classic Stroop Task has been used in experiments for testing executive functions like selective attention, mental capacity, and processing speed (Lamers, 2010; Stroop, 1935). The emotional Stroop Task (ES) differs from the classic Stroop Task because it captures the conflict between the individual's emotion processing and the presented stimuli, instead of just the color-word conflict (Ben-Haim et al., 2016). The ES structure is an appropriate measure of implicit power motive because it allows for the measurement of any conflict between words relating to power (dominance, prestige, and leadership) and individual processing caused by implicit associations. A Stroop task was created using semantically distinct stimuli (power related words) and neutral stimuli. Pilot test data suggested the task had adequate psychometric properties.

Procedure

The informed consent statement was read to the participants after they had been assigned a computer station. The participants were then asked to pull up the Millisecond link for the tests. The order of the test was as follows: Demographics, Power Standard IAT, IPIP Scales Set 1, Dominance ST-IAT, IPIP Scales Set 2, Prestige ST-IAT, Stroop Task, Leadership ST-IAT, the DoPL Scale, Power ST-IAT, and the Need for Power scale. Explicit and implicit scales were alternated to mitigate the effects of fatigue that can occur when multiple implicit or explicit scales are administered. The data were analyzed with SPSS and AMOS software.

Data Analysis

Confirmatory factor analytic procedures (CFA) were used to evaluate a set of nested latent trait models that test convergent and discriminant validity hypotheses, in accord with Widaman's (1985) recommendations. Changes in fit statistics were analyzed between successive pairs of models. The comparisons started with the least restrictive model (Figure 1) where the factors intercorrelate freely. Two more restrictive models followed this comparison: one where the method factors are freely correlated and there are no trait factors (Figure 2), and another where the trait factors are perfectly correlated, and the methods are freely correlated (Figure 3). The trait factors are freely correlated in the final model, but the method factors are uncorrelated (Figure 4).

Table 3. Category Labels and Word Stimuli for Power IATs.

Overall	Dominance	Prestige	Leadership	Intimacy
Assertive	Assertive	Admired	Responsible	Care
Dominate	Dominate	Reputation	Coordinate	Console
Admired	Aggressive	Respect	Direct	Protect
Reputation	Coerce	Recognized	Manage	Comfort
Responsible	Forceful	Achieve	Inspire	Loving
Coordinate	Manipulate	Prominent	Motivate	Nurture

Table 4. Single-Target Implicit Association Test Structure.

Block	*N* trials	Task	Response key assignment	
			Left key	Right key
1	20	Attribute Practice	me	not me
2	20	Incompatible Test	me	not me + target
3	20	Incompatible Test	me	not me + target
4	20	Compatible Test	me + target	not me
5	40	Compatible Test	me + target	not me

Table 5. Category Labels and Word Stimuli for Power ST-IATs.

Overall	Dominance	Prestige	Leadership
Assertive	Assertive	Reputation	Coordinate
Popular	Dominate	Popular	Direct
Manage	Aggressive	Recognized	Manage
Coordinate	Forceful	Prominent	Motivate

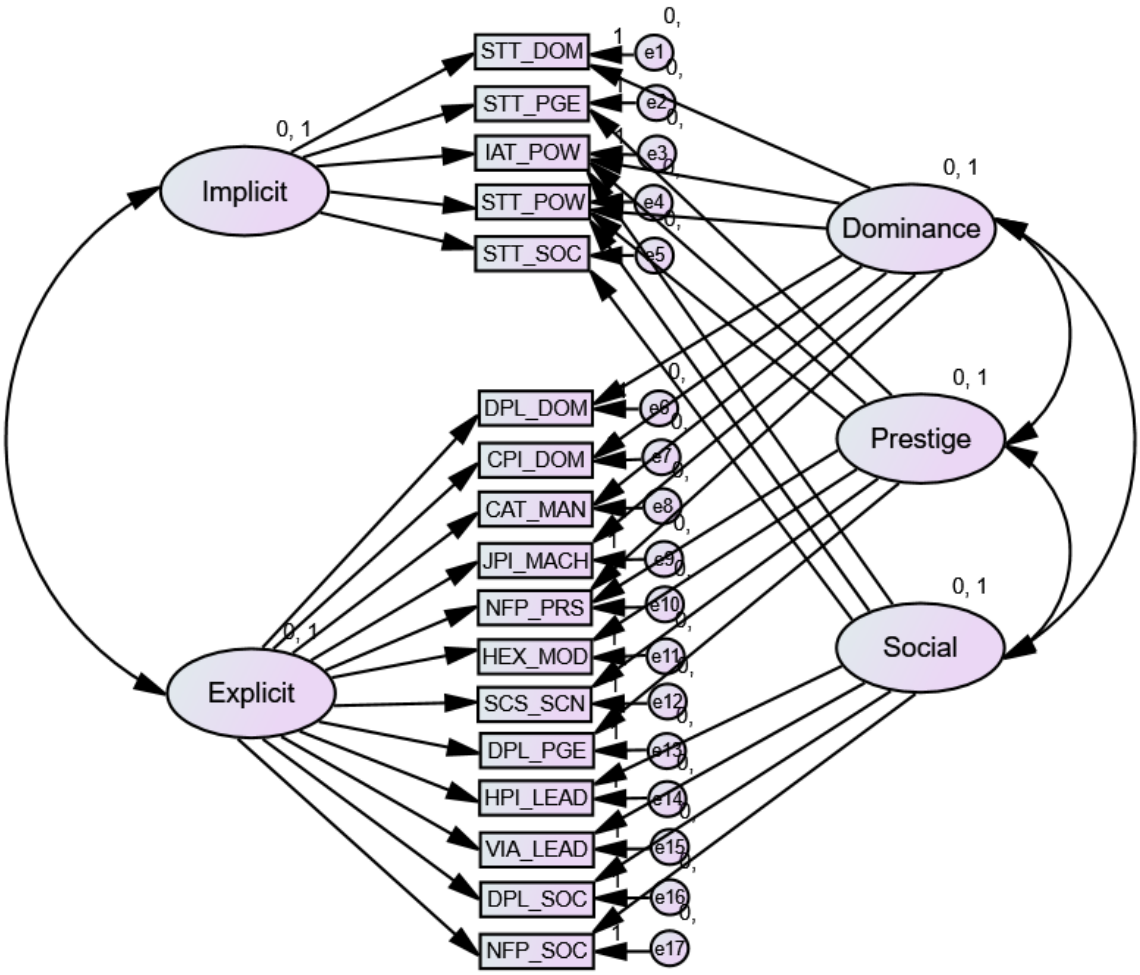

Figure 1. CFA Model 1: Two Freely Correlated Method Factors and Three Freely Correlated Trait Factors

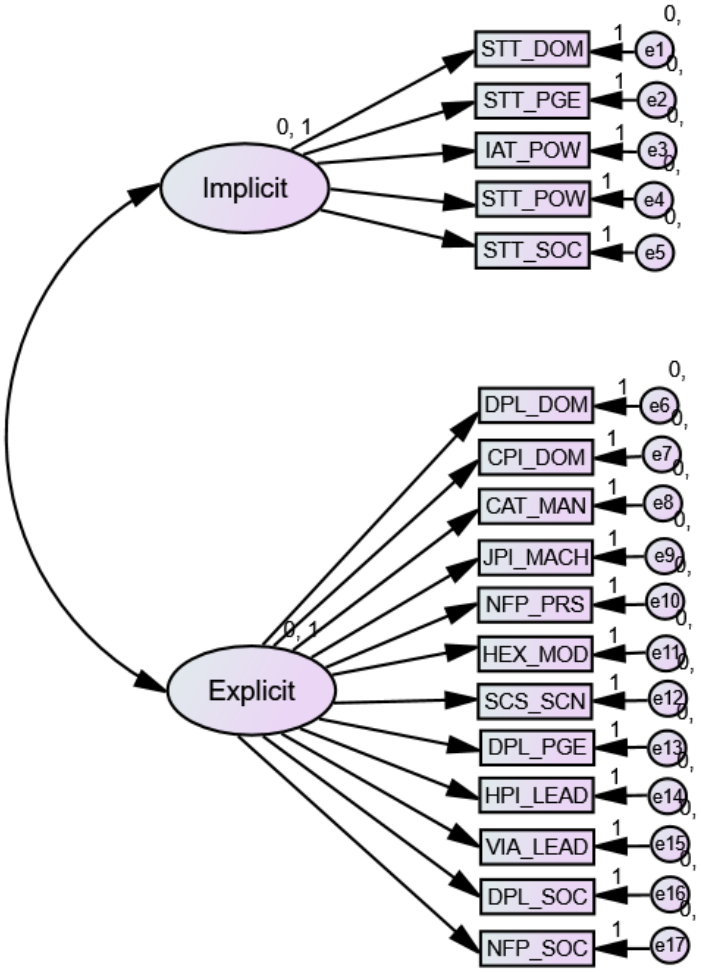

Figure 2. CFA Model 2: Two Freely Correlated Method Factors and No Trait Factors

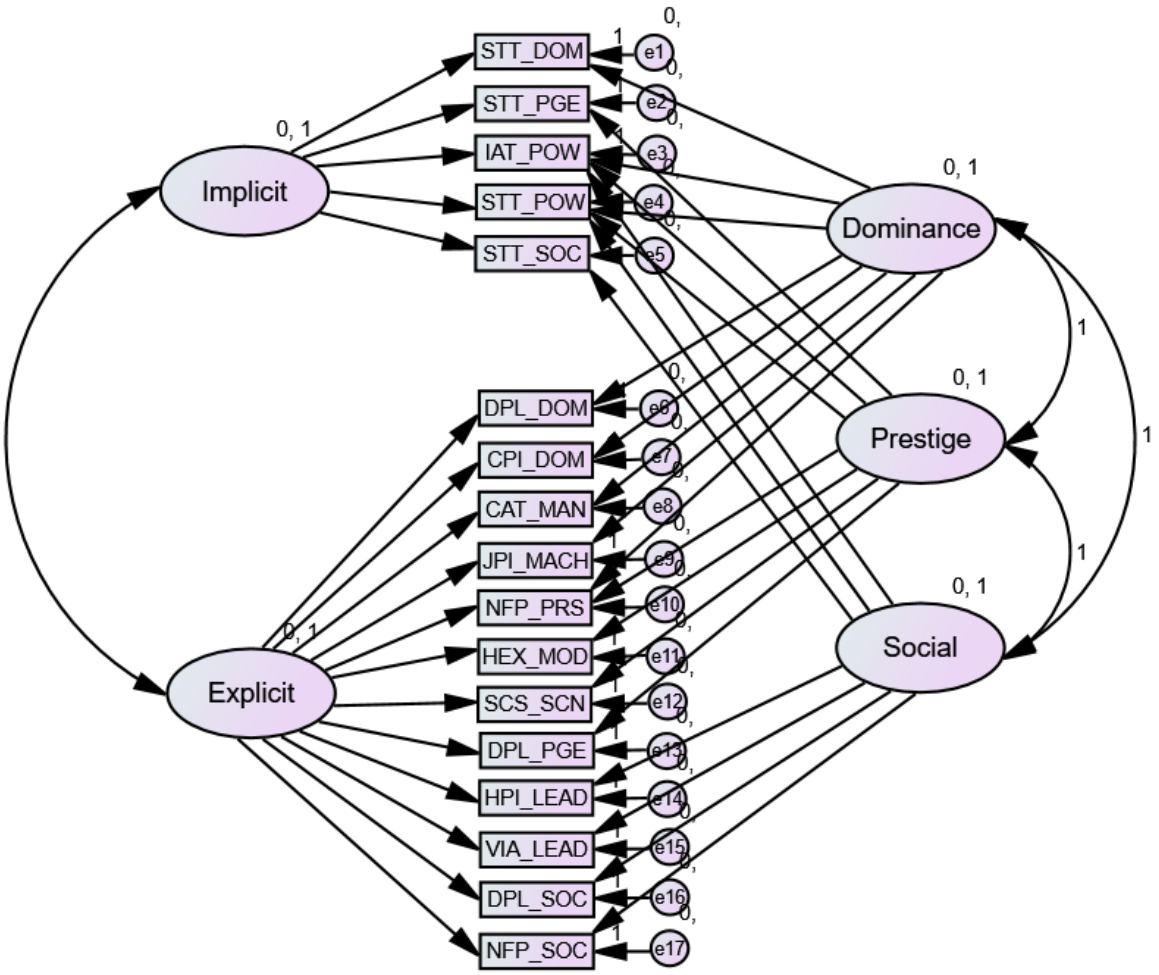

Figure 3. CFA Model 3: Two Freely Correlated Method Factors and Perfectly Correlated Trait Factors

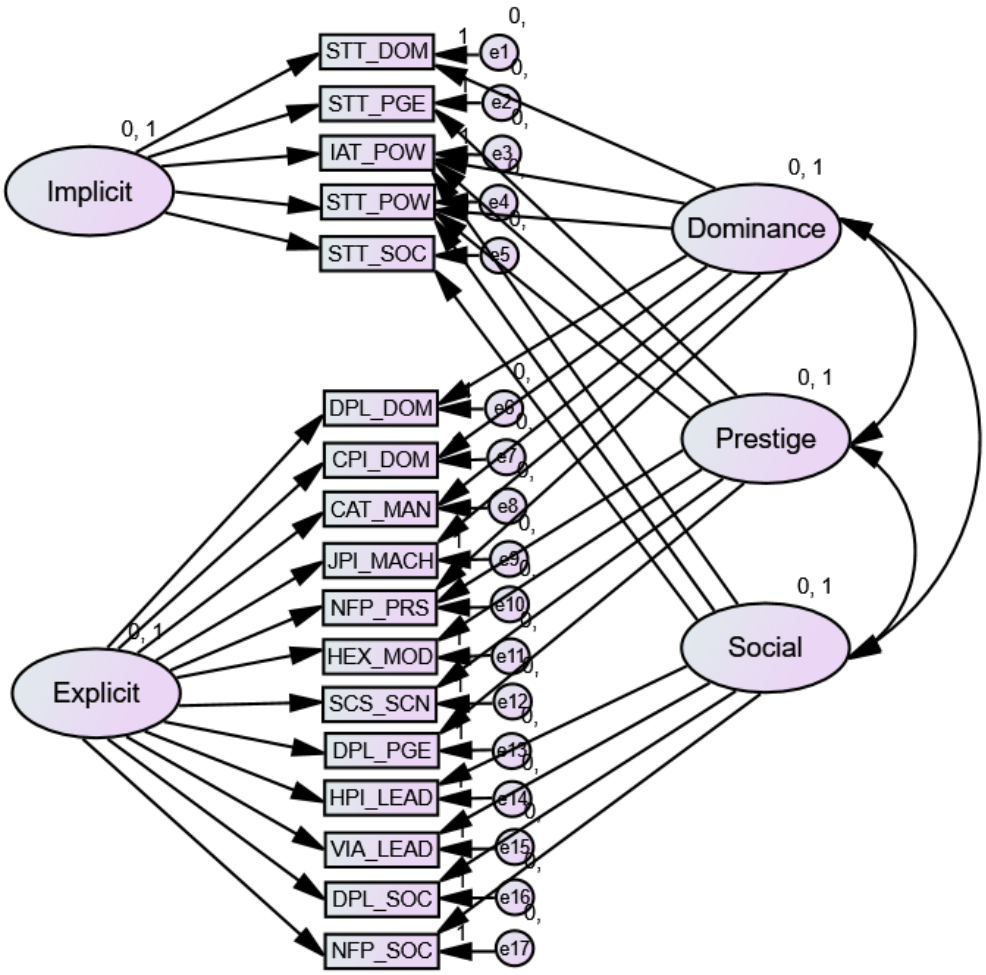

Figure 4. CFA Model 4: Two Uncorrelated Method Factors and Three Freely Correlated Trait Factors

RESULTS

Demographics

The final sample had 189 participants. The data were cleaned by removing responses with significant missing data and excessive error rates. Of the 189 respondents, 123 were female (65.1%), 62 were male (32.8), and four were non-binary (2.1%). The racial and ethnic demographic breakdown was as follows: 3.2% American Indian or Alaskan Native, 2.6% Asian, 3.2% Black or African American, 3.7% Hispanic or Latino, 81.5% Non-Hispanic White, and 5.8% identify with Two or More races/ethnicities. English was the first language for 97.9% of the respondents. The age of the respondents ranged from 18 to 52 years, with a mean of 18.93.

Table 6 shows the descriptive statistics and reliability coefficients for the variables in this study. The Standard (7-block) Implicit Association Test for Power was the implicit measure with the highest reliability coefficient (α=.79) which met Nunnally's (1978) minimum level of α=.70. The Single-Target (5-block) Implicit Association Tests all had poorer reliabilities, with Power (α=.29), Dominance (.39), Prestige (α=.48), and Social (α=.34). The explicit scales showed mostly acceptable reliability coefficients except for CAT – Manipulativeness and HPI – Leadership.

Table 7 shows the zero-order correlations for the variables of this study. The Power IAT showed significant correlations with explicit measures of self-consciousness (negative), leadership, and personalized power. However, according to Cohen's (1992) standards, these correlations represent less than moderate relationships. The Stroop Task mean rates were highly correlated with each other, but they did not correlate with any other measures.

The explicit scales mostly showed the expected correlations among each other. CAT-Manipulativeness correlated positively with the JPI Machiavellism, CPI Dominance, and Personalized Need for Power Scales. It correlated negatively with HEXACO Modesty and VIA Leadership Scale. These relationships provided evidence that Dominance was assessed effectively with explicit measures. HEXACO's Modesty Scale showed significant negative correlations with most scales, with Dominance scales showing the largest inverse correlation. Personalized Need for Power correlated with dominance and prestige measures such as CAT Manipulativeness, CPI Dominance, and HEXACO Modesty (negative).

The initial model included all implicit and explicit measures. An admissible solution could not be found for this model. Consequently, the Stroop Tests were removed since they did not correlate with any implicit or explicit measures. Thus, the final model consists of Power IAT and all four ST-IATs, with all explicit measures. An equality constraint was imposed on the error variances for HEX Modesty and Self-Consciousness scales and the Dominance, Prestige, and Social Single-Target IAT to arrive at an admissible solution, as suggested by Marsh et al., (1992).

Table 6. Descriptive Statistics for Study Variables.

Variables	N	Min	Max	Mean	SD	Alpha
Demographics						
Age	189	18	52	18.93	2.72	NA
Implicit Measures						
Power IAT	189	-1.47	.86	-.57	.43	.79
Power STIAT	189	-.80	.96	-.07	.28	.29
Dominance STIAT	189	-.86	.63	-.08	.28	.39
Prestige STIAT	189	-.78	1.00	-.08	.31	.48
Social STIAT	189	-.74	.56	-.08	.27	.34
Dominance Stroop	189	431.76	2,029.76	711.40	188.68	.56
Prestige Stroop	189	429.13	2,135.36	709.32	200.46	.68
Social Stroop	189	446.76	1,500.87	707.55	171.30	.37
Explicit Measures						
DoPL Dominance	186	6	32	15.52	5.53	.84
DoPL Prestige	186	13	36	25.37	4.59	.73
DoPL Leadership	186	6	36	23.24	5.78	.87
Self-Consciousness	189	24	60	40.25	7.31	.80
CAT Manipulative	189	6	27	11.49	4.09	.81
HPI Leadership	189	7	30	19.24	4.06	.70
JPI Machiavellism	189	8	28	18.37	4.03	.72
CPI Dominance	189	16	43	27.42	5.30	.71
HEX Modesty	189	11	50	32.53	4.04	.76
VIA Leadership	189	21	49	37.34	5.43	.66
NFP Personal	189	9	54	25.03	7.08	.83
NFP Social	189	9	54	41.73	6.86	.88

Table 7. Zero-Order Correlations Based on Study Variables.

Variables[1]	1	2	3	4	5	6	7	8	9	10
Implicit										
IA_Pow	-									
ST_Dom	.06	-								
ST_Pge	.03	.26**	-							
ST_Soc	.01	.04	.24**	-						
ST_Pow	.03	.14	.25**	.21**	-					
SP_Dom	.09	-.03	-.06	.13	.00	-				
SP_Pge	.10	-.06	-.03	.11	-.02	.76**	-			
SP_Soc	.15*	-.09	-.02	.13	.11	.80**	.72**			
Explicit										
DL_Dom	-.07	.05	.03	.05	-.05	.05	.02	.03	-	
DL_Pge	-.02	.09	.11	.07	-.10	.06	.03	.06	.28**	-
DL_Soc	.08	.00	.02	.04	-.02	-.05	-.09	-.05	.19**	.31**
BS_SCn	-.23**	.00	-.04	-.11	-.02	-.03	-.01	-.04	-.07	.00
CT_Man	.05	.00	-.02	.08	.06	.05	.10	.06	.02	-.04
HP_Led	.13	-.02	.09	.08	-.02	-.05	-.06	-.05	.04	-.03
JP_Mch	.07	-.01	.00	.18*	.13	.06	.09	.00	.01	.00
CP_Dom	.19*	.09	.01	.16*	.13	.13	.13	.14	.00	.01
HE_Mod	-.12	-.04	-.02	-.18*	-.04	-.06	-.11	-.02	-.14	-.02
VI_Led	.03	-.19**	-.14	-.04	-.04	-.02	-.05	-.01	-.21**	-.08
NP_Prs	.20**	.15*	-.01	.11	.15*	.07	.16*	.09	-.01	-.04
NP_Soc	-.01	-.06	-.02	.05	.06	-.02	-.01	-.07	-.09	-.02

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

Table 7 continued

Variables[1]	11	12	13	14	15	16	17	18	19	20
Implicit										
IA_Pow										
ST_Dom										
ST_Pge										
ST_Soc										
ST_Pow										
SP_Dom										
SP_Pge										
SP_Soc										
Explicit										
DL_Dom										
DL_Pge										
DL_Soc	-									
BS_SCn	-.16*	-								
CT_Man	.03	.10	-							
HP_Led	.13	-.53**	-.16*							
JP_Mch	.12	-.11	.43**	.43**	.21**	-				
CP_Dom	.13	-.10	.48**	.48**	.18*	.41**	-			
HE_Mod	-.19*	.12	-.20**	-.20**	-.32**	-.52**	-.47**	-		
VI_Led	-.05	.04	-.36**	-.36**	.11	.17*	-.14	.03	-	
NP_Prs	.10	-.21**	.43**	.43**	.12	.37**	.54**	-.37**	-.10	-
NP_Soc	-.05	.20**	-.29**	-.29**	.04	.16*	-.03	-.14	.58**	.05

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

[1]Variable names have been shortened due to space restrictions. Variable names are as follows (scales cited on Method section): Power Implicit Association Test, Dominance Single Target IAT, Prestige Single Target IAT, Social Single Target IAT, Power Single Target IAT, Dominance Stroop Task, Prestige Stroop Task, Social Stroop Task, DoPL – Dominance Scale, DoPL – Prestige Scale, DoPL – Leadership (Social) Scale, Self-Consciousness Scale, CAT Manipulative Scale, HPI Leadership Scale, JPI Machiavellism Scale, CPI Dominance Scale, HEXACO Modesty Scale, VIA Leadership Scale, NFP Personal Scale, and NFP Social Scale.

Test of Hypothesis

The first comparison (Model 1 vs Model 2) demonstrated convergent validity among the dominance, prestige, and leadership traits based on the deterioration of the fit statistics (Table 8). The second comparison (Model 1 vs Model 3) demonstrated discriminant validity to the extent that the fit statistics were different between the freely correlated model (Model 1) and the perfectly correlated model (Model 3). The larger the difference in CFI values and χ^2, the more support there is for discriminant validity. For the final comparison (Model 1 vs Model 4), the lack of a significantly large difference in the final comparison (Model 1 vs Model 4) also provided support for discriminant validity (Byrne, 2010).

Model 1 of this study showed satisfactory fit statistics ($\chi^2_{(94)} = 172.555$; CFI = .87; RMSEA = .067, 90%CI = .051, .082); whereby, the CFI did not meet the .90 threshold, but the RMSEA was less than .08 but greater than .05 (Bentler, 1990). The first comparison (Model 1 vs Model 2) for this study showed evidence for convergent validity (Table 9) since there was a substantial degradation ($\Delta\chi^2_{(27)} = 301.423$; ΔCFI = .46). Power motivation was condensed into a single factor in Model 3. And this comparison (Model 1 vs Model 3) showed evidence for discriminant validity ($\Delta\chi^2_{(10)} = 144.193$; ΔCFI = .23). The final comparison (Model 1 vs Model 4) showed negligible differences in fit statistics ($\Delta\chi^2_{(1)} = .201$; ΔCFI = .001). Thus, the implicit and explicit measures have no common method variance.

Table 10 shows the factor loadings for each of the three power trait factors and the two method factors. The results showed that only some of the indicator variables for each factor had significant loadings (23 of 41), providing only modest support for the measures' construct validity.

Table 8. Summary of Goodness-of-Fit Statistics for CFA Models.

Model	x^2	df	CFI	RMSEA	90%C.I.
1. Freely correlated traits; freely correlated methods	172.555	94	.87	.067	.051, .082
2. No traits; freely correlated methods	473.978	121	.41	.125	.113, .136
3. Perfectly correlated traits; freely correlated methods	316.748	104	.64	.104	.091, .118
4. Freely correlated traits; uncorrelated methods	172.756	95	.87	.066	.050, .081

Table 9. Differential Goodness-of-Fit Indices for MTMM Nested Model Comparisons.

	Difference in		
Model comparisons	x^2	df	CFI
Test of Convergent Validity			
Model 1 versus Model 2 (traits)	301.423	27	.460
Test of Discriminant Validity			
Model 1 versus Model 3 (traits)	144.193	10	.230
Model 1 versus Model 4 (methods)	.201	1	.001

Table 10. Trait and Method Loadings for CFA Model 1.

Measures	Dominance	Prestige	Social (Lead)	Implicit	Explicit
Implicit Measures					
Power IAT	.292*	.220	-.179*	.039	
Power STIAT	.261*	-.162	.061	.447***	
Dom STIAT	.053			.370***	
Prestige STIAT		.002		.573***	
Social STIAT			-.091	.356***	
Explicit Measures					
DoPL Dominance	.041				-.002
DoPL Prestige		.030			-.011
DoPL Leadership			-.203*		.113
CPI Dominance	.710***				.074
JPI Mach	.637***	.638***			.280**
VIA Leadership			.444***		.528***
NFP Personal	.823***	-.217			.132
NFP Social			.597***		.601***
HEX Modesty		-.787***			-.464***
HPI Leadership			-.422***		.502***
Self-Consciousness	-.446*	.760***	.889***		-.384***
CAT Manipulativeness	.748***				-.432***

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

DISCUSSION

In this study, I developed and tested the validity of implicit measures of power motivation as a multidimensional construct. Specifically, I sought to develop implicit association tests for three independent motives (Dominance, Prestige, and Social) previously measured as a single global factor – power motivation. The CFA model comparisons provided sufficient evidence for convergent and discriminant validity for the hypothesized model. However, the small and insignificant factor loadings for most of the implicit measures presented construct validity issues.

Moreover, the Model 1's CFI (.87) did not meet the .90 threshold. A revised model (Figure 5) with the DoPL Dominance removed showed better fit statistics ($\chi^2_{(80)} = 140.226$; CFI = .90; RMSEA = .067, 90%CI = .046, .080). The DoPL Dominance subscale's failure to correlate with other measures and the poor factor loadings provided some support for removing it from the model, However, this model was not selected as our final model because the DoPL Dominance subscale was essential for hypothesis testing because the three DoPL scales were the equivalent explicit measures for the developed power motivation measures. Moreover, the Dominance subscale was highly effective when it was validated when it was developed.

Convergent validity was stronger for the explicit scales than for the developed implicit measures. The loadings for most of the implicit measures on the latent trait factors were weak and insignificant. The correlations matrix revealed that the Power ST-IAT and IAT correlate with the explicit scales from Dominance, Prestige, and Leadership factors. However, the correlations between the implicit and explicit measures were still overall weak.

Reliabilities were calculated through Spearman-Brown coefficients based on split-half correlations of practice and test blocks. This is the least preferred method for calculating reliabilities of implicit measures, so these coefficients should increase if using the preferred methods. The reliability coefficients for all four ST-IATs were poor compared to the acceptable range The Power IAT showed the most promising reliability alpha (.79). Thus, improvement of the psychometric properties for the implicit measures, especially the Power IAT and ST-IAT, could produce more reliable implicit measures of power motivation and provide better evidence for construct, convergent, and discriminant validity.

Future research could focus on establishing criterion-related validity studies that evaluate the predictive validity between the developed IATs and ST-IATs and related behaviors. Dominance, for instance, has been connected to workplace sexual harassment tendencies (Browne, 2006). Future researchers could evaluate the efficacy of the Dominance ST-IAT as an implicit measure that predicts individuals' likelihood to sexually harass others. The Leadership ST-IAT could be evaluated on whether it can be a used to predict individuals' tendencies to exhibit helping leadership behaviors or behaviors that reflect conscientiousness.

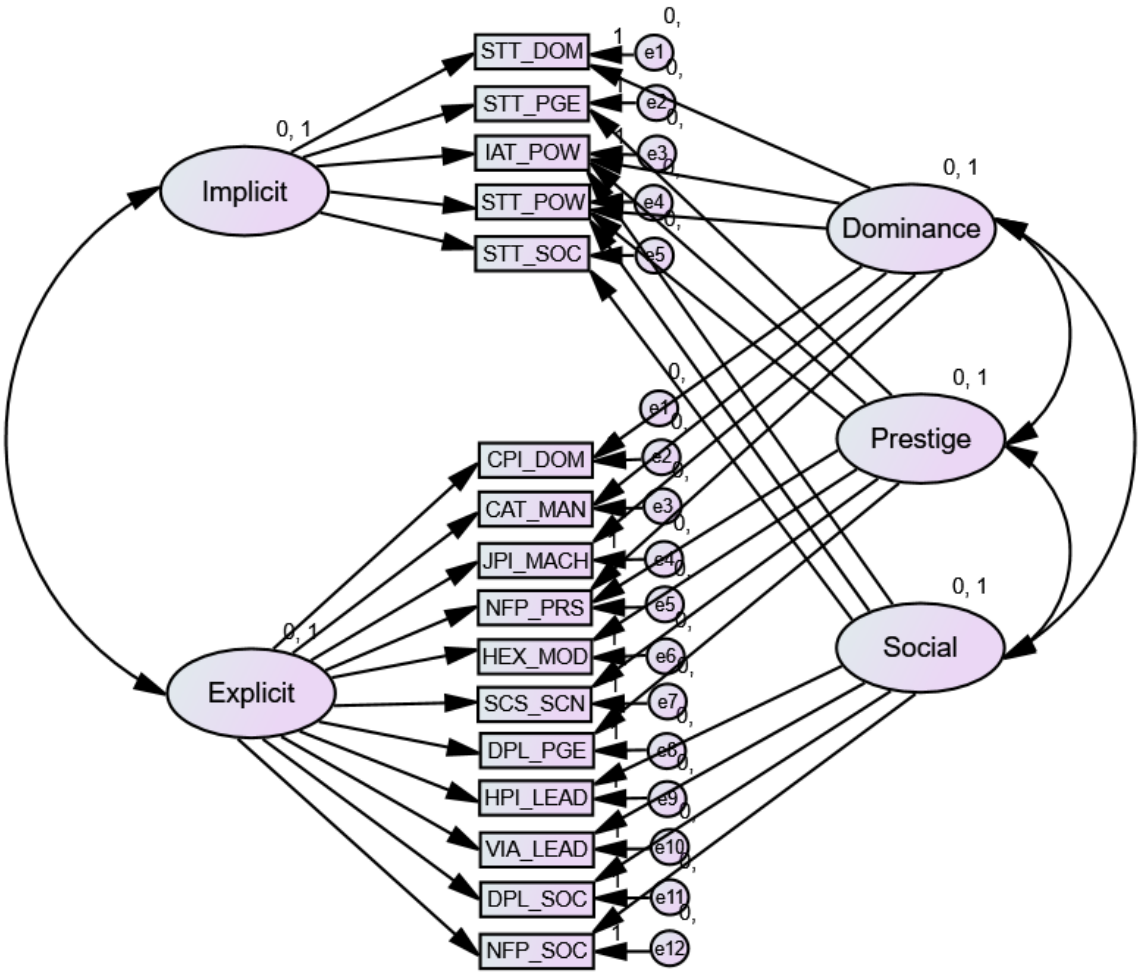

Figure 5. CFA Model 5: Two Freely Correlated Method Factors and Three Freely Correlated Traits (without DoPL Dominance)

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APPENDICES

Appendix A. Human Subjects IRB Approval

To:
Donald Fischer
Psychology

Date: Jan 4, 2021 12:24:47 PM CST

RE: Notice of IRB Exemption
Study #: IRB-FY2021-296
Study Title: Development of Implicit Measures for Power Motives

This submission has been reviewed by the Missouri State University Institutional Review Board (IRB) and was determined to be exempt from further review. However, any changes to any aspect of this study must be submitted, as a modification to the study, for IRB review as the changes may change this Exempt determination. Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB.

This study was reviewed in accordance with federal regulations governing human subjects research, including those found at 45 CFR 46 (Common Rule), 45 CFR 164 (HIPAA), 21 CFR 50 & 56 (FDA), and 40 CFR 26 (EPA), where applicable.

Researchers Associated with this Project:
PI: Donald Fischer
Co-PI:
Primary Contact: Timothy Amadore
Other Investigators: Lindsey Carpentier, Haein Won, Max Lischwe, Mary Newsham, Derek Rowe, Joseph Wansing

Appendix B. Dominance, Prestige, and Leadership (DoPL) Scale

The following questionnaire items represent **statements**. Please indicate on a scale from 1 = strongly disagree to 6 = strongly agree how much you agree or disagree with each item.

		Strongly disagree	Disagree	Rather disagree	Rather agree	Agree	Strongly Agree
		1	2	3	4	5	6
1	I relish opportunities in which I can lead others.	☐	☐	☐	☐	☐	☐
2	I enjoy bending others to my will.	☐	☐	☐	☐	☐	☐
3	I try to control others rather than permit them to control me.	☐	☐	☐	☐	☐	☐
4	I am willing to use aggressive tactics to get my way.	☐	☐	☐	☐	☐	☐
5	I often share with others when I achieved something great.	☐	☐	☐	☐	☐	☐
6	I have little interest in leading others.	☐	☐	☐	☐	☐	☐
7	I feel sad if nobody recognises my unique talents and abilities.	☐	☐	☐	☐	☐	☐
8	Success means being respected.	☐	☐	☐	☐	☐	☐

9	When people challenge me I want to put them down hard.	□	□	□	□	□	□
10	I want to twist others around my little finger.	□	□	□	□	□	□
11	I feel confident when directing the activities of others.	□	□	□	□	□	□
12	I am happy when I can present my achievements to others.	□	□	□	□	□	□
13	I am often the leader.	□	□	□	□	□	□
14	I avoid positions with responsibility over others.	□	□	□	□	□	□
15	I often try to get my own way regardless of what others may want.	□	□	□	□	□	□
16	I make a good leader.	□	□	□	□	□	□

The following questionnaire items represent **goals**. Please indicate on a scale from 1 = Not important to me to 6 = extremely important how important these goals are for you.

Not important to me	Of little importance to me	Of some importance to me	Important to me	Very important to me	Extremely important to me
1	2	3	4	5	6

17	Recognition from others.	□	□	□	□	□	□
18	Be respected and admired by other people.	□	□	□	□	□	□

Dominance items: 2,3,4,9,10,15

Prestige items: 5,7,8,12,17,18

Leadership items: 1,6(-),11,13,14(-),16

Appendix C. IPIP Scales

Factor	Measure	Question
Manipulativeness	CAT-PD	Am an honest person.
Manipulativeness	CAT-PD	Cheat to get ahead.
Manipulativeness	CAT-PD	Deceive people.
Dominance	CAT-PD	Am known as a controlling person.
Dominance	CAT-PD	Boss people around.
Dominance	CAT-PD	Have a strong need for power.
Manipulativeness	CAT-PD	Have exploited others for my own gain.
Manipulativeness	CAT-PD	Like to trick people into doing things for me.
Manipulativeness	CAT-PD	Take advantage of others.
Dominance	CPI	Am quick to correct others.
Dominance	CPI	Challenge others' points of view.
Dominance	CPI	Demand explanations from others.
Dominance	CPI	Hate to seem pushy.
Dominance	CPI	Impose my will on others.
Dominance	CPI	Lay down the law to others.
Dominance	CPI	Put people under pressure.
Dominance	CPI	Try to outdo others.
Dominance	CPI	Try to surpass others' accomplishments.
Dominance	CPI	Make demands on others.
Dominance	CPI	Want to control the conversation.
Dominance	CPI	Insist that others do things my way.
Dominance	CPI	Like having authority over others.
Leadership	HPI	Am easily discouraged.
Leadership	HPI	Am easily intimidated.
Leadership	HPI	Find it difficult to approach others.
Leadership	HPI	Have a low opinion of myself.
Leadership	HPI	Take the initiative.
Leadership	HPI	Think highly of myself.

Table continued

Factor	Measure	Question
Power-Seeking	MPQ	Take charge.
Machiavellianism	JPI	Can talk others into doing things.
Machiavellianism	JPI	Find it easy to manipulate others.
Machiavellianism	JPI	Hate being the center of attention.
Machiavellianism	JPI	Lack the talent for influencing people.
Machiavellianism	JPI	Lack the talent for influencing people.
Machiavellianism	JPI	Find it difficult to manipulate others.
Machiavellianism	JPI	Have a natural talent for influencing people.
Power-Seeking	MPQ	See myself as a good leader.
Power-Seeking	MPQ	Can talk others into doing things.
Power-Seeking	MPQ	Am good at making impromptu speeches.
Power-Seeking	MPQ	Don't like to draw attention to myself.
Power-Seeking	MPQ	Keep in the background.
Power-Seeking	MPQ	Have little to say.
Leadership	VIA	Am good at helping people work well together.
Leadership	VIA	Am not good at planning group activities.
Leadership	VIA	Am not good at taking charge of a group.
Leadership	VIA	Am told that I am a strong but fair leader.
Leadership	VIA	Believe that leaders should let everyone have a say in what the group does.
Leadership	VIA	Believe that our human nature brings us together to work for common goals.
Leadership	VIA	Have difficulty getting others to work together.
Leadership	VIA	Treat everyone the same.
Leadership	VIA	Try to make my group members happy.
Leadership	VIA	Try to make sure everyone in a group feels included.