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Power Bases of Faculty Supervisors and Educational Outcomes for Graduate Students

Introduction

Power is a topic that receives consistent attention from educational researchers. At the macro level, theories of power help explain decisions about the selection of an academic program for termination [28], varying levels of institutional research activity [31], and decisions regarding higher education policy [50]. At the micro level, researchers are interested in power perceptions and their impact on outcome variables such as quality of interpersonal relationships and educational success. The last decade of educational research has been particularly prolific on the topic of power perceptions and their correlates, especially in higher education. For example, Dry [18] examined

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power relationships between administrators, faculty, and students; Fisher [21] investigated university presidents' power bases; Ranta [55] reported deans' power in areas such as rule-making, budgets, scheduling, curriculum development, and staffing; and Whitson and Hubert [73] measured department chairpersons' perceptions of faculty power. An area that has not been similarly scrutinized, however, is the dyadic power relationship between graduate students and supervising professors.

The Importance of Power in Faculty-Student Interactions

Graduate education is frequently portrayed as an intimate relationship between a supervising professor and a student [51]. Graduate students regard their relationship with members of the faculty as the most important aspect of the quality of their graduate education [30]. Moreover, researchers frequently describe the relationship and interactions between faculty and students as one of the most important factors affecting students' satisfaction with a graduate program [cf. 11, 29, 60]. In addition, graduate education is often represented as a student socialization and development process mainly influenced by student-faculty interrelationships [12, 35]. Accordingly, the degree to which faculty can influence students and the *power relationship* between graduate students and their faculty supervisors is often described as one of the most critical determinants of graduate students' success [10].

Graduate students' perceptions of the power of supervising faculty are assumed to influence the relationship between them, and ultimately, educational outcomes such as (a) graduate students' satisfaction with the graduate program and university environment, (b) students' mood and morale, (c) number of years spent in graduate school before graduation, and (d) future career success [cf. 33, 62]. Because the power relationship between faculty and student can determine students' success or failure, several researchers have investigated this issue empirically. However, the topic is still seriously underinvestigated.

Power in Faculty-Student Interactions: An Underinvestigated Issue

The aforementioned contentions regarding the importance of students' perceptions of the power of professors seem to be indirectly supported by research at the *elementary school* [36, 47] and *undergraduate* [57, 61] level, showing that students' perceptions of instructors' power affect learning and motivation. However, despite the considerable interest and hypothesized relevance of power in faculty-student relation-

ships in *graduate* education, the empirical information on the topic is only tangential. For instance, Baker [9] examined power relationships among graduate teaching assistants (TAs), but no information was gathered regarding TA-faculty interactions. Also, Feld [20] examined whether a sample of graduate social work students perceived themselves, in general, as being more powerful than graduate business students. However, and similar to Baker [9], self-perceptions of power were not provided regarding faculty-student relationships. In another recent article, Heinrich [33] utilized rigorous qualitative methods for collecting and analyzing experiences in graduate school (including power relationships) from an all-female sample of twenty-two students. In this case, the overall power relationship between faculty and students was considered, but because of Heinrich's small and exclusively female sample and unstructured data collection procedures, the results may not generalize to other settings, samples, and methodologies (see West [72]).

Other researchers have shown interest in investigating influence strategies and the use of power. Madonna, Wesley, Bailey, and Anderson [39], for instance, investigated the use of an influence strategy labeled "Machiavellianism," defined as "the extent to which an individual uses manipulative strategies to gain control over interpersonal situations" (p. 953). The sample included freshmen undergraduate, upper-class undergraduate, and graduate students, and the results indicated that freshmen reported lower frequency use of Machiavellianism than the other two groups. However, despite the interesting findings and important contribution of this research, no information was gathered regarding (1) use of Machiavellianism in faculty-student interactions, (2) use of additional influence strategies, and (3) students' perceptions regarding faculty power. In another recent study on the use of power, Robyak, Goodyear, Prange, and Donham [58] investigated counseling psychology graduate students' preference for the use of various power resources such as expertise. However, this study examined power use in the context of student-client relationships, and thus no information was provided regarding supervising professors-graduate students relationships. Finally, additional empirical and theoretical work related to power in graduate student-faculty and other differential power relationships has focused on sexual harassment rather than power perceptions and their correlates [cf. 22, 27, 41, 52].

In sum, the topic of power relationships between faculty and students in higher education has not been directly studied. In particular, the important issue of whether students' perceptions of faculty power

are associated with relevant outcomes and variables has not yet been investigated.

Power: Definition and Measurement Difficulties

In addition to the scarcity of empirical research on power in graduate student-faculty relationships, the few studies conducted in this area have typically relied on implicit or ambiguous definitions of the construct of power. This is a rather pervasive problem, so the examples that we use next should not indicate that we devalue these studies; we just selected them for illustrative purposes. For instance, Robyak et al. [58] used “power” as a synonym for “influence,” without defining either concept. As a second illustration of problems regarding the definition and operationalization of power, Rouse [62] used only one-item scales to measure multidimensional constructs such as expert power and reward power. Strong criticisms have been raised against this practice [53, 63], because using only one item may be insufficient and inadequate to capture the construct in question and thus poses a serious threat to the validity of the results (i.e., “construct underrepresentation,” [17, p. 64]).

An additional example of difficulties in defining and measuring the construct of power is a study conducted by Gilbert [25], in which graduate students were asked to assess the “power and influence” of those whom they “consider[ed] to be the strongest model for [them] at the present time.” However, in this study there were several problems regarding the concept of power. First, the author intended to measure “power and influence,” terms which were not defined and apparently were considered to be the same, or at least part of the same underlying construct. However, numerous authors have argued that there is a clear distinction between these two concepts (see Tedeschi and Nesler [70] for a recent review). Second, a prediction regarding possible gender differences in “power and influence” (p. 113) was based on research on status and prestige. Thus, apparently, power and influence could be narrowly equated to status and prestige. Third, the Power and Influence scale used included four items. The only item reported by Gilbert is “person’s authority in the department” (p. 116), and consequently power and influence seem to be equated to “legitimate authority.” Given the lack of definition and narrow operationalization of the construct of power, it is not surprising that no relationships were found between the power and influence variable and other constructs measured [cf. 37].

The difficulties in defining and measuring power led to a historical review of the concept by Mitchell and Spady [43], an examination of the treatment of the concept in introductory textbooks by Paap [49], as

well as a more recent review of the concept of power as it relates and differentiates from influence by Tedeschi and Nesler [70]. As compellingly argued by Cook and Campbell [17], when a construct (e.g., power) is not clearly defined, the operationalizations of this construct may be invalid. Thus, the subsequent use of power perceptions as antecedents of graduate students' behavior and attitudes may result in invalid findings [cf. 17]. Alternatively, a more precise definition of power and its various components would allow researchers interested in power in graduate faculty-student relationships to define more adequately and investigate the relationship between specific power perceptions and graduate students' (1) perceptions (e.g., of faculty trustworthiness), (2) intentions (e.g., to invite supervising professor to chair a thesis or dissertation committee), and (3) behaviors (e.g., research productivity). To overcome previous theoretical limitations of power research in graduate student-faculty relationships, we adopted the power taxonomy proposed by French and Raven [23].

The French and Raven Power Taxonomy

The power bases taxonomy proposed by French and Raven [23] is a consensually accepted theoretical framework for the study of power in several social sciences, such as psychology [45, 53], management [74], and social work [20]. In addition, this taxonomy has been recently utilized in other disciplines such as health care [56], marketing [24], and medicine [59].

The French and Raven power taxonomy is especially relevant to the study of supervising professor-student power interactions because it is a theory of power that applies to *dyadic relationships*. French and Raven defined power as the ability or potential of an agent (e.g., supervising professor) to alter a target's (e.g., graduate student) behavior, intentions, attitudes, beliefs, emotions, or values. In addition, they distinguished five bases of power, which contribute to the agent's overall ability to alter a target: (1) referent (based on the target's desire to be associated with the agent), (2) coercive (based on the target's belief that the agent has the ability to punish him or her), (3) expert (based on the target's belief that the agent can provide him or her with special knowledge), (4) legitimate (based on the target's perception that the agent has the legitimate right to influence the target and that he or she is obligated to comply), and (5) reward (based on the target's belief that the agent has the ability to provide him or her with desired tangible or intangible benefits). According to this perspective, the agent's power (i.e., his or her ability or potential to alter a target) is a function of the perceptions of a target.

French and Raven distinguished power from influence [70]. Whereas power refers to the *ability* or *potential* of an agent to alter a target's behavior, intentions, attitudes, beliefs, emotions, or values, influence refers to the *use* of power. Thus, influence refers to the actual use of power, for example, in the form of influence tactics such as threats (use of coercive power) and promises (use of reward power).

The Present Study

Although the power relationship between faculty and students in higher education is assumed to be a major determinant of the relationship between them and, ultimately, of graduate student success and satisfaction with the graduate experience [cf. 33, 62], no empirical research to date has tested specific hypotheses regarding these relationships. Consequently, the goal of the present study was to address the need to investigate systematically power in graduate supervisor-student relationships. We used the French and Raven [23] power taxonomy to examine the power of graduate supervisors as perceived by their graduate students and the *main* and *interactive* effects of the five power bases on three types of outcome variables: students' (1) perceptions, (2) intentions, and (3) behaviors.

Hypotheses

Effects of Professors' Power on Students' Perceptions. (1) *Students' perceptions of the quality of the professor-student relationship* are predicted to be negatively related to supervisors' coercive power and positively related to referent and expert power [cf. 48, 67] (Hypothesis 1). (2) *Students' perceptions of professors' trustworthiness* are predicted to be negatively related to students' perceptions of professors' coercive power and positively related to referent and expert power [cf. 44, 71] (Hypothesis 2). (3) *Students' perceptions of professors' credibility* are hypothesized to be positively related to perceptions of supervisors' expert and referent power [cf. 45] (Hypothesis 3).

Effects of Professors' Power on Students' Intentions. (1) *Students' intentions to invite their supervising professor to serve or chair a dissertation/thesis committee* are hypothesized to be negatively related to coercive power and positively related to expert and referent power [cf. 10] (Hypothesis 4). (2) *Students' intentions to conduct research* with their current supervisor in the future are also predicted to be negatively related to coercive power and positively related to expert and referent power [cf. 10] (Hypothesis 5).

Effects of Professors' Power on Students' Behavior. (1) A number of

behaviors that evidence *research productivity* are hypothesized to be influenced by the professor-student power relationship (Hypothesis 6). Coercive power is predicted to be negatively associated, and reward, referent, and expert power are predicted to be positively associated with research productivity [cf. 33]. (2) In addition, we hypothesized that students' *compliance* with their supervisors' requests would be positively related to perceptions of professors' legitimate, reward, expert, and referent power [cf. 75] (Hypothesis 7).

Method

Subjects

Surveys were mailed to all ($N = 967$) graduate students with assistantship assignments in a large northeastern state university. This type of methodology is common in higher education because it yields information that can be useful for theory development as well as institutional decision making [8]. The sample only included students with assistantship duties, because the relationship between supervising professor and student allows for qualitatively richer interactions regarding power than relationships in which the professor does not supervise assistantship duties. Stated differently, professors who supervise assistantship duties are in closer contact with their students and, consequently, tend to have a greater variety of power sources than professors who do not. For example, professors who supervise assistantship duties have the opportunity to interact more frequently with students and may therefore have the ability to acquire not only legitimate power but also referent and coercive power, which are power sources that may not be available to professors who do not supervise assistantship duties.

A total of 346 completed questionnaires were received, for a response rate of 35.78%. Although this return rate may be considered to be low, it is rather typical for surveys conducted using mailed questionnaires [42]. For example, in recent studies, Braxton, Brier, and Hossler [13] realized a return rate of 40.0%, Goodwin and Stevens [26] a return rate of 34.4%, and McCabe and Trevino [40] a return rate of 38.3% of the surveys mailed.

Some surveys had to be discarded because of incomplete information. Final sample sizes for the measured scales ranged from 315 to 331. Before conducting any of the substantive (i.e., theory-based) analyses described below, we conducted numerous descriptive and inferential analyses based on (a) gender, (b) university school, and (c) department. First, the sample-based results were similar to those found at the

campuswide levels in terms of gender and campus unit-based proportions. Second, ANOVAs using the three aforementioned variables as independent factors and this study's relevant variables as dependent factors (i.e., power bases perceptions, credibility, etc.) yielded statistically nonsignificant results. Consequently, we feel confident that (a) the sample was representative of the population (at least regarding gender, university school, and department), and unreturned surveys were random, and (b) the lack of differences across departments and schools allows for the aggregation of respondents across these variables.

Measures

The surveys included scales to measure (1) students' perceptions of supervising professors' power bases, (2) outcome variables (i.e., students' perceptions, intentions, and behaviors), and (3) demographic variables. Following recent developments regarding scale and questionnaire construction [65, 66], and other recent survey-based research [for example, 19], most of the questions were answered on 19-point scales with anchors ranging from "strongly disagree" (−9) to "strongly agree" (+9), with higher scores representing a greater endorsement of the items. Graduate students were asked to respond to the questions regarding their "supervisor in assistantship duties" (Appendix A includes the instructions read by participants).

Perceptions of supervising professors' power bases. The five French and Raven bases of power were measured using a modified version of the Hinkin and Schriesheim [34] scales. These scales consist of four items measuring each of the five power bases (i.e., referent, coercive, expert, legitimate, and reward). Although one may argue that four items may not be sufficient to cover the power bases constructs, the construct validity and reliability of these scales have been strongly supported by thorough investigations that have used confirmatory factor analysis techniques in both laboratory and field settings [for example, 3, 34, 45]. Also, in developing these scales, Hinkin and Schriesheim followed a process that included (a) the development of conceptually consistent, theoretical definitions of the five power bases, (b) the generation of items that were content valid using two panels of independent judges ($n_s = 37$ and 42), (c) the administration of the resulting items to three independent and diverse samples (251 undergraduate students, 375 full-time hospital employees, and 220 part-time MBA students), and (d) the examination of relationships between the five power bases and other constructs. Based on the results, Hinkin and Schriesheim concluded that these measures of power bases "have built-in content

validity and that they have demonstrated reasonable internal consistent reliability, factor structure, discriminant validity, and criterion-related validity" (p. 566).

Some of the items had to be slightly modified for the context of professor-student relationships. For example, a *Reward* item in the original scale such as "My supervisor can influence my getting a promotion" was not relevant and was replaced by "My supervisor can write a strong letter of recommendation on my behalf." Appendix B includes the items utilized to measure students' perceptions of professors' five power bases, as well as the items used to measure all of the scales described below.

Outcome variables. Three types of outcome measures were included in the questionnaire: (1) students' perceptions, (2) students' intentions, and (3) students' behaviors.

1. *Students' perceptions.* (1) *Relationship quality* perceptions were measured using the question "How would you describe your overall relationship with your supervisor?" with anchors "very positive/very negative," and "very distant/very close." (2) *Trustworthiness*, defined as "a lack of intent to exploit or mislead a target" [44, p. 35], was measured using five items (see Appendix B). (3) *Credibility*, defined as "truthfulness, follow-through, and accuracy of a source" [45, p. 1406], was measured using six items developed by Nesler et al. [45] (see Appendix B).

2. *Students' intentions.* (1) *Students' intentions to invite the supervising professor to serve or chair a dissertation/thesis committee* were measured with the items "Rate the likelihood that your supervisor will chair your thesis or dissertation committee" and "Rate the likelihood that your supervisor will serve on your thesis or dissertation committee," ranging from "very likely" to "very unlikely." (2) *Students' intentions to conduct research* with his or her current supervisor in the future were measured with the item "How many projects are you working on that you plan to submit as coauthor with your supervisor to a conference or journal?"

3. *Students' behaviors.* (1) *Research productivity* was measured with the questions "How many publications have you coauthored with your supervisor?" and "How many conference papers have you coauthored with your supervisor?" (2) *Compliance*, defined as "the extent to which a subordinate actually carries out his or her superior's directives," was measured with two items adapted from Rahim and Afza [54] (see Appendix B).

Demographic Variables. This section of the questionnaire included

questions regarding (1) student's type of program (doctorate or master's), (2) tenure with current graduate supervisor, (3) student's gender, (4) supervisor's gender, (5) supervisor's academic rank, (6) student's university school, (7) student's source of funding (i.e., grants, department), (8) student's age, and (9) student's tenure in school.

Results

Demographic and Personal Information

The percentage of male students was 48.27, and the percentage of male supervisors was 69.36. There were more professors (40.46%) than associate (26.88%) or assistant (15.32%) professors. Respondents were mainly from the School of Arts and Sciences (53.76%), followed by Public Affairs (13.87%), Education (11.27%), Public Health (8.96%), and Business (6.65%) (5.2% of respondents did not specify their school).

In regard to funding, the departments were the most typical source of support, except for the School of Public Health, which was the only school in which more students (67.74%) were funded by external grants rather than departmental budgets.

Of the total sample, 64.16% sought a doctoral degree. The respondents' mean age was 28.7 years, mean tenure in school was 2.7 years, and mean tenure with current supervisor was 1.7 years.¹

Analyses of variance (ANOVAs) were conducted to test whether ratings on the five power bases were associated with (1) university school, (2) supervisor gender, (3) student gender, (4) supervisor academic rank, (5) source of funding, and (6) degree sought. All F-statistics were statistically nonsignificant ($ps > 0.05$). In addition, correlation coefficients were computed between each of the five power bases ratings and (1) tenure in school and (2) tenure with supervisor. These analyses also yielded statistically nonsignificant results ($ps > 0.05$). Therefore, all subsequent substantive analyses were conducted collapsing across these variables.

Psychometric Properties of the Scales

The scale means, standard deviations, and reliabilities estimates are presented in Table 1. Cronbach's alphas for the five power base scales support the previous evidence regarding the excellent reliabilities of these scales [cf. 34, 45]. Reliability estimates for the *Quality of Relationship*, *Credibility* and *Compliance* scales were all above 0.80. The alpha coefficient for the *Trustworthiness* scale was above the 0.70 recommended by Nunnally [46] for newly developed items.

TABLE 1

Scale Means, Standard Deviations, Cronbach's Alpha Reliability Estimates, and Number of Respondents

	<i>Mean</i>	<i>SD</i>	<i>Alpha</i>	<i>N</i>
<i>Power Bases</i>				
Coercive power	-1.16	5.01	0.84	323
Expert power	5.12	4.00	0.90	328
Legitimate power	5.38	3.03	0.87	321
Referent power	4.80	3.89	0.90	328
Reward power	3.67	3.49	0.73	324
<i>Outcome Variables</i>				
<i>Perceptions</i>				
Quality of relationship	4.27	4.29	0.91	331
Trustworthiness	3.65	4.03	0.75	319
Credibility	5.59	3.83	0.94	323
<i>Intentions</i>				
Invite supervisor to serve on dissertation or thesis committee ^a	3.61	7.16	—	315
Invite supervisor to chair dissertation or thesis committee ^a	2.10	7.61	—	318
Submit papers to conferences or journals ^a	0.84	1.28	—	325
<i>Behaviors</i>				
Number of publications ^a	0.41	1.10	—	324
Number of conference papers ^a	0.67	1.92	—	326
Compliance	5.21	3.34	0.81	326

NOTE: Individual items were rated on 19-point Likert-type scales ranging from -9 (strongly disagree) to +9 (strongly agree), with higher scores representing a greater endorsement of the items.

^aMeasured using one item only.

Data Analysis Strategy: Moderated Multiple Regression

We utilized moderated multiple regression (MMR) in order to examine both the *main* and *interactive* effects of the five power bases on the criterion variables (students' perceptions, intentions, and behaviors). MMR consists of comparing least-squares regression equations [16], and is especially suited for the examination of relationships among continuous variables [4, 54] such as power ratings. Given a criterion or dependent variable *Y* (e.g., compliance), a predictor *X* (e.g., referent power) and a second predictor *Z* (e.g., legitimate power) hypothesized to interact with *X* in affecting *Y*, the first regression equation (i.e., Step I) tests the additive model of the main effects for predicting *Y* from *X* and *Z*. The second equation (i.e., Step II) adds a third term, which carries information regarding the *X* by *Z* interaction, obtained by multiplying the predictors (i.e., $X \times Z$). To test for the statistical significance

of the interaction between X and Z , the coefficient of determination (i.e., squared multiple correlation coefficient, R^2) is computed for each of the two equations, and an F -statistic that tests for the difference between the two R^2 s (i.e., ΔR^2) is calculated. MMR is routinely utilized in education, psychology, and numerous other social sciences [1, 5, 6, 7].

In the following sections, we report results of MMR regressing the criterion variables on the main and second-order interactive effects of the five power bases. For all of the criterion variables, the contribution of the three-order, four-order, and five-order interactive effects never accounted for more than 5% in the criterion variables variance above and beyond that accounted for main and second-order effects. Consequently, and in spite of occasional statistical significance, three- and higher-order interactions are not reported [cf. 15].

In interpreting the various effects of the power bases, we first consider their second-order interactive effects, followed by the main effects. The reason for this is that the main effects of a power base cannot be easily interpreted if that variable interacts with one or more of the other bases in determining the values of a criterion variable. Stated differently, in the presence of interactions, main effects represent the average effects of a variable across relevant levels of the other variables [6, 48]. A significant interaction indicates that this average has been computed across *heterogenous* values. Thus, the interpretation of a second-order interaction yields more detailed and precise information about the impact of one power base on the criterion variable at specific levels or values of the second power base. Alternatively, the interpretation of main effects provides more generalizable, but less precise information.

Probing of the various interaction effects was accomplished by utilizing plotting techniques adapted from Aiken and West [7, pp. 12–14] and Cohen and Cohen [16, pp. 315–317]. In plotting the various interactions, we conducted the following two-step procedure (1) variables not participating in the interaction were fixed to a constant value (i.e., zero), and (2) all possible combinations of the highest (i.e., 9) and lowest (i.e., -9) scale values for each of the predictor variables participating in the interaction were entered in the resulting unstandardized regression equation to predict criterion variable values. Consequently, the figures shown below include predicted criterion variable scores for all combinations of high and low predictor variable values. Note that we chose the highest and lowest possible scale values so that the nature and form of the interactions become easily visualized.

Lastly, and because product terms also carry information about the main effects [16], the tables shown below include regression statistics

computed after the second-order terms have been entered into each specific equation.

Effects of Power Bases on Outcome Measures

Students' perceptions. Tables 2–4 show the MMR results of regressing students' perceptions of (1) quality of professor-student relationship, (2) professors' credibility, and (3) professors' trustworthiness on the five power bases.

1. *Quality of professor-student relationship.* Table 2 shows that four of the five power bases were related to students' perceptions regarding their relationship with their supervising professors. Perceptions of a professor as having high referent, expert, and reward power contributed to more positive relationship ratings. On the other hand, the greater the perceived coercive power of supervising professors, the lower the perceived quality of professor-student relationships. Overall, an impressive 68.44% of the variance in quality of relationship ratings was accounted for by the power bases. No interactive effects were found.

2. *Professors' trustworthiness.* Table 3 summarizes the MMR results of regressing perceptions of professors' trustworthiness on the five power bases. After entering the two-way interactions into the equation, 57.56% of the variance in trustworthiness ratings was accounted for by the main and interactive effects of the power bases. Next, the two statistically significant two-way interactions are described, and then we turn to the main effects.

Two-way interactions. The Referent by Coercive and Coercive by Legitimate interactions are plotted in Figure 1. Figure 1a shows that the relationship between coercive power and trustworthiness is moder-

TABLE 2
Moderated Multiple Regression Analysis: Regression of Quality of Relationship on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.68437**	0.68437**
REF	0.50258	0.45564	71.16**		
COER	-0.14309	-0.16745	20.40**		
EXP	0.26029	0.24293	26.81**		
LEG	0.06059	0.04291	1.08		
REW	0.13335	0.09868	4.33*		
II. Two-way interactions				0.69023	0.00586

NOTE: Intercept = -0.510316. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. REF: Referent power; COER: Coercive power; EXP: Expert power; LEG: Legitimate power; REW: Reward power.

***p* < 0.01. **p* < 0.05.

TABLE 3
Moderated Multiple Regression Analysis: Regression of Trustworthiness on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.53734**	0.53734**
<i>REF</i>	0.13242	0.12766	0.88		
<i>COER</i>	-0.40206	-0.50034	25.10**		
<i>EXP</i>	0.20538	0.20384	5.34*		
<i>LEG</i>	-0.02088	-0.01573	0.07		
<i>REW</i>	0.02846	0.02240	0.03		
II. Two-way interactions				0.57557**	0.03823**
<i>REF X COER</i>	0.05254	0.40451	14.56**		
<i>REF X EXP</i>	0.02325	0.15196	1.50		
<i>REF X LEG</i>	-0.01280	-0.08435	0.35		
<i>REF X REW</i>	0.01472	0.08305	0.51		
<i>COER X EXP</i>	-0.00776	-0.06293	0.40		
<i>COER X LEG</i>	-0.03159	-0.24937	4.65*		
<i>COER X REW</i>	-0.00205	-0.01358	0.01		
<i>EXP X LEG</i>	-0.00846	-0.05590	0.21		
<i>EXP X REW</i>	0.00388	0.02244	0.04		
<i>LEG X REW</i>	-0.01453	-0.08174	0.64		

NOTE: Intercept = 1.573438. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. *REF*: Referent power; *COER*: Coercive power; *EXP*: Expert power; *LEG*: Legitimate power; *REW*: Reward power.
***p* < 0.01. **p* < 0.05.

TABLE 4
Moderated Multiple Regression Analysis: Regression of Credibility on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.60911**	0.60911**
<i>REF</i>	0.38806	0.39333	42.53**		
<i>COER</i>	-0.14086	-0.18429	19.82**		
<i>EXP</i>	0.23515	0.24536	21.94**		
<i>LEG</i>	0.11426	0.09046	3.86		
<i>REW</i>	0.06986	0.05779	1.19		
II. Two-way interactions				0.63260**	0.02349

NOTE: Intercept = 1.462838. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. *REF*: Referent power; *COER*: Coercive power; *EXP*: Expert power; *LEG*: Legitimate power; *REW*: Reward power.
***p* < 0.01. **p* < 0.05.

ated by referent power. More specifically, when referent power is high, there is no difference between high and low coercive ratings on trustworthiness. However, note that when referent power is low, there is a noticeable difference between low and high coercive power, such that

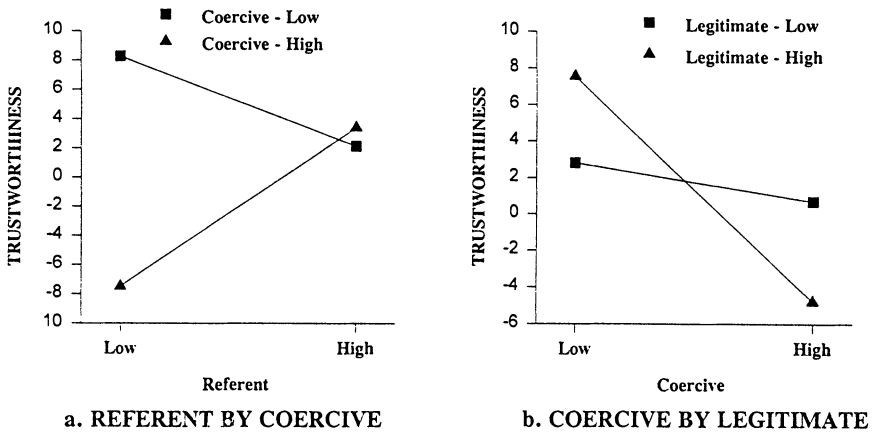


FIG. 1. Interactive Effects of Power Bases on Trustworthiness

low coercive power is associated with higher trustworthiness ratings than high coercive power. Figure 1b shows the Coercive by Legitimate interaction. At the level of high coercive power, trustworthiness ratings are generally low, but they are lower for high legitimate than low legitimate power. On the other hand, at levels of low coercive power trustworthiness ratings are generally higher, and a supervisor with high legitimate power is seen as more trustworthy than a supervisor with low legitimate power.

Main effects. Table 3 shows that, overall and averaging across values of the other power bases, expert and coercive ratings were positively and negatively associated with trustworthiness, respectively. The standardized regression coefficients indicate that coercive power was very strongly and negatively associated with trustworthiness (i.e., $B = -0.50$).

Taken together, regressing trustworthiness ratings on the main and interactive effects of the five power bases indicates that coercive power is associated with low trustworthiness and expert power is associated with high trustworthiness. In addition, the interaction effects suggest that high ratings on individual power bases do not fully explain trustworthiness ratings. More specifically, the negative impact of coercive power is even stronger when it is accompanied with (a) high legitimate power as compared to low legitimate power, and (b) low referent power as compared to high referent power.

3. *Professor's credibility.* Table 4 shows the results of regressing credibility ratings on the five power bases scores. Referent and expert power were positively associated with credibility ratings. Interestingly, high

coercive power was associated with low credibility. The main effects of the five power bases accounted for about 61% of the variance in credibility ratings. No interactive effects were found among the power bases.

Students' intentions. Tables 5–7 show the results of regressing students' intentions regarding (1) inviting the supervising professor to serve on a dissertation or thesis committee, (2) inviting the supervising professor to chair a dissertation or thesis committee, and (3) submitting papers together with supervising professor to conferences or journals on the main and interactive effects of the five power bases.

1. *Intention to invite professor to serve on dissertation or thesis*

TABLE 5

Moderated Multiple Regression Analysis: Regression of Intention to Invite Supervisor to Serve on Dissertation or Thesis Committee on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.14276**	0.14276**
REF	-0.39351	-0.21359	5.44*		
COER	-0.25129	-0.17606	7.85**		
EXP	0.53275	0.29769	14.02**		
LEG	-0.03358	-0.01424	0.04		
REW	0.38691	0.17141	4.54*		
II. Two-way interactions				0.18414**	0.04138

NOTE: Intercept = 1.061471. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. REF: Referent power; COER: Coercive power; EXP: Expert power; LEG: Legitimate power; REW: Reward power.

***p* < 0.01. **p* < 0.05.

TABLE 6

Moderated Multiple Regression Analysis: Regression of Intention to Invite Supervisor to Chair Dissertation or Thesis Committee on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.08213**	0.08213**
REF	-0.22056	-0.11255	1.43		
COER	-0.23723	-0.15627	5.84*		
EXP	0.36528	0.19189	5.50*		
LEG	-0.02480	-0.00989	0.02		
REW	0.27268	0.11358	1.88		
II. Two-way interactions				0.12630**	0.04417

NOTE: Intercept = 0.018072. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. REF: Referent power; COER: Coercive power; EXP: Expert power; LEG: Legitimate power; REW: Reward power.

***p* < 0.01. **p* < 0.05.

TABLE 7

Moderated Multiple Regression Analysis: Regression of Intention to Submit Papers with Supervisor to Conferences or Journals on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.03931*	0.03931*
REF	-0.01718	-0.05209	0.30		
COER	0.00152	0.00595	0.01		
EXP	0.05410	0.16891	4.22*		
LEG	-0.00477	-0.01130	0.02		
REW	0.03897	0.09647	1.34		
II. Two-way interactions				0.05629	0.01698

NOTE: Intercept = 0.511923. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. REF: Referent power; COER: Coercive power; EXP: Expert power; LEG: Legitimate power; REW: Reward power.

***p* < 0.01. **p* < 0.05.

committee. Fourteen percent of the variability in this criterion variable was accounted for by the main effects of the power bases (see Table 5). Also, the standardized regression coefficient associated with expert power was the largest and positively associated with the intention to invite the supervisor to serve on the committee. Coercive and referent power ratings were negatively associated, and reward power ratings were positively associated with this criterion variable.

2. *Intention to invite professor to chair dissertation or thesis committee*. The relationship between power bases and intention to invite a supervisor to serve on the committee is not the same as that between the power bases and intentions to invite a supervisor to chair it. Table 6 indicates that (1) only about 8% of variance in this criterion variable is explained by power bases ratings, and (2) expert power has a positive relationship and coercive power has a negative relationship with this intention.

3. *Intention to coauthor conference or journal manuscripts with professor*. The relationship between power bases ratings and this criterion variable was weak, with only a 4% variance overlap (see Table 7). Expert power was the only power base associated with this intention: expert power ratings are positively associated with intentions to engage in this type of collaborative work with the supervisor.

Students' behaviors. Tables 8–10 show MMR results of regressing (1) number of publications coauthored with supervisor, (2) number of papers coauthored with supervisor presented at conferences, and (3) compliance with supervisors' requests on the five power bases.

1. *Number of publications coauthored with supervisor*. Power bases

TABLE 8

Moderated Multiple Regression Analysis: Regression of Number of Publications on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.02505	0.02505
<i>REF</i>	-0.03295	-0.11700	1.49		
<i>COER</i>	-0.00168	-0.00768	0.01		
<i>EXP</i>	0.02275	0.02831	0.12		
<i>LEG</i>	-0.02913	-0.08080	0.27		
<i>REW</i>	0.06967	0.20194	5.76*		

NOTE: Intercept = 0.399439. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. *REF*: Referent power; *COER*: Coercive power; *EXP*: Expert power; *LEG*: Legitimate power; *REW*: Reward power.

** $p < 0.01$. * $p < 0.05$.

TABLE 9

Moderated Multiple Regression Analysis: Regression of Number of Papers Presented at Professional Conferences on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.02556	0.02556
<i>REF</i>	-0.06116	-0.12384	1.68		
<i>COER</i>	0.02455	0.06415	0.96		
<i>EXP</i>	0.05532	0.11531	1.93		
<i>LEG</i>	-0.01852	-0.02929	0.16		
<i>REW</i>	0.08641	0.14280	2.89		

NOTE: Intercept = 0.447336. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. *REF*: Referent power; *COER*: Coercive power; *EXP*: Expert power; *LEG*: Legitimate power; *REW*: Reward power. None of the regression coefficients was significant at the $p < 0.05$ level.

ratings only accounted for 2.5% of the variance in this reported behavior ($p > 0.05$) (see Table 8). Reward was the only power base found to be related (positively) to number of publications coauthored by students and their supervisors ($p < 0.05$).

2. *Number of conference papers coauthored with supervisor.* Table 9 shows results comparable in nature to Table 8, but statistical significance was not reached for the effects of any of the power bases. Students' reports of number of papers presented at conferences do not seem to be related to power ratings.

3. *Compliance with supervisors' requests.* Table 10 includes the MMR results of regressing compliance on the main and interactive effects of the power bases. The second-order interactive effects of the power bases accounted for approximately 6% of the variance in com-

TABLE 10
Moderated Multiple Regression Analysis: Regression of Compliance on Power Bases

Step Variable	<i>b</i>	<i>B</i>	<i>F</i>	<i>R</i> ²	ΔR^2
I. Main effects				0.50219**	0.50219**
<i>REF</i>	0.01810	0.02105	2.41		
<i>COER</i>	-0.05449	-0.08178	0.65		
<i>EXP</i>	0.32737	0.39180	19.25**		
<i>LEG</i>	0.43906	0.39870	45.35**		
<i>REW</i>	0.25008	0.23730	0.91		
II. Two-way interactions				0.56008**	0.05789**
<i>REF X COER</i>	-0.01794	-0.16656	2.41		
<i>REF X EXP</i>	-0.01515	-0.11943	0.91		
<i>REF X LEG</i>	-0.00259	-0.02059	0.02		
<i>REF X REW</i>	0.05081	0.34569	8.61**		
<i>COER X EXP</i>	-0.00595	-0.05813	0.33		
<i>COER X LEG</i>	0.03756	0.35749	9.32**		
<i>COER X REW</i>	0.00011	0.00085	0.00		
<i>EXP X LEG</i>	0.00074	0.00593	0.02		
<i>EXP X REW</i>	-0.03167	-0.22046	3.51		
<i>LEG X REW</i>	-0.02762	-0.18741	1.12		

NOTE: Intercept = 0.789897. *b*: Unstandardized regression coefficient; *B*: Standardized regression coefficient. *REF*: Referent power; *COER*: Coercive power; *EXP*: Expert power; *LEG*: Legitimate power; *REW*: Reward power.

** $p < 0.01$. * $p < 0.05$.

pliance above and beyond their main effects. The two-way interactions are described next, followed by the main effects.

Two-way interactions. Figure 2 illustrates the nature of the two-way interactive effects of the power bases on compliance. Plotting the Referent by Reward interaction (Figure 2a) indicates that the relationship between reward power and compliance is moderated by referent power ratings. More specifically, reward power has a strong and positive relationship with compliance when referent power is high. However, this positive relationship between reward power and compliance is mitigated in situations of low referent power. A perusal of Figure 2b, which displays the Coercive by Legitimate interaction, shows that the impact of legitimate power on compliance ratings is contingent on coercive power ratings. High legitimate power ratings increase compliance as compared to low legitimate power when coercive is high. However, at low levels of coercive power, high versus low legitimate power ratings do not affect compliance.

Main effects. Table 10 shows that expert and legitimate power ratings had a positive, and similar in magnitude, effect on compliance.

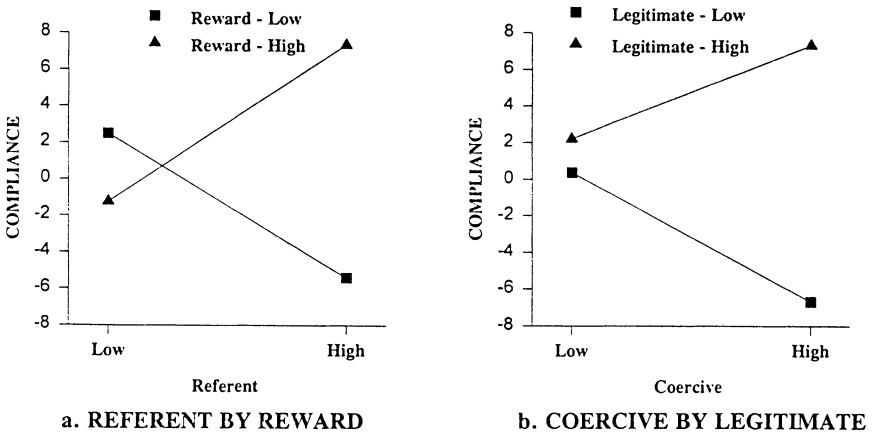


FIG. 2. Interactive Effects of Power Bases on Compliance

Moreover, the standardized regression coefficients for these two predictors are virtually identical.

Taken together, results of regressing compliance ratings on the main and interactive effects of the five power bases indicate that expert power and legitimate power are positively associated with compliance. In addition, the interactive effects indicate that (a) the impact of reward power decreases as referent power ratings increase, and (b) the positive effect of legitimate power is diminished when coercive power ratings increase.

Discussion

The present study extended previous research on power in supervising professor-student relationships in graduate education in three ways: (1) we used a theory of power to define precisely the term and its components, (2) we used measurement instruments with demonstrated psychometric properties (i.e., construct validity and reliability) to measure the various power bases, and (3) we systematically investigated relationships between supervisors' power and students' reports of their perceptions, intentions, and behaviors.

Extending previous work found in the graduate student socialization and development literatures regarding the importance of faculty-student interrelationship and interactions [for example, 30, 11, 60], the results of this study show that graduate students' perceptions of their supervising professors' *power* are related to a number of variables critical to student satisfaction and success. More specifically, this study's results

show that graduate students' perceptions of their supervisors' power are strongly associated with (1) perceptions of quality of the professor-student relationship, (2) perceptions of supervisors' trustworthiness, (3) perceptions of supervisors' credibility, and (4) students' reports of compliance with supervisors' requests. In addition, students' perceptions of their supervisors' power are moderately related to (1) intention to invite a supervisor to serve on dissertation or thesis committee, and (2) intention to invite a supervisor to chair dissertation or thesis committee. Lastly, power perceptions are weakly associated with intention to submit papers with a supervisor to journals or conferences.

*Specific Relationships between Power
Bases and Outcome Variables*

An examination of the individual relationships between the power bases and their correlates indicates the following relationships:

1. *Expert power* is positively associated with perceptions of quality of the relationship, a supervisor's trustworthiness, a supervisor's credibility, intention to invite a supervisor to serve and chair a dissertation or thesis committee, and intentions to engage in collaborative research with a supervisor.

2. *Reward power* is associated with a good perceived quality relationship, intention to invite a supervisor to serve on a dissertation or thesis committee, and number of publications coauthored with a supervisor.

3. *Legitimate power* is associated with trustworthiness and compliance through interactive effects. When supervising professors are perceived as having high coercive power, high legitimate power is associated with lower trustworthiness ratings than low legitimate power. On the other hand, at levels of low coercive power a supervisor with high legitimate power is seen as more trustworthy than a supervisor with low legitimate power. Thus, a faculty supervisor is not seen as trustworthy when he or she has coercive power, and this perception of untrustworthiness is even stronger when a supervisor not only has the ability to punish a student but can also use this ability legitimately.

The impact of legitimate power on compliance ratings is contingent on coercive power ratings. A supervisor perceived as having high legitimate power elicits more compliance than a supervisor with low legitimate power when coercive power ratings are high. However, at low levels of coercive power, differences in perceived legitimate power ratings do not affect compliance. Thus, when the faculty supervisor is perceived as not having high coercive power, legitimate power is not strongly associated with compliance. However, the combination of high

legitimate power and high coercive power is associated with the highest compliance ratings.

4. *Referent power* is related to trustworthiness and compliance through interactive effects. When referent power is high, differences in coercive power do not affect perceptions of trustworthiness. However, when referent power is low, low coercive power is associated with higher trustworthiness ratings than is high coercive power. Thus, when a faculty member has power over the student because of a student's desire to be associated or identified with a professor, presence or absence of coercive power does not affect perceptions of trustworthiness. However, when a professor does not have much referent power, the perceptions of high coercive power decreases perceptions of trustworthiness noticeably.

Reward power has a strong and positive relationship with compliance when referent power is high. However, this positive relationship between reward power and compliance is mitigated in situations of low referent power. Students report the highest compliance levels when a professor is not only perceived as being able to provide them with rewards (high reward power) but is also perceived as making a student feel valued, personally accepted, approved, and important (high referent power).

5. The greater the perceived *coercive power* of faculty supervisors, the more likely students were to report negative outcomes such as poor-quality professor-student relationships, perceptions of a supervisor's untrustworthiness and low credibility, and intentions not to invite this supervising professor to chair and serve on a dissertation or thesis committee.

Implications for Theory and Policy

The results pertaining to the individual effects of the power bases are consequential for theory and policy in higher education. First, graduate education is frequently portrayed as an intimate relationship between a supervising professor and a student, and the socialization and development of graduate students is known to depend largely on this relationship [30, 51]. The present research demonstrates the importance of the *power relationship* between faculty and students. We found that this relationship plays a critical role in student-faculty relationships and interactions. For example, if a supervising professor is seen as an expert, this affects students' perceptions of him or her as being trustworthy and credible, perceptions of the overall quality of the student-faculty relationship, and students' desire to invite the supervisor to be

on a dissertation or thesis committee and to collaborate in research-related activities. Alternatively, if a supervising faculty member is perceived as having coercive power, students perceive her or him as not being credible or trustworthy and therefore do not intend to invite him or her to serve on a thesis or dissertation committee. Consequently, the power relationship between students and faculty members can have a profound impact on students' experiences in graduate school and their research productivity.

The results of this study also have direct implications for faculty. Hartnett and Katz [30] argued that faculty need graduate students to collaborate with their research and that faculty often need students more than students need faculty. In light of this need and the well-known pressures to be productive as dictated by "publish or perish" policies, our results provide suggestions regarding the individual identities that professors need to present in order to develop positive relationships with graduate students and recruit research collaborators. If a faculty member desires to serve as chair on theses and dissertation committees and to carry out collaborative research, he or she needs to be concerned with displaying expertise and avoid any appearance of possessing significant coercive power. Clearly, students enjoy their relationships with a supervising professor who has high expert power more than with one who has low expert power.

The negative association of coercive power with educational outcomes of graduate student assistants also has important implications. Universities are typically described in terms of intellect and universal values and appeal to reason as the basis of decision making. Expertise and competence are the criteria for employing, retaining, and promoting faculty members. Professors who resort to coercion to obtain compliance from students may be perceived as illegitimate and, consequently, students display psychological reactance. Graduate students attempt to avoid or dissociate from faculty who are perceived to possess coercive power in favor of those who have bases of power more consistent with the values perceived as relevant to a university.

Finally, an additional issue of theoretical importance refers to the interactive effects. The statistically significant interactive effects show that the perceptions of the power bases form complex patterns, which in turn are related to at least two constructs (perceptions of faculty trustworthiness and student compliance) that are undoubtedly relevant for social relationships in graduate education and other organizational settings. These interactive effects, together with the results reported by Aguinis, Nesler, Quigley, and Tedeschi [3], suggest the existence of

contingency mental models that link power bases perceptions with other constructs, perhaps in implicit ways. These mental models are cognitive systems of interrelated symbols that guide and simplify processing of social perceptions (see [3] for an application of a cognitive theory to the study of power perceptions). That is, specific patterns of combinations of power bases are associated with high or low perceptions of trustworthiness and compliance. Consequently, the *interactive* effects of the power bases reported here and, to our knowledge not yet investigated elsewhere, suggest a new theoretical avenue for the study of power that includes not only the main effects of power bases, but also their interactions.

Limitations and Suggestions for Future Research

We should acknowledge that throughout this article we have used terms such as “the effect of . . . on . . .” despite the fact that we conducted a passive observation study and, therefore, the data do not strictly allow for the attribution of causal relationships [17]. However, despite the fact that our study was based on a passive observation design, we had a priori, theory-based hypotheses regarding the direction of the anticipated relationships. Several authors [for example, 56, 70] have theoretically predicted the same causal direction from power bases to various outcomes that we have tested in this study. Future research utilizing experimental designs should address the causality issue and replicate our findings in the context of a controlled setting. One suggestion for conducting this type of experimental research is that students in a laboratory setting be presented with written descriptions of various faculty profiles in which the power bases are manipulated. Then, students may be asked to answer questions regarding the same outcome variables that we measured in the present study (e.g., faculty credibility, faculty trustworthiness). However, conducting this type of experimental research is not without criticisms. The delineation of causal directions is gained at the expense of an experimental situation that may not realistically represent faculty-student interactions.

It should be noted that although the predictive ability of the power bases was clearly realized regarding perceptions and some intentions, the proportion of variance accounted for in reports of behaviors was smaller. This finding does not necessarily mean that the power of faculty, as perceived by students, does not predict behavior. More specifically, Table 1 shows that the mean number of publications in the sample is 0.41, the mean number of conference papers is 0.67, and the mean rating regarding intention to submit papers to conferences or

journals is 0.84. These means were accompanied by extremely small standard deviations, $SD = 1.10$ for publications, $SD = 1.92$ for conference papers, and $SD = 1.28$ for intentions to submit papers. Recent computer simulation work on the ability of MMR to detect interaction effects has uncovered that small variability in the predictor and criterion variables inevitably leads to the underestimation of population effects [1, 6]. Thus, given that the variability of these three reported variables was noticeably smaller than that of the other variables measured (see Table 1), the effects of the power bases on the reports of these were most likely underestimated. Accordingly, future research should address this issue and test whether the weak, although statistically significant, relationship between the power bases and the research productivity-related reports found in the present study was due to an underestimation of population effects. This could be achieved by collecting data in a sample in which students present more variability regarding research productivity than in the present sample.

In the present study we did not differentiate teaching assistants from research assistants. An anonymous reviewer suggested that the nature of the research and teaching assistant jobs differ and that, consequently, their relationships with faculty supervisors may differ as well. The results suggest definite relationships between faculty power and graduate assistants in general; however, future research should address whether there are differences regarding the effects of faculty power bases on these two groups. For example, faculty supervising research assistantships may have higher reward power than faculty supervising students in teaching assistantship duties, because they may have the ability to provide students with summer support and laboratory space.

We believe the present results give rise to several additional avenues for research on power in graduate professor-student relationships. Now that we know of the existence of consistent patterns of interactive relationships among the power bases on trustworthiness and compliance, future research should attempt to delineate possible mental models regarding these relationships in a more precise manner [cf. 1]. This could be achieved by utilizing readily available methodologies such as neural networks [32, 64]. Adopting this approach would allow researchers to account for the formation and maintenance of cognitive models regarding the possibly dynamic relationships among the power bases and other related constructs.

Finally, in this study we chose to investigate professor-student power relationships in a unilateral manner. We did not measure students' perceptions of their own power, which past research has shown to be low

[38], nor did we assess supervisors' perceptions of their students' power. For example, Brenders [14] suggested that power relationships are relational rather than unilateral. Thus, future research could simultaneously investigate students' and professors' power perceptions.

Concluding Remarks

Graduate faculty are often portrayed as models and mentors of their students [60], and therefore they play a central role in the socialization and development of students [35]. As the agents of this socialization process, professors educate, shape, influence, and direct graduate students. Our study indicated that students' perceptions of faculty power play a critical role in their interactions with supervising professors. In short, the present research demonstrated that the power bases are important antecedents of several variables critical to graduate students' experiences, satisfaction, and success.

Notes

¹Tables detailing the sample's demographic characteristics can be obtained by contacting the senior author.

Appendix A

Instructions Read by Participants

This survey consists of a list of statements which may be used in describing the relationship between professors (supervisors in assistantship duties) and their graduate students. First carefully read each descriptive statement, thinking in terms of your supervisor in your assistantship duties. Then decide to what extent you agree with each of the statements. Please read each statement carefully and *circle* the number which most closely represents what you feel. If you work with more than one supervisor, choose the one with whom you spend more time.

In responding to the items, circle the number that best represents what you feel.

Likert-type Scale Utilized

-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
STRONGLY			MODERATELY			SLIGHTLY			NEITHER		SLIGHTLY			MODERATELY			STRONGLY	
DISAGREE			DISAGREE			DISAGREE					AGREE			AGREE			AGREE	

Appendix B

Scale Items

MY SUPERVISOR . . .

(*Coercive Power*)

can make my work difficult for me.

can make things unpleasant here.

can make being at the lab/office distasteful.
 can give me undesirable assistantship-related assignments.

(Expert Power)

can share with me her/his considerable experience and/or training.
 can give me good technical suggestions.
 can provide me with needed technical knowledge.
 can provide me with sound advice related to our field of study.

(Legitimate Power)

can make me feel that I have commitments to meet.
 can make me feel like I should satisfy my assistantship requirements.
 can give me the feeling that I have responsibilities to fulfill.
 can make me recognize that I have tasks to accomplish.

(Referent Power)

can make me feel valued.
 can make me feel like (s)he approves of me.
 can make me feel personally accepted.
 can make me feel important.

(Reward Power)

can give me extra time off.
 can write a strong letter of recommendation on my behalf.
 can provide me with special benefits.
 can make my work week easier.

(Trustworthiness)

tends to take my ideas as her/his own. (R)
 manipulates me for her/his own ends. (R)
 gives me tasks to do which are not related to my graduate training. (R)
 is a manipulative person. (R)
 would not have me work on a project without giving me credit for it.

(Credibility)

is a person who keeps her/his word.
 does what (s)he says (s)he will do.
 tells the truth.
 makes accurate statements of fact to me.
 is accurate in her/his statements to me.
 is honest.

(Compliance)

is someone with whose directives I comply.
 is someone whose suggestions I follow.

NOTE: (R) indicates that item responses were reflected.

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