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Researcher Behavior that Leads to Success in Obtaining Grant Funding: A Model for Success

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ABSTRACT

The purpose of this study was to examine a previous funding success model for its use across disciplines in order to identify the significant behaviors, networking activities, and demographic profile that contributed to the successful receipt of federal grant awards. A comprehensive model of funding success was identified.

INTRODUCTION

Researchers have investigated what determines the capacity or ability to obtain grant awards and indicated that developing a behavioral profile of faculty who are persistent in getting funding is possible and desirable (Ebong, 1999). The ability to participate in grant-funded research can be critical to new faculty seeking tenure and to institutions seeking funding to support research activities. Only a few recent studies have attempted to systematically investigate the behaviors that lead to federal grant awards (Boyer & Cockriel, 1998; Campbell, 2000; Ebong, 1999; Thornley, Spence, Taylor, & Magnan, 2002). The investment in academic research is great, with the federal government alone investing $15 billion annually in academic research (Executive Office of the President of the United States, 2000). This causes fierce competition among research universities, who attempt to increase income and intellectual gain to students (Stigler, 1993). Several key, prominent issues might influence faculty's success in receiving federal funding: (a) the perspectives and needs of research faculty (Boyer & Cockriel, 1998; McMillin, 2004; Porter, 2004); (b) incentives that could influence faculty to pursue funded research (Beier, 2002; McMillin, 2004); (c) institutional processes and behavior that could impact faculty who seek funded research (Ebong, 1999; McMillin, 2004; Thornley et al., 2002); (d) the balance between teaching and research (Daly, 1994; Fairweather, 2002; Marsh & Hattie, 2002; Tang & Chamberlain, 1997); and (e) the competitive nature of federal funding (Stigler, 1993).

Boyer and Cockriel (1998) showed that the key to pursuing grant funding lies in discovering the motivators that attract faculty. McMillin (2004) reported that becoming a complete scholar is traditionally identified as behavior associated with preparing proposals, participating in research projects, and

publishing research results. Competition for support could seriously hinder new researchers' efforts. Data from the National Institutes of Health (NIH) showed that only 13.5% of its proposals were submitted from investigators between the ages of 36 and 40, while 20.4% were submitted from investigators over 50 years of age (National Institutes of Health, 2005).

This study was conducted because of the lack of a systemic process to identify the behaviors that contribute to improving the success rate of proposal submissions and the factors that encourage faculty to pursue federal funding. For this study, the number of awards and dollar value of awards measure success. This article attempts to extend existing research performed by Campbell (2000) by examining a comprehensive funding success model for its use across disciplines in order to identify the significant behaviors and to obtain a demographic profile that contributed to successfully receiving federal grant awards. This article expands the Campbell (2000) conceptual model by adding: (a) two more disciplines, (b) more categories of institutional support, (c) demographic data to obtain a successful researcher profile, and (d) networking activities. Research performed by Ebong (1999) indicated that developing a profile of faculty who are persistent in getting funding is possible. Ebong (1999) clarified that literature on grant activity over the last two decades showed that early experience was critical in individuals' and institutions' success in receiving external support. Competition does take place among research universities and faculty. The competition focuses on the need to increase the intellectual gains to students and for faculty to derive economic gain from new ideas that advance science and human well-being. Faculty compete for higher salaries, larger offices, and recognition. Universities compete for prestige and income, and competition determines which are successful (Stigler, 1993).

Campbell (2000) recommended replicating this research to verify the models and to add other disciplines. A survey was designed based on the federal agencies' funding criteria and administered to university faculty. The researcher selected full-time faculty for the study to determine if a generic model may be developed to be used across disciplines. The conceptual model used for this article is depicted in Figure 1.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

Specifically, this article answers the following research questions: (a) What are the behaviors that contribute to success in competing for federal funding? (b) Can the conceptual model be used across disciplines? (c) What factors encourage faculty to pursue federal funding? A review of the literature showed such knowledge was of value to new researchers and to universities.

> *Hypothesis 1: The total dollar value of the awards received will be negatively related to faculty behavior.*

Fountain (2004) reported that during the fifty years following World War II, changes occurred that called for major adjustments in the strategy for funding scientific research. The two most important changes were the "end of the Cold War and the emergence of a global technological marketplace" (Fountain, 2004, p. 1). The extent of the federal government's participation in research is clearly visible when reviewing the history of congressional appropriations to academic research. Universities and colleges reported that R&D funding grew by 13.7% in FY2002 and 2003, reaching $24.7 billion. The federal government's share of this growth totaled 61.7%, or $15 billion, which was at its highest level since FY1985 (NSF, 2005).

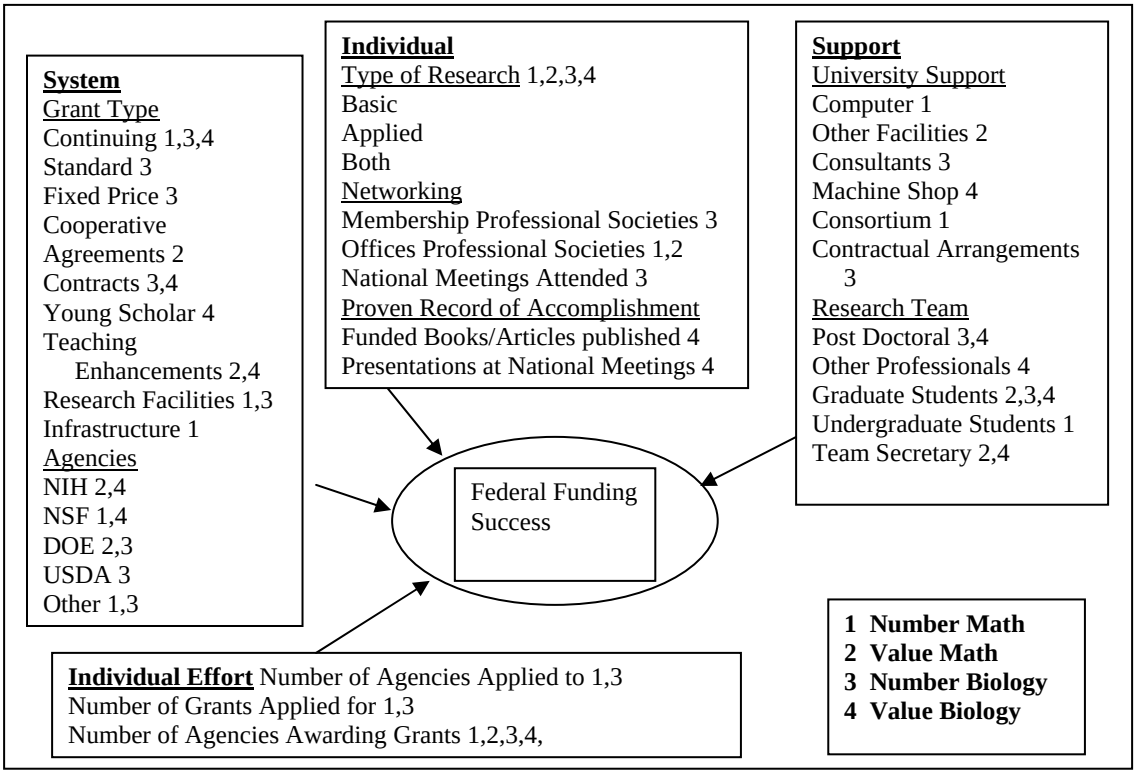

Figure 1. Composite Federal Funding Success Model. Used as the conceptual model for this study. The justification for the components of the model was taken from federal agency review requirements in place at the time of the study and the review of research literature discussed in chapter 2. From *Federal Funding Success Factors in Biology and Mathematics* by E. D. Campbell (2000, p. 3). Permission granted by Dr. Campbell on January 28, 2006.

Hypothesis 2: The number of awards received will be negatively related to faculty behavior.

During the Society for Research Administrators' Annual Meeting in 2003, it was reported that less than 50% of the combined research and teaching faculty submitted proposals in 2003 (Porter, 2004). Porter mentioned that new faculty often have little awareness of how to receive federal funds or how to become a Principal Investigator (P.I.). In addition, Porter explained new faculty are overwhelmed by their teaching responsibilities, advising students, adjusting to a new environment, and the need to publish to get tenure. Boyer and Cockriel (1998) stated, "Research universities [were] judged by others based on research productivity and the dollar amount of acquired grants" (p. 61). Furthermore, being "scholarly" was traditionally defined as "engaging in research, writing articles for publication, and sharing research findings with students" (Boyer & Cockriel, 1998, p. 61).

METHOD

Participants

Participants were 286 full-time faculty located at comprehensive and master's degree universities in Texas and California. These states were selected due to the high concentration of universities meeting the established selection criteria. The majority of the participants (86%) represented the fields of biological

sciences, mathematics, physical science, and computer science. The average number of years as a P.I. was 13.8 years. The majority of respondents were males (66%) and most held the rank of full professor (49%). The average age of the sample was 55 years.

Procedures

From the universities' faculty directories, contact information was abstracted to generate a list of possible participants. The universities were selected with a stratified random multistage sampling process. This sample was selected first based on the criteria of the Carnegie Foundation's classification of comprehensive doctoral and master's degree-granting universities. Second, these universities in the states of Texas and California were selected based on receipt of $1 million of federal awards as reported by the National Science Foundation (*Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions*, 2002). The survey was prepared in electronic format and included a cover letter that contained a brief description of the study, instructions for completion of the survey, and thanks to faculty for agreeing to participate. The letter stressed that the information would remain anonymous. The university classifications were verified by the Carnegie Foundation for the Advancement of Teaching database. All participants were verified as full-time faculty in the selected universities.

From this process, 4,152 faculty names and corresponding contact information were generated. The goal of this study was to obtain 250 participants; 286 responses were received (N = 123 from California and N = 163 from Texas). The data were collected electronically and a record of the number of surveys returned and the survey question answered for each response was maintained. All participants were asked to respond to the survey with profile data and information about their federal award experiences. The electronic survey consisted of closed-ended and open-ended questions. This provided the respondents with an opportunity to define responses and to give yes-and-no answers.

Measures

Multiple regression analysis was selected because it offers a reliable method for exploring the predictive ability of a set of independent variables to more than one dependent variable. Some open-ended questions required a numerical answer such as age or years as a P.I. and led easily to coding; however, other open-ended questions required a response, and yes/no questions were assigned a value of 0 = no and 1 = yes. Cronbach's alpha correlation, a numerical coefficient of reliability, was calculated to determine survey reliability. "Computation of alpha is based on the reliability of a test relative to other tests with the same number of items, and measuring the same construct of interest" (Santos, 1999, p. 1). A score of 0.70 is said to be an acceptable reliability coefficient, but lower thresholds are sometimes accepted (Santos, 1999). Not all questions in the study were included because they did not generate yes-or-no answers and were not Likert-scale questions. However, using the standardized variable, the overall alpha was 0.713545 and was thus an acceptable score for survey reliability.

Analysis

The statistical analysis determined which factors were significant predictors of funding success. For the continuous variables, the mean, median, and standard deviation were calculated. The normality of the distribution was assessed using the descriptive statistics process. The faculty were only excluded due to missing data if the missing data were required for the analysis. They were still in the analyses for questions for which they had supplied the needed information. A linear regression was used for the

analysis of the dollar value of awards. The Poisson regression analysis was used to analyze the number of awards. The Poisson regression is more appropriate for count data (*Oxford Journals*, 2006).

The evidence for acceptance or rejection of the null hypotheses was provided by a significant relationship between the dependent and independent variables of faculty behaviors. Univariate regression was used to identify variables that had significant individual correlation with the dependent variables. Multiple regression analysis and backward elimination were used to identify behaviors with significant independent correlation with the dependent variables. Variables included in the multiple regression were the significant individual behaviors plus additional behaviors deemed to have important relevance based on the literature review. Biographical, profile, institutional support, record of accomplishment, number of proposals submitted, dollar value of awards, institutional support, other networking behaviors, and research team data were self-reported and not subject to validation.

Descriptive statistics were used to provide the basic features of the data in the study. One of the goals of this research was to provide an understanding of researcher demographics to develop a profile of behaviors that contribute to the success in receiving federal funding, and what factors encourage faculty to pursue federal funding. Such a profile is provided by descriptive statistics (number of observations, mean, and standard deviation) as shown in Table 1.

Table 1. Researcher Profile Factors—Basic Statistical Measure of Quantitative Variables

Variable	*N*	Mean	Std Dev
Age	255	50.396	11.980
Education	213	0.526	0.501
Number of proposals	227	6.595	7.572
Number of publications	215	17.270	27.146
Number of years as P.I.	227	15.173	13.199
Association officer	225	0.933	0.250
Research team size	280	5.902	11.014

Note: Education means training in grant writing.

Respondents reported on professional relationships or other networking behaviors that contributed to success in receiving federal funding. The most frequently reported networking behaviors were collaborative arrangements and talking with federal program officers. Some noted that they performed no networking activities, but instead relied on quality research to get the respect of their peers. A summary of the reported networking activities and behavior is listed in Table 2.

ANALYSIS OF DEPENDENT VARIABLE—DOLLAR VALUE OF AWARDS

For the dependent variable, dollar value of awards, a univariate regression analysis was performed on all variables. The result of the univariate regression analysis is shown in Table 3.

"The level of significance actually obtained after the data [were] collected and analyzed [was] called the probability value, and [was] indicated by the symbol *p-value*" (Gall et al., 2003, p. 138). For the univariate regressions, the value $p < .10$ was considered to be significant. The variables from the univariate analysis with a significant p value of <.10 were number of proposals, research team size, number of publications, association meetings attended, and funding from NIH, NSF, DOD, and other funding agencies. The discipline or field of study of the participants showed no significant relationship, as proposed by Campbell (2000). A multiple regression analysis with a backward elimination was then

Table 2. Summary Table of Networking Behaviors

Other Networking Activities/Behavior	***N***
Attend NSF sponsored program specific workshops	1
Collaborative arrangements	126
Looked at old proposals	1
Have other scientist read proposal before submission	2
Meet with colleagues/peers	5
Meet with legislative representatives	11
Meet with persons who have problems to be solved	1
No networking activities	68
Participate on review panels	1
Talk with federal program officers	142
Talk with successful grantees	1

Note: Other networking activities/behavior are in addition to attending association meetings.

performed on these variables, and with the inclusion of number of years, education, tenured, gender, institutional support, and reduced teaching load that were considered important based on the review of literature. From the backward elimination, three important variables were identified as significant at the $p < 0.05$ levels and were shown in Table 3 below. Attending association meetings was identified as nearly significant with a $p = .062$.

The identified significant variables or behaviors, including the addition of the variable, attending association meetings, for dollar value of awards are described as follows:

1. Education was the data code for any type of grant writing training in which the P.I. had participated. This behavior included obtaining mentor instruction, attending college courses, participating in continuing education courses, and participating on-the-job-training. Obtaining education in grant writing was selected as a significant variable with a 0.018 *p* value as related to the dollar value of awards.

2. Association meetings attended were the data code for the number of professional association meetings attended. This represents the actual annual count as reported by the P.I. Attending association meetings was selected with a 0.0623 *p* value as related to the dollar value of awards.

3. Number of proposals was the data code for number of proposals submitted. This represents the actual count of proposals submitted to any number of the six federal funding agencies included in the study: DOD, DOE, NASA, USDA, NIH, and NSF, or other agencies. The number of proposals submitted was selected as a significant variable with a <.0001 *p* value as related to the dollar value of awards.

4. Research team size was the data code for the number of persons assigned to the research team. The research team represents a variety of personnel hired by the researcher such as postdoctoral associates, graduate research assistants, project managers, secretarial assistance, and other professional personnel. The number of persons on the research team was selected as a significant variable with a 0.0052 *p* value as related to the dollar value of awards.

Table 3. Results of Univariate Regression Analysis-Dollar Value of Awards

Variable	Estimate	Standard Error	*P*-Value
Age	-0.014	0.018	0.458
Assistant Professor	0.050	0.621	0.936
Associate Professor	-0.242	0.513	0.637
Biological Sciences	-0.401	0.457	0.382
Computer Science	-0.099	0.629	0.875
Consortium	1.565	1.108	0.159
DOD	0.943	0.527	0.075
DOE	0.253	0.531	0.634
Education	-0.689	0.476	0.149
Facilities	0.035	0.150	0.814
Full Professor	0.473	0.458	0.303
Gender	-0.105	0.526	0.842
Mathematics	0.316	0.688	0.646
Association meetings	0.086	0.028	0.002
Association membership	0.102	0.088	0.247
Monetary rewards	0.193	0.221	0.383
NASA	0.928	0.582	0.113
NIH	0.758	0.452	0.095
No. of proposals	0.104	0.029	0.001
No. of publications	0.017	0.009	0.045
NSF	1.144	0.566	0.044
No. years as P.I.	0.009	0.017	0.602
Association offices	0.178	0.258	0.491
Other agencies	-0.895	0.457	0.052
People support	0.076	0.114	0.506
Reduced teaching Load	0.592	0.512	0.249
Research team size	0.065	0.018	0.001
Tenured	0.055	0.576	0.924
USDA	0.537	0.712	0.452

Note: Education means training in grant writing. Other agencies means agencies reported other than NIH, NSF, NASA, DOE, USDA, and DOD. *P* = probability.

Table 4. Summary of Backward Elimination for Dependent Variable-Dollar Value of Awards

Variable	Parameter Estimate	Standard Error	*P*-Value
Education	-1.01035	0.420	0.017
Association meetings	0.04923	0.026	0.062
Number of proposals	0.06442	0.028	0.023
Research team size	0.05008	0.018	0.005

Note: Education means training in grant writing. *P* = probability.

To further test the robustness of the selection, all original 30 variables were analyzed in a stepwise regression model, and the same variables were identified as significant with $p < .05$.

ANALYSIS OF DEPENDENT VARIABLE—NUMBER OF AWARDS

For the dependent variable, number of awards, a univiariate regression analysis was performed on all variables. The variables with *p* values <.10 from the univiariate regression were then selected for a Poisson multiple regression analysis. The results of the univariate regression analysis are shown in Table 5, and the results of the Poisson regression analysis are shown in Table 6.

The identified significant variables for number of awards were defined as follows:

1. Consortium was described as two or more individuals, companies, organizations or government agencies associating and participating in a common activity or pooling their resources for achieving a common goal. Involvement in consortium activities was selected as a significant variable or behavior with a 0.0001 *p* value as related to the number of grant awards.

2. DOD is the Department of Defense, a federal agency that was charged with ensuring that the U.S. military has superior resources to support its missions. The funding agency DOD was selected as a significant variable or behavior with a 0.005 *p* value as related to the number of grant awards.

3. Number of proposals was the data code for number of proposals submitted. This represents the actual count of proposals submitted to any number of the six federal funding agencies included in the study—DOD, DOE, NASA, USDA, NIH, and NSF and other agencies. The number of proposals submitted was selected as a significant variable or behavior with a <.0001 *p* value as related to the number of grant awards.

4. Association officer is the data code for the number of officer positions held by the P.I. in professional organizations. This represents the actual count as reported by the P.I. The number of offices held was selected as a significant variable or behavior with a 0.003 *p* value as related to the number of grant awards.

5. Reduced teaching load was the data code for time released from teaching duties. This represents whether the P.I. receives release time from teaching to perform research. Obtaining release time was selected as a significant variable or behavior with a 0.004 *p* value as related to the number of grant awards.

Table 5. Results of Univariate Regression Analysis-Number of Awards

Variable	Parameter Estimate	Standard Error	*P*-Value
Age	-0.004	0.012	0.7070
Assistant Professor	-0.276	0.397	0.4880
Associate Professor	0.059	0.329	0.8580
Biological Sciences	-0.144	0.293	0.6230
Computer Science	0.149	0.402	0.7120
Consortium	3.053	0.750	<.0001
DOD	1.167	0.332	0.0001
DOE	0.892	0.336	0.0080
Education	0.107	0.297	0.7190
Facilities	0.262	0.104	0.0120
Full Professor	0.184	0.293	0.5300
Gender	-0.201	0.337	0.5520
Institutional support	0.188	0.459	<.0001
Mathematics	-0.717	0.435	0.1010
Association meetings	0.071	0.018	<.0001
Association membership	0.104	0.056	0.0630
Cash incentives	0.519	0.150	0.0010
NASA	0.798	0.372	0.0330
NIH	0.421	0.290	0.1480
Number of proposals	0.190	0.014	<.0001
Number of publications	0.014	0.005	0.0120
NSF	0.576	0.364	0.1150
Number of years as P.I.	0.003	0.011	0.8090
Association officer	0.476	0.161	0.0030
Other agencies	0.651	0.293	0.0270
People support	0.292	0.077	0.0001
Physical Sciences	0.504	0.318	0.1140
Reduced teaching load	0.766	0.355	0.0320
Research team size	0.064	0.011	<.0001
Tenured	0.282	0.369	0.4450
USDA	1.266	0.450	0.0050

Note: Education means training in grant writing. Other agencies means agencies reported other than NIH, NSF, NASA, DOE, USDA, and DOD. *P* = probability.

Table 6. Summary of Poisson Regression Analysis for Dependent Variable-Number of Awards

Variable	Estimate	Standard Error	*P*-value
Consortium	0.588	0.155	0.0001
DOD	0.249	0.090	0.0050
Number of proposals	0.032	0.003	<.0001
Association officer	0.121	0.041	0.0030
Reduced teaching load	0.272	0.095	0.0040

Note: *P* = probability.

RESULTS

The regression analysis shows statistically significant relationships between the faculty behavior as represented by the independent variables and the dollar value of awards; the number of awards shows that the null hypotheses may be rejected for certain significant variables:

Reject the Null Hypotheses:

1. There is a relationship between the total dollar value of the awards (dependent variable) and the independent variables ($p < .05$) education, number of proposals, research team size, and association meetings with a $p < .062$.

2. There is a relationship between the number of awards (dependent variable) and the independent variables ($p <.05$) consortium, DOD, number of proposals, association officer, and reduced teaching load.

The variable, number of proposals submitted, is significant to both dependent variables. Other significant variables for dollar value of awards and number of awards are not identical. Thus, the behaviors that encourage faculty to pursue federal funding were identified. A demographic profile was identified using the mean value of the population. The study population was described as: age 50, has not obtained training in grant writing (fewer than 1%), has submitted six proposals, has published 17 articles, has 15 years of experience in submitting grant proposals, has not served as an officer of a professional association (1%), and has a six-member research team. Most respondents were from the biological sciences—42.97%. The NSF was the most frequently reported agency applied to—63.89%. Basic research was performed most frequently—86.57%. Full professors more frequently responded—54.94%-–while 81.08% of respondents were tenured. The categorical analysis showed that 88.32% of respondents were motivated to get grant funding to build a professional reputation, and 27.83% were motivated by institutional financial incentives. Specialized training in grant writing was reported by 52.58% of respondents, and a reduced teaching load was reported by 20.44%.The other networking data showed that talking with federal program officers ($N = 142$) and collaborative arrangements ($N = 126$) were the two most frequent activities. No networking activities were reported by many of the respondents ($N = 68$).

The relationship between the dependent and independent variables is reported based on a backward elimination regression analysis for dollar value of awards and a Poisson regression analysis for number of awards. The results show significant variables ($p < .05$) that influenced the receipt and the dollar value of grant awards. For dollar value of awards, the significant variables identified were: (a) education, (b) association meetings, (c) number of proposals, and (d) research team size. For number of awards, the significant variables identified were: (a) consortium, (b) DOD, (c) number of proposals, (d) association officer, and (e) reduced teaching load.

This study resulted in new funding success models that can be applied across disciplines. Discipline or field of study was included as an independent variable in the regression analysis, and the results for all four disciplines showed $p > .05$; discipline was thus determined to not be a significant variable for inclusion in the funding model. Two separate funding models were generated as shown in Figures 2 and 3. The two models were then combined to achieve a consolidated model for federal funding success (Figure 4).

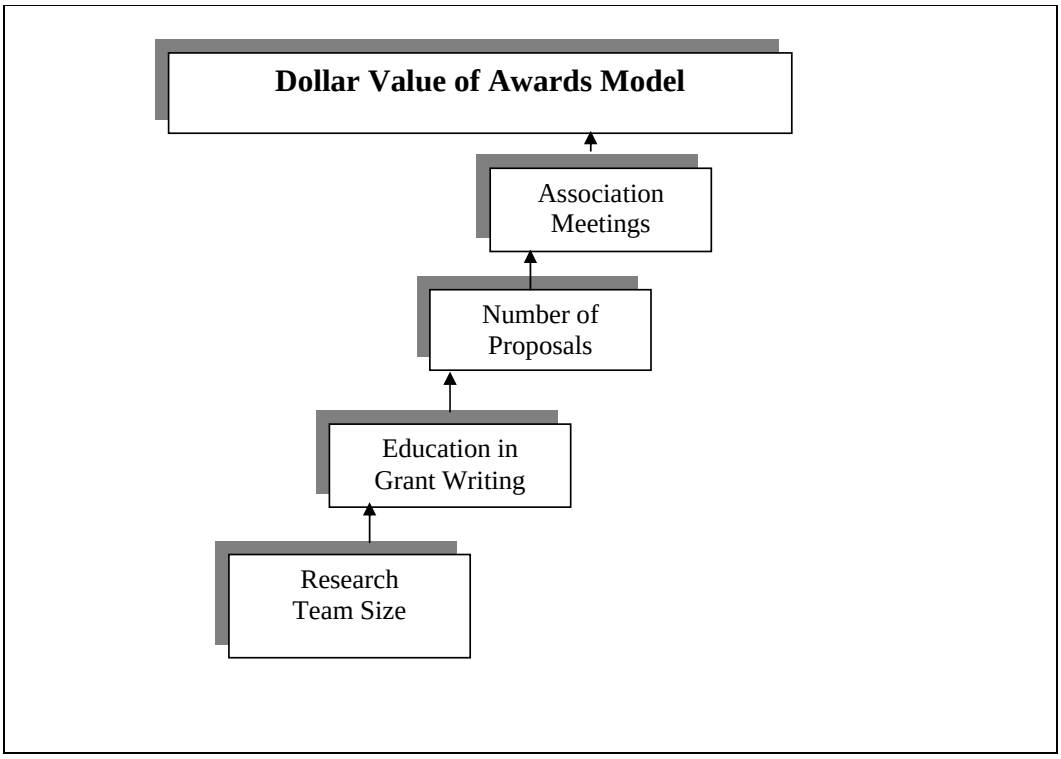

Figure 2. The Dollar Value Model for Federal Funding Success. The significant variables ($p < .05$), including association meetings at $p < .062$ for dollar value of awards are listed in order from bottom to top. Research team size was the most significant variable for dollar value of awards.

In Figure 3, the number of awards success model is shown as a step process with number of proposals being the foundation or first step in the success model. Other significant variables, such as consortiums, association officer, reduced teaching load, and DOD, were added to complete the steps of the success model.

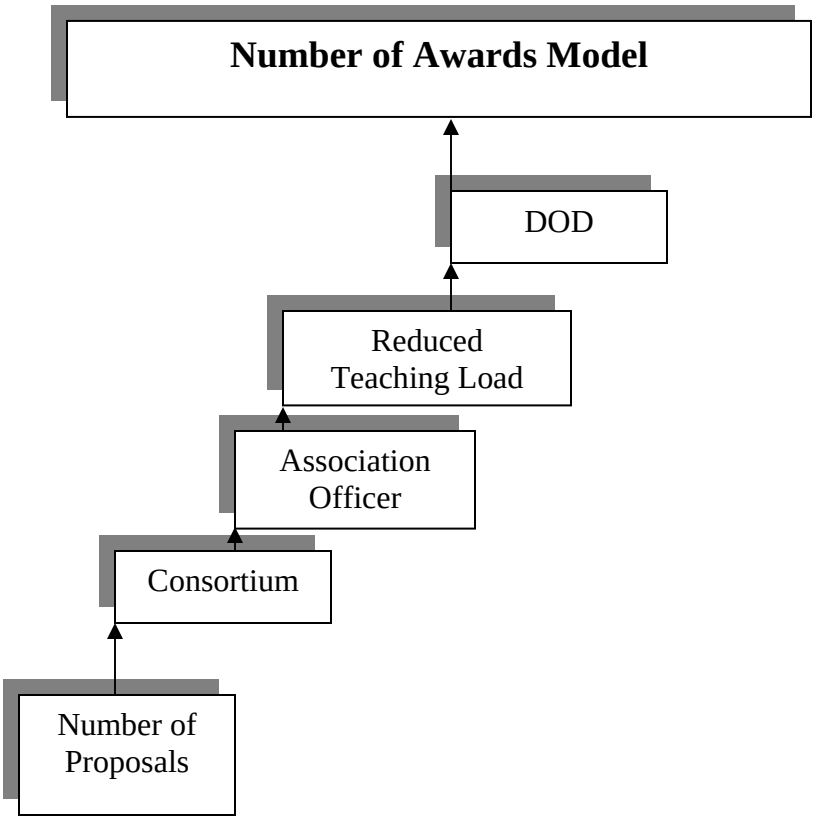

Figure 3. The Number of Awards Model for Federal Funding Success. The variables are listed in order of significance ($p < .05$) from bottom to top. Number of proposals is the most significant variable for number of awards.

The two models, dollar value of awards and number of awards, can be combined to determine the model or strategy for achieving overall success in getting federal funding in order to achieve a comprehensive model for funding success. This comprehensive model (Figure 4) incorporates all significant variables.

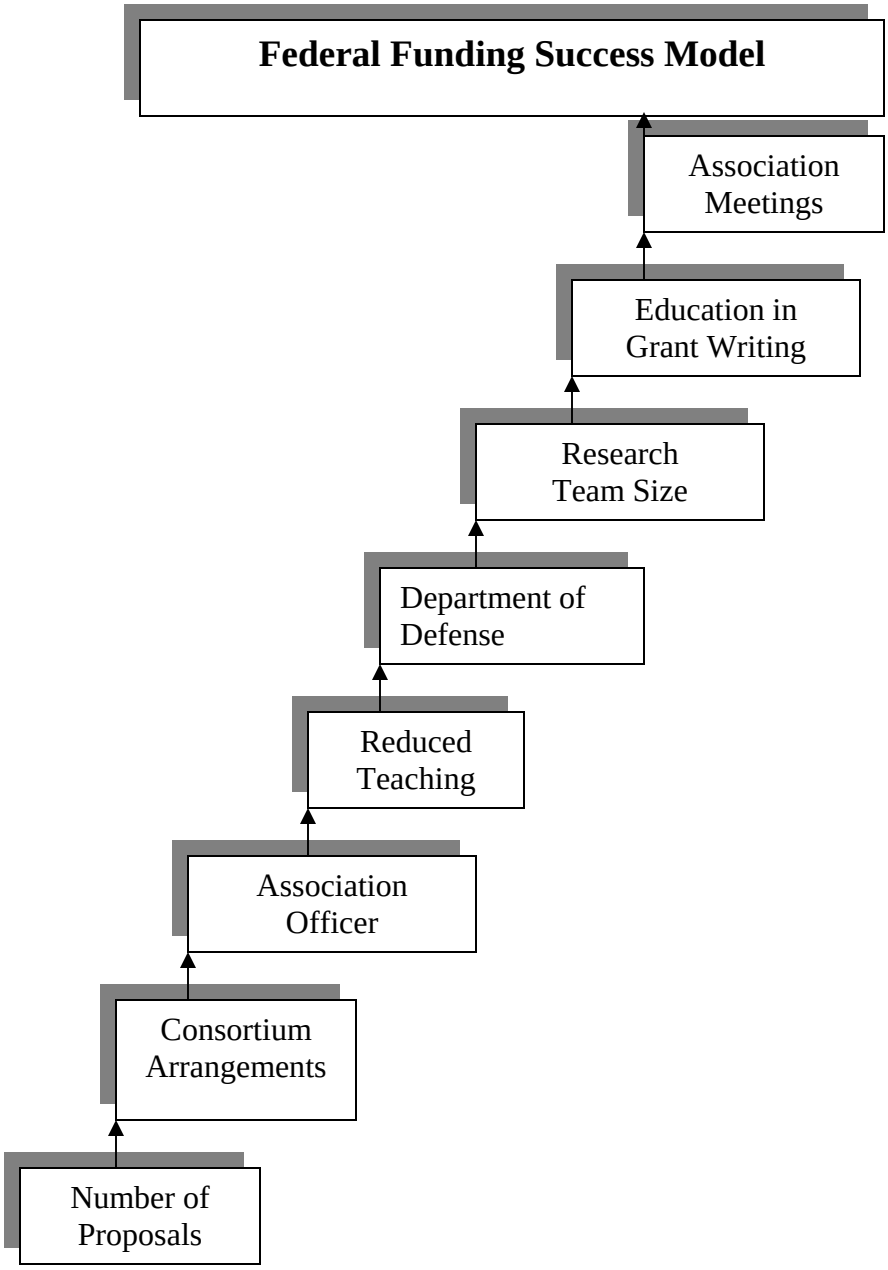

Figure 4. The Comprehensive Federal Funding Success Model. The significant variables for both dollar value of awards and number of awards are combined from the most significant variable number of proposals submitted to the least significant variable, attendance at association meetings.

DISCUSSION

These models could be used to obtain an understanding of the behaviors that lead to successful federal funding in other disciplines. The anticipated results of applying these models are an increase in the dollar value of awards and an increase in the number of awards. The literature review supported several significant variables identified in this study. Ebong (1999) suggested that a model could be developed based on a measurement of research activity. Subsequently, the model generated by this study could be used to create generic strategies for developing research projects. Boyer and Cockriel (1998) stated that the key to pursuing grant funding lies in discovering the individual motivators that attract faculty. This identification would reduce barriers and stimulate the grant funding efforts. Demographic or profile data with significant frequencies for the respondent population was identified in this study. Porter (2004) stated that junior faculty often have little awareness of how to receive federal funds or how to become a P.I. Porter suggested that too few mentors were available to help new faculty in becoming successful and suggested that a training program would help. Mentor was not a significant variable in this study but training in grant writing was a significant variable for the study population. Beir (2002) and McMillin (2004) suggested that university incentive programs and facilities would help build faculty research capacity. Many institutions "invest in faculty research by providing funding for start-up costs, research grants, travel support, sabbaticals, and pre-tenure leaves [of absence]" (McMillin, 2004, p. 2). Research universities' reputations seem to follow research productivity; thus, such support is fair and needed (McMillin, 2004). However, university incentive programs and facilities were not significant variables for this study population. Ebong (1999) noted that previous experience with funding programs is directly related to activity in seeking external funds. Ebong attempted to relate faculty capacity for research to a persistence profile of funds-seeking. He noted that research development requires the input of resources to produce consistent research goals and to accomplish the mission of the university. Ebong suggested that to measure capacity, a model could be developed based on a measurement of research activity. The results of this study support Ebong's theory and generated a generic model for developing research behavior. Hu and Gill (2000) reported that tenure status and academic rank had no significant correlation to faculty research productivity. Also, tenure and academic rank are not significant variables for this study population in obtaining grants.Thornley et al. (2002) noted the need for peer review processes to provide applicants with feedback. For this study, few survey respondents ($N = 5$) reported the use of peer review as behavior to gain success in obtaining grant awards. Daly (1994) reviewed the results of a Carnegie Foundation study and found that "half of the respondents publications were merely counted and never read even by those who insisted that these publications were needed for tenure or promotion" (p. 2). Likewise, publication was not a significant variable in getting funding for this study population. Marsh and Hattie (2002) attempted to determine the relationship between teaching and research with a meta-analysis and correlation. They found a zero relation across disciplines among various measures of productivity and measures of teaching quality. For this study, a reduction in teaching load was a significant factor in obtaining funding and was correlated with obtaining grant funding.

In light of the findings, the research community could benefit from applying the funding success models represented in this study. The success model as determined by this study can be applied across disciplines, and this study offers a systematic approach to determining the significant behaviors that can be applied to similar populations. To apply this model to other disciplines, the agencies selected as independent variables should be those who usually fund programs in the disciplines under study. This model can be applied to colleges and universities that focus on other objectives, such as student support, operating expenses, or program costs, by replacing the research-related variables with those related to other objectives.

CONCLUSION

Findings from this study may increase understanding of the federal funding process by offering models for funding success. Two strategies should be considered (dollar value of awards and number of awards), but these strategies may be combined into one model for funding success. Such an understanding is critical to the success of research faculty and institutions that want to support new research, to comply with university research missions, to help federal agencies in meeting their goals and objectives, and to expand the knowledge of science in society as a whole.

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