ADVANCE

PROJECT
CREST

Changing **R**esearch **E**xperiences **S**tructures
and (in)**T**olerance through the Adaptation
of Promising Equity Practices

Project CREST
Research Climate
Survey 2024

University of Colorado Colorado Springs
September 19, 2024

OVERVIEW

We assessed the research climate among tenured and tenure track faculty at the University of Colorado Colorado Springs in 2019. This report details a follow-up survey five years after the ADVANCE Project CREST (Changing Research Experiences through Structural Transformation) grant activities between July 2021 and August 2024.

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Project CREST Research Climate Survey 2024

Introduction

In 2019, the ADVANCE Project CREST Team sought to understand what structures, policies, and practices might impede women-identified and minoritized mid-career faculty from being promoted to full professor. These original problem analyses revealed that not only were women-identified faculty significantly underrepresented at the full professor level in STEM fields but results also highlighted that support for their research agendas, clear evaluation structures of their research, and time to dedicate to their research were barriers to success. Based on these problem analyses, we adapted and implemented two initiatives proven successful at other universities:

- Initiative 1: Build a Responsive and Inclusive Research Infrastructure
- Initiative 2: Reshape Research Policies, Practices, and Evaluation Structures

After three and one-half years of intentional work by the Project CREST Team, we revisited these problem analyses and assessed the impact of our activities on outcomes related to faculty promotion and research success.

Expectancy-Value and Self-Determination Theory

We explore the impact of these initiatives through the lenses of 1) expectancy-value cost theory and 2) self-determination theory. Expectancy-value cost theory (EVT) is a psychological framework that explains motivation based on an individual's expectations of success and the value they place on the success of a task (de Brabander, C., J. & Martens, R. L., 2014; Wigfield & Eccles, 2000). According to EVT, motivation is determined by two key factors – expectancies for success/value and the anticipated costs. In the context of this climate survey of faculty, expectancy is operationalized as confidence in the ability to be successful in research endeavors

such as securing funding for sponsored projects. Value is operationalized as the perceived importance or benefit of the particular research task. For faculty, this could include intrinsic value (personal satisfaction from grant-getting), attainment value (importance of achieving professional goals), and/or utility value (usefulness of the task for future opportunities). Finally, cost is operationalized as perceived sacrifices or effort required, such as time or competing priorities. By incorporating EVT to inform the climate survey design, we hope to better understand how specific CREST activities embedded within the two initiatives impact the motivational factors associated with faculty engaging in sponsored programs and, ultimately, how this relates to their job satisfaction and retention and promotion.

The second theoretical framework we employed is self-determination theory (SDT). SDT emphasizes the role of intrinsic motivation and the fulfillment of basic psychological needs in fostering well-being and motivation (Ryan and Deci, 2017). According to SDT, there are three fundamental needs that drive human behavior. The first of these needs is autonomy in which motivation is higher for activities that are self-directed, provide a sense of ownership, and align with a person's values. The next innate need is that of competence. Motivation for an activity is highest when the person feels they are competent and effective at engaging in that activity. It helps provide a sense of accomplishment in one's actions. Finally, the need of relatedness is the sense that one belongs and is cared for by those around them. SDT is particularly well-suited for understanding faculty motivation because it addresses the intrinsic aspects of their professional lives and their relational situation in the university context. Faculty members often seek meaningful and fulfilling work; and SDT helps identify the factors that contribute to intrinsic motivation. In the context of the climate survey, we explore how faculty perceptions of their

autonomy, competency, and relatedness are impacted by CREST initiatives and, in turn, how this relates to their job satisfaction and retention and promotion.

Method

Procedure

Tenure-track and tenured faculty at UCCS were surveyed in 2019 regarding their perceptions of and experience with the grant writing and submission process and how this relates to their job satisfaction and career progression. In 2024, after three and one-half years of implementation of Project CREST's two initiatives, faculty were again surveyed to assess the impact of the grant activities.[1] The population of faculty at UCCS in 2024 were invited via email by the Project CREST PI to participate in the online survey. The survey asked participants several items related to their likelihood of applying for a grant, their perceived competency in writing a grant, how much they value grant writing, the perceived costs of writing a grant, current job satisfaction, and the importance of research support services on campus. Additional variable information follows below. Items were counterbalanced to ensure that order effects were minimized. The survey was approved by the UCCS IRB and took approximately 15 minutes to complete, and participants were given a $20 electronic gift card for their participation.

Participants

A total of 286 tenured and pre-tenure faculty were recruited to participate in an online survey about their perceptions of opportunities and challenges experienced by faculty in their research and grant-getting at UCCS. A total of 163 respondents followed the link to the survey. Sixteen participants were excluded from the analysis because they failed to complete more than

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[1] This is not a longitudinal survey, and previous responses were not linked to past responses. Indeed, some faculty had left UCCS, some were new, and others might have opted to not take the survey at one or both time points, resulting in a cross-sectional design, which is an important caveat to the interpretation of results.

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60% of the survey items, which resulted in a completed response rate of 52%. Of the remaining 147 participants, 54.4% were women-identified, 40.1% were man-identified, 1.4% were gender-nonconforming or other, and 4.1% chose not to respond. The sample was largely white (61.2%), with 9.5% reporting an identity from a historically marginalized racial or ethnic background (e.g., Black, Hispanic, Pacific Islander), 8.2% were Asian, and a large portion chose not to indicate their race/ethnic identity (21.1%). Faculty rank was well-balanced with 34% of the sample being assistant professors, 30.6% being associate professors, and 31.3% being full professors. The remaining 4% either held the rank of distinguished professor or chose not to answer this question. On average, the respondents have been at UCCS for 12.3 years (range 1 – 45 years) with a median of eight years. Slightly more of the respondents were from a STEM or social and behavioral science field (57.2%). It is this population that is of primary interest regarding ADVANCE Project CREST activities.

STEM/SBS Participants

The sample included 84 faculty who reported working in a STEM or SBS field. There were slightly fewer faculty in this subset that identified as female (44%); they were predominantly white (56%), with 10.7% identified as being from a historically underrepresented background, 9.5% identified as Asian, and 23.8% chose not to respond to this question. Once again, faculty rank was well distributed with 34.5% assistant professors, 28.6% associate professors, and 32.1% full professors.

Measures

We are interested in different motivating factors related to faculty's research productivity and retention at UCCS. Leveraging EVT, we measured faculty's perceptions of costs associated with grant writing (e.g., Writing a grant takes too much time.), their expectancy for how the

grant writing process will be (e.g., I think writing a grant will be easy), and the value they place on grant writing activities (e.g., Grant writing is a worthwhile way to spend my time.). We are also interested in the self-determination faculty experience as a result of Project CREST activities. We measured their feeling of relatedness (e.g., I get along with the people I work with), autonomy (e.g., I feel like I can make a lot of inputs on how my job gets done), and competence (e.g., Most days I feel a sense of accomplishment from working). Finally, as measures of impact from the CREST initiatives, we gathered faculty perceptions related to retention (e.g., job satisfaction, intent to stay at UCCS, feelings of belonging at UCCS) as well as future intentions to apply for sponsored funding opportunities.

Results

Revisiting Midcareer Expectations for Success

Among midcareer women in STEM and SBS fields (n = 11) and men (n = 12), there was no significant difference in their expectancies for success in receiving a grant, their interest and value in writing a grant, nor in the costs associated with writing a grant (ps > .15). This represents a shift over the last five years of Project CREST as our original problem analyses suggested a gender gap by which midcareer men in STEM/SBS were more confident in their grant success compared to women and women reported greater costs associated with writing a grant.

Overall, faculty at all ranks felt the criteria by which their research will be evaluated during promotion to full professor is clear (M = 5.91, SD = 1.49), which was significantly different than the scale mid-point of 4 (p < .001). There was no significant difference between the perception of research criteria clarity among STEM/SBS or non-STEM/SBS fields. However, those at the associate rank felt the criteria were less clear compared to assistant and full

professors, perhaps because of the imminency and saliency of their tenure review (M = 5.56, SD = 1.74, p = .05).

We repeated the analyses first conducted in 2019 from the faculty survey concerning pre-tenure and mid-career women's perceptions of the value of grant writing, their expectations for success, concerns about the effort to write a grant, their future intentions to submit a grant, and their job satisfaction. We also included their perceptions about how clear their unit's evaluation processes are regarding faculty research. Compared to the 2019 results, we see that clear research evaluation expectations are no longer related to any of the other measures of the grant writing experience, nor is it related to job satisfaction. However, contrary to the 2019 data, we now see that the value of grant writing is positively associated with expectancies for success in grant writing, which we did not see previously among this population.

Impact of CREST

The two primary initiatives implemented by Project CREST were: 1: Build an Inclusive Research Infrastructure and 2: Reshape Research Policies, Practices, and Evaluation Structures. Central to Initiative 1 was the creation of a new support position – the Research Development Coordinator (RDC) who provides grant writing boot camps to faculty. Additionally, this initiative involved developing several resources to support faculty, such as the CREST Belayer's Research Network and numerous materials to support faculty promotion (e.g., sample dossiers for promotion to full, vita templates, workshops and speakers on the topic of promotion). Initiative 2 involved leading the co-creation of new annual merit review criteria with departments in the first project year. We also made concerted efforts to systematically review and offer suggestions for changes to criteria for campus awards and research policies over years two and three of the project. Finally, through year three and half of our no-cost extension year

we facilitated campus-wide discussions of how to better recognize and reward faculty's engaged scholarship activities in promotion criteria. This work began with a think tank of faculty from a variety of ranks and departments engaging in deep conversations about faculty promotion processes. This work resulted in Scholarship Reconsidered: A UCCS Promotion Think Tank White Paper and Considered Conversations across campus, which prompted six units to revise their promotion criteria to full professor.

We assessed the impact of these initiatives by first determining if there were significant differences between key groups on variables. Table 1 summarizes group differences between women- and men-identified participants, white participants and those from historically marginalized racial backgrounds, and participants from a professional field (e.g., education, business) or a STEM/SBS field. Of note, there were very few significant group differences on most variables (described below), therefore, we chose not to limit further analysis to only mid-career women faculty in STEM/SBS when assessing the further impact of CREST's initiatives.

Group Differences

Of the variables measured, the only group differences found were for 1) participants' value of the Research Development Coordinator and the grant writing boot camps, 2) perceived support of engaged scholarship, and 3) intentions for future grant activity. For the value of the RDC and grant writing bootcamps, a gender difference emerged such that overall, women-identified faculty found the support offered by the RDC and the grant writing bootcamp to be more beneficial compared to men. Importantly, the RDC's role is intentionally designed to dedicate 50% of their effort to women-identified and other marginalized faculty, and these results suggest this targeted support had a positive impact.

For support for engaged scholarship, racially marginalized faculty felt greater support for their engaged scholarship than white faculty. This is valuable since research shows minoritized faculty often participate in more engaged scholarship than their white peers (Settles et al., 2021). Thus, Project CREST's focus on changing annual review criteria, RPT criteria, and leading campus-wide conversations about engaged scholarship to center the work of diverse scholars was recognized by minoritized faculty.

Finally, for intentions to apply for external funding, there were expected field differences such that faculty in STEM or SBS fields reported they were more likely to apply for external funding in the future. This is expected, as those fields are more likely to have access to funding opportunities, require funding for their research, and reward funding in evaluations.

We also tested whether the group means on these measures were significantly different than the scale midpoints (neutral). The results of these one-sample t-tests indicate that for all our CREST variables and outcome measures, participant scores were all significantly higher than the scale midpoint suggesting that faculty hold significant positive perceptions of the CREST activities embedded within each of the two initiatives. Moreover, one-sample t-tests indicate that participants had positive outcomes as well, specifically in that they reported feeling significantly high levels of belonging, significantly high intentions to stay at UCCS, significantly positive intentions to submit a future grant, as well as significantly positive job satisfaction.

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Table 1. *Group Differences on Variables Measuring CREST Initiatives and Their Impact*

Activity/Resource	Gender		Race/Ethnicity		Field		One-Sample T-Test^
	Women-identified	Men-identified	URM	White	STEM/SBS	Profess. Fields	
Initiative 1:							
Build a Responsive and Inclusive Research Infrastructure							
Research Development Coordinator Resources	**4.89 (1.34)***	**4.36 (1.51)***	4.58 (1.28) ns	4.70 (1.55) ns	4.78 (1.40) ns	4.53 (1.46) ns	<.001**
CREST Research Resources/ Infrastructure	4.39 (1.11) ns	4.25 (1.34) ns	4.01 (1.49) ns	4.43 (1.13) ns	4.23 (1.08) ns	4.45 (1.34) ns	<.001**
Initiative 2:							
Reshape Research Policies, Practices, and Evaluation Structures							
Clear Annual Merit Review Expectations	6.30 (1.01) ns	6.21 (1.34) ns	6.27 (.92) ns	6.25 (1.26) ns	6.16 (1.38) ns	6.34 (.89) ns	<.001**
Fair and Transparent Research Policies	4.86 (1.41) ns	4.83 (1.78) ns	5.11 (1.11) ns	4.77 (1.68) ns	4.94 (1.57) ns	4.75 (1.59) ns	<.001**
Fair and Transparent Campus Award Policies	5.17 (1.30) ns	5.15 (1.60) ns	5.15 (1.01) ns	5.15 (1.61) ns	5.04 (1.44) ns	5.26 (1.46) ns	<.001**
Support for Engaged Scholarship	3.65 (1.64) ns	4.04 (1.68) ns	**4.36 (1.55)***	**3.68 (1.70)***	4.00 (1.56) ns	3.54 (1.75) ns	.17
Outcome Measures							
Grant Application Intentions	3.60 (1.09) ns	3.48 (1.28) ns	3.74 (1.23) ns	3.53 (1.18) ns	**3.81 (1.09)****	**3.21 (1.16)****	<.001**
Job Satisfaction	3.69 (.98) ns	3.83 (1.10) ns	3.81 (.98) ns	3.72 (1.04) ns	3.71 (1.00) ns	3.74 (1.09) ns	<.001**
Belonging at UCCS	3.69 (1.07) ns	3.47 (1.45) ns	3.50 (1.33) ns	3.61 (1.26) ns	3.65 (1.24) ns	3.52 (1.29) ns	<.001**
Intent to Stay at UCCS	3.53 (1.29) ns	3.17 (1.30) ns	3.50 (1.24) ns	3.46 (1.33) ns	3.36 (1.24) ns	3.35 (1.43) ns	.001**

*CREST Activities and Outcome Measures*

While the significantly positive outcome measures are informative data on their own, we next investigated how the activities associated with each initiative impacted these important outcome measures of faculty retention. For Initiative 1, we investigated the link between perceived support from the Research Development Coordinator, faculty value of grant writing, expectancies for success in grant writing, and potential costs associated with grant writing (Figure 1). We found that greater perceived support from the RDC was positively associated with valuing grant writing and higher expectancies for success and negatively associated with cost concerns related to grant writing. Additionally, perceived support from the RDC was directly positively associated with future grant activity and intentions to stay at UCCS. High value and lost costs were also related to future grant writing intentions, job satisfaction, feelings of belonging at UCCS, and intentions to stay at UCCS for at least the next five years. Another aspect of Initiative 1 was the development of resources, workshops, and community for faculty on the path to full professor. Faculty's perceived support from these CREST Research Infrastructure resources was positively related to job satisfaction, feelings of belonging at UCCS, and intentions to stay at UCCS for at least the next five years.

Figure 1. *Initiative 1 activities' relationship to expectancy, value and cost perceptions of faculty, and outcome measures of grant activity and faculty retention*
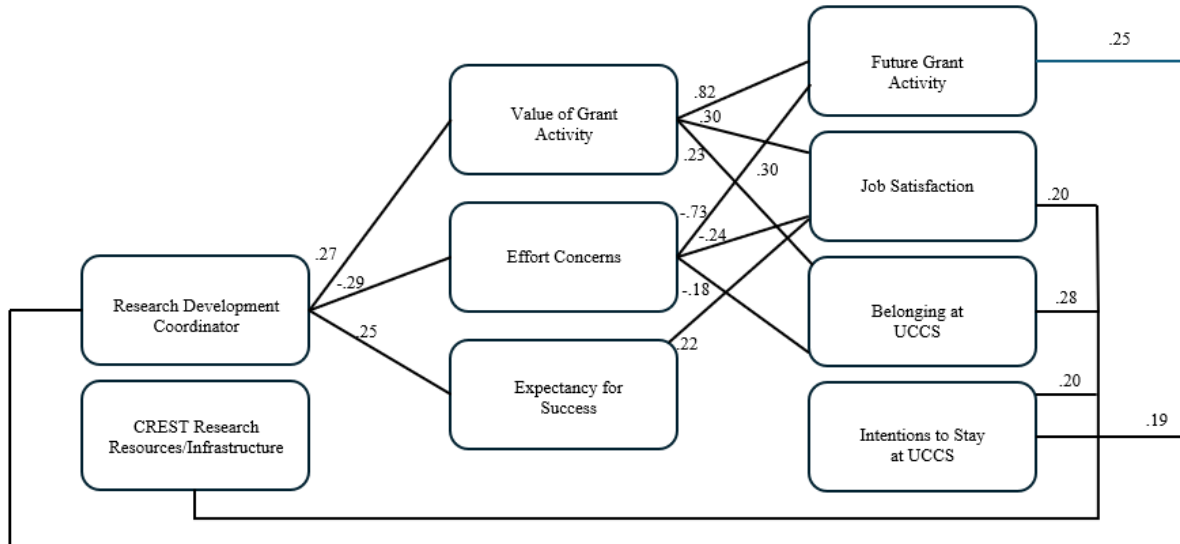
For Initiative 2, we focused on CREST's activities to improve the transparency of research policies and campus awards, increase support for engaged scholarship, and the development of clear, holistic annual merit review criteria (Figure 2). Results show that when faculty feel criteria and policies are fair and transparent (i.e., research policies and campus award criteria) they were also more likely to report greater feelings of relatedness, competency, and autonomy. These psychological needs were, in turn, positively associated with job satisfaction and feelings of belonging at UCCS. Feeling support for engaged scholarship was directly related to job satisfaction and intentions to stay at UCCS. Clear annual merit review criteria was also directly related to job satisfaction, intentions to stay at UCCS, and feelings of belonging at UCCS.

Figure 2. *Initiative 2 activities and their relationship to self-determination measures and outcome measures of faculty retention*
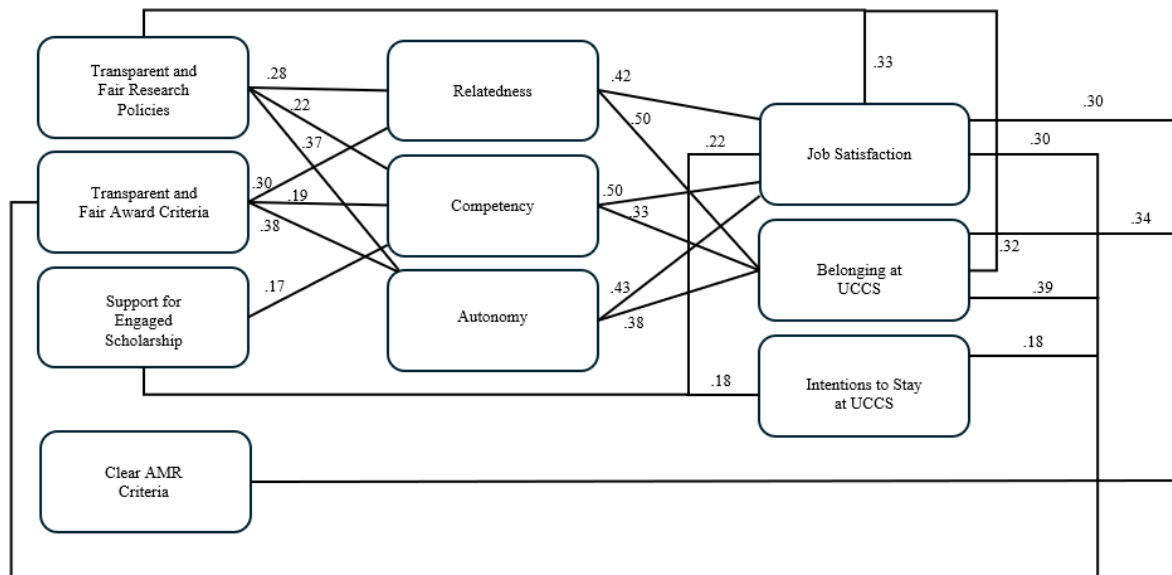
Summary

Results show that job satisfaction, faculty retention, and motivation to engage in sponsored program activity remain significantly associated with expectancy-value cost perceptions of the research climate at UCCS. While many things changed over the course of the three years of Project CREST (including vast turnover in administrative leadership), results point to the promising practices of Project CREST activities that helped to shrink the gender gap in sponsored program expectancies for success and perceived costs of grant writing. Results suggest a positive impact of many of the activities from Project CREST's two initiatives as likely possibilities for shrinking this gap. As our results suggest for example, women in STEM and SBS (more so than men in those fields) highly valued the Research Development Coordinator and the grant writing bootcamps. What is more, CREST activities had direct and indirect positive associations with key faculty retention variables of job satisfaction, belonging, and intentions to

stay at UCCS for the next five years. In particular, the CREST focus on transparency in new and revised research-related policies, award criteria, and annual merit review criteria were positively linked to job satisfaction and retention for all faculty. Add to this, job satisfaction and retention were higher among all faculty when they also felt supported for engaged scholarship, interfaced with the Research Development Coordinator, and participated in a grant writing bootcamp. Taken as a whole, results show the positive benefits of sustaining the research infrastructure activities developed using the expectancy-value cost model of motivation and adapted from other successful ADVANCE grantees.

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