

# Does Enjoyment, Guilt, and/or Rewards Motivate Faculty Research Productivity? A Large-Scale Test of Self-determination Theory

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## Introduction

University faculty are the largest contributor to scientific progress by society (Landry et al., 2003; Perkmann et al., 2013; Weinberg et al., 2014), yet, from 1988 to 2011, there was relatively little growth in the number of USA academic publications (30%) compared to the considerable growth in funding for research (80%; \$17.3 billion to \$49.7 billion; Hale & Hamilton, 2016). Studies consistently show institutional (Bentley & Kyvik, 2013) and social-environmental factors (Stupnisky et al., 2015) explain limited variance in faculty research productivity; yet, motivation remains understudied.

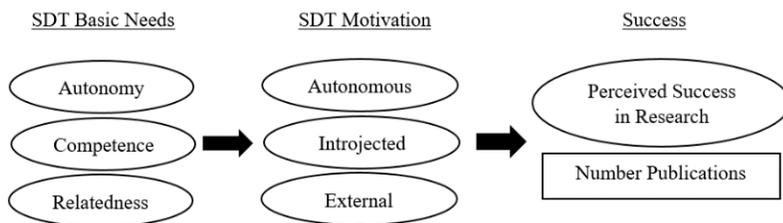


Figure 1. Conceptual Model of Faculty Motivation and Research Success

Self-determination theory (SDT; Deci & Ryan, 1985) posits *autonomous* motivation occurs when task engagement is enjoyable (intrinsic motivation) and/or seen as valuable (identified motivation). SDT further holds that autonomous motivation emanates when three underlying psychological needs are satisfied: (a) *autonomy*, seeking a sense of choice; (b) *competence*, a desire to interact effectively with one's environment; and (c) *relatedness*, experiencing close and secure emotional bonds with significant others. When the SDT basic needs are thwarted, controlled motivations are more likely. For instance, *introjected* motivation occurs when behaviors are provoked based on shame and guilt, while *external* motivation is triggered by external rewards and/or punishments.

Evidence for the role of motivation in faculty research success is growing (Bland et al., 2005; Hardre et al., 2011; Lechuga, 2012; Stupnisky et al., 2017; Walker & Fenton, 2013), yet have had important limitations. We should also consider demographic and workload variables when seeking to understand research productivity. The *current study* tested a model hypothesizing that faculty members' SDT motivation is an important predictor of research success, while additionally testing the roles gender, ethnicity, and time on research.

## Methods

**Sample.** Participants were 1,980 faculty members recruited from 19 USA institutions near the end of the 2017-18 academic year (March to May) who completed an experimental extra item set appended to the end of the *Faculty Survey on Student Engagement* (FSSE). Faculty reported average hours spent on work tasks as teaching 19.7 ( $SD=9.1$ ), research 9.6 ( $SD=8.5$ ), service 8.7 ( $SD=7.8$ ), and advising 5.5 ( $SD=5.5$ ).

**Measures.** The basic needs were measured with 12 items adapted from Van den Broeck et al. (2010) (1=*Never*, 4=*Very often*), motivation via 12 items adapted from Frenet et al. (2004), and success using four items from Stupnisky et al. (2015, 2017; (1=*Well below average*, 3=*Average*, 5=*Well above average*). We also asked faculty to provide a frequency count for how many times in the past three years their "scholarly writings have been accepted for publication."

Table 1: Respondent Characteristics

		Count	Percent	
Disciplinary Area	Arts & Humanities	379	20.5	
	Biological Sciences, Agriculture, & Natural Resources	149	8.1	
	Physical Sciences, Mathematics, & Computer Sciences	191	10.3	
	Social Sciences	200	10.8	
	Business	141	7.6	
	Communications, Media, & Public Relations	63	3.4	
	Education	191	10.3	
	Engineering	88	4.8	
	Health Professions	188	10.2	
	Social Service Professions	76	4.1	
	Other disciplines	170	9.2	
	Academic Rank	Full Professor	408	22.1
		Associate Professor	458	24.8
Assistant Professor		447	24.2	
Instructor		322	17.4	
Lecturer		211	11.4	
Tenure Status	No tenure system at this institution	138	7.5	
	Not on tenure track, but this institution has a tenure system	584	31.6	
	On tenure track but not tenured	428	23.2	
	Tenured	684	37.1	
Gender Identity	Man	860	46.6	
	Woman	878	47.6	
	Another gender identity	4	0.2	
	I prefer not to respond	83	4.5	
Racial/Ethnic Identification	American Indian or Alaska Native	7	0.4	
	Asian	100	5.4	
	Black or African American	202	10.9	
	Hispanic or Latino	133	7.2	
	Native Hawaiian or Other Pacific Islander	1	0.1	
	White	1,119	60.6	
	Other	30	1.6	
	Multiracial	72	3.9	
Sexual Orientation	I prefer not to respond	167	9.0	
	Straight (Heterosexual)	1,557	84.3	
	Gay	25	1.4	
	Lesbian	9	0.5	
	Bisexual	24	1.3	
	Queer	8	0.4	
	Questioning or unsure	3	0.2	
	Another sexual orientation	5	0.3	
I prefer not to respond	204	11.1		

## Results

Table 2: Reliabilities, Descriptive Statistics, and *t*-tests for Study Variables

Measure	range	<i>M</i> ( <i>SD</i> )	$\alpha$	Men	Women	<i>t</i>	<i>d</i>	White	Faculty of Color	<i>t</i>	<i>d</i>	STEM	Non-STEM	<i>t</i>	<i>d</i>
<i>Basic Needs</i>															
Autonomy	1-4	3.31(.59)	.81	3.37(.58)	3.28(.59)	3.29***	.18	3.31(.61)	3.32(.58)	-0.13	.01	3.28(.58)	3.33(.59)	-1.49	.07
Competence	1-4	3.51(.55)	.86	3.52(.55)	3.51(.54)	0.54	.03	3.56(.52)	3.47(.56)	3.44***	.16	3.48(.55)	3.51(.55)	-1.17	.05
Relatedness	1-4	3.18(.67)	.87	3.18(.67)	3.22(.67)	-1.34	.06	3.15(.68)	3.20(.66)	-1.69	.08	3.15(.66)	3.19(.67)	-1.23	.06
<i>Motivation</i>															
Autonomous	1-4	3.23(.71)	.92	3.27(.69)	3.20(.72)	2.22*	.11	3.37(.65)	3.15(.72)	6.69***	.31	3.30(.68)	3.22(.71)	2.10*	.10
Introjected	1-4	2.25(.90)	.80	2.30(.93)	2.20(.87)	2.46*	.12	2.39(.95)	2.16(.86)	5.38***	.25	2.21(.94)	2.26(.89)	-1.14	.05
External	1-4	2.27(.84)	.77	2.33(.84)	2.21(.84)	2.96**	.14	2.41(.84)	2.17(.83)	6.08***	.28	2.29(.86)	2.26(.83)	0.63	.02
<i>Success</i>															
Perceived	1-5	3.32(.92)	.85	3.40(.93)	3.24(.90)	3.60***	.17	3.44(.94)	3.24(.90)	4.58***	.21	3.33(.97)	3.31(.90)	0.36	.02
Number pubs	0-10+	9.74(25.3)	-	8.22(21.9)	10.61(27.3)	-2.00*	.10	10.47(26.2)	9.27(24.7)	0.99	.05	7.33(19.0)	10.58(27.1)	2.36*	.11

Note. Degrees of freedom were as follows for *t*-tests: gender 1736, expect number pubs 1715; race 1844, expect number pubs 1823; discipline 1834, expect number pubs 1813.  
\**p* < .05, \*\**p* < .01, \*\*\**p* < .001

Table 3: Correlations

	1	2	3	4	5	6	7
1. Autonomy	-						
2. Competence	.65*	-					
3. Relatedness	.63*	.52*	-				
4. Autonomous motivation	.45*	.44*	.31*	-			
5. Introjected motivation	.06	-.02	.05	.28*	-		
6. External motivation	.12*	.04	.08*	.24*	.46*	-	
7. Perceived success	.35*	.36*	.25*	.47*	.15*	.24*	-
8. Number publications	.14*	.12*	.01	.31*	.13*	.21*	.43*

\**p* < .01

**SEM.** Using AMOS, after some modifications the CFA and SEMs showed good fit to the data:  $\chi^2(273)=1588.39$ , RMSEA=.05 (95% CI = .049-.054), CFI=.95. The basic needs of autonomy and competence predicted autonomous motivation, and indirectly predicted achievement (respective,  $\beta = .16$  and  $\beta = .08$ , *p* < .01). Autonomous motivation (enjoyment, value) positively related to self-reported research productivity and number of publications, beyond time spent on research. External motivation (rewards) had relatively smaller positive relationships with research productivity, while introjected motivation (guilt) had no relationships.

**Group differences.** For gender, *t*-tests showed men reporting more research autonomy and perceived success compared to women. For ethnicity, white faculty reported more autonomous motivation and perceived success, but also more introjected and external motivation.

**Correlations.** Strong support for SDT among faculty.

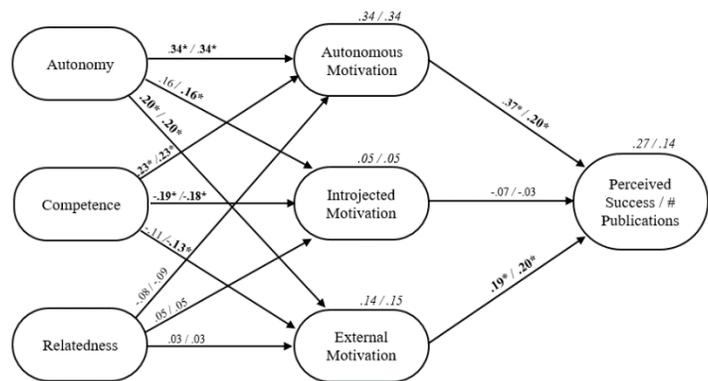


Figure 2. Significant paths at *p* < .05 are bolded with star (\*). Coefficients of determination (*R*<sup>2</sup>) appear at the corner of respective endogenous variables and are in italics.

## Discussion

The critical finding of this study was that autonomous motivation, engagement based on enjoyment and value, was the strongest predictor of faculty research productivity. This study contributes to previous research on faculty motivation by (1) using a large, multi-institutional sample of faculty members across a variety of disciplines; (2) utilizing multi-item scales and latent variables in structural equation models to improve the reliability and validity of findings; and (3) examining motivation beyond intrinsic (i.e., autonomous) motivation to consider the roles of introjected and extrinsic motivations.

Practical applications to support faculty research include encouraging faculty to pursue research questions they are most interested in, passionate about, and deem valuable may foster autonomy. Also giving faculty flexibility in their schedule and choice about working conditions would promote autonomy. Universities can promote competence in faculty by supporting professional development, such as attending workshops, conferences, and facilitating collaborations. Sabbaticals are excellent opportunities for faculty to update their knowledge base and develop new skills, and thus should be encouraged to build competence, and in turn autonomous motivation.