

Putting Personality in Context: Determinants of Research Productivity and Impact in Political Science¹

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ABSTRACT Research on the determinants of scholarly productivity is flourishing, driven both by long-standing curiosity about its wide variation, and by recent concern over race and gender inequalities. Beyond standard structural and demographic determinants of research output, some studies point to the role of individual psychology. We contribute to scholarship on personality and productivity by showing not only that personality matters, but when and for whom. Using an original, representative study of faculty from one discipline, political science, we propose and test several hypotheses about the “Big Five” personality determinants of productivity, as gauged through counts of publications, H-index scores, and citations. Controlling for a large number of familiar determinants (e.g., race, gender, rank, and institutional incentives), we find that conscientiousness predicts productivity, but that its effects are conditioned by openness to experience. More precisely, we discover that these two personality traits have compensatory effects, such that openness to experience and conscientiousness each matter most in the absence of the other. In addition, personality has heterogeneous impacts on productivity across different contexts; conscientiousness more strongly affects scholarly output in research-oriented institutions, while collaboration reduces the penalty associated with lack of conscientiousness.

Article Highlights

1. Using an original survey of political scientists, academic productivity has personality correlates, especially to conscientiousness.
2. Conscientiousness and openness to experience interact in shaping productivity, substituting for a deficit of the other.
3. Institutional and collaborative contexts condition the effects of conscientiousness on productivity.

key words: productivity, personality, coauthorship, H-index, citation

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Why do some scholars publish more than others? Why are some cited more frequently than others? Scholarship on individual research success is flourishing, driven by scientific curiosity, concerns about variability in outcomes, and proposals for how productivity and impact might be more broadly and equitably stimulated across lines of gender and race. Existing scholarship points unequivocally to the combined impacts of demographic characteristics such as gender and rank, as well as institutional variables such as research and teaching expectations. However, the literature has not fully accounted for the role of individual psychological differences. We focus on one such psychological factor: researcher personality. We show that two core traits of scholarly interest, conscientiousness and openness to experience, interact with each other as well as the environment to shape “research success,” a broad term that we use to encompass closely-related, but distinguishable dimensions of productivity and impact. Our analysis of research success is one of the first empirical tests of personality to both control for a host of other well-known predictors and use a sample composed exclusively of working scientists.

In the sections that follow, we begin by assessing the state of existing research, before discussing personality as an important explanatory dimension that deserves further theorizing. We note why conscientiousness and openness might be especially likely to shape research success, but also why these and other traits should be evaluated within institutional, collaborative, and disciplinary contexts. We then turn to data from an original survey of academic political scientists, and present new evidence of how specific traits explain scholarly outputs, conditional on context.

We find evidence that the personality traits of conscientiousness and openness exercise consistent, compensatory effects across domains of research success on measures of both quantity and quality; high scores on one measure seem to substitute for low scores on the other. At the same time, personality effects are conditioned by the environment, whether gauged by university type or coauthorship networks. In sum, we demonstrate that including personality is needed if we are to

have a more complete understanding of research success. We close by discussing how looking at personality, alongside variables such as pedigree and rank, provides a more complete explanation of productivity and presents avenues for future work.

Previous Studies on Research Success

The investigation of academic productivity spans many decades and disciplines, both in subjects and authors. Researchers often argue explicitly that publication and citation counts signal productivity, creativity, and scholarly contributions to knowledge (e.g., Amabile 1996, 33; Masuoka, Grofman, and Feld 2007a, 133; Weisberg 2006, 61). These are distinct but related concepts since impact and creativity hinge on production, but not all scholarly products are creative or impactful. In what follows, we draw on literatures that discuss both quantity and quality of scholarly output under the umbrella heading of research success.

Scholars have converged on a number of standard determinants of research output. As Witte and Rogge (2010) capture them, output is a function of individual characteristics (such as age, gender, and rank), research activity and motivation, competing priorities (especially teaching), and institutional rules. However, previous studies do not always agree on the significance and relative importance of these various factors; these disagreements highlight the need for further research to fill in the distribution of effects and assess the conditional effects of contexts, disciplines, samples, and measures that might explain variation.

Scholarship on the determinants of research success in our discipline of interest, political science, likewise has a long history (e.g., Somit and Tanenhaus 1964). Many findings echo the broader literature (e.g., Blackburn and Lawrence 1995, 43-74; Fox and Milbourne 1999; Hattie and Marsh 2002; Maske et al. 2003). Political scientists with especially high publication or citation counts disproportionately earned their Ph.D.s at highly-rated departments, mostly hold faculty

appointments at other highly-rated departments, and are likely to be male and white (Klingemann, Grofman, and Campagna 1989; Masuoka, Grofman, and Feld 2007a, 2007b; McCormick and Rice 2001; Roettger 1978). Examining self-reported counts of publications from individual-level survey data, Hesli and Lee (2011) replicate most of the previous findings; they also find that higher teaching loads are negatively related to political scientists' productivity, while frequency of conference attendance and department research resources are positively related to productivity. Perhaps surprisingly, Hesli and Lee report that the less collegial the departmental climate and the higher the student advising load, the higher the productivity (though this finding could arise from graduate student advising loads in Ph.D. granting departments). More recently, scholarship has posited a variety of explanations for persistent gender and racial/ethnic gaps in political science publication and citations (see, among others, Hesli and Lee 2011; Teele and Thelen 2017; Dion, Sumner, and Mitchell 2018; Djupe, Smith, and Sokhey 2019, 76; Hesli and Lee 2011, 400-402; and Masuoka, Grofman, and Feld 2007a, 139-141). Nonetheless, fully explaining the productivity puzzle requires accounting for a more inclusive range of predictors – something we develop as we investigate the roles played by personality.

Bringing in Personality

Psychological research argues that the roots of actions we take every day are deep and dispositional. As Feist (2006: 163) put it, “To think of a scientist who appears fullblown as a scientist without a developmental path behind him is to think the unimaginable.” The most creative and productive scientists are distinguished by having an especially high motivation for research, persistence, intellectual flexibility, and openness to new ideas (for extensive, recent reviews of these findings, see Feist 2014; Simonton 2014). Because of the wide adoption of some version of “publish or perish” tenure expectations in most four-year colleges and research universities, such personal

attitudes are plausibly very important to scientists' professional prospects (e.g., Rushton, Murray, and Paunonen 1983; Wildavsky 1989, 41-56; Witte and Rogge 2010). These attitudes track with broader dispositions toward engagement with the social world that have coalesced under the banner of personality. Personality is often defined as a stable set of traits, and there is considerable evidence of persistence over the life course (Roberts and Mroczek 2008). If personality traits are “consistent patterns of thoughts, feelings, and actions” (McCrae and Costa 2003: 205), and, if they correlate with career paths, then they are essential to consider.

Among various frameworks for understanding personality, the “Big Five” inventory holds great promise for explaining research success in academe. Early work on research productivity used widely variant measures of personality (e.g., Mahoney 1979; Rushton, Murray, and Paunonen 1983). In contrast, subsequent work drawing on personality concepts has standardized around the “Big Five,” or Five Factor personality traits of agreeableness, conscientiousness, extraversion, neuroticism, and openness to new ideas (also called “openness to experience”), derived from an extended research program in psychology (e.g., Goldberg 1992; McCrae and Costa 1987; for a review see John, Naumann, and Soto 2008).

Two of the Big Five traits seem particularly important for research. In recent reviews of the literature, Feist (2014, 74) and Oleynick, DeYoung, Hyde, Kaufman, Beaty, and Silva (2017, 9) argue that the trait of “openness” has been most generally associated with creative achievements – indeed, they note that creativity is an outcome of openness/intellect. Oleynick, et al. (2017, 15) also acknowledge that the other Big Five traits relate to creativity, but that they do so inconsistently and in domain-specific manners. In addition, Feist (2014, 74) and Simonton (1988, 50-52; 2014, 94) observe that highly successful scientists are distinguished by a syndrome of attitudes and behaviors, including perseverance, persistence, and work ethic, that map to the trait of conscientiousness.

However, two features of the literature on the Big Five and scientific output prevent an easy aggregation of findings: its composition of samples and variation in dependent variables. Existing research has been carried out with diverse convenience samples – for example, samples of “scientists” that range from junior high science students to academic scholars to the general public (e.g., Feist 1998; Kaufman, Quilty, Grazioplene, Hirsh, Gray, Peterson, and DeYoung 2016). Indeed, only Grosul and Feist (2013) and Rushton et al. (1983) offer an analysis based on data from professional scientists, from a diverse variety of social and physical science disciplines. Yet Grosul and Feist’s (2013) empirical results do not fully suggest how the Big Five traits compare with the explanatory power of other known predictors of productivity,³ and their samples are too small to support discipline-specific analyses. Others have drawn on highly productive subsets of working scientists (e.g., Masuoka et al. 2007a), which minimizes the inferences that can be drawn.

Second, the literature has adopted wide-ranging dependent variables; it includes everything from tallies of publication numbers and citations, to reports of subjects’ self-assessed creativity, teacher assessments of creativity, and even grades earned in school (e.g., Feist 1998; Kaufman, Quilty, Grazioplene, Hirsh, Gray, Peterson, and DeYoung 2014). More of a standard has emerged over time so that, among working scientists, citations are sometimes interpreted as measures of “creativity” or “quality” (e.g., Rushton et al. 1983; Simonton 1988), as well as a “valid measure for determining standing in the profession” (Masuoka et al. 2007a: 133). Yet there is tremendous overlap between measures; Simonton (1988) reports just how strongly publication counts are related to other dependent variables such as citation counts and peer recognition: correlations are in the range of “.47 to .76” (Simonton 1988: 85). With such high correlations, we feel confident drawing

³ In their analyses, Grosul and Feist (2013) do not include measures of such attributes as where one earned their doctoral degree, or the character of an individual’s current academic department.

from investigations of both productivity (i.e., publication counts) and impact (i.e., citations), but remain attentive to differences between and nuances within these studies.

Despite limitations, the literature suggests that the strongest of the Big Five candidates for influence on research success are conscientiousness and openness. However, we suspect that these personality traits do not shape productivity equally for everyone. While research to date has suggested that the psychological determinants of productivity are likely to be domain-specific, we still do not know enough about when, how, and for whom these dispositions matter.

First, little work has considered the interactive relationships among personality traits. We suspect that different traits might logically be substitutive or compensatory, such that conscientiousness would matter most for the productivity and impact of academics low in openness to experience and vice versa. Each trait motivates research activities – whether as a response to career incentives and norms, or as a response to curiosity and intellectual drive. Moreover, each is likely to be sufficient for work production in the absence of the other, though articles produced by highly conscientious scholars lacking in openness may have a different character from articles produced by highly open but non-conscientious scholars. While it would seem that each trait acts on different components of a research project – generating ideas from openness versus managing time and details from conscientiousness – having high levels of both is unlikely to add measurably to raw output over having high levels of one.

Second, we also do not know enough about how personality manifests in academic research differently across contexts. While we expect certain individual traits to be important to research success, personality is likely both to parallel and to modify the impact of other contextual forces. Indeed, John, Naumann, and Soto (2008, 141) observe that a major contemporary thrust of research with the Big Five traits assumes that “personality traits are important because they influence the way individuals interact with particular environments.” Thus, a full accounting of how personality shapes

research success likely will require an assessment of the direct effects of personality variables within a variety of specific “environments” or discrete academic contexts.

One of the most important sources of environmental heterogeneity facing professional academics relates to different types of institutions, such as research-intensive (e.g., “R1”) and teaching-intensive institutions. Different academic work environments pose different sets of incentives and constraints on academics’ behavior, and personality traits may affect how researchers respond to them. Highly open scholars might launch creative research projects in some contexts but lead innovative study abroad programs in others. Similarly, academics high in conscientiousness would likely respond differently to the incentives of universities that prioritize research output than to those that put the highest premium on excellence in teaching and advising. That is, conscientious academics are likely to prioritize the aspects of their work that their superiors and institutional structures convey as being most important.

Another potential source of environmental heterogeneity in the impact of personality relates to variation in the extent to which academics coauthor or instead publish largely solo-authored work. The collaborative context of coauthorship may mitigate the role of personality by drawing on the distinctive strengths of coauthors, such that different members of a coauthorship team each contribute in their own measure. For instance, a coauthor high in openness to experience but low in conscientiousness might contribute novel ideas to a collaborative endeavor, while a coauthor high in conscientiousness and low in openness to experience might contribute the hard work needed to execute the project, such that the mutual product reflects the borrowed strengths of the team. By contrast, in single-authored projects, success is more likely to mirror the variation in individual academics’ personality traits.

Finally, a context-sensitive analysis of the impact of personality on academic productivity must also account for heterogeneity across scientific disciplines. To that end, we undertake a

discipline-specific analysis limited to political scientists, a strategy that comports with the widely held conclusion that such research is at present preferred over that which pools research subjects from notably different scholarly disciplines (e.g., Feist 2017; Ericsson 1999; Sak, Ayvaz, Bal-Sezerel, and Ozdemir 2017). In particular, Feist (2017, 200-201) makes a compelling argument that physical scientists and social scientists “have distinct psychological profiles,” and that “different kinds of intelligence and problem-solving skills” are essential for success in the social as opposed to the physical sciences. The latter argument comports too with the observation of Oleynick, et al. (2017, 15) that the Big Five traits relate differently to creativity in different domains and disciplines (see also Simonton 2009).

Hypotheses

We offer a detailed assessment of a wide range of predictors of scholarly productivity – including the Big Five traits – among academic political scientists. This is one of the first examinations of such a broad range of explanatory variables for a specific scientific discipline (though see Witte and Rogge 2010). Given the focus on openness and conscientiousness as they link to scientific research (e.g., Feist 2014; Oleynick et al. 2017), we develop directional expectations for these two traits, but not for agreeableness, extraversion, and emotional stability (though we control for all five traits in our model specifications). Specifically, we hypothesize the following:

1. *Additive effects*: Higher conscientiousness and openness to experience predict greater academic productivity.
2. *Compensatory effects*: Conscientiousness and openness to experience interact such that high levels of the one compensates for low levels of the other in predicting greater academic productivity.

3. *Contextual effects:* The impacts of conscientiousness and openness to experience on academic productivity will be stronger in research-intensive institutions, and for scholars who conduct predominantly solo-authored research.

Data: The PASS Study

Our hypotheses demand indicators of personality lacking in standard datasets of observable measures of productivity and impact, so we turned to a survey effort conducted in March 2017 called the Professional Activity in the Social Sciences (PASS) study. We began with a list of American Political Science Association (APSA) member departments, sampled half of them in early 2017 (N=308),⁴ and then generated a list of faculty in these departments (N=5,084).⁵ We sent an invitation by email to all faculty in those departments, which generated 900 replies after three reminder attempts (for a final response rate of just under 18%). A comparison of the PASS sample to distributions in two recent surveys of political scientists and numbers reported by the APSA appears in the appendix (Table A1). The PASS sample has about 10 percent more women than these other data sets (e.g., Mitchell and Hesli's 2013 study), but is otherwise comparable in terms of rank, race, subfields, and percentages from PhD granting institutions. Though most are from the United States, 4 percent of institutions and 6 percent of respondents are not.

Independent Variables

These data yield most of our explanatory variables (see Table A2 in the Appendix for full variable coding), including the nature of the home institution (PhD granting or not), the participant's academic rank, time since PhD, race, and gender (the survey allowed for non-binary responses, but only one respondent identified as non-binary). To test the effects of the Big Five personality traits,

⁴ In June, 2017 we conducted a companion study of sociology departments (at the same sampled universities). We discuss those results elsewhere [redacted for review].

⁵ We had coders collect email addresses from the webpages for these departments. 44 email addresses were not usable.

we employ responses to two items for each trait as suggested in Gosling, Rentfrow, and Swann's (2003) ten item personality inventory, or TIPI (though see Bakker and Lelkes 2018). For instance, participants were asked whether they agree or disagree, on a five-point scale, with the following two pairs of descriptors to capture conscientiousness: 1) dependable, self-disciplined, and 2) disorganized, careless. Conscientious people would agree with the former and disagree with the latter. Distributions of these variables are available in Appendix Figure A1.

We also utilize the survey to capture elements of participants' academic advice networks. Specifically, we asked respondents for the names or initials "of the first three people that come to mind who have provided help or feedback on your work." We then asked if each person in the three-member egocentric network was a coauthor and summed the number of network members who were coauthors, yielding a variable running from 0 to 3 representing the propensity to coauthor. In addition, we control for responses on a Likert-type item measuring agreement or disagreement that the participant "can get comments from scholars who are likely to review my research." Finally, we include controls from a survey measure asking how much time academics spend in a typical week on teaching, research, service, and home responsibilities.

A final explanatory variable comes from data collected independently, outside the PASS dataset: rank of the respondent's PhD-granting department. We collected PhD-granting departments from respondents' web-posted CVs (and other sources), and then merged in data on program ranks. To do so, we used Hix's (2004) "global ranking of political science departments."⁶ We did not have access to rankings using a similar method for each year in which participants received their PhD. However, while the rankings shift across time, this time period roughly corresponds with the average

⁶ Simon Hix graciously shared a list that went beyond what was reported in his paper, including 400 departments – this covered almost all of our sample.

date of participants' receipt of a PhD (2003). The rank variable is coded so that lower numbers correspond to higher-prestige institutions (i.e., the best ranking is 1, and the lowest is 381).

Dependent Variables

Following research arguing that productivity and creativity are multidimensional constructs (e.g., Martin 1996; Witte and Rogge 2010), our dependent variables measure three dimensions of scholarly success. Total publications serves as a standard measure of productivity; this variable is highly correlated with our indicator of impact, citation counts (logged to account for strong rightward (positive) skew in the distribution). The H-index (Hirsch 2005) is a blended measure integrating the quantity and impact of output. The survey collected self-reported information on submissions and publications in the past year, which we will draw on in the Discussion section. In the main analyses we focus on longer-term measures, as these are arguably more reliable indicators. Accordingly, we coded each participant's number of publications, citations, and H-index from the Social Science Citation Index (SSCI) in the larger Web of Science archive.⁷ As noted, Simonton (1988) reports correlations between productivity and citations in the range of .47-.76; in our data, the correlations between these three items are all $r=0.7$ or greater.⁸ Given overdispersion in the distributions for the number of total publications and for the H-index, for those two dependent variables we use negative binomial models; we model logged total citations using ordinary least squares regression.

For the visual display of uncertainty, we rely on the advice of Knol, Pestman, and Grobbee (2011; see also MacGregor-Fors and Payton 2013; Payton, Greenstone, and Schenker 2003), who detail how to translate significance tests into confidence intervals. That is, simply applying 95

⁷ We also attempted to replicate this procedure with Google Scholar, but discovered that a large portion of our respondents did not have public profiles there. SSCI counts are much lower than Scholar, but are highly correlated (Martín-Martín et al. 2018).

⁸ $r(\text{publications, H-index}) = .81$; $r(\text{publications, logged citations}) = .71$; $r(\text{logged citations, H-index}) = .84$.

percent confidence intervals to any figure will produce misleading inferences, so confidence intervals are recalculated so that their visual overlap is equivalent to statistical tests (e.g., two 84% intervals are equivalent to a single 95% test, while two 76% intervals are equivalent to a single 90% test at the point of overlap).

Results

Table 1 presents the estimates from models regressing three measures of research success on “Big Five” personality measures, as well as measures of professional context and a wide range of demographic and personal characteristics. The analysis partially supports and partially disconfirms our first hypothesis: conscientiousness is strongly and consistently associated with metrics of successful research careers in political science, but openness to experience is unassociated with any of our dependent variables. Holding all other variables at their observed values, moving from the minimum to the maximum observed values of conscientiousness in our dataset is associated with a rise in the predicted number of publications reported in SSCI from 8.9 to 12.3 (a 38% increase), a rise in the predicted H-index from 3.35 to 3.54, and a rise in the predicted number of total citations from 18 to 23.⁹ In addition, we find a small negative effect of agreeableness on publications, but not on the other dependent variables.

The effects of personality are estimated from models that control for a wide range of variables that have previously been found to predict scholarly productivity – rank, gender, race, teaching and service loads, and pedigree (rank of Ph.D. granting department). We also include important measures of institutional and collaborative context, namely characteristics of the respondent’s current institution and information on how much the respondent coauthors. Many of

⁹ The dependent variable for citations is estimated by adding one to the count, before logging. Hence, we exponentiate predicted values and subtract one to obtain predicted effects.

these variables yield expected effects, and some will be important in subsequent analyses. In particular, those teaching in Ph.D.-granting institutions are predicted to have 6.5 more total publications than those who are not. Meanwhile, those with the highest level of coauthorship are predicted to have H-indices 1.1 points higher and to have 15 more total logged citations than those with the lowest levels of coauthorship.

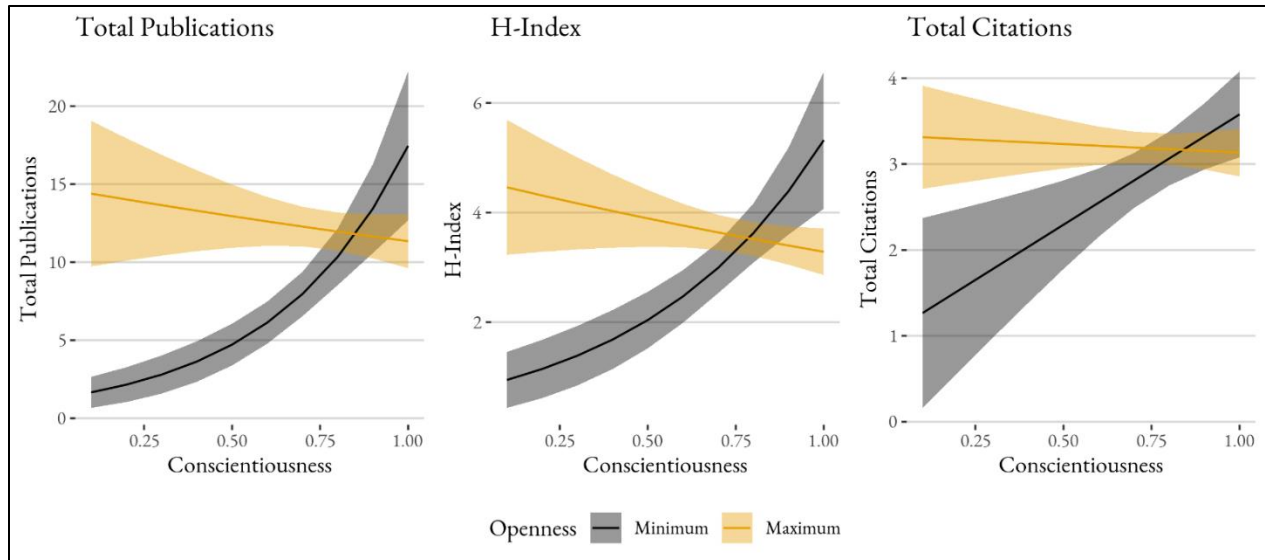
Table 1. Personality, Context, & Background Determinants of Productivity & Impact

	Total Publications (negative binomial)		H-index (negative binomial)		Total Citations (logged - OLS)	
	Coef	<i>p</i>	Coef	<i>p</i>	Coef	<i>p</i>
Openness	0.35	0.14	0.06	0.77	0.25	0.55
Conscientiousness	0.77***	0.00	0.36*	0.06	0.70*	0.08
Extraversion	-0.11	0.48	-0.04	0.77	-0.22	0.46
Agreeableness	-0.48**	0.03	-0.12	0.52	-0.17	0.67
Emotional Stability	-0.23	0.30	-0.35*	0.06	-0.61	0.13
PhD Granting Inst.	0.53***	0.00	0.54***	0.00	1.20***	0.00
Network Coauthor %	0.12	0.34	0.30***	0.01	0.59**	0.01
Able to get comments	-0.11***	0.01	-0.09**	0.02	-0.09	0.24
Assistant	0.62***	0.00	0.66***	0.00	0.89***	0.00
Associate	0.95***	0.00	1.02***	0.00	1.68***	0.00
Full	1.24***	0.00	1.33***	0.00	2.16***	0.00
Years since PhD	0.00	0.36	-0.00	0.42	-0.01	0.19
Women	-0.20**	0.02	-0.14*	0.06	-0.22	0.16
Non-White	-0.31***	0.01	-0.35***	0.00	-0.61***	0.00
Time Spent: Teaching	-0.01***	0.00	-0.01***	0.00	-0.01**	0.03
Time Spent: Service	-0.00	0.18	-0.00	0.20	-0.00	0.67
Confs Attended	0.19***	0.00	0.15***	0.00	0.31***	0.00
Rank own PhD Dep't	-0.00	0.38	-0.00**	0.01	-0.00**	0.01
Constant	1.04***	0.01	0.25	0.49	1.28*	0.06
lnalpha	-0.34***	0.00	-1.12***	0.00		
Observations	603		603		603	
R-squared					0.33	

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Our second hypothesis suggested that conscientiousness and openness to experience would compensate for each other, effectively providing alternative routes to academic success. In Table A3 (see the Appendix), we present results from models examining the interactive relationship between

openness to experience and conscientiousness in predicting total publications, total citations, and the H-index.¹⁰ We find a large and statistically significant interaction between openness and conscientiousness, such that conscientiousness most strongly affects productivity for those with low values of openness (see Figure 1). Moreover, despite the fact that the non-interactive models presented in Table 1 had demonstrated no statistically significant effect of openness, this subsequent analysis shows that openness to experience significantly predicts two of our three dependent variables – total publications and the H-index – at low values of conscientiousness. At the minimum observed value of conscientiousness, moving from the minimum to maximum levels of openness to experience boosts productivity by nearly 14 publications and the H-index by 3.6 points; at the highest levels of conscientiousness, openness to experience is associated with a marginally statistically significant *drop* of 2.1 points on the H-index. Strikingly, the highest values of all three dependent variables are predicted for respondents with maximum levels of conscientiousness and minimum levels of openness to experience.¹¹



¹⁰ We do not find a statistically significant interaction between conscientiousness and any other personality variables beyond openness.

¹¹ We obtain a similar pattern of results if we model the average number of publications (dividing by years since PhD).

Fig. 1 Conscientiousness and Openness to Experience Condition One Another

Source: PASS Data for Political Science, 2017

Note: The figure shows 76% confidence intervals. Comparison of two 76% confidence intervals is equivalent to a 90% ($p=.10$, two-tailed) test of statistical significance at the point of overlap. Citations are logged.

Finally, our analysis confirms that context modifies the impact of conscientiousness on academic productivity. The appendix presents full models in which conscientiousness is interacted first with an indicator variable for whether the respondent works in a PhD program, and second with a measure of coauthorship (see Tables A4 and A5). Figures 2 and 3 present the predicted, interactive effects of conscientiousness and the contextual variables on the three measures of scholarly success.

Figure 2 demonstrates that conscientiousness more strongly shapes productivity for those who work in PhD-granting institutions, a finding in line with the third hypothesis. For those working in PhD programs, moving from minimum to maximum levels of conscientiousness approximately doubles the predicted number of publications and leads to a 50% rise in the H-index; the effects are smaller for those in other types of institutions. Conscientiousness has roughly the same positive effect on total (logged) citations regardless of institution type.

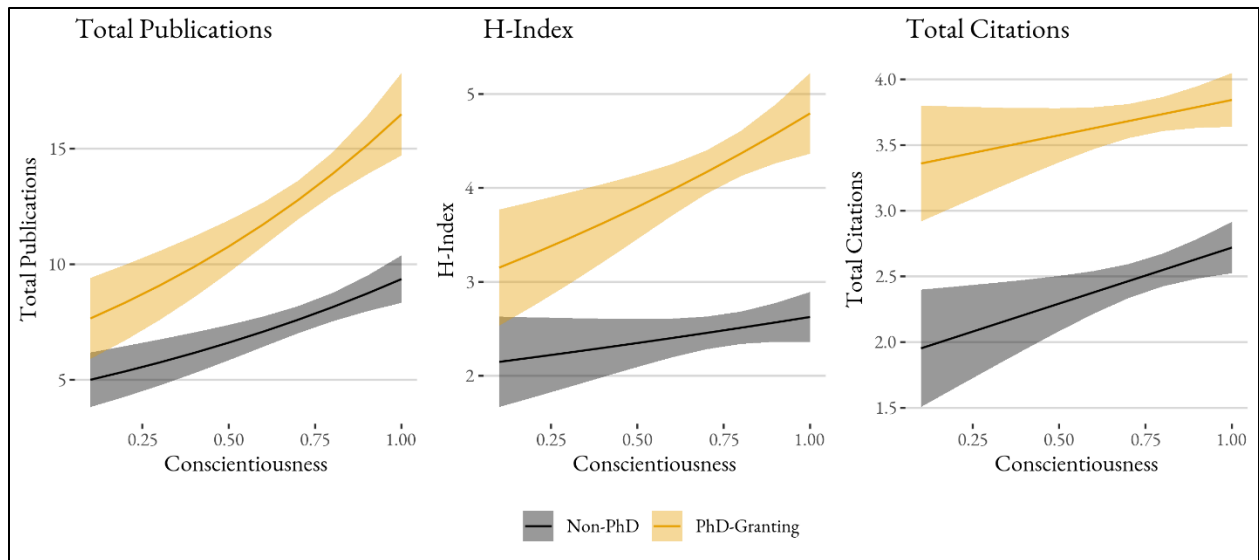


Fig. 2 Institutional Incentives Modify the Effect of Conscientiousness

Source: PASS Data for Political Science, 2017

Note: The figure shows 76% confidence intervals. Comparison of two 76% confidence intervals is equivalent to a 90% ($p=.10$, two-tailed) test of statistical significance at the point of overlap. Citations are logged.

Figure 3 shows that conscientiousness is much more strongly linked to productivity for those who tend to write without coauthors, also in line with the third hypothesis. Conscientiousness has little impact on the academic productivity of those with high numbers of coauthors (though there is weak evidence it might actually decrease total citations). Yet for those who tend to single-author work, moving from the minimum to maximum levels of conscientiousness has an extremely large effect on productivity: it nearly triples the total number of publications, doubles the H-index, and results in a fourfold increase in total predicted SSCI citations, from about 6 to about 25 (the latter results are exponentiated, given that the citations measure is logged in the figure).

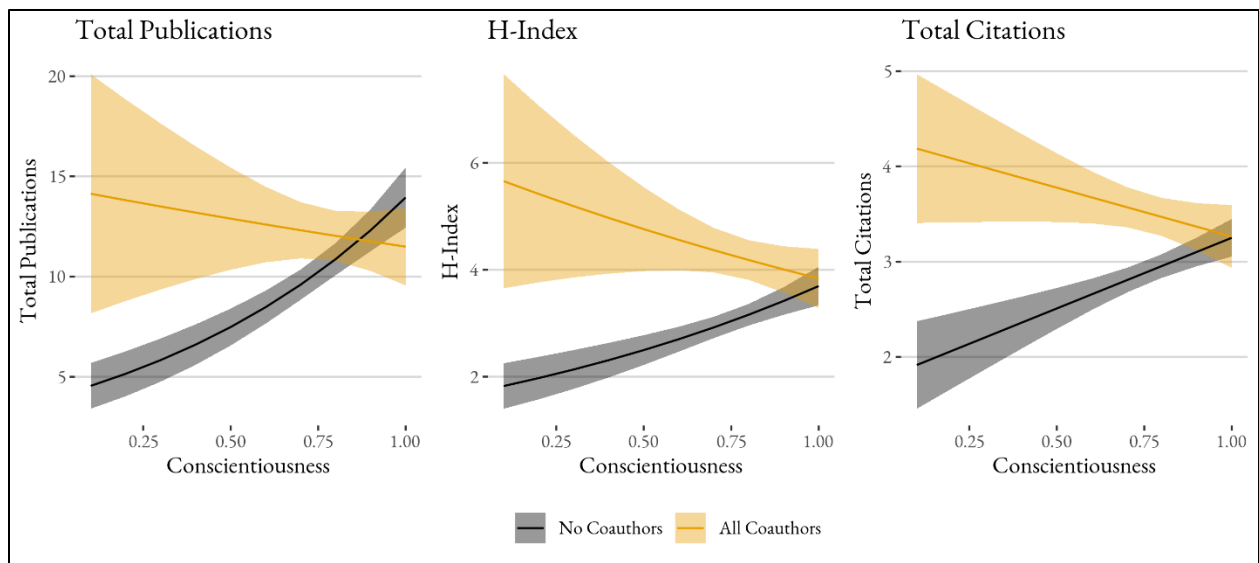


Fig. 3 Coauthorship Reduces the Effect of Conscientiousness

Source: PASS Data for Political Science, 2017

Note: The figure shows 76% confidence intervals. Comparison of two 76% confidence intervals is equivalent to a 90% ($p=.10$, two-tailed) test of statistical significance at the point of overlap. Citations are logged.

Discussion: Are These Patterns Consistent Over Time?

One important consideration is whether the personality patterns we uncover are consistent across the career-course.¹² This question matters especially for pre-tenure candidates with running clocks, but reputations and research legacies are also at stake. With cross-sectional data, we are unable to say too much about this, but did take several approaches with available measures that point toward future analyses.

First, we examined whether the primary interaction tested – between openness to experience and conscientiousness – varied by academic rank. Shown in Appendix Figure A2, we find that the same pattern holds across ranks: openness and conscientiousness are effectively substitutes for each other. The pattern is somewhat weaker among associates, in part, we suspect, because they no longer face the same pressures of the clock. However, the overall consistency in effects across rank would seem to indicate that our primary findings manifest consistently across the career.

We also examined a self-reported measure from the survey of the number of journal publications in the past year (we capped the measure at 10, which excluded a handful of outliers). Using the same model (available in Table A6), we found no significant interaction between openness and conscientiousness, but, instead, that only conscientiousness has a significant and positive effect (adding about 1 publication across the full range of the variable). The estimate for openness is positive, but it is overwhelmed by its standard error.

Given the limitations of our data, we must avoid making definitive statements about over-time patterns. Still, the combination of these two looks is suggestive. Conscientiousness is linked consistently to production, which leads us to hypothesize that a systematic examination of productivity over time might show that highly conscientious scholars publish at a steady rate. Those higher in openness to experience produce at the same rate as the conscientious over the career, though we suspect that they might be less consistent year-to-year. Their records are likely to be

¹² We thank Reviewer 1 for suggesting this direction of discussion and analysis.

“lumpier,” with publications coming in bursts. These patterns also seem consistent with the personality traits themselves, with the conscientious valuing consistency and routine, and those open to experience valuing novelty and chasing new questions and experiences.

Conclusion

Across analyses, we predict scholarly productivity and impact from the same constellation of factors that has appeared regularly in the literature. Rank and pedigree operate as expected, and we replicate previous results with respect to race and gender gaps. We also find robust confirmation of the importance of a comprehensive set of contextual determinants – that is, the type of institution scholars work in, how they spend their time in that setting, and how other scholars support their output (via collaboration and feedback).

Notably, we expand upon these previous models by also evaluating the role of personality traits, while accounting for the way personality’s impact varies across researchers and contexts. Looking at such a broad set of variables simultaneously is essential if we are to help adjudicate between different explanations offered in the literature. In a full specification, we see that conscientiousness emerges as a predictor of research success, but we also see that some intuitive suspects fall by the wayside – for example, “time spent on service” appears to do little to structure publication or citation numbers after controlling for other factors. The incorporation of a broad set of variables is only possible because the PASS Study included items tapping demographic, psychological, and social/contextual factors. We encourage future studies to include a similarly large number of items to properly cover these different dimensions of the academic experience.

Reflecting further on the results, one pattern worth additional commentary comes in the direction of the effects across models. By and large, we see the same covariates pushing in the same directions across measures of success, whether the outcome in question is quantity (publication

numbers) or impact (H-index scores or citation counts). To this point, we have effectively treated all three dependent variables as operationalizations under a single concept of research success, albeit one with two dimensions, productivity and impact. Our results affirm the strong linkages among different aspects of research success, suggesting that demographic, psychological, and contextual factors work in similar ways when it comes to explaining processes of knowledge production and of knowledge reception. Future work should probe for necessary qualifications on these conclusions and pursue differences in mechanism across these outcomes. For example, gender differences in publication numbers may be partially explained by orientations towards submission (e.g., [redacted for review]), while a contributor to gender differences in H-index scores and citation counts may come from men self-citing at higher rates (e.g., King et al. 2017; Maliniak et al. 2013), or from network effects in which people who are better known or more powerful get cited at higher rates.

Another important way in which we see consistent results across the outcomes of interest comes in our argument for conditioning on context. Scholars working in genopolitics have given considerable attention to the consequences of gene-environment interactions (e.g., McDermott et al. 2013). We introduce a similar logic to the study of scholarly success, finding robust evidence that the effects of individual traits are moderated by features of the environment. Conscientiousness matters for productivity, but its effects vary dramatically based on the nature of the institutional and collaborative context. Notably, while these settings overlap, they differ in the extent to which scholars can actively shape them; one has some agency in determining one's coauthorship network, but the broader university is a step beyond individual control. By looking at how dispositions operate amidst various settings, we gain a better understanding of what drives differences within and between scholars at, for example, the liberal arts college versus the R1 university. Remembering that heterogeneity in success is informed by a combination of psychological, social, and institutional

factors is important as we think critically about gaps based on demographics like race and gender, and debate possible interventions to address these persistent problems in academia.

Of course, these findings with respect to context remind us that other questions about context remain. While focusing on the discipline of political science helped us control for disciplinary heterogeneity in incentive structures, norms, and practices, we must also ask: would we have found different things if instead we had surveyed, for instance, evolutionary biologists or philosophers? The fact that most prior findings on success within the field of political science align with prior work in other fields (and with disparate samples) suggests that the process of research production in – and the culture of – political science likely does not differ markedly from other fields.

That said, political science continues to straddle the social sciences and humanities, with continued, sometimes heated, debates over the rightful aims of the discipline and the level of productivity and impact expected. At times this debate has adopted the posture of defending quality against the pressures to produce quantity (e.g., Mearsheimer and Walt 2013), which may bear on the investigation of components of academic success. As a counterpoint, we would return to the strong relationship between productivity and impact observed in these data ($r > 0.7$) and remind readers that these debates are not unique to political science. Still, without explicit comparison we cannot fully know whether the discipline we have examined is distinctive – perhaps a study of other fields would have found a stronger independent impact of openness to experience. What is clear, however, is that future work should elaborate on the complex interactions between academic contexts and personality.

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Appendix to:
**Putting Personality in Context: Determinants of Research Productivity and Impact in
Political Science**

Appendix Tables A1-A6.....pgs. 1-7
Appendix Figures A1-A2.....pgs. 8-9

Table A1 – A Comparison of Sample Statistics from Three Recent Surveys of Political Scientists†				
	PASS Study	Mitchell & Hesli (2009/2014)	Djupe (2015)	APSA Reported*
Women	41.7	32.0	31.7	33
Assistants	32.8	30.1	25.4	
Associates	28.7	27.3	32.7	19
Full	30.3	34.6	37.7	26
White	88.0	87.0	82.4	65
PhD year	2003	1991	1997	—
PhD granting	37.2	34.4	46.5	43.3
BA granting	35.0	40.7	30.4	
American	33.1	37.8	—	
Comparative	22.3	17.3	—	
Articles, past/per year	1.4	.71 [^]	.97 [^]	—

†This table appears in the appendix to Djupe, Smith and Sokhey (2019).

*These figures are reported in Djupe (2015: 346).

[^] The Mitchell and Hesli data came from a list generated in 2009; the articles were averaged from a career total with a denominator of 2009 minus the year they received the PhD. The Djupe 2015 statistic comes from a three-year prior total divided by three.

Table A2. Variable Coding

Variable Name	Question Coding
Network Coauthor %	This is the mean of Yes (1) answers to three items: From time to time, scholars ask other people for comments on their research. Thinking back over your recent research projects, please write the FIRST names of the first three people that come to mind who have provided help or feedback on your work, and who are not coauthors on the project for which they provided feedback....Is this person a coauthor on another project?
Big Five Personality	Here are pairs of words that may or may not describe you. Please consider each pair, and indicate the extent to which you agree/disagree that it applies to you. You should rate the extent to which the pair applies to you, even if one word applies more strongly than the other. I see myself as... Extroversion: Mean of responses to (a) extroverted, enthusiastic; and (b) reserved, quiet (reverse coded) Conscientiousness: Mean of responses to (a) dependable, self-disciplined; and (b) disorganized, careless (reverse coded) Agreeable: Mean of responses to (a) sympathetic, warm; and (b) critical, quarrelsome (reverse coded) Emotional Stability: Mean of responses to (a) calm, emotionally stable; and (b) anxious, easily upset (reverse coded) Openness to Experiences: Mean of responses to (a) open to new experiences, complex; and (b) conventional, uncreative (reverse coded) Responses to all 10 items: Strongly Agree (7), Agree (6), Somewhat Agree (5), Neither Agree nor Disagree (4), Somewhat Disagree (3), Disagree (2), Strongly Disagree (1)
Female	What is your sex or gender identity? Male (0), Female (1)
Non-White	Indicator variable coded “1” for everyone who did not check “White/Caucasian” in response to the question: How would you classify your racial/ethnic identification? Check all that apply. “White” is 0.
PhD Granting Inst.	Indicator variable coded “1” for everyone who selected “1” in response to the question: At what sort of institution are you employed (or are you currently unemployed)? Response: My institution offers a PhD in (political science/sociology/my discipline) as its terminal degree (1) All other responses are 0.
Rank	What is your current rank? 0 = Untenured, not on tenure track; Visiting Assistant Professor, not on tenure track; PhD, practitioner 1 = Assistant Professor, on tenure track 2 = Associate Professor, untenured; Associate Professor, tenured 3 = Full Professor, tenured
Time Spent: Teaching	Thinking about an “average” week during a typical academic quarter/semester, what percent of your work time would you estimate that you devoted to the following tasks? (Total must sum to 100) <ul style="list-style-type: none"> Teaching, course preparation, and grading
Time Spent: Service	<ul style="list-style-type: none"> Service internal to your university (for instance, advising; serving on or chairing committees or departments)
Conferences Attended	How many professional conferences do you attend yearly? (0-5)
Able to get comments	Response on a Likert scale to the following item: I am able to get comments from scholars who are likely to review my research. 1=strongly agree to 5=strongly disagree.

Variable Name	Question Coding
Years Since PhD	= 2017 – Reported year of PhD

Table A3. Interaction between Openness and Conscientiousness

	Total Publications	H index	Total Citations (logged)
Openness	3.18*** (0.93)	1.97** (0.81)	2.58 (1.69)
Conscientiousness	3.46*** (0.87)	2.17*** (0.76)	2.88* (1.58)
Openness*Conscientiousness	-3.73*** (1.19)	-2.51** (1.03)	-3.08 (2.16)
Extraversion	-0.10 (0.16)	-0.03 (0.14)	-0.21 (0.30)
Agreeableness	-0.47** (0.22)	-0.10 (0.19)	-0.15 (0.41)
Emotional Stability	-0.25 (0.22)	-0.38** (0.19)	-0.62 (0.40)
Assistant	0.60*** (0.18)	0.67*** (0.19)	0.88*** (0.29)
Associate	0.95*** (0.18)	1.02*** (0.19)	1.68*** (0.31)
Full professor	1.23*** (0.21)	1.32*** (0.21)	2.16*** (0.38)
Female	-0.22*** (0.08)	-0.16** (0.08)	-0.23 (0.15)
Works in PhD program	0.54*** (0.08)	0.55*** (0.08)	1.19*** (0.16)
Years Since PhD	0.01 (0.01)	-0.00 (0.00)	-0.01 (0.01)
Non-white	-0.27** (0.11)	-0.33*** (0.11)	-0.57*** (0.21)
Time Spent: Teaching	-0.01*** (0.00)	-0.01*** (0.00)	-0.01** (0.00)
Time Spent: Service	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)
Conferences Attended	0.19*** (0.04)	0.15*** (0.03)	0.32*** (0.07)
Network Coauthor %	0.15 (0.12)	0.31*** (0.11)	0.60*** (0.23)
Able to Get Comments	-0.12*** (0.04)	-0.10** (0.04)	-0.10 (0.08)
Rank own PhD Dep't	-0.00 (0.00)	-0.00** (0.00)	-0.00** (0.00)
Constant	-1.00 (0.75)	-1.14* (0.67)	-0.37 (1.35)
Observations	603	603	603
R-squared			0.33
Inalpha	-0.36***	-1.13***	

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A4. Interaction between conscientiousness and PhD granting department

	Total Publications	H index	Total Citations (logged)
Conscientiousness	0.70** (0.29)	0.22 (0.27)	0.85 (0.55)
Works in PhD Program	0.41 (0.31)	0.36 (0.29)	1.44** (0.60)
Conscientiousness*PhD Program	0.16 (0.40)	0.24 (0.36)	-0.31 (0.76)
Network Coauthor %	0.11 (0.12)	0.29*** (0.11)	0.59** (0.23)
Assistant	0.62*** (0.18)	0.66*** (0.19)	0.89*** (0.29)
Associate	0.95*** (0.18)	1.02*** (0.19)	1.68*** (0.31)
Full professor	1.24*** (0.21)	1.33*** (0.21)	2.16*** (0.38)
Female	-0.21** (0.08)	-0.15* (0.08)	-0.21 (0.15)
Years Since PhD	0.00 (0.01)	-0.00 (0.00)	-0.01 (0.01)
Non-white	-0.30*** (0.11)	-0.34*** (0.11)	-0.61*** (0.21)
Openness	0.34 (0.24)	0.05 (0.20)	0.25 (0.43)
Extraversion	-0.12 (0.16)	-0.04 (0.14)	-0.21 (0.30)
Agreeableness	-0.49** (0.22)	-0.13 (0.19)	-0.17 (0.41)
Emotional Stability	-0.23 (0.22)	-0.35* (0.19)	-0.61 (0.40)
Time use: Teaching	-0.01*** (0.00)	-0.01*** (0.00)	-0.01** (0.00)
Time use: Service	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)
Conferences Attended	0.19*** (0.04)	0.15*** (0.03)	0.31*** (0.07)
Able to get comments	-0.11*** (0.04)	-0.09** (0.04)	-0.09 (0.08)
Rank own PhD Dep't	-0.00 (0.00)	-0.00** (0.00)	-0.00** (0.00)
Constant	1.10*** (0.41)	0.36 (0.39)	1.16 (0.75)
Observations	603	603	603
R-squared			0.33
lnalpha	-0.34***	-1.12***	

Table A5. Interaction between Conscientiousness and Network Co-authorship

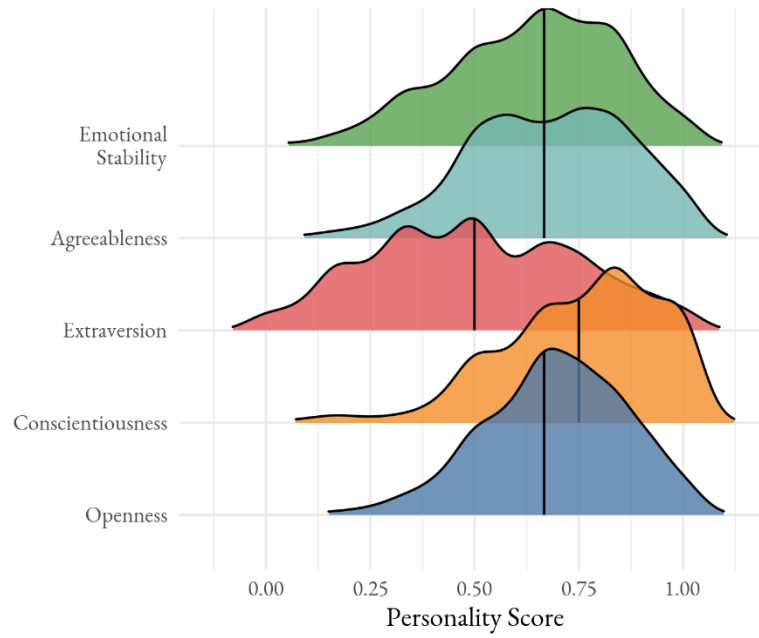
	Total Publications	H index	Total Citations (logged)
Conscientiousness	1.25*** (0.30)	0.78*** (0.28)	1.48*** (0.56)
Network Coauthor %	1.28** (0.56)	1.25*** (0.48)	2.52** (1.01)
Conscientiousness*Co-authorship	-1.48** (0.69)	-1.21** (0.60)	-2.51* (1.28)
Assistant	0.59*** (0.18)	0.65*** (0.19)	0.86*** (0.29)
Associate	0.93*** (0.18)	1.00*** (0.19)	1.66*** (0.31)
Full professor	1.21*** (0.21)	1.30*** (0.21)	2.12*** (0.38)
Female	-0.19** (0.08)	-0.14* (0.08)	-0.21 (0.15)
Works in PhD Program	0.54*** (0.08)	0.55*** (0.08)	1.21*** (0.16)
Years Since PhD	0.00 (0.01)	-0.00 (0.00)	-0.01 (0.01)
Non-white	-0.31*** (0.11)	-0.35*** (0.11)	-0.63*** (0.21)
Openness	0.39 (0.24)	0.09 (0.20)	0.30 (0.43)
Extraversion	-0.12 (0.16)	-0.05 (0.14)	-0.23 (0.30)
Agreeableness	-0.47** (0.22)	-0.11 (0.19)	-0.15 (0.41)
Emotional Stability	-0.20 (0.22)	-0.34* (0.19)	-0.60 (0.40)
Time use: Teaching	-0.01*** (0.00)	-0.01*** (0.00)	-0.01** (0.00)
Time use: Service	-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.01)
Conferences Attended	0.19*** (0.04)	0.15*** (0.03)	0.32*** (0.07)
Able to get comments	-0.11*** (0.04)	-0.08** (0.04)	-0.09 (0.08)
Rank own PhD Dep't	-0.00 (0.00)	-0.00** (0.00)	-0.00** (0.00)
Constant	0.61 (0.43)	-0.15 (0.40)	0.59 (0.76)
Observations	603	603	603
R-squared			0.33
Inalpha	-0.35***	-1.12***	

Table A6. Negative Binomial Estimates of Articles Published in the Past Year with and without the Personality Interaction

	With Interaction	Without Interaction
Openness	0.57 (0.59)	0.25 (0.31)
Conscientiousness	1.04 (0.28)	0.76*** (0.00)
Openness*Conscientiousness	-0.41 (0.76)	—
Extraversion	-0.12 (0.49)	-0.12 (0.49)
Agreeableness	0.00 (0.99)	0.00 (1.00)
Emotional Stability	-0.20 (0.39)	-0.20 (0.39)
Assistant	0.74*** (0.00)	0.74*** (0.00)
Associate	0.97*** (0.00)	0.97*** (0.00)
Full professor	1.20*** (0.00)	1.20*** (0.00)
Female	-0.24** (0.01)	-0.24** (0.01)
Works in PhD program	0.18* (0.06)	0.18* (0.06)
Years Since PhD	-0.03*** (0.00)	-0.03*** (0.00)
Non-white	-0.04 (0.72)	-0.05 (0.69)
Time Spent: Teaching	-0.00 (0.12)	-0.00 (0.12)
Time Spent: Service	-0.01*** (0.01)	-0.01*** (0.01)
Conferences Attended	0.19*** (0.00)	0.19*** (0.00)
Network Coauthor %	0.36*** (0.01)	0.36*** (0.01)
Able to Get Comments	-0.03 (0.55)	-0.03 (0.56)
Rank own PhD Dep't	0.00 (0.26)	0.00 (0.27)
Constant	-1.18 (0.16)	-0.96** (0.03)
Inalpha	-1.19***	-1.19***
Observations	603	

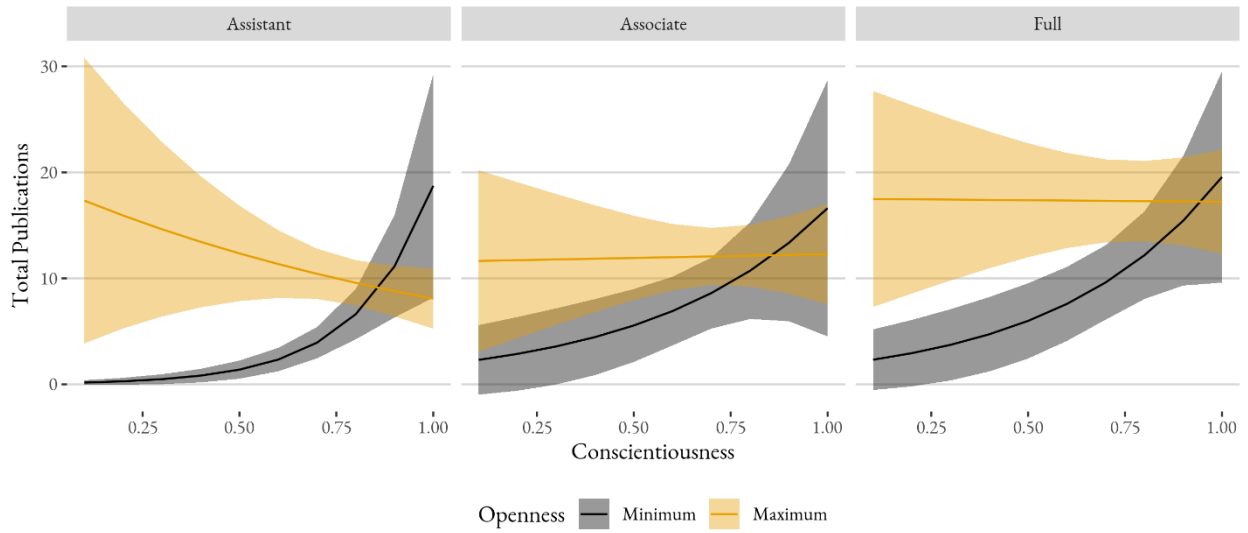
Note: p values in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure A1. The Distribution of the Personality Dimensions



Source: PASS Data for Political Science, 2017

Figure A2. The Interactive Effects of Conscientiousness and Openness are Consistent Across Ranks



Source: PASS Data for Political Science, 2017

Note: The figure shows 76% confidence intervals. Comparison of two 76% confidence intervals is equivalent to a 90% ($p=.10$, two-tailed) test of statistical significance at the point of overlap.