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Mirror on the Field: Gender, Authorship and Research Methods in Higher Education's Leading
Journals

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Abstract

Framed conceptually by gender equity, gender homophily, the contest regime of blind peer-review publishing, and the gendered nature of the quantitative-qualitative debate, this study investigates the intersection of authorship, gender and methodological characteristics of 408 articles published from 2006-2010 in three major higher education journals. Non-binary coding of author gender based on pronouns identified via web searches virtually eliminated missing data and likely reduced error. Results suggest movement toward gender parity over time; however, women's representation among authors does not appear commensurate with representation in the field. Findings reveal gendered use of research methods, with qualitative articles more likely to be first-authored by women and quantitative articles more likely to be first-authored by men. Nevertheless, articles first-authored by both women and men are more likely to use quantitative than qualitative methods. Quantitative research, more so than qualitative research, appears to be a site of co-gender collaboration, which has increased over time. This portrait of the intersection of authorship, gender and research methods provides an empirical foundation for discussion and inquiry about gender and scholarship in the field, and the results of our study are generative for future research.

Keywords: gender, authorship, higher education research, content analysis, research methods

Men's domination of scholarly knowledge production historically and the gendered nature of academic disciplines and fields are prominent contextual features of the contemporary academy. Although the proportion of women faculty has increased over the past few decades, from 39% in 1993 to 49% in 2013 (NCES, 2015a), gender equity remains an important concern in academia. Because entry to and advancement within university faculty ranks in most disciplines hinges on successful peer-reviewed publishing, assessment of the intersection of academic publishing and gender is vital. West, Jacquet, King, Correll and Bergstrom's (2012) high-profile investigation of JSTOR's immense digital archive exemplifies the illuminating power of studying how author gender and academic publishing relate – both across and within disciplines.

Given the gendered nature of the quantitative-qualitative divide (Oakley, 2000), and recent findings that quantitative methods continue to predominate in the field of higher education's top journals (Wells, Kolek, Williams, & Saunders, 2015), it is important to study gender and authorship in conjunction with research methods. Because gender differences and gender inequities are so often in tandem, consideration of research methods holds promise for expanding insight about the relationship between gender and knowledge creation. Rather than prematurely assume a post-gender context for scholarship production in the field of higher education, it is important to continue to assess the state of the field, especially given Silverman's (1987) astute observation that, "perhaps journals both create and mirror their fields" (p. 40).

Subsequent to an initial flurry of investigations in the 1980s (e.g. Bean & Kuh, 1988; Hunter, 1986; Tyron, 1981; Volkwein, Carbone, & Volkwein, 1988), relatively few researchers have investigated scholarship production and gender within the field of higher education specifically, although the broader body of research focused on publication characteristics has

continued to develop (e.g., Davis & Liddell, 1997; Hart, 2006; Hart & Metcalfe, 2010; Hutchinson & Lovell, 2004; Johnson, Wagner, & Reusch, 2016; Ropers-Huilman, 2011; Saunders, Kolek, Williams, & Wells, 2016; Tight, 2007; Tight, 2008; Wells et al., 2015). Consequently, the existing literature that sheds light on author gender and its relationship to such aspects as solo-authorship, co-authorship/collaboration, broad research approach (i.e. quantitative, qualitative, or mixed methods), and/or sophistication level of statistical techniques employed remains underdeveloped.

In order to establish an empirical foundation for discussion and inquiry about gender and scholarship in the field of higher education, this study draws from a systematic content analysis of the entire population of articles published from 2006-2010 in three premier journals in the field -- *The Journal of Higher Education (JHE)*, *Research in Higher Education (ResHE)*, and *The Review of Higher Education (RevHE)*. The larger project from which this paper stems replicates and extends the important research of Hutchinson and Lovell (2004), who inventoried the methodological characteristics of all empirical articles in *JHE*, *ResHE*, and *RevHE*, from 1996-2000. This study focuses on the relationship between author gender and methodological characteristics of research articles – a subject not explored by Hutchinson and Lovell (2004). Our primary research questions are as follows:

- 1) What is the gender composition of article authorships and of the population of article authors? To what extent does the gender composition mirror that of the field? To what extent are there differences by journal?
- 2) For empirical articles, are there gender differences in (a) broad research approach (i.e. qualitative, quantitative, mixed methods), (b) use of advanced statistical methods, (c) use

of specific statistical procedures, and (d) use of data sets associated with particular organizations? To what extent are there differences by journal?

Previous Research

Over the past few decades, a substantial body of research has accumulated that investigates the relationship between gender and academic publishing, both broadly (see Ward & Grant, 1996 for a review of early literature) and within specific disciplines and fields of study. Empirical investigations that shed light on the relationship between gender and scholarly authorship tend to address one or more of five main topics: (a) publication productivity (e.g., Hunter & Kuh, 1987; Nakhaie, 2002; Xie & Shauman, 1998), (b) citation rates (e.g., Clemens, Powell, McIlwaine & Okamoto, 1995), (c) article topic/content (e.g., Lockheed & Stein, 1980; Mathews & Andersen, 2001), (d) authorship rates (e.g., Breuning & Sanders, 2007; Jaggi et al., 2006), and (e) authorship/co-authorship patterns (e.g., Powers & Walker, 2009; Rigg, McCarragher & Krmenec, 2012). Most relevant to this study is research focused on authorship rates and authorship/co-authorship patterns. Nearly all such studies are field/discipline specific (an exception is West et al., 2012) and analyze a population or sample of articles published in one or more journals over a particular time period.

Most studies of gender and academic publishing patterns at least implicitly employ the concept of gender parity. Studies in this vein, several of which investigate potential change over time, have focused on the fields of business (Walters, Hobbs Fry & Chaisson, 1990), economics (Boschini & Sjögren, 2007), education (Lockheed & Stein, 1980), geography (Rigg et al., 2012), law (Kotkin, 2010), medicine (Bhattacharyya & Shapiro, 2000; Jaggi et al. 2006; Schrager, Bouwkamp & Mundt, 2011; Sidhu et al., 2009), political science (Breuning & Sanders, 2007, Mathews & Andersen, 2001), and social sciences (Bird, 2011). Many studies focused on

assessing gender parity have also investigated authorship patterns, comparing rates of single-authorship, as well as percentages of authorships that are men-only or women-only, or co-gender (e.g., Bird, 2011; Rigg et al., 2012). Although these studies are too extensive to review here, many found women to be underrepresented among authors relative to their demographic presence in the field, and most studies that explored change over time found a diminished gender gap in publishing. Recently, West et al. (2012) analyzed author gender across 1.8 million scholarly articles included in JSTOR's digital archive. They found that women constituted 27% of all authorships from 1990-2011, but that the percentage of women authorships differed dramatically by disciplinary grouping, ranging from 11% in mathematics and 14% in economics to 41% in sociology and 46% in education. The finding that education had the highest percentage of women authorships is not surprising given that women have earned more than half of the education doctorates awarded in the U.S. since 1985, and in 2014 earned 68% (NCES, 2015b).

Empirical investigations of the relationship between author gender and research methods employed remain scarce among studies of gender and academic publishing, despite the longstanding feminist critique and rejection of quantitative methods in favor of qualitative approaches (Oakley, 2000; Westmarland, 2001). Sociologists Grant, Ward and Rong (1987) undertook one of the first comparisons of research methods used by women and men social scientists, investigating “a frequent, but largely untested, assertion... that there is a systematic association between gender and methods” (p. 856). They identified two potential reasons for this association: 1) preference, based on a correspondence between qualitative methods and “females’ skills and preferences” and 2) utility, based on the appropriateness of qualitative methods for studying “gender and women’s issues” (p.856) as well as the belief that qualitative methods “hold the greatest potential for correcting ‘andocentric’ biases” in research (p.857).

Analyzing a sample of 856 articles published in ten journals from 1974-83, they found that articles solo-authored or first-authored by women were more likely to employ qualitative methods than articles solo-authored or first-authored by men. (It is important to note, however, that both woman-authored and man-authored articles were much more likely to feature quantitative methods than qualitative methods.)

In a later study that analyzed publishing patterns in sociology, Clemens et al. (1995) found that empirical journal articles first-authored by women and men differed with regard to “evidentiary basis” (p. 471). Examining one volume-year (1987-88) of articles published in the *American Journal of Sociology* and *American Sociological Review*, they found that eight of 13 articles first-authored by women were qualitative, compared to eight of 63 articles first-authored by men. More recently, Breuning and Sanders (2007) analyzed a population of 1,605 research articles and notes published in eight political science journals from 1999-2004. They found that women authors were slightly less likely than men authors to utilize a “statistical” methodology (p.350).

Higher Education Research

Most investigations of author gender within the field of higher education were conducted prior to 2000, with researchers first delving into the topic in the 1980s in the wake of the feminist movement’s second wave. Most commonly, researchers tabulated and contrasted percentages of men and women authors, but occasionally compared research topics and methods used (Bean & Kuh, 1988; Nicoloff & Forrest, 1988; Rentz, 1986; Tyron, 1981; Volkwein et al., 1988). These studies complemented and added to a developing body of research that analyzed journal articles within the field and shed light on the theoretical approaches and research methods used and substantive topics addressed by scholars (Kuh, Bean, Bradley & Coomes, 1986; Milam, 1991;

Silverman, 1984; Silverman, 1987; Townsend, 1993). Investigations of author gender within the field have been largely atheoretical and descriptive, and have featured analysis of sets of articles published in one or more prominent journals. Researchers have varied their approaches, with some studies focusing on first-authors, others on all authors, and a few exploring the gender composition of collaborations. Additionally, some researchers have assessed change in the gender composition of authorships over time. Only a few studies have explored the intersection of author gender and research methods.

Authorship and Gender

Tyron (1981) appears to be the first to investigate the gender distribution of article authors. Coding author sex¹ via first name, she found that women constituted 17% of authors published in the *Journal of College Student Personnel* in 1974, but that the percentage had risen to 32% by 1979. She also found that in both years, men were more likely than women to engage in same-sex collaborations. Subsequently, Bean and Kuh (1988) analyzed over 1,000 articles about college students published in eleven journals between 1969 and 1983. They found that men authored 60%, women authored 13%, and 19% were co-gender collaborations (8% of articles were not classifiable). With a broader topical scope, Silverman (1987) analyzed 1,000 articles published between 1975 and 1981 in eight journals. Although author gender was not a main focus of this study, Silverman noted that women comprised 16% of first-authors overall, and that the percent ranged from 8% to 28% across journals.

Volkwein et al. (1988) touched on author gender in their study of all 643 articles published *ResHE* from 1973 (the journal's first year) to 1987. Like Tyron (1981), Volkwein et

¹ In the studies reviewed here, researchers coded and analyzed data based on authors' sex (typically inferred via first name) rather than gender. Throughout this literature review, we refer to "sex" only when the original article used that term. This referencing does not indicate a conceptual conflating of sex and gender on our part.

al. documented a doubling of the proportion of women authors over time – from 13% in the 1973-1977 period to 26% in the 1983-1987 period.

Interested primarily in the relationship between author gender and article focus/content, Creamer (1994) analyzed 775 articles published in four journals (*ResHE*, *RevHE*, *JHE* and *Journal of College Student Development (JCSD)*) from 1987 to 1991. Like previous researchers, Creamer coded author sex based on first name. Across the four journals, she found that women were primary or first author on 36% of articles, and that 38% of all authors were women. Creamer also found that of the four journals, *JCSD* had the largest number of women authors. Focusing on this particular journal, Davis and Liddell (1997) found that nearly half (47%) of first-authors were women and that women and men were equally likely to collaborate with at least one other author.

For the past twenty years, research focused on author gender has been largely absent from the American higher education literature. One exception is Hart's (2006) analysis of all articles published in *JHE*, *ResHE* and *RevHE* from 1990-2002. Although authorship was a secondary focus of Hart's study, some minor calculating of the data presented in her tables reveals that, across the three journals, 46% of the articles published included a woman author, 32% of the solo articles were authored by women, and 25% of all articles (and 51% of all co-authored articles) were co-gender collaborations.

Unfortunately, Budd and Magnuson (2010) did not incorporate author gender in their citation analysis of the 420 articles published in *JHE*, *ResHE* and *RevHE* from 2001-2006. Nevertheless, their list of the top twenty most-cited individuals appears to include only one woman. Similarly, Tight's (2008) slightly earlier study of cited authors in 17 non-North

American English-language journals published in 2000 found that men comprised all 24 of the most cited authors.

Research Methods and Gender

Bean and Kuh (1988) appear to be the first to undertake a gender comparison of research methods employed. They found that articles authored by women-only were more likely to use what they – perhaps pejoratively -- termed “anecdotal information” (p. 135) whereas articles authored by men-only were more likely to employ advanced statistical methods. Davis and Liddell’s (1997) study of *JCSD* articles also included an exploration of gender and research methods. They coded all of the articles (n=577) as quantitative, qualitative, or conceptual, and found that women first-authored 22 of the 39 qualitative studies. To the best of our knowledge, no researchers have conducted further explorations of the intersection of gender and research methods in the field. As mentioned previously, Hutchinson and Lovell (2004) did not pursue this line of inquiry, although their important research established that the vast majority of empirical articles published in the top three journals employed quantitative methods.

Conceptual Framework

As previously noted, studies of gender and authorship in academic publishing are largely atheoretical, particularly those focused on the field of higher education. In contrast, this investigation is informed and guided by conceptions of gender equity, gender homophily, knowledge production, and the quantitative/qualitative debate. We understand gender to be integral to broader conversations about equity in this specific field, as well as academia more broadly. Consequently, our study engages with existing dialogues regarding both gender equity and knowledge creation in academia as we investigate gender differences in first-authorships, collaborations, and research techniques along the quantitative/qualitative divide.

Following in the footsteps of previous researchers, we situate this study in the context of women's historical underrepresentation among published authors. As noted above, most empirical investigations of academic publishing and author gender have focused on assessing the status of women relative to men. Such an approach is understandable given men's dominance of and women's exclusion from the academy historically. Although women have made gains, their underrepresentation within the professoriate, particularly within its highest ranks, continues to prompt concern about the extent to which opportunity structures within academia are gender-equitable (Ward & Grant, 1996; West et al., 2012). Descriptive information documenting certain outcomes of these opportunity structures – particularly those of high import, such as publication in high-status journals – is crucial to recognizing and assessing any existing differentials and subsequently investigating root causes. It is important to acknowledge, however, that any inquiry that compares women and men can reinforce a gender binary and obscure other genders – however unintentionally. In our data collection, we aimed for gender inclusivity by breaking with previous approaches and using a technique that enabled genders other than “woman” and “man” to be coded (additional detail to follow).

Whether explicitly or implicitly, most studies of gender equity in scholarly authorship are predicated on the concept of gender parity, with researchers aiming to assess whether authorship rates among women are commensurate with their approximate proportional representation in particular academic disciplines (or fields). Most typically, representation is based on the gender distribution of professional association members (e.g. American Political Science Association, Association of American Law Schools, Association of American Geographers), but percentage of doctorates earned by women also is used as a benchmark. Although precise determination of proportional representation within the field of higher education is elusive, the concept of gender

parity nevertheless informs our study and provides a basis for how we organize and present our results.

Gender homophily – the tendency of like-gender people to associate with one another at higher rates than with those of other genders (McPherson, Smith-Lovin & Cook, 2001) – necessarily informs consideration of the intersection of authorship, gender, and research methods in academic publishing. As documented by McPherson et al. (2001), homophily is a “law-like pattern” (p. 438) that undergirds social relationships -- including relationships formed within both school and work settings. We recognize that authorships are outcomes of interpersonal connection and collaboration likely shaped by gender homophily, and that this tendency likely influences the scholarly networks that provide the infrastructure for peer review processes.

Given the proliferation of journals over time, and the increasing distinctions of prestige (e.g. citation index, impact factors) associated with outcomes and processes of knowledge creation, it is important to acknowledge the tiered landscape of academic publishing. In line with previous research, our investigation analyzes a group of articles published in high-status journals that employ blind peer review. Informed by the work of sociologists Clemens et al. (1995), we conceptualize these articles as selection outcomes of a “contest regime” (p. 451). Contrary to the “sponsored” selection system of book publishing, publication in peer-reviewed journals results, at least theoretically, from open contest and unbiased assessment of merit via blind peer review – conditions consistent with the norm of universalism that Merton identified as a hallmark of the collaborative activity of science (Long & Fox, 1995; Merton, 1973). Importantly, Merton acknowledged that societal contexts do not always support “the ethos of science” (p. 272) in that scientific gatekeepers (e.g. editors, reviewers) may be susceptible to attitudes and prejudices characteristic of their social context. In such instances, particularism may lead to biased

publication outcomes. Of course, assessment of the extent to which journal publication outcomes in the field are biased is impeded by the very lack of transparency necessitated by blind peer review practices. It may be that the “mirror” image reflected by the field of higher education’s top journals suffers from distortion.

Our understanding of the enduring quantitative-qualitative debate as gendered both impels and undergirds our exploration of potential differences in research methods employed in articles first-authored by women and men. As feminist sociologist Ann Oakley (2000) thoroughly documented, the long-standing debate and/or split common to social science disciplines and associated fields of study is deeply rooted in “gendered social relations” (p. 4) and has been sustained by extensive feminist critique and rejection of quantitative methods in favor of qualitative approaches. Westmarland (2001) pointed out that feminist critique of quantitative methods stems both from the idea that quantitative methods are premised on an unachievable objectivity, and the perception that positivist approaches to research questions are intrinsically androcentric. Separate from but linked to feminist critique is the idea – promulgated by many social scientists -- that women have “a greater affinity” for qualitative methods whereas men are drawn to quantitative techniques (Ward & Grant, 1996; p. 186). This notion that qualitative methods are a more natural fit for women than quantitative methods is consistent with historically prevailing stereotypes, and is contentious in the same way as claims that women simply do not prefer STEM fields.

Of course, the gendered methodological split manifests within a broader context for scholarship in which certain research approaches and techniques are privileged over others. Grant et al. (1987) pointed out that quantitative methods hold greater prestige within social science than do qualitative methods. Their observation holds true currently, with quantitative

methods requisite for many federal research grants. Quantitative research approaches continue to dominate in many of the social sciences and are highly valued by federal funders and policy makers (Fuer, Towne, & Shavelson, 2002; Kezar & Talburt, 2004), whereas qualitative methods are sometimes denigrated (Whitehurst, 2008).

Current Context

We position our study by considering the gender composition of the community of higher education scholars. Discerning the gender composition of this population presents some challenges. For example, the Association for the Study of Higher Education (ASHE) is constitutive of the field, particularly those who are or aspire to be faculty members, but Division J of the American Educational Research Association (AERA) and the Association for Institutional Research (AIR) also include higher education scholars. The field's multidisciplinary nature entails that the group of authors published in higher education journals includes researchers rooted within disciplines such as economics, sociology and psychology, as well. In the absence of a precise demographic profile, three lenses provide insight: the gender distribution of doctorates awarded in the field, the gender distribution of professional organization members, and the gender compositions of the editorial boards of the three journals that are the focus of this study.

Although men dominated the field initially, the gender balance has shifted dramatically over time. Women now earn an increasingly large proportion of doctorates awarded in the subfield of "Higher Education/Evaluation & Research," the percentage having risen from 57% in 1998 (NSF, 1999) to 63% in 2014 (NSF, 2015). According to self-reported data gathered by organizations, women comprise 57% of current faculty/staff members of the Association for the Study of Higher Education (ASHE) (K. Nehls, personal communication, July 1, 2013), and 61%

of members of the Association for Institutional Research (AIR) (L. Gwaltney, personal communication, July 29, 2015). These two statistics suggest that currently, the majority of higher education researchers – both academics and professionals – are likely to be women.

Turning to the gender composition of the editorial boards of *JHE*, *ResHE*, and *RevHE* cumulatively from 2006-2010 (the publication years upon which this study focuses), women appear to slightly outnumber men on the *JHE* board (57.1% v 42.9%), whereas men appear to substantially outnumber women on the boards of *ResHE* (74.1% v 25.9%) and *RevHE* (62.5%. v 37.5%). The differential representation of women and men on these two editorial boards across all five years is concerning, given the gender balance statistics noted above. The consistently small number of women on the board of *ResHE* -- the most quantitatively oriented and prolific of the three major journals investigated here (Hutchinson & Lovell, 2004; Wells et al., 2015) – seems particularly incongruous.

Methods and Data Sources

As previously noted, this study stems from a content analysis that replicated and extended Hutchinson and Lovell's (2004) investigation of published research in the field of higher education. Our five-person team for this project was comprised of three men and two women, and collectively has more than sixty-five years of experience conducting research in the field of higher education. Our data consist of coded characteristics, combined with author-gender data, of all articles published in *JHE*, *ResHE*, and *RevHE* from 2006 to 2010 (N=408). The basis for our coding scheme was the exact form used by Hutchinson and Lovell (2004), which provides for the capturing of broad design type, (i.e. qualitative, quantitative, mixed-methods). However, we expanded the original scheme to provide more extensive insight about the research published in higher education's leading journals.

Once we established our coding procedures, we divided up the 408 articles systematically among four of the five members of our research team so that each person would code articles across each year and journal. To assess the reliability of our ratings, each researcher coded all articles in one random issue of *RevHE* and one random issue of *JHE* (eight articles in total). Using these data, we calculated Krippendorff's alpha. Treating all of our data as nominal, which results in the most conservative estimate, our reliability was 0.844, exceeding a suggested acceptable threshold of 0.800 (see Wells et al., 2015 for additional methodological details).

To enable the analysis we report on here, we coded author gender based on pronouns identified via web searches – primarily pronouns used on departmental websites. The research team member not involved in the article coding did nearly all of the coding of author gender. Although certainly more time consuming than the first-name-based coding methods used by most previous researchers, our Internet-facilitated coding technique helped us to virtually eliminate missing data and likely minimized error in the identification of author gender. We successfully captured first-author gender for 406 of the 408 articles that are our focus. At the individual author level, we were able to code the gender of 566 (98%) of the 578 people who comprise our entire population of authors (i.e. both first-authors and co-authors). In all instances, missing data stems from our inability to locate a web presence for a specific author, rather than the absence of a particular pronoun or one we were unable to code. As points of comparison, Bean and Kuh (1988) were unable to capture author sex for 8% of the articles they coded, and Hart (2006) was not able to code author gender for 7% of the authors in her study. Ultimately, our coding technique yielded data for 901 of 913 authorship instances. Although our open-coding did not restrict gender to the traditional binary, our web searches yielded no information that prompted us to use any code other than “woman” and “man.” Certainly, this does not mean

that only people who identify as women or men published in these journals from 2006-2010.

Some university web sites may be out of date or may disallow pronouns other than “woman” and “man,” and our coding technique was not sensitive to the fluid nature of gender since we captured the data at a single point in time (Evans et al., 2010).

Our analysis focuses primarily on comparing article characteristics by first-author gender across the three journals -- *JHE*, *ResHE*, and *RevHE*, although we consider article authorships, and individual authors, as well. Because the concepts of article authorship, authorship instance, and author appear to be confounded in some of the studies we reviewed, we aim to make clear distinctions: Our dataset includes 408 authorships (one for each article), 913 authorship instances (the entire number of names – including duplicates – that comprise the 408 authorships), and 578 authors (the individual people who account for the 913 authorship instances).

We used both SPSS and Excel to generate the descriptive statistics upon which we base our analysis. We compare characteristics pertaining to authorship, data types, data sources, research approach, and statistical techniques employed. Using categories similar to those employed by Hart (2006), we detail the gender composition of all article authorships. We do not employ tests of statistical significance because we inventoried the characteristics of a complete population of journal articles and have no sampling error (Cowger, 1984).

Limitations

First, our study is restricted to the same three major journals studied by Hutchinson and Lovell (2004). As top journals in the field, these are certainly worthy of study. But it is possible that our findings would be different had we focused on a broader set of journals, or extended our elite grouping to include the *Journal of College Student Development (JCSD)*. A second limitation is that our statistics pertaining to article authorships, first-authorships, authorship

instances and authors align only partially with those of previous studies, limiting points of comparison over time. This imperfect alignment is attributable to the comparatively confined set of statistics included in some previous studies, as well as their focus on a different journal or set of journals. A third limitation is that we did not extend the scope of our investigation to include research topic or subject as did Bean and Kuh (1988), Creamer (1994) and Hart (2006).

Results

Authorship and Gender

Our analysis revealed that women first-authored 44.6% of all articles (see Table 1). This percentage was nearly identical (44.9%) when considering empirical articles only. The proportion of articles with women first-authors ranged by journal from 40.2% (*ResHE*) to 50.7% (*JHE*). Women authored 48.5% of all solo pieces, with this proportion ranging from 41.3% in *ResHE* to 55.1% in *JHE*. Overall, women first-authored 45.8% of articles co-authored by women and men.

[Insert Table 1 about here]

Our analysis of data sources showed that articles based on National Center for Education Statistics (NCES) data (n=51) were slightly more likely to have been first-authored by women than men (54.9% v 45.1%). Similarly, articles based on data from the Higher Education Research Institute (HERI) (n=21) were more likely to have been first-authored by women (61.9% v 38.1%). Our analysis also revealed that men first-authored all 28 articles focused on data from the Indiana University Center for Postsecondary Research.

Table 2 illustrates the gender composition of article authorships by journal. Perhaps most striking is the relatively equal distribution of articles among the six delineations. Within individual journals, the distribution across the six categories is most even for *JHE*. It is notable that solo-authored pieces (33.5% of articles overall) constitute a much larger proportion of

RevHE articles (47.7%) than *JHE* articles (36.1%) or *ResHE* articles (25.0%), although it is important to keep in mind the small publication volume of *RevHE* (n=86) relative to the other two journals. Of the three journals, *ResHE* had the largest proportion of articles co-authored by women and men (40.2%), but *ResHE* also published more than twice as many exclusively men-authored pieces (either solo or co-authoring with other men) (n=76) as exclusively women-authored pieces (n=34). Overall, 63.9% of all article authorships included at least one woman, whereas 71.7% included at least one man. These proportions varied somewhat by journal, with *ResHE* having the largest differential: 58.7% of authorships included a woman whereas 81.5% included a man.

[Insert Table 2 about here]

Altogether, our data include 913 authorship instances: 406 (45.1%) women, 495 (54.9%) men and 12 of unknown gender. Five-hundred and seventy-eight individuals account for these authorship instances: 287 (50.7%) women, 279 (49.3%) men, and 12 people of unknown gender.

Research Methods and Gender

Table 3 shows authorship gender composition for all empirical articles (n=376) by research method employed. As illustrated, articles using quantitative methods constitute the vast majority (75.5%) of all articles – regardless of first-author gender. At least one woman author is included in 58.6% of the quantitative articles, whereas at least one man author is included in 79.7%. In contrast, only 43.1% of articles using qualitative methods include a man author, whereas 77.8% include a woman author.

[Insert Table 3 about here]

Articles featuring qualitative methods are more likely than those featuring quantitative methods to be solo-authored (43.0% v. 30.0%), and co-gender co-authorships account for a

larger proportion of quantitative articles (38.1%) than qualitative articles (20.9%). Women-only authorships account for 56.9% of qualitative articles, whereas men-only authorships account for 22.2%. Conversely, women-only authorships (either solo or co-authoring) account for 20.5% of the quantitative articles, whereas men-only authorships (either solo or coauthoring) account for 41.6%. Co-gender co-authorships account for a majority (65.0%) of the small number of mixed methods articles.

Table 4 details research approaches, data types, and statistical techniques of empirical articles by first-author gender and journal. As illustrated, women first-authored 62.5% of all articles that employed qualitative methods, 39.8% of all articles that employed quantitative methods, and 55% of the relatively few articles that employed mixed methods. Empirical articles first-authored by women (n=169) were less likely than those first-authored by men (n=207) to employ quantitative methods (66.8% v. 82.6%). In contrast, articles with women first-authors were twice as likely as those with men first-authors to use qualitative methods (26.6% v. 13%).

[Insert Table 4 about here]

Women first-authored 61.3% of all articles that analyzed interview or focus group data, and 45.0% of articles based on survey data. Articles first-authored by women (n=169) were equally likely to use survey data as those first-authored by men (n=207) (58% for both), but articles first-authored by women were twice as likely to use interview or focus group data (29.0% v. 15.0%).

Women first-authored 38.0% of the articles that employed advanced statistical techniques, including 47.1% of the articles that used structural equation modeling (n=17), and 45.3% of the articles that used logistic regression (n=64), but only 25.0% of the articles that used hierarchical linear modeling (n=48). Empirical articles with women first-authors were less likely

to employ advanced statistics than articles with men first-authors (45.0% v. 59.9%). Articles first-authored by women were equally likely as those first-authored by men to use logistic regression (about 17%) and structural equation modeling (about 5%), but articles first-authored by women were less likely to use hierarchical linear modeling (7.1% v. 17.4%). The percentage of articles first-authored by women that used advanced statistical techniques did not vary appreciably by journal.

Discussion

This study offers an unprecedented and multifaceted portrait of the intersection of authorship, gender, and research methods within three prestigious and frequently consulted higher education journals (Bray & Major, 2011). By illuminating patterns and associations that might otherwise remain unseen and unnoticed, our research provides an empirical foundation for consideration of gender equity and knowledge production in the field. Although our findings reveal that the field's top journals reflect considerable gains in women's authorship overall, they also suggest important sites where gender inequity may remain rooted within processes of knowledge creation.

Movement Toward Gender Parity

Cumulatively, this study's findings suggest substantial movement toward gender parity over the past few decades. We found that 63.9% of all article authorships included at least one woman, a percentage higher than that found by Hart (2006), and nearly double that found by Bean and Kuh (1988). Encouragingly, representation of women among authors has increased dramatically as women's representation within the field has increased. We also found that articles with women first-authors comprised a much larger proportion of all articles than was the case at the time of Silverman's (1987) investigation (44.6% v. 16.0%). Similarly encouraging is

our finding that women accounted for one-half of individual authors. Although this figure was slightly lower for *ResHE* (45.1%) than for the other two journals, it is a substantial increase from the 26% reported for *ResHE* by Volkwein et al. (1988). Another important point of comparison is authorship instances, with women accounting for 45%, compared to 38% in Creamer's (1994) study. Lastly, although higher education is a sub-field of the broader field of education that was a focus of West et al. (2012), it is notable that the proportion of women authorships in our study (46.4%) is nearly identical to their finding for education overall.

Given the challenges of precisely determining the gender composition of the population of higher education scholars, it is not possible to determine definitively the extent to which our findings evidence parity – or lack thereof – in the field. A 50/50 gender distribution is not sufficiently aspirational, given that women almost certainly constitute greater than half the population of potential authors. Relying on similarly imperfect points of comparison as researchers in other fields, we found that the percentages of women authorship instances, first-authorships, and authors approach, but are not commensurate with, women's apparent proportional representation within the field. And even though the group of individual authors includes a slightly higher number of women than men, men account for more authorship instances than women. Consequently, it appears that women scholars may be underrepresented among authors published in these three prestigious journals – despite undeniably substantial gains over time.

This study's findings show that women account for a larger proportion of authorships in the field of higher education than they do in many other fields or disciplines (see West et.al. 2012). Although the precise degree to which women's representation among authors jibes with the proportion of doctorates earned is elusive, the field clearly draws women into its fold.

Perhaps the comparatively open path to graduate study facilitates the entry of women relative to men. Although psychology and sociology (and other social science) majors are a natural fit for higher education graduate programs, a wide array of majors are typically represented among students -- including humanities, business, and the natural sciences. The field may be among the most gender-proportionate because women have substantive interest, because no specific curricular path is prerequisite to graduate study, and because the field has been comparatively welcoming to women historically. Future investigations of gender and knowledge production in academia more broadly may benefit from considering the field of higher education as a site of meaningful progress toward equity.

Gender and Collaboration

Our results pertaining to gender and collaboration are both intriguing and salient – especially in relation to a recent AERA task force report calling for increased attention to collaborative scholarship in faculty evaluations (AERA, 2013). Our finding that women solo-authored 16.3% of all articles mirrors Hart's (2006) finding; however, we found that men solo-authored a much lower proportion of total articles than was the case in Hart's study (17.2% v. 34.4%), which considered an earlier and longer time-period (1990 to 2002). Concurrent with this decreased prevalence of solo authorships by men were increases in co-authorships overall (51% in Hart's study v. 66.5% in ours) and co-gender co-authorships, specifically (25.3% in Hart's study v. 35.5% in ours). This seemingly proportionate level of co-gender collaboration suggests a field in which gender homophily does not unduly influence the formation of research collaborations. In fact, collaborative authorships are slightly more likely to be co-gender than to be single-gender.

Overall, men-only collaborations outnumber women-only collaborations, which prove to be the least common type of authorship. Interestingly, we found collaborations, including co-gender collaborations, to be more prevalent among quantitative articles than among qualitative articles. Whether co-gender collaborations stem from opportunity-induced connections or those forged by personal choice – or both -- they suggest the existence of mentoring patterns and intellectually collegial relationships that are gender inclusive.

Gendered Research Methods

Our results provide multifaceted evidence that the use of research methods within the field of higher education is gendered. Not surprisingly, the pattern revealed is consistent with Bean and Kuh (1988) and David and Liddell (1997), and more importantly, the historically gendered quantitative-qualitative split. Although the articles we analyzed were much more likely to feature quantitative than qualitative methods – regardless of first-author gender -- empirical articles first-authored by women were twice as likely to use qualitative methods as those first-authored by men (26.6% v. 13.0%), and also were less likely to employ quantitative methods (66.9% v. 82.6%), and to use advanced statistics (45.0% v. 59.9%). Women-only authorships accounted for nearly three times as many authorships of qualitative articles as quantitative articles. Conversely, men-only authorships accounted for nearly twice as many authorships of quantitative articles as qualitative articles. More than three-quarters of qualitative articles include at least one woman author, compared to about three-fifths of quantitative articles. Nearly four-fifths of quantitative articles include a man author, compared to about two-fifths of qualitative articles.

Although our study reveals manifestation of the historically gendered quantitative-qualitative split, it also shows that women and men higher education scholars are by no means

polarized with respect to their use of qualitative and quantitative methods. Use of the quantitative techniques that dominate the scholarship examined here is prevalent among both women and men authors. That said, within each of the three journals, quantitative articles were more likely to be first-authored by men than by women, and qualitative articles were more likely to be first-authored by women than by men.

Contest Regime Distinctions

Our inter-journal comparisons revealed some distinctions worthy of consideration. First, the ratio of qualitative to quantitative articles is lowest in *JHE* (41:74) and highest in *ResHE* (9:164). Overall, *JHE* published 56.9% of the qualitative articles in our dataset whereas *ResHE* published 57.7% of the quantitative articles. Although the nature of these distinctions is likely not surprising to readers of these journals, their magnitude may be – as may be the sheer volume of *ResHE* relative to the other two journals.

ResHE had the largest proportional gender difference in first authorships, with men first-authorships constituting 59.8% of all articles. Given that *ResHE* published a lower proportion of solo-authored articles than the other two journals, it is perhaps not surprising that co-gender collaborations are proportionately most prevalent in this journal, accounting for two-fifths of all authorships. This distinction accompanies a relative scarcity of women-only collaborations (only 8.2% of *ResHE* authorships) and relative abundance of men-only collaborations (26.6%) that is reflective of the entire set of quantitative authorships across journals. Possible sources of explanation for these distinctions are *ResHE*'s publication of almost exclusively quantitative research (91.6% of all articles), and the gendered use of research techniques revealed by our findings. While the contest regime may feature a gender-blind review system intended to promote fairness, this regime is positioned within a scholarly context where social forces may

give rise to gender-based distinctions across, and even within, journals. Qualitative researchers' own understandings and perceptions of publication venues and regimes could lead them to submit to journals other than those we investigated here, or seek out publishing opportunities within the sponsored regime of book publishing if that regime is perceived as more amenable to qualitative research (Nakhaie, 2002).

Implications

As reflections of scholarly methodological engagements and outcomes of the contest regime, journal articles are an invaluable source of insight about both faculty publishing and knowledge production. Our codification and analysis of article and authorship characteristics reveals associations and patterns otherwise not readily discernable. Because our findings illustrate that research methods and gender are entwined within the field of higher education it is important to consider potential implications for gender equity, knowledge production, and future research.

It is important to be routinely mindful that *what* we know is a product of *how* we know it and that the privileging of research methods over questions can constrain the pursuit of important knowledge gains (Keller, 1998). Gender differences in the use of research methods are not inherently problematic. Rather, such differences can *become* problematic if they function as a basis for disadvantage or if they have negative ramifications for the development of knowledge about higher education phenomena. Because gender differences have served as a foundation for sexism and gender discrimination historically, intellectual consideration of whether and how inequity might stem from the gendered use of research techniques within our field is worthwhile.

Certainly, pragmatic recognition of the gendered quantitative-qualitative divide – rather than unspoken acceptance of its existence as a matter of course -- is a necessary precedent of its

interrogation. Research methods training in higher education doctoral programs could incorporate consideration of both the origins of the gendered quantitative/qualitative split and how this divide may shape the production of knowledge within the field. Doctoral research socialization processes are likely to be fruitful sources of insight about the origins of the gendered use of research methods, as well as the sparse use of mixed methods. To what extent does the gendered use of research techniques reflect skill sets and preferences developed prior to doctoral enrollment? Do higher education doctoral programs foster methodological “pluralism” (p. 275) and versatility rather than “monism” (p.268) (Keller, 1998)? How do gender homophily and heterophily influence the mentoring relationships and research collaborations through which research skills are transmitted and valued? Philosophical, theoretical and empirical pursuit of such questions can inform whether the entwining of gender and methods warrants disruption.

Clemens et al. (1995) posited two decades ago that “opting” for qualitative methods might detrimentally impact women scholars’ careers (p. 483). Within the field of higher education, quantitative research predominates in the contest regime elite, so it is conceivable that opportunities to publish qualitative studies in the field’s most career-driving outlets are constrained for researchers of any gender. Certainly, qualitative research specialists may be less likely to pursue and obtain federal research grants and participate in the increasingly salient realm of “big data” – both activities likely to have career implications. Of course, recognition of this terrain is by no means tantamount to accepting or endorsing the status quo of quantitative hegemony. And it is important to be mindful that research socialization processes may constrain both women’s and men’s agency to “opt” for either quantitative or qualitative research approaches – or to employ mixed-methods.

Our findings of improved representation of women among authors and authorships may be partially attributable to fair and impartial “blind review” contest regime decisions. However, some of our findings raise questions about the extent to which the three elite journals examined here provide equal opportunity to men and women scholars. Women outnumbered men among individual authors, but men accounted for more authorship instances. Are men’s article submission rates to these journals outpacing women’s? Are article acceptance rates higher for articles authored or co-authored by men? Knowledge about the interface of qualitative research articles and these top journals, including rates of submission and acceptance, would be illuminating. The operation of peer-review journals depends on human networks likely formed and influenced by homophily – whether based on gender, methods, or other characteristics. Consequently, implicit bias (Carnes et al., 2012) on the part of journal gatekeepers may compromise the ideal of open contest and unbiased assessment of merit. Preemptive awareness training for editors, editorial board members, and ad hoc reviewers may mitigate this possibility.

Further consideration of *ResHE*, in particular, seems warranted because its publication volume is so comparatively large, and therefore consequential, to the careers of higher education faculty as a whole. The journal is a prolific outlet for quantitative scholarship produced by co-gender collaborations (and collaborations, more generally). Nevertheless, it is important to contemplate the role the journal may have in (re)producing a gendering of quantitative research in the field – particularly in light of women’s very modest inclusion among the journal’s gatekeepers during the publication years that are the focus of this study (2006-2010).

This portrait of the intersection of authorship, gender, and research methods shows that a substantial proportion of scholarship in the field of higher education is attributable to co-gender collaborations, but it also reveals important gender differences that deserve further investigation

and explanation. Because the field is multidisciplinary and multifaceted, the gender breakdown of higher education researchers is difficult to ascertain, making parity a challenge to assess precisely. But it is important to reassess gender parity moving forward, perhaps equipped with more tenable points of comparison should they develop. Additional and/or alternative methods of approximating the gender balance of our field would benefit future investigations of parity. For example, memberships of associations other than ASHE and AIR might be pertinent – most notably AERA Division J -- as well as the actual readership of this applied field’s journals.

Although the three journals we investigated are justifiable given their status (Bray & Major, 2011) and use by other researchers to study the field (e.g. Hutchinson & Lovell, 2004; Budd & Magnuson, 2010; Hart, 2006), investigation of others is warranted. Extension of this line of inquiry beyond elite publication venues would be especially interesting given our finding that research methods are gendered. Are other higher education journals publishing proportionally more qualitative articles than the triumvirate focused on here? How does the gender distribution of authorships in other journals compare to what we found here? Analysis of other publication outlets is increasingly legitimate as scholarly journals proliferate and as publication models (e.g., open journals) and lead times change.

The necessity of delimiting this study to produce deep description precluded empirically addressing questions of “why,” but pursuit of this question is a logical subsequent step. It is important to keep in mind that our investigation focused on published articles – outcomes of the contest regime. Authors who submit journal articles for blind review are out-of-reach for empirical study, so little is known about how the demographic composition of published authors compares to that of the entire population of authors who submit. A survey that investigates characteristics of higher education scholars’ self-reported empirical submissions for publication

(e.g. venue, methods employed, authorship gender composition, publication outcome) might shed light on the nature of rejected studies and authorships relative to those accepted for publication. Additionally, and perhaps more fruitfully, qualitative methods could be harnessed to delve into and beyond the numbers we report and explore in depth the gendered nature of publication in our field. Possible topics of investigation include methods “preferences” among researchers, journal editors, associate editors, editorial board members, and ad hoc reviewers; interpersonal networks among scholars; processes for selecting editorial board members and ad hoc reviewers; research funding opportunities; and publication venues. Of particular importance may be qualitative research that explores the extent to which journals’ peer review processes and procedures are truly “blind” within the relatively small (and highly interconnected) field of higher education.

Lastly, our results pertaining to co-gender co-authorship prompt questions about collaboration and homophily along dimensions of social identity other than gender. How might race/ethnicity or other characteristics complicate our findings given the intersectional nature of authors’ identities? As the field of higher education continues to diversify, investigating homophily, more broadly, would seem a promising and worthwhile endeavor. If the field of higher education is collectively constructed through actions taken or not taken by individuals, groups, and institutions, then there is substantial value in holding up multiple mirrors to assess the state of our field.

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