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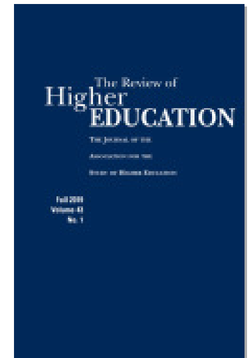
Methodological Troubles with Gender and Sex in Higher Education Survey Research



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The Review of Higher Education, Volume 43, Number 1, Fall 2019, pp. 1-24 (Article)

Published by Johns Hopkins University Press
DOI: https://doi.org/10.1353/rhe.2019.0088

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[143.107.8.173] Project MUSE (2024-05-06 19:38 GMT) USP-Universidade de SÃ£o Paulo

The Review of Higher Education
Fall 2019, Volume 43, No. 1, pp. 1–24
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Methodological Troubles with Gender and Sex in Higher Education Survey Research

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Abstract: We examine the American landscape of higher education quantitative research concerning how gender and sex demographic information is collected. We use a directed content analysis to examine the prevalence and

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operationalization of gender and sex among widely used higher education survey instruments. Our findings illuminate a seemingly haphazard approach to developing gender and sex demographic questions and a number of limitations related to gender and sex variables inherent in the surveys analyzed. We discuss misalignment of question/item stem and response options, formatting decisions that result in data collection and analysis opportunities and challenges, and recommendations for policy and practice.

Keywords: gender, sex, survey, quantitative criticalism

Although the terms *gender* and *sex* are defined for scholarly usage in the *Publication Manual of the American Psychological Association* (APA, 2001, 2010), the lack of consistent usage in scholarly work threatens not only analytic precision but also theoretical development and the ability to contribute to meaningful dialogues about and in the social sphere. In this paper, we argue that higher education survey research suffers from an imprecise application of the terms "gender" and "sex" in the collection of demographic data, which then limits the potential impact of that scholarship with regard to policies and practices designed to support gender inclusivity on college campuses. Feminist and queer theories suggest that higher education scholars should rethink the usage of binary variables for collecting demographic data, which may have far-reaching effects. Renn (2010) stated that she "would like to see education researchers who work on non-LGBT topics use queer theory to examine policies, programs, and systems of knowledge that presume fixed categories" (p. 138). To answer Renn's call, researchers would need to address the methodological barriers presented by the imprecise use of gender and sex in higher education survey research. In other words, variables matter (Bensimon & Marshall, 2003; Glazer-Raymo, 2008).

Survey instruments are tools to capture data for analyzing the representativeness and operationalization of social identities in higher education research. Reflecting on the wide use of survey research in the field of higher education, Pascarella and Terenzini (2005) stated, "[A] number of national [U.S.] data sets, which produce a substantial portion of the evidence on the impact of college on students, have become targets of opportunity for large numbers of social scientists" (p. 15). In this regard, we argue that higher education survey instruments are systems of knowledge (Renn, 2010) with great influence and importance that require closer examination.

Gould and Kern-Daniels (1977) noted decades ago that scholars used the terms gender and sex imprecisely in the literature. They called for a more complex theorization of gender and sex, noting that categories and nomenclature contain assumptions that may limit analysis. In particular, they cited the reflexive nature of sociological understanding, stating that "the relationship between ideas and academic foci is a reciprocal one in which ideas in

part reflect the socio-political arrangements of the academy itself" (p. 186). More recently, McDermott and Hatemi (2011) argued, "when political scientists refer to 'gender' in a survey, they are referring to and conflating several overlapping and meaningfully distinct underlying constructs" (p. 89). This conflation is then transferred to the general public through the survey instrument, and has the potential to become embedded within public policy as the survey findings are interpreted. Further, education scholars must question quantitative models, measures, and analytic practices in order to propose competing practices that more adequately capture the lived experiences of individuals across social identities (Stage, 2007). As such, the operationalization and collection of gender and sex variables warrants interrogation in the field of higher education in general, and within quantitative research in particular, which is the focus of this study.

Critical Quantitative Research

When examining identities using quantitative methodologies, researchers must navigate the difficult tension of recognizing the complexities of social identities while also quantifying and operationalizing individuals' experiences and selves. Recently, scholars have demonstrated how critical quantitative research can challenge existing policies, theories, and measures and reexamine traditional questions for nontraditional populations (Stage & Wells, 2015; Wells & Stage, 2015). Stage (2007) aptly wrote that "as quantitative researchers we are uniquely able to find those contradictions and negative assumptions that exist in quantitative research frames" (p. 6). Whereas quantitative research was historically framed as using positivist and post-positivist paradigms, quantitative criticalists examine phenomena with relative objectivity, while also advocating for social justice and the reduction of oppression (Carter & Hurtado, 2007).

Quantitative criticalists are concerned with the focus and intention of the research questions, not only on the methods used to answer them. "If we focus solely on research methods…we see little difference between the positivistic approach and the critical quantitative approach. However… the most interesting part rests with the motivation for the research" (Stage, 2007, p. 9). As such, critical quantitative scholars have unique opportunities to question and modify pre-existing quantitative models, measures, and analytic methods to better represent marginalized groups and individuals.

Consistent with the aims of quantitative criticalists, we argue that the focus and intent of how gender and sex are measured in quantitative scholarship is essential. Although we recognize the complex relationship between variable operationalization, collection, and use, we foreground the first two in our manuscript to focus inwardly on how ways of knowing are reinforced by quantitative research techniques. Rios-Aguilar (2014) called for "higher

education scholars [to] more closely examine their research practices and the factors that influence those practices" (p. 96). Such practices logically influence quantitative data use in analyses, yet the initial processes of variable operationalization and collection serve as a gateway to how gender and sex variables are later used. In other words, the restrictions placed on gender and sex variables during survey design and data collection foreclose later opportunities for scholars to have more expansive and inclusive uses in quantitative analyses. Rather than viewing quantitative research design as technically driven applications of methods (Baez, 2007), we seek to problematize variable operationalization and collection in order to open up new possibilities of knowing. Thus, the purpose of this paper is to examine the American landscape of higher education quantitative survey research concerning how demographic information for gender and sex is operationalized and collected.

Theoretical Framework

Theoretically, our work follows a contemporary reading of gender performativity (Butler, 1990, 1993, 2004) in higher education, as well as a re-examination of the discourses of sexuality (Foucault, 1978) in the field. Gender theorists have pushed the boundaries of feminism(s), and we find this extension useful in that we are interested in examining whether research polarizes its subjects or recognizes subjectivity (Abes & Kasch, 2007; Acker, 1999; Alsop, Fitzsimons, & Lennon, 2002; Renn, 2007). We also find that queer theory (Dilley, 2002; Renn, 2010; Tierney, 1997) is appropriate as an overarching theoretical lens. We see the outcomes of this research having a broad influence on the ways in which higher education scholarship speaks to issues and experiences of all individuals, particularly among those who do not conform to gender and/or sex binaries.

Butler's (1990) book, *Gender Trouble*, marked a paradigm shift in feminism(s), sexuality, and gender research through the introduction of the concept of gender performativity. Building upon Foucault's (1978) notion of subjectivity and de Beauvoir's (1989) question of the position of "woman" in relation to "man," Butler (1990) described gender as an active performance and participation within a social discourse around sexuality and sex roles. She stated, "Gender is the repeated stylization of the body, a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearance of substance, of a natural sort of being" (p. 45). She continued, arguing, "That the gendered body is performative suggests that it has no ontological status apart from the various acts which constitute its reality" (p. 185). In this way, what is described by the term sex (the material presence of the individual subject) is distinct from the modalities and gestures of gender, which may be "radically independent of sex" (p. 9). Yet, Butler noted that the

sex binary of female/male is likely itself historically constructed (Foucault, 1978), so that the conventional feminine and masculine gender roles may have been influenced by a "prediscursive" scientificazation surrounding sex that gives preference to that which can be easily categorized.

Furthermore, Butler (1990) argued that distinguishing sex from gender, and deconstructing the binary systems of sex (i.e., female/male) and gender (i.e., feminine/masculine, woman/man), are necessary steps in understanding how gender is both produced and (re)produced. "…[G]ender is also the discursive/cultural means by which 'sexed nature' or 'a natural sex' is produced and established as 'prediscursive,' prior to culture, a politically neutral surface *on which* culture acts [original emphasis]" (p. 10). Indeed, Butler's (1990, 1993, 2004) aforementioned theory of performativity discussed the importance of separating these two terms, gender and sex, as vital to avoiding any claims of essentialism, or that gender and sex are natural.

Queer theory is useful in this context as it reminds us that sex is a contested term, and that gender is more than a statement as to the social construction of femininity and masculinity (Levy & Johnson, 2011). Further, queer theory challenges hegemonic conceptions of gender, in part by considering the interconnection of multiple identities (Abes & Kasch, 2007). In addition, Abes (2009) highlighted the use of queer theory in her "borderland approach" to theoretical development. This approach leads to the use of disparate theoretical perspectives that may provide greater insight to aspects of inequity in higher education.

Decades of feminist and gender research have shown that "the human subject is not uniquely male and that gender identities, ambiguities and conflicts are a crucial part of human experience" (Evans, 2011, p. 3), which has given way to academic policies and practices that are more inclusive (Hart & Lester, 2011; Marine, 2011; Yost & Gilmore, 2011). Although qualitative research is well suited to examining the nuances of subject identities and gender performance at the level of individuals and organizations, the strength of quantitative research lies in the precision of fixed categories that are applied across large populations. Yet, there may be a theoretical disconnect if a researcher wishes to employ a more constructivist or subjective view of identity when the data are captured or presented in binary form. When gender is used as the name of an item or variable in survey research, for example, with "male" and "female" as the only two options available, the word gender loses its meaning and its analytic and theoretical potential as a continuous variable. However, if the term sex is used instead, are we really measuring what we want to know? These questions may be all the more relevant for researchers using secondary data sets, where they were not involved in the creation of survey instruments or variable categories. Thus, in questioning the assumptions or implications of variable choice, researchers take the first step toward more inclusive research practices.

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USE OF GENDER AND SEX IN RESEARCH

In their review of the early usages of sex and its terminological relationship to the word gender in psychological research, Muehlenhard and Peterson (2011) provided a helpful backdrop to the contemporary confusion of this nomenclature in educational research. As might be expected, the field of psychology has been influential in understanding both the behavioral and biological aspects affecting the usage of these terms, and they help those outside the field to see how these "distinctions" have emerged from research. Muehlenhard and Peterson specifically cited Money, Rubin, and Unger, whose respective work in the latter half of the 20th century provided the groundwork for the contemporary usage of gender and sex, whereas gender is a social construct and sex is primarily considered a biological trait. As a result of this scholarship, psychology textbooks were updated to reflect the constructivist aspects of gender rather than the more biological deterministic aspects of sex.

Muehlenhard and Peterson (2011) reviewed the contemporary psychological literature for the use of gender and sex, finding that usage ranged from interchangeable to distinct. When not synonymous, it was accompanied by varying definitions of gender and sex. When scholars defined these terms, sex was associated with sexual behavior; chromosomes, hormones, and reproductive anatomy; and traits and characteristics resulting from biological origins. In contrast, scholars defined gender as maleness and femaleness; social groups or categories; traits and characteristics resulting from social origins, stereotypes, or expectations that society attributes to women and men; and performance of socially expected roles or "doing gender." Muehlenhard and Peterson also noted a potential analytical mismatch, as seen in the following passage:

> If researchers ask participants to indicate whether they are female or male, and if they find a female–male difference in attitudes or behaviors, some would call this a *sex difference*, and others would call it a *gender difference*. Paradoxically, even though many authors consider the terms *female* and *male* to refer to sex rather than gender, many would still refer to behavioral differences between those who check *female* and those who check *male* to be gender differences [italics in original]. (p. 800)

Muehlenhard and Peterson (2011) provided the platform for social scientists outside the field of psychology to ask: what are we measuring exactly? And, (why and to whom) does it matter? The lack of consensus in the psychological literature is disconcerting, and may lead us to draw a similar conclusion to that of Muehlenhard and Peterson who stated that "as researchers learn more, the distinction between sex and gender may become less important or meaningful" (p. 801). However, we argue that these distinctions are meaningful and the question of how to construct relevant research

designs in the field of higher education remains pertinent at present.

Glasser and Smith (2008) found that there is confusion surrounding the "correct" use of the terms gender and sex in educational research. They reviewed examples of imprecise terminology in educational research in relation to the usage of gender and sex, and noted that the contemporary conflation of the words failed to offer either analytic clarity or conceptual development. They stated:

> The use of gender and sex either synonymously or without clear differentiation is a symptom, not a root, of the problem. We believe that researchers have not seriously taken on the task of defining gender (or sex) in their analyses and have not operationalized the term in their research. That is, they have not stated how they see and identify gender in their data. As a result, readers are left to apply their own views in interpreting the author's meaning. (p. 344)

We view this ambiguity as an unintended outcome of educational research that includes gender or sex variables without a clear statement of why it matters to the authors' analyses and implications. In other words, more precise use of words for variable labels does little for the impact of educational research if the questions surrounding gender and sexuality are not meaningfully brought into the theoretical framework or analysis.

Glasser and Smith (2008) pointed to the then current version of the American Psychological Association (APA) publication manual as a potential source of confusion, noting that editors of the Fourth Edition "took an important step forward in casting sex as a biological dimension of human difference and gender as a cultural product" (p. 348). However, they described the APA examples as vague, leading to the synonymous usage of gender and sex. They did not feel that the Fifth Edition went far enough either.

The Sixth Edition of the *APA Publication Manual* followed the same headings for the editors' "General Guidelines for Reducing Bias" as the Fifth Edition, but the section on "gender" is revised. The section previously began: "Avoid ambiguity in sex identity or sex role by choosing nouns, pronouns, and adjectives that specifically describe your participants" (APA, 2001, p. 66). In the Sixth Edition, the following text is added: "Remember that *gender* refers to role, not biological sex, and is cultural [italics in original]" (APA, 2010, p. 73,). Further, the section about gender in the Sixth Edition ends with two new paragraphs about reducing bias when referring to transgender individuals. Overall, the tone of the section has shifted from a discussion of pronoun usage (e.g., avoiding the universal usage of "he"), to a more definitive discussion of the social aspects of gender, including an additional sentence recommending authors to avoid the term "opposite sex" and instead use "other sex," for the reason that "there are more similarities than differences between the two sexes" (APA, 2010, p. 74).

Although the revisions to the gender section in the Sixth Edition of the *APA Publication Manual* provide more rationale for the guidelines, our concern is that by reducing bias in language as the APA guidelines suggest, researchers may feel that they have adequately addressed the social issues behind the need for distinct terms (i.e., gender and sex), and then forgo a more thorough analysis. Moreover, using "other sex" rather than "opposite sex" continues to reinforce sexual binaries. Put another way, gender research is more than the mere use of the term followed by a categorization of research participants into columns labeled "male" and "female," or "women" and "men." The superficial use of the word gender, however conventional in practice, does little to address the underlying social conditions of the higher education setting.

Survey Research in Higher Education

Above, we introduced scholarship that explored gender and sex in research; however, the extant literature is limited in capturing how gender and sex are measured in the field of higher education, suggesting the need for the current study. In particular, we are interested in how gender and sex are operationalized and collected as variables in quantitative survey research. Additionally, there are few parameters for adequately representing participants' social identities in survey instrumentation and question construction in general (Garvey, 2014). With a growing emphasis on intersectional survey research (Cole, 2009; Davis, 2008; McCall, 2005), there is a need to examine the ways in which influential surveys collect demographic information across various social identities, while also recognizing the inherent difficulties in exploring the process of intersectionality in survey research (Anthias, 2013). Thus, because of the wide use of survey instruments in higher education scholarship and the potential implications of how variables are measured, we focused our inquiry on these to interrogate how gender and sex are operationalized and collected in higher education survey research.

Method

To answer our research question, we conducted a directed content analysis (Hsieh & Shannon, 2005). Such an analysis is useful when extant research might benefit from additional description (Hsieh & Shannon, 2005). Below, we provide additional information about our deductive methodological process, including sampling techniques and analysis.

Sample

To unitize our data (Krippendorff, 1989), we utilized Garvey's (2014) catalog of most widely used higher education survey instruments in tier-one

higher education journals. These journals included *The Journal of Higher Education, Review of Higher Education, Research in Higher Education, Journal of College Student Development,* and *Higher Education* (Bray & Major, 2011). One-third (124 of 373) of all the quantitative articles published in these journals from 2010 to 2012 used data from 19 survey instruments. The remaining two-thirds of quantitative articles that did not utilize those instruments conducted quantitative studies from various other data sources, including other nonprofit and federal datasets, institutional datasets, or instruments/scales constructed by individual researchers. Among the 19 widely used survey instruments, six were U.S. federal government surveys and 13 were administered by education nonprofit organizations. The most widely used U.S. federal government surveys were the National Education Longitudinal Study (NELS, N = 21) and the Integrated Postsecondary Education Data System (IPEDS, N = 19). The most used surveys from educational nonprofit organizations were the Wabash National Study of Liberal Arts Education (N = 17) and the National Survey of Student Engagement (NSSE, N = 12)[1].

We did not include three educational nonprofit organization survey instruments in the current analysis for specific reasons. First, the Higher Education Research Institute (HERI) administers the Cooperative Institutional Research Program (CIRP) College Students' Beliefs and Values Survey as a follow-up to their Freshman (sic.)[2] Survey (TFS), which we do include. A personal identifier links participants' survey responses across both instruments. Although the only demographic question included in the College Students' Beliefs and Values Survey is religion/spirituality, researchers are able to include other demographic variables in analyses that were asked in TFS. Second, we did not include the National Association of State Student Grant and Aid Program survey because it assessed programmatic information and did not include individual-level variables. Lastly, the National Student Clearinghouse Research Center does not publish and did not make available the National Student Clearinghouse survey for this study.

Data Collection and Analysis

Upon identifying the most widely used higher education survey instruments, we acquired copies of them by either contacting the survey distributors or downloading the survey instrument online. After collecting the instruments, we conducted a detailed, directed assessment of demographic

[1]For a more detailed summary of these widely used higher education surveys, please see Garvey (2014).

[2]For ease of reading, we use (sic.) only once when referring to the Freshman Survey. *Freshman* is not a gender inclusive term and is subject to the same criticism regarding genderism (Bilodeau, 2009).

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information included in the surveys and concentrated on the prevalence and operationalization of gender and sex in demographic questions. One member of the research team was responsible for the initial analysis of the data. Once completed, the other members of the research team reviewed the findings and concurred with the analysis. There were no cases of disagreement among the research team members.

FINDINGS

The following section details the ways in which U.S. higher education survey instruments operationalize gender and sex, concentrating on both the inclusion and formatting of questions/items. Table I provides a summary of the ways in which these higher education surveys operationalized gender and sex, including both question/item stem and response options.

Question/Item Inclusion

All six U.S. federal government surveys and 10 education nonprofit organization surveys included at least one item or question that measured participants' gender or sex, although whether the instrument question/item focused on gender or sex varied greatly across instruments, as did the question and response option formatting. Question/item stem and response options aligned for 12 of the 16 instruments across categories of gender and sex. This is to say that when asking participants to identify gender, the possible responses were gender identities and when asking to identify sex, the possible responses were sex identities.

Among the 16 survey instruments analyzed, only three instruments measured gender for both the question/item stem and response options. NSSE and the Faculty Survey of Student Engagement (FSSE), both administered through Indiana University, had the most inclusive gender data collection questions. For both surveys, the question stem read, "What is your gender identity?" and the response options included "*Man; Woman; Another gender identity, please specify: ___; I prefer not to respond*." Only one U.S. government survey included gender in its item stem and response options; IPEDS included an item for "Gender" with responses options of "*Men; Women*." The other U.S. government surveys asked for participants' sex or incorrectly mismatched question stem and response options.

Seven instruments operationalized sex in both question/item stem and response options, including four U.S. government surveys and two education nonprofit organization surveys. Questions/stems were posed in three different ways across these seven instruments. Three surveys asked "Are you:" for the question stem, including the NSOPF, the Survey of Earned Doctorates, and the Gates Millennium Scholars Tracking and Longitudinal Study. Two instruments asked "What is your sex?" as its question stem, including

Table 1.
Operationalization of Gender and Sex in Higher Education Survey Instruments

Survey Instrument	*Question/Item Stem*	*Response Options*
National Education Longitudinal Study+	What is your sex?	*Male; Female*
Integrated Postsecondary Education Data System*+	Gender:	*Men, Women*
Wabash National Study of Liberal Arts Education*	Gender:	*Male; Female*
National Survey of Student Engagement	What is your gender identity?	*Man; Woman; Another gender identity, please specify: ___; I prefer not to respond*
Freshman Survey	Your sex:	*Male; Female*
	Do you identify as transgender?	*Yes; No*
Beginning Postsecondary Students Longitudinal Study+	What is your sex?	*Male; Female*
National Study of Postsecondary Faculty+	Are you:	*Male; Female*
Faculty Survey	Your sex:	
	Do you identify as transgender?	*Male; Female No; Yes, male to female; Yes, female to male*
Survey of Earned Doctorates	Are you:	*Male; Female*
Current Population Study+	What is (name of person talking about)'s sex?	*Male; Female*
Postsecondary Education Transcript Study*+	Gender:	*Male; Female*
Faculty Survey of Student Engagement	What is your gender identity?	*Man; Woman; Another gender identity, please specify: ___; I prefer not to respond*

Table 1, cont.

Survey Instrument	*Question/Item Stem*	*Response Options*
Gates Millennium Scholars Tracking and Longitudinal Study	Are you:	*Male; Female; Refused*
Multi-Institutional Study of Leadership	What is your gender?	*Male; Female; Transgender*
	Please indicate which of the following best describes you:	*Female to male; Male to female; Intersexed; Rather not say*
National Study of Living-Learning Programs	What is your gender?	*Male; Female; Transgendered*
The College Student Experiences Questionnaire	Sex:	*Male; Female*

Note. The Faculty Survey provides an optional *Sexual Orientation and Status Module* in which the second question appears.
Note. The Multi-Institutional Study of Leadership uses skip logic. The second item only appears if participants select *Transgender* as their gender.
*Data provided by participating higher education institution, not participants.
+U.S. federal government survey.

NELS and the Beginning Postsecondary Students Longitudinal Study (BPS). Similarly, The College Student Experiences Questionnaire (CSEQ) asked participants to identify "Sex." Finally, the Current Population Study (CPS) asked "What is (name of person talking about)'s sex?" Questions/items for all of these seven instruments had two response options (*Male; Female*), with the exception of the Gates Millennium Scholars Tracking and Longitudinal Study (*Male; Female; Refused*).

Two survey instruments, both administered by HERI, included question/item stems that inquired about both gender and sex. Both TFS and the Faculty Survey included "Your sex" as an item, with "*Male; Female*" as response options. These two surveys also included another question that asked "Do you identify as transgender?" with three response options (*No; Yes, male to female; Yes, female to male*). Worth noting is that the Faculty Survey provided a *Sexual Orientation and Status Module* that participating institutions can opt to add to the primary survey instrument. In the module, the second question was "Do you identify as transgender?"

Finally, for four of the 16 survey instruments, the question/item stem and response option did not align. Both the Wabash National Study of Liberal Arts Education and the Postsecondary Education Transcript Study included "Gender" as an item stem, yet had response options that represented sex (*Male; Female*). The National Study of Living-Learning Programs (NSLLP) asked participants "What is your gender?," yet provided responses options for both sex (*Male, Female*) and gender (*Transgendered* (sic.)). Likewise, the Multi-Institutional Study of Leadership (MSL) asked "What is your gender?." However, the response options differed slightly from the NSLLP: *Male; Female* (sex) and *Transgender* (gender). The MSL also included skip logic so that participants who selected "*Transgender*" received a second item that read "Please indicate which of the following best describes you" with four response options (*Female to male; Male to female; Intersexed* (sic.)*; Rather not say*).

Question/Item Format

Across all 16 survey instruments, questions were formatted in a number of different ways that provided unique data collection and analysis opportunities and challenges. These formatting considerations included institutional reporting of gender, single response options, fill-in-the-blank response options, and options to refuse selection.

Colleges and universities, not individual participants, provided data for two U.S. government surveys and one nonprofit education organization survey. IPEDS, the Postsecondary Education Transcript Study, and the Wabash National Study of Liberal Arts Education required institutional personnel to provide gender data for individuals rather than through participants themselves. In other words, institutional staff must decide the ways in which an individual's gender is operationalized and align their question/stem response

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options with the data collection techniques for these surveys. For example, IPEDS asked participating institutions to provide percentages of individuals across two gender categories: *Men* and *Women*. Interestingly, IPEDS provides information to institutions to determine how to account for "students for which gender is unknown." Their website reads,

> These individuals are still to be reported to IPEDS, even though their gender is unknown. It is up to the institution to decide how best to handle reporting individuals whose gender is unknown. However, a common method used is to allocate students with gender unknown based on the known proportion of men to women. (IPEDS, n.d.)

As articulated above, institutions are responsible for best representing gender data for "individuals whose gender is unknown" and are encouraged to place individuals into categories of *Men* or *Women* when a determination cannot be made, rather than providing a percentage of students whose gender is unknown.

For all 16 higher education survey instruments, participants were forced to choose only one response for their gender or sex. In none of the surveys were individuals provided the opportunity to select more than one gender or sex response option. Furthermore, only two surveys provided additional options for participants to elaborate on their gender or sex. Both NSSE and FSSE included a response option that reads *Another gender identity, please specify:* ___. Three surveys (NSSE, FSSE, and the Gates Millennium Scholars Tracking and Longitudinal Study) allowed participants to refuse selection of any gender or sex by including *I prefer not to respond* and *Refused* as response options, respectively.

Discussion and Implications

The findings above illuminate a number of limitations related to gender and sex variables inherent in the survey instruments analyzed. Unfortunately, researchers relying on these surveys are subsequently limited in what they can theorize and claim about gender and sex in their analyses, which has implications for policy and practice throughout higher education. In other words, survey developers are at a critical juncture to influence gender and sex variable operationalization and collection, which has lasting consequences for restrictions and opportunities in use of these variables within analyses. For example, four instruments, including one of the three most used in scholarship in the top higher education journals from 2010 to 2012, asked participants to identify their gender, yet gave them the choice to categorize their sex instead. Similarly, the HERI instruments asked separately about gender and sex. However, when considering gender, participants could only

identify as transgender—and within that identification, male to female or female to male. Although male to female and female to male are identifications widely used in transgender scholarship, they denote sex, not gender. As such, researchers who use these instruments automatically conflate gender and sex in their analyses (Glasser & Smith, 2008; Gould & Kern-Daniels, 1977; McDermott & Hatemi, 2011; Muehlenhard & Peterson, 2011). In this way, gender has lost its meaning for the researcher (and importantly, for the participant completing the survey). Butler (1990, 1993, 2004) argued that gender and sex are not interchangeable terms. However, when researchers use data from these instruments, they have no choice but to treat them as interchangeable.

Researchers who use the instruments analyzed in this study, with the exception of NSSE and FSSE, are also restricted by binary constructions of gender and sex. In addition, the categories participants can select are static, reflecting no sense that gender or sex are fluid (Butler, 1990, 1993, 2004). Thus, if researchers embrace gender (and/or sex) as performative, socially constructed, and subjective, the binary nature of the data available from most of these surveys conflicts with researchers' ontologies and can limit further theorizing.

Further, nearly all of the instruments generate data about sex, whether explicitly or in a conflated manner. If, as many believe, sex is a biological and prediscursive construct (Butler, 1990; Muehlenhard & Peterson, 2011), is that truly the most interesting unit of analysis? For example, if we consider sex, instead of gender, to understand student development in complex ways, we run the risk of essentialism and reductionism, the very critiques of many early student development theories (Abes, Jones, & McEwen, 2007). Yet, the secondary data provide researchers no other alternatives but to use sex as an inadequate proxy for gender.

Although the intention of the survey designers of the MSL and NSLLP may have been to collect more nuanced data that reflect the fluidity of gender or sex, the terminology used in the survey instruments is highly problematic. Specifically, the MSL not only conflates gender and sex, but provides the option intersex*ed* for individuals to consider. The NSLLP survey item asks about gender and provides gender and sex options, again conflating and confusing these distinct identities. However, unlike the MSL, instead of the choice, transgender, the choice is transgender*ed*. The terms "intersexed" and "transgendered" dehumanize participants. The *ed* suggests that something is done to a person—as if that individual is now someone different (GLAAD, 2015; Serano, 2007). For example, a person is radicaliz*ed* or stigmatiz*ed*. Also, the *ed* denotes completion, negating gender or sex fluidity. Ultimately, the terms are outdated, potentially hurtful to participants, and inconsistent with conducting ethical research.

As previously noted, IPEDS, the Postsecondary Education Transcript Study, and the Wabash National Study of Liberal Arts Education require institutional representatives to provide demographic data. Most likely, those providing the data rely on admission and personnel information collected at one point in time. These data are binary and fixed; gender is fluid, changeable over time (Butler, 1990, 1993, 2004). Thus, it is unclear whether the data individual colleges and universities provide are accurate. In fact, regarding IPEDS in particular, inaccuracies are highly likely because when gender is unknown, personnel are asked to assign the gender of man or woman. Moreover, when institutions must provide individual level data, it assumes that they use the same questions/stems and responses when collecting those data on their respective campuses, which may or may not be the case.

The most disconcerting finding from this study is the seemingly haphazard approach to developing gender and sex demographic items throughout higher education survey instruments. Among the surveys we analyzed, there was a wide variety in the ways that survey developers wrote question/item stems and response options. These gender and sex question/item discrepancies create troubling implications for how policymakers and practitioners use survey data, once again reinforcing the pivotal role that survey developers and data collection researchers play in regulating the use of gender and sex variables in higher education quantitative research. The quantitative studies analyzed in this study are nationally representative and thus central to advancing institutional, state, and national policies and practices in higher education (Stage, 2007). With such varied gender and sex data collections, it is difficult for policymakers and practitioners to create narratives with continuity. Additionally, higher education practitioners may adopt language from these widely-used higher education surveys in their own program assessment and evaluation. In so doing, they fail to address Sanlo's (2002) critique: "I am concerned about the language we as professionals still use on our campuses . . . these words violate boundaries of race, gender, and sexual identity, and serve to perpetuate a climate of exclusion and marginalization" (p. 171).

RECOMMENDATIONS

We resist the perceived need to prescribe a template for question/item stem and response options for surveying participants' gender and/or sex. Scholars must continually question and interrogate variables, models, and analytic practice in order to propose more culturally relevant and inclusive research practices that more closely capture participants' lived experiences (Stage, 2007). By proposing a universal model or approach to constructing demographic questions, we eliminate the necessity of researchers to examine their own gender or sex narratives, purpose and design for their survey research, and subjective positionalities of research participants. Rather, in

our recommendations section we describe missed opportunities in previous surveys and propose alternative methodological and theoretical approaches for survey methodologists to consider. Given our focus on gender and sex variable operationalization and collection, we direct our recommendations to survey developers, and in particular, scholars who have governance and influence in decision-making within large-scale national higher education quantitative survey instruments.

Across nearly every instrument analyzed, we found missed opportunities with regard to demographic information data collection. Both methodologically and theoretically, survey designers must consider the utility of multiple response options for gender and sex. Identities are complicated and non-fixed (Abes et al., 2007), and including multiple response options celebrates the fluidity of social identities. As described earlier, survey methodologists must recognize the subjectivity of gender and sex rather than polarizing identities into fixed binaries (Abes & Kasch, 2007; Acker, 1999; Alsop et al., 2002; Butler, 1990, 1993, 2004; Renn, 2007). For example, participants may identify with multiple gender identities like gender queer and woman, or trans*[3] and another gender identity. Enabling participants to describe their own gender narrative provides an empowering survey design that welcomes people across all gender identities and challenges hegemonic conceptions of gender.

Furthermore, by allowing survey participants the option to write in a different gender or sex identity that is not prescribed on survey design, researchers remove the necessity to prescribe an individual's identity. Such modifications in survey designs enable a more fluid and dynamic understanding of social identities in quantitative research and acknowledges the theoretical and societal frameworks in which individuals navigate the complexities of self (Abes & Kasch, 2007). Again, however, researchers must consider the implications of these survey design decisions across the entire quantitative research scope.

If survey designers provide the option to write in a gender and/or sex identity response, then they must create a coding and classification scheme to organize and sort participants' responses. Although all non-binary gender or sex identity response options (including write-in responses) may each be consolidated into one gender or sex identity category, it does not reduce or entirely diminish the benefit of having an open-ended response option. Quantitative criticalists must focus on the intentions of methods and not exclusively on the output (Stage, 2007; Stage & Wells, 2015). By including an open-ended response option, it signals to participants that survey methodologists recognize the fluidity and complexity of gender and sex identities. Furthermore, scholars may decide to explore differences within gender and

[3]We acknowledge the use of the asterisk is contested; we have chosen to use the term trans* to reflect the limitations of a solitary identity (Nicolazzo, 2017).

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sex identity groups, and allowing for self-prescribed identities provides opportunity for such future research examinations.

Including an option that allows participants to refuse to indicate their gender identity is a provocative consideration. Quantitative scholars must consider how to code and classify these participants. For example, when conducting an analysis with gender as a covariate, should people who refuse to indicate their gender be excluded from analyses? Certainly, utilizing missing data techniques to predict and prescribe a person's gender identity is problematic, but we contend that omitting a person altogether because their gender does not fit into the binary of man/woman is also problematic. With that said, especially for researchers with small datasets, there are difficult decisions about the inclusion of people whose gender identities do not fit within the binary of man/woman. The erasure of trans* and gender non-conforming people from quantitative education research is not accidental. Not only have survey methodologists historically not included such questions (Garvey, 2014), but even when non-binary gender identities are included in the survey design, they are often discarded in analyses because of sampling restraints. (We argue the same is likely the case for non-binary sex identities). Including multiple response options and varied item/question formatting techniques will create a more welcoming and affirming survey design across identities.

Hopefully, with more gender and sex inclusive response options, trans*, and gender and sex non-conforming people will be less likely to refuse to provide their identities. However, rather than including an option that allows people to refuse to answer, survey designers can simply make the gender and sex identity items non-forced response options, whereby participants do not have to indicate any response. However, non-forced response options may create a non-representativeness among non-responders because these survey participants likely chose not to disclose their gender or sex for particular reasons. Furthermore, if a survey designer determines that their sample is not representative, they will not be able to weigh the sample properly beyond binary measurements of gender or sex. Researchers must balance the benefits and constraints of these data collection and analysis decisions continually with consideration for both the process and product of survey design and analysis.

Methodologically, researchers must have strategies in place not only for survey design, but for analyses as well. If researchers provide participants the option to indicate more than one gender and sex identity, these scholars must have strategies in place before data collection to categorize individuals across all possible combinations. For example, if a participant indicates both man and woman as gender identity response options, should the person be categorized into a trans* response option, another gender identity option,

or as their actual response of man and woman? Data categorization decisions must be made with consideration for the entire survey population and gender and sex diversity. If surveying a population of students, there may be a small proportion who do not identify as man or woman and/or male or female. However, if surveying a population of those who do not conform to gender or sex binaries, there may be more gender and sex diversity and greater opportunity to create more specific classifications.

When surveying students' social identities, researchers must consider additional classifications beyond gender and sex to understand the complexities of student narratives and experiences. For example, if survey researchers are interested in queer and trans* populations, they may include social identity categories that capture a more nuanced understanding of these individuals, including sexual identity, sexual behavior, sexual attraction, gender identity, gender performance, and/or assigned birth sex (Rankin & Garvey, 2015). Adding these additional measures better reflects gender, sex, and sexuality diversity and provides deeper opportunities to challenge gender inequality (Magliozzi, Saperstein, & Westbrook, 2016). The Williams Institute's report on sexual orientation (Badgett & Goldberg, 2009) and gender-related measures (Herman, 2014) provides more specific recommendations for operationalizing these social identities in survey design. Particularly within studies that sample college students broadly, survey designers may need to make decisions on how many additional gender and sex classifications to include concerning survey length for paper surveys and coding specifications for electronic surveys.

As described throughout the manuscript, survey researchers must examine the entirety of their research processes to envision more socially just and culturally responsive quantitative research. Although we examined demographic question/item construction, there are numerous other facets of quantitative survey research to consider when creating more inclusive research designs, including theoretical frameworks, instrumentation, sampling, data coding and consolidation, and analysis. Recently, quantitative scholars have advocated for critical frameworks to represent the fluidity and complexity of identity, power, and marginalization among survey participants. Queer theory (Lugg, 2003; Renn, 2010), intersectionality (Cole, 2009; Crenshaw, 1991; Dubrow, 2008; McCall, 2005), and feminist theories (e.g., Acker, 1999; Ahmed, 2012; Butler, 1990, 1993, 2004; Collins, 2002) are frameworks that quantitative scholars may consider when designing an overall survey research experience that is more culturally inclusive and responsive (Rankin & Garvey, 2015). These critical frameworks will ensure that in addition to including culturally responsive demographic items/questions, scholars must also navigate the dynamic nature of gender and sex as social constructions, including genderism, transphobia, and sexism.

CONCLUSION

Overall, we found that the survey instruments we analyzed suffer from imprecision with regard to variable construction related to gender and sex. This lack of precision during variable operationalization and collection may introduce or reinforce confusion when data are analyzed and interpreted, which threatens the validity and reliability of higher education research and its applicability to many of our most important policy discussions regarding access, equity, and social transformation.

We recognize the hands of scholars who use secondary data from these instruments are tied regarding gender and/or sex questions and responses available. For example, researchers who are interested in gender may be forced to use sex as a proxy and vice versa. Further, they will almost always be constrained by gender or sex as binary and fixed, which fails to account for the fluidity of these variables. Until those developing survey instruments engage in better practices regarding gender and sex variable construction, it is critical that researchers using these data sets discuss the limitations of the data regarding gender and sex.

The existing lack of precision inherent in using secondary data sets like those examined in this study means that we lose rich opportunities for theoretical development that might contribute to disciplines such as sociology and fields such as health and gender studies. In addition, the examination of our research from the lens of queer theory challenges choices about gender we may unintentionally make in our scholarship and permits a more inclusive research culture, one that supports intentional gender research as part of an ongoing call for transformational work in higher education.

Our analysis left us with questions that remain unresolved. We challenge researchers who are conducting gender and sex research, and those who are using gender and sex as variables, to consider the following. Regarding Butler's (1990) deconstructing binary systems of gender and sex, to what extent does privileging certain genders and sexes on survey designs silence other identities? Must survey designers rely on robust sample sizes to justify the inclusion of identities in demographic data collection, or should quantitative scholars take an advocacy lens by including multiple identities regardless of the sample size? Are other data collection techniques (e.g., "*another gender identity, please specify:* ____") adequate in capturing all gender identities, or is there power in naming historically ignored identities?

In addition to considering the aforementioned questions, we argue that using terminology purposefully and inclusively is crucial if we want to conduct research that challenges genderism (Bilodeau, 2009). The examination of our research from the lens of queer theory challenges choices about gender we may unintentionally make in scholarship and permits a more inclusive research culture, one that supports intentional gender research as part of

an ongoing call for transformational work in higher education. Although constructing categories for gender and sex may seem antithetical to queer theory, blurring the boundaries between the two creates opportunities to challenge categorization while also exploring more liberating approaches to collecting data about gender and sex (Browne, 2008).

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