"Genderfluid" or "Attack Helicopter": Responsible HCI Practice with Non-Binary Gender Variation in Online Communities

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ABSTRACT

As non-binary genders become increasingly prevalent, researchers face decisions in how to collect, analyze and interpret research participants' genders. We present two case studies on surveys with thousands of respondents, of which hundreds reported gender as something other than simply women or men. First, Tumblr, a blogging platform, resulted in a rich set of gender identities with very few aggressive or resistive responses; the second case study, online Fantasy Football, yielded opposite proportions. By focusing on variation rather than dismissing non-binary responses as noise, we suggest that researchers can better capture gender in a way that 1) addresses gender variation without othering or erasing non-binary respondents; and 2) minimizes "trolls'" opportunity to use surveys as a mischief platform. The analyses of these two distinct case studies find significant gender differences in community dimensions of participation in both networked spaces as well as offering a model for inclusive mixed-methods HCI research.

Author Keywords

Survey research; social media; gender; non-binary; transgender; LGBTQ; online communities; trolling; Tumblr; Fantasy sports.

ACM Classification Keywords

H.5.3. Information interfaces and presentation (*e.g.*, HCI): Group and Organization Interfaces: Collaborative computing, Computer-supported cooperative work, Web-based interaction.

INTRODUCTION

Demographic questions are standard practice in survey methodology; however, the ways that researchers construct demographic indicators and analyze and report data are not neutral. To use Langdon Winner's phrase, each of these processes "have politics" [77]. Collecting demographic

indicators is an effort in classifying data into meaningfully distinct categories [11]. For the sake of limiting the analytical burden on researchers and following established convention, demographic categories offer a common shorthand for data analyses. However, demographic categories are neither neutral nor static. A notable example is the U.S. Census Bureau's recent revision of available categories for reporting race [56]. Not only have the categories available for selection changed over time, but individuals have also reported different races at different points in time [12]. In practice, standards and categories always create categories of otherness [11].

Moments of friction or change that push against existing classifications often provide opportunities to make taken-for-granted assumptions perspicuous. In this study, we analyze open-ended responses to a basic demographic question – a request for respondents' gender – on two unrelated surveys to better understand the range of reactions to gender questions phrased to allow non-binary gender responses. "Non-binary" refers to people whose genders are multiple, fluid, and/or something other than male or female. Some but not all non-binary people are also transgender or "trans," defined as "people who move away from the gender they were assigned at birth, people who cross over (trans-) the boundaries constructed by their culture to define and contain that gender" [70]. We identify two trends in our open-ended responses: 1) users self-reporting a varied range of gender responses and 2) "mischievous responders" presumably providing us with bad data for ideological reasons. In practice, many researchers omit the "other" category from data analysis because it often includes a statistically negligible proportion of users but complicates analysis. However, statistically negligible populations ought not to be excluded from entire fields of research. Historically this has occurred with consequences ranging from exclusionary to dire [44,58]. In this paper, we begin by taking the "other" respondents seriously and consider what it means to observe supposedly stable categories – such as gender – showing variation, and how to understand mischievous responders in our data.

The available range of gender identities has been the subject of ongoing academic, social, and political inquiry. Alongside these debates, awareness of the spectrum of

gender identities has become increasingly mainstream. As researchers fielding surveys in both industry and academic settings, we have been attuned to the recent emergence of a range of responses to demographic questions asking users to identify a gender. This has moved the debates around gender identities from an academic, social, and political arena into a methodological one as well, raising the question: How should HCI researchers assess, analyze, interpret, and represent gender in our work? This question holds weight in multiple HCI research settings, from generative survey to published article, policy report, or proprietary product.

Approaching HCI research questions carefully and thoughtfully requires both awareness going into the study design, as well as an openness to listening to research participants. For researchers studying people in online communities, a number of methodological questions arise about conveying subjects' personhood to audiences [33]. How are users self-identifying in our surveys? What message do our respondents' convey in response to our questions? How does one faithfully represent and understand a digital self? We address one such question in this work by describing how researchers can reflect the diversity within a population by recognizing, taking seriously, and reporting self-reported identities.

BACKGROUND

In survey research, it is a linguistic challenge to identify a category for respondents beyond the gender binary that does not "other" them. To "other" someone means to posit them as intrinsically different and outside of the norm, which can be harmful to marginalized people. We have seen survey options such as "non-binary," "other," and "something else;" however no such option begins to approach the level of standardization of the traditionally used binary gender question: male or female? [48] notes that standards create "intercategorical objects, residual categories (such as 'not elsewhere specified') and…make 'others.'" Using and creating categories may be helpful, but is not neutral. Among other characteristics, standards and infrastructure are embedded, learned as part of membership, linked with conventions of practice, and made visible upon breakdown [43,48].

Standard and pre-determined gender categories and options – those that are "baked in" to platforms – reflect dimensions of social power and have material consequences for those othered and in broader understanding of social variation [9]. Because standards and infrastructure by definition work to underlie and prop up existing order as heuristic shortcuts [11] and mediators of action [12,68], they can continue operating relatively durably until upended or broken down. Reconstructing or breaking down categories and standards is challenging because they reflect and support power structures and are often taken for granted [9,11]. While boundaries and categories can operate symbolically at the individual level, those heuristic boundaries can become

externalized (and then internalized), scaling up to groups [45]. These group-level, or social, categories have the consequence of "constraining social action…and translate…into identifiable patterns of social exclusion" [45]. Because categories create outsiders, and because those categories are often "morally fraught" in their consequences (with unequally distributed burdens), it is important to foreground – or invert – the analytical categories used in our creation of knowledge, science, and the products and systems they inform [11].

Gender and Survey Research

Trans and non-binary people are often made invisible in research, which means that they often become invisible in culture more broadly [53]. To effectively study a world that includes gender-diverse people, researchers cannot use binary gender measures [71]. This is important in an HCI context because excluding trans and non-binary data or people from research often then excludes them from information systems, thus negatively impacting their lives [36,78]. Trans and non-binary exclusion from surveys perpetuate what [36] calls data violence – "the continued exclusion from or subjugation of [trans and non-binary] populations to information systems that do not represent their lives or needs." In a health context, this erasure makes trans and non-binary people seem like an anomaly to health systems [4], a feeling which likely also extends to sociotechnical systems and HCI research.

Within the broad category of trans, people's identities and experiences are diverse [3,18]. Even though counting trans and non-binary people, as survey research does, can inflict rigid categories on a complex population, counting is necessary to document how many people fall into this vulnerable population [15]. Large numbers demonstrate need; thus, counting the trans and non-binary population is a first step in improving health [73], rights [21], and reducing discrimination [34] for gender minorities. Similarly, in an HCI context, trans and non-binary-inclusive survey measures are necessary to understand these users and thus improve user experiences for gender minorities. Yet data analysis and information systems often create new ways of defining and containing gender categories [36].

Previous literature has identified many complexities in trans and non-binary-inclusive survey design, such as: 1) Surveys must account for diversity within the population, rather than grouping all trans and non-binary people together [2,18]. 2) Not all trans and non-binary people will check a "transgender" or "other" box [2]. 3) Designating gender-diverse people as "other" is literally othering [2]. 4) Respondents often fit in multiple gender categories, rather than only one (e.g., a person may be both male and trans) [2]. Ignoring gender complexities not only erases trans and non-binary people; it also creates messy and inaccurate data [75]. For example, the 2010 U.S. Census used restrictive binary gender options to ask about gender, with no custom

or trans option [15]. As a result, many trans people responded by checking neither box, or both boxes [15].

Researchers must strive to design for gender complexities rather than removing gender minorities from surveys [10]. In response to the challenges described above, researchers have proposed many for inclusive survey design, including: 1) Offer responses beyond male/female[59]. 2) Phrase non-binary gender responses as "something else" instead of "other" [3]. 3) Allow participants to choose multiple gender options, rather than only one [49]. 4) Acknowledge that sex and gender may change over time [75].

While trans and non-binary people generally appreciated inclusive gender options on surveys [60], in some studies, a small percentage of cisgender people found such options offensive. In [60], two out of 30 cisgender participants responded negatively. While two negative responses would not cause much disruption, at scale, 7% of cisgender respondents reacting negatively would. Several studies [3, 50] reported zero cisgender participants responding negatively to trans and non-binary-inclusive gender questions – yet this may be because [49] was conducted in-person rather than online, and [3] only asked open-ended gender questions to trans and non-binary participants.

Gender in Online Social Communities: Tumblr
Tumblr is a social media blogging site. Users follow blogs and see content in their feed. Currently, Tumblr hosts over 138 billion posts on over 367 million blogs [79]. Tumblr is the home of many online communities, including communities of LGBTQ people and gender minorities [16]. Social media sites have substantial power in determining how gender is categorized more broadly in our culture [9]. Thus, Tumblr's reputation as a queer and non-binary-friendly space [74] is notable. For many users, Tumblr is a queer space both in terms of queer theory (which challenges dominant gender categories and posits identity as socially constructed, fluid, and ambiguous rather than fixed or essential [14]) and in terms of being populated by queer/LGBTQ communities [16].

Tumblr's features and affordances enable trans, queer, and non-binary self-expression, and make the site "queer" in many different ways [16,17,55,61]. Users' ability to be pseudonymous, maintain multiple identities and blogs, and the site's unstructured, flexible profiles (on which people can choose which parts of themselves to display, and how) allow people to express non-normative identities [55,61]. Tumblr's visual design enables identity complexity [74], and with its tagging system people can denote gender and find others with similar genders [17]. Finally, the site facilitates nonlinear, impermanent, and multiple trajectories of content reblogged across the site and personal narratives [16,26,74]. [55] argued that Tumblr blogs help shape language and discourse around genders and sexual orientations more broadly. Because of its large trans and non-binary user base and its "queer" features and affordances, Tumblr is a rich source of data about trans and

non-binary populations [30], and also provides a key survey population for researchers who want to include trans and non-binary people in their studies.

HCI researchers have approached trans and non-binary gender topics primarily in studies examining how Facebook's gender options enable and constrain self-presentation for trans and non-binary users. Facebook's initially constraining methods of categorizing non-binary genders as all one category denied non-binary visibility [40]. In 2015 the site made improvements by allowing users to self-identify with any gender they choose, a design improvement that was appreciated by many trans and non-binary people [29]. Yet these increased gender options are only at surface level – genders are still coded as binary in Facebook's database [8]. Trans and non-binary Facebook users often still have difficulty representing changing and fluid gender identities on Facebook, and identity disclosure difficulties remain [28,29]. Thus, many trans and non-binary people use Tumblr, rather than Facebook, as their primary social media site [55].

Gender in Online Social Communities: Fantasy Sports
Fantasy Sports is a genre of game that uses data and statistics from real-world sporting events – such as games played by athletes in the National Football League – to populate the content of Fantasy team match-ups. Groups of typically 8-12 people, called *managers*, join together in a *league* to compete for a championship. Each manager *drafts* a roster of individual professional athletes for their fantasy team. Typically, a manager can draft from the pool of all available professional athletes, regardless of what professional team that player is affiliated with. Managers then accumulate points based on the performance of all of the athletes they had on their roster in their live games each week. This experience simulates the role of a professional sports team general manager or coach, letting users play the fantasy of what is, for many, a dream job. Because it relies on data from actual game-play, being a Fantasy manager feels more realistic and also involves the day-to-day contingencies of professional sport play, such as adjusting lineups based on player injuries, speculating on the value of young players, and putting one's own squad head to head against a competitor's team.

Many users find Fantasy to be a fun pastime, a way to supplement or increase their sport fandom, and a way to learn more about sports generally [7,23,46,62]. It is primarily a platform for competition, but its social organization makes it a space for communication and relationship maintenance as well [5,63,67].

In stark contrast to Tumblr's reputation as a gender-inclusive and non-binary friendly space, Fantasy Sports operate in a traditionally male domain with a specific form of dominant, hegemonic masculinity. Indeed, [62] describe Fantasy Sports as a "boys' club", recognizing women's marginalization across sports consumption and participation historically. They describe the ethos of hypermasculinity in

Fantasy Sport: "for men who think mainstream sport has become less deviant and neutered, fantasy sport offers a new frontier in which hegemony is both enforced and boorish behavior is more likely to be tolerated" [62:438]. [20] attribute the hegemony of masculinity in Fantasy Sports to its position at the intersection of a number of privileged dimensions: users are overwhelmingly young, college-educated white men. These studies and others identify Fantasy Sports as a realm marginalizing to women and the feminine [37,42,46,47]. However, Fantasy Sports provide not just a networked space for the display of hegemonic masculinity but also a social, interactive leisure activity populated by a huge range of increasingly diverse users. [80] estimates that over 54 million users currently participate in Fantasy sports in the U.S. and Canada alone – with diverse motivations [7,22,25,46,62]. This research emphasizes that motivations for involvement in Fantasy Sports reflects dynamic social dimensions, including bonding with friends and family and sharing or applying their knowledge about the sports they love [6,7,25]. The body of literature consistently identifies and considers gender differences between men and women in Fantasy Sports, but there is no mention of any non-binary users in any of the studies we reviewed for this project.

HCI and Critical Theory
Given this background, we set out to make sense of our survey gender data through a new lens. This is in the tradition of a methodological re-visit [33], or a return to and reflection on data and analysis in light of new information, such as a new theoretical approach. Our goals to re-analyze the data had interrelated motivations. As both academic and industry HCI researchers, a driving principle of our work is to better understand the populations we study. As responses beyond the binary emerged in our data, we recognized the necessity of positing these identifications as important, rather than excluding them, to enable a full picture of our users' genders and identities.

In HCI, as in many other fields, gender is often used as "an ineffective proxy for determining some other piece of information" [78] because of false assumptions about gender's stability and cohesiveness. Most HCI research uses simple gender categories that can erase trans and non-binary identities [65]. Users are multidimensional, and gender is only one category; [13] and [65] argued that HCI researchers need to embrace both gender complexity and its intersections with other identity facets. HCI needs more nuance than a simple understanding of how men and women use technologies differently [13]. [32] called for a queering of HCI, which can occur through examining moments of breakdown between technology design decisions and how people actually use technology. Trans and non-binary people's individual histories contain a story disruptive to gender [69], which means these users are often ignored or rendered invisible by HCI design choices [40]. Thus, [40] argued that HCI researchers should study the ways systems constitute identities. Feminist HCI, which

calls for agency, identity, equity, empowerment, and social justice, can be important for empowering and advocating for non-binary users [31,40]. Questions around whether gender categorizations are necessary [19,76] and the limitations of categorizing people in sociotechnical systems [11] remain vital in HCI research.

Some of [1]'s feminist HCI methodological positions are especially relevant here. A non-binary inclusive research design demonstrates a commitment to feminist methodology, by taking into account researchers' and participants' assumptions, commitments, and goals. Our suggested approaches demonstrate "an empathic relationship with research participants focused on understanding their experiences" [1] and require reflexivity, as demonstrated in our iterative approach to coding and ongoing self-questioning about how to best approach non-binary inclusion in survey design and data analysis.

While feminist HCI is not restricted to qualitative or design research domains, [1] encourage future work in exploring how to "provide the intellectual grounds for a feminist HCI quantitative methodology." In this paper, we bring feminist HCI principles into a quantitative methodological realm. As we have shown, there is tension in using quantitative methods around complex constructs like gender. Yet, this is why our work is so important: HCI researchers do quantitative work, and often in a gender essentialist way. Our recommendations for minority gender-inclusive HCI research design enable HCI researchers to achieve the rich analyses and equitable, ethical stance that is possible when refusing to exclude gender minorities.

DATA: CASE STUDIES
This authorship team is comprised of researchers at both academic and private sector institutions, and our training is grounded in the social sciences and HCI research traditions. We apply this training to our access to large and varied datasets. The corporate umbrella that spans both Tumblr and the Fantasy Sports platform facilitated our creation of and access to these datasets. Within that umbrella, we routinely share our projects and empirical findings, and discuss best practices for research, including survey design. It was through these interactions that the comparative cases emerged as an interesting area of study. The primary researcher on the Fantasy Sports dataset was dismayed by the trolling or mischievous responders who inundated the "gender" data field; the Tumblr researcher was puzzling over best practices for making sense of – and avoiding othering – the gender field's range of inputs. We identified a key issue: how to ask respondents' gender in a way that reflects diversity and captures the social facts of their lived experience while fitting into the context of the community being studied, remaining manageable for researchers, and minimizing the occurrence of trolling responses.

As Tumblr and Fantasy Sports are very different communities and interest-areas, we focus on one theme that 1) cuts across both communities, 2) is relevant to gender,

and 3) appears in both surveys: feelings of social connectedness. We present results on gender differences in feelings of connectedness within online communities. We do not emphasize gender differences around feelings of connectedness as empirical results; instead, we present them as evidence of our larger argument that it is important to include and analyze non-binary gender categories in HCI research. Despite the substantive differences between the two communities studied, the two data sets had comparable numbers of write-in responses to the "gender" question.

Tumblr Data

Our first case study is a survey administered on Tumblr in December 2016 and asked about livestreaming behaviors and feelings, the results of which are reported elsewhere [50]. The gender question was asked as open-ended with the label and format: "Gender? (optional): [text box]."

Fantasy Football Data

The second case study uses data from a survey distributed to active Fantasy Football players via email in November 2016. Fantasy Football is the most popular and diverse – including gender diversity – of all of the Fantasy Sports [81]. We selected Fantasy Football as our comparative case study for this reason and because of the large sample size. The survey posed questions on behaviors and practices within the product as well as social and relational dimensions of those involved in the micro-organizational unit of Fantasy Sports known as a league.

Prior to this survey, we ran a small pilot and asked gender in the exact manner of the Tumblr survey: an open text box (which we considered to be the most inclusive option). We were taken aback by the number of abusive, hateful, and frankly disturbing comments we received from the Fantasy population. To mitigate abusive responses and our own distress (as supported by [52]), we re-launched with fixed answer choices plus an open text-box for non-binary individuals to self-identify. Thus, the gender question was asked, "With which gender do you most closely identify?" with response options: "male," "female," "decline to answer," and "other (please specify)." We manually coded open-ended responses to "other (please specify)."

METHODS

Recognizing much diversity in the open-ended responses, each researcher went through their respective datasets to identify broad themes. We initially identified general categories of responses in addition to the wide range of gender identities listed, including trolling answers ranging from absurd to malicious in content, aggressive responses, self-deprecating humor, and political commentary. We then developed a coding scheme to code each unique response, shown in Table 1. Our initial codes were based on [3]. During the coding period, two authors coded 15% of the data, discussed any differences, and arrived at a consensus. One author coded the remainder of the dataset. We also established codes to describe all the additional non-gender related commentary in responses.

Each response could be coded with multiple codes; for example "trans feminine" would receive two codes: "trans" and "woman." We then used these gender categories to perform a MANCOVA on the two questions related to social experiences. In this analysis, our final gender categories constitute the independent variable, age is included as a covariate, and the answers related to the social experiences of livestreaming and hanging out are dependent variables.

FINDINGS

Our qualitative findings outline a diverse range of non-binary responses in both the Tumblr and Fantasy Football data. Table 1 presents the codes used to manually code the gender responses. During coding, we added an additional category of non-binary, as this was an overwhelming popular response. In devising the final categorizations for the quantitative analyses, we grouped "both," "something else," and "non-binary." The quantitative results present statistically significant differences by gender category (women, men, and non-binary) in social dimensions of online community participation.

Qualitative Analysis of Gender Qualifiers

Tumblr

We begin by describing results from the Tumblr survey's gender options (see Table 1). 7922 participants initiated the survey, of which one-quarter ($N = 2011$) left the gender field blank. There were 746 responses that fell outside of "female / woman / girl / f" and "male / man / boy / m," of which 202 were unique. Each response had on average 1.4 codes associated to it.

We next describe each of the codes within the "Commentary" theme. Absurd / silly responses included items such as "*FRAPPUCCINO,*" "*bagel,*" "*alien,*" "*no*

Code categories	Codes	Tumblr count	Fantasy count
Gender	woman	59	12
	man	32	251
	both	15	45
	something else	29	45
	non-binary	11	7
Gender qualifier	trans	16	3
	cis	8	1
	demi (incl. partial)	5	1
Commentary	absurd / silly	44	160
	political commentary	8	500
	aggressive	1	109
	unable to code	39	123
Total codes		267	1257
Total unique responses		202	697
Total N		746	837

Table 1. Total number of codes applied to unique responses for Tumblr and Fantasy surveys.

gender only food," and "*A flaming hot cheeto.*" Some absurd responses may refer to memes; for example, "*I'm a potato*" may refer to one of several memes online. A set of absurd responses were similar in that the author also identified as male or referred to being male, for example: "*I IDENTIFY AS A SOCCER BALL~ I'm male.*", "*Airplane....jk male*", "*alpha*", and "*meat popsicle.*"

Political commentary tended to be responses to gender in society or reactions to the question or the platform, such as: "*good question,*" "*Gender does not exist, it's only an idea that society has forced apon*[sic.] *us.*" "*Female (but wtf is gender anyways),*" "*female, do I need to list my pronouns? because this is a tumblr survey*" and "*The one where you're born female, and only ever wanted to be a boy because you like some girls and because your periods hurt SO bad, but basically you're definitely a girl.*"

There were relatively few aggressive responses in the Tumblr dataset – we identified only one. This participant described their gender as "attack helicopter," which we classified as aggressive because it stems from a meme that ridicules non-binary gender identifications. While it is impossible to quantify the actual demographics of online trolls, they often present themselves as male, and often engage in sexist behaviors and target marginalized populations [57]. Toxic communities of anti-feminist trolls thrive in some online spaces, where mocking trans and non-binary gender identities is commonplace [51]. The "I Sexually Identify as an Attack Helicopter" copypasta initiated and spread throughout some of these spaces, as a parody of non-binary gender identities [82]. Online trolling mirrors culture [57], and as such the aggressive nature of many of our survey responses points to larger cultural tensions around gender classification. The "unable to judge" code was applied to responses such as single letters, comments like "*?,*" "*f*uck like I know,*" and "**non-committal wiggly hand gesture*.*" The responses in this category tended to be unique.

We included age as a covariate because of recent studies [24,64] that found that validity of responses to gender questions on large-scale surveys varied with age. Youth was associated with a phenomenon of "mischievous responders" who intentionally provided falsified or absurd responses to survey questions, creating problematic findings for the researchers.

We used Table 1's codes to ultimately bracket responses into three umbrella categories of women (including 111 responses from cis and trans women and responses such as "femme," "gurl," "chick," "born feminine"), men (including 181 responses from cis and trans men and responses such as "dude," "boi," "masc," and "gentleman") and non-binary (including partial gender, fluid gender, agender and many others; see Table 2). Of the 5,835 Tumblr respondents who reported their gender, 66% were women, 26% were men, and 7% were non-binary. Tables 2 and 3 present responses where at least 2 were identical,

Tumblr non-binary gender responses	N
non-binary	143
agender	92
genderfluid	63
genderqueer	20
none	14
demi girl	12
fluid	10
bigender	9
queer	4
male-ish / male-ish (demiboy i guess)	3
neutral	3
transmasc nonbinary	3
greygender	2
other	2
pangender	2
questioning	2
them	2
single occurrence terms such as ambigender, androgynous, omni, etc.	41
Total non-binary	454

Table 2. Counts of non-binary subcategories in Tumblr data.

whereas Table 4 includes unique responses. Variations in spelling were grouped; some spelling variations are shown.

This dataset is interesting for the variety of responses but also the large proportion of non-binary responses. To put these proportions into context, trans people (though notoriously difficult to count) are considered to be about 0.6% of the U.S. population [27] and about 35% of trans people are non-binary [38]. Though the total number of non-binary people is likely much larger than 35% of 0.6% (since many non-binary people do not identify as trans), it is still probably a small percentage of the U.S. population. Thus, the percentage of non-binary respondents on the Tumblr survey (7%) is huge compared to what little we know about the proportion of non-binary proportions in the general population. For the Tumblr data, "non-binary" was the largest self-identified category.

Here we provide explanation of Table 2's categories. Different non-binary people identify as both man and woman (e.g., bigender), neither man nor woman (e.g., agender, genderqueer), and/or a fluid or changing identification as man and woman at different times (e.g., genderfluid). Adding cis, a shortened form of cisgender, is an explicit statement of identifying as the same sex that one was assigned at birth, and by explicitly saying 'cis' instead of assuming it, including 'cis' asserts that non-cis also exists. Trans acknowledges the shift from previously being one gender to being another. Demi, partial and "-ish" denote partial but not full identification with a binary gender category. Pangender is similar to bigender, but denotes identification with many, rather than two, genders. Importantly, some non-binary people identify as trans, while some do not. Thus, while transgender and cisgender

are mutually exclusive categories, non-binary overlaps with both.

Our "woman" and "man" categories include a multitude of terms that cluster around binary gender identities, for example, for women: females, femme, gal, feminine. While queer tends to refer to non-mainstream sexual orientation, we are not sure whether queer in response to a gender question refers to non-binary gender (e.g., genderqueer), or whether respondents mistakenly answered the question in reference to sexual orientation. We did receive several responses signifying sexual-orientation categories (e.g., gay, lesbian) rather than gender identities. Lastly, we report a selection of responses where no gender was specified (see Table 3.

Fantasy Football

The Fantasy Football survey asked the question, "with which gender do you most closely identify?" and gave the following options with radio buttons: "male," "female," "decline to answer", and "other (please specify)". Of the total completed responses ($N = 56,348$), roughly 90% were men, around 10% were women, approximately 1% declined to answer, and roughly 2%, a total of 837 chose to enter an open-ended "other (please specify)" answer.

The open-ended responses were coded using the same approach as the Tumblr responses. While non-binary was the dominant "other" response in the Tumblr dataset, the dominant response among the Fantasy Football respondents was some form of outrage, annoyance, and political commentary at the question. Typical responses in that category include "*Are we really this PC? Good gracious!*" and "*Are you fucking kidding me with this bullshit?*". Users who provided these types of responses chose to enter additional information rather than select a binary gender option or decline to answer. Many of these responses were unequivocally offensive; others went into detail to specify the users' discontent. These users often indicated that the question itself – by offering options other than male and female -- reveals a liberal bias, a lack of common sense, or an affront to the current user base. For example, a respondent wrote: "*Drop the liberal bullshit with this question. I have a penis, therefore I am a man. This 'gender identity' bullshit you guys are so busy pushing is disgusting to me, and you should be ashamed of yourselves for even giving it a voice.*" Some included this commentary alongside a gender identity. Typical responses in that vein included, "*are you fucking kindding[sic] me I am a male i dont closely identify as a male i am a male*" and "*100% female - this question about is ridiculous!*" Responses that indicated a gender, such as the two preceding examples, were recoded to reflect that gender statement. Of the 837 total "*please specify*" responses, 310 (37%) fell into this umbrella category.

Respondents who chose to give an off-topic response or offer commentary without including a gender were counted as missing data. Such responses included Apache or attack helicopter ($N = 28$) and twenty distinct inanimate objects. In total, 71 responses were coded as non-binary. Table 4 documents non-binary responses to the open-ended gender answer choice on the Fantasy Football survey. The modal response in the open-ended pool that were re-coded into the non-binary category was "both" ($N = 44$), with an additional seven respondents indicating they were transgender (coded as non-binary because they specified they were trans without also specifying a binary gender).

Quantitative Analysis of Gender Qualifiers

Our surveys were administered independently. In discussing our findings we identified a shared concern about how we were asking "gender." As such, we engaged in a methodological revisit and explored our surveys to identify a commonality in the surveys so we could compare our findings meaningfully. Tumblr and Fantasy Football are very different online communities. The social connectedness questions were the only questions that the surveys had in common. Given that others have found gender differences in connectedness in online communities [39,41] we were motivated to explore this question.

Tumblr

Of the 7,922 Tumblr responses, 1,598 had livestreamed and completed the survey questions related to livestreaming. Of these, 341 respondents left the gender field blank, and 16 provided responses unrelated to personal gender identity. Of the 1,241 who reported gender, 688 (55%) were women

Tumblr no gender specified responses	N
attack helicopter / helicopter	3
yes	3
eh	2
nah	2
no	2
single occurrence terms such as who knows, oh, klingon, hot pocket, haha, etc.	64
Total not specified	76

Table 3. Counts of responses in Tumblr data not related to gender identity.

Fantasy non-binary gender responses	N
both	44
trans	7
depends	6
gender fluid/free/neutral/non-conforming	4
ambiguous	2
queer	2
omitted (offensive)	2
50/50	1
asexual male	1
demiboy	1
agender	1
Total non-binary	71

Table 4. Most frequent responses in Fantasy Football data that we recoded as non-binary.

(including cis and trans), 425 (34%) were men (including cis and trans), and 128 (10%) were non-binary.

The MANCOVA for the relationship of gender to the dependent variables was significant ($p < .001$). Gender was significantly related to agreement with "The most rewarding part of livestreaming is connecting to my friends" ($F[2, 1157] = 5.588$, $p = .004$, partial eta squared = .011, observed power = .904; Figure 1), with a post-hoc analysis using Least Significant Difference (LSD) showing that men and women differed significantly ($p = .001$) whereas non-binary responses were not significantly different from men's or women's.

Gender was also significantly related to agreement with "Hanging out with friends is my favorite way to spend my time" ($F[2,1157] = 6.428$, $p = .002$; partial eta squared = .010, observed power = .857; Figure 2). A post-hoc analysis using LSD showed that the non-binary group was between neutral and slightly agree and differed significantly from women and men ($p < .001$), whereas men and women were between slightly agree and agree and did not differ significantly from each other. These effect sizes are small and our observed power is relatively high. Results show that online social experiences can be gendered and that a quorum can be reached to make claims about statistically significant differences for non-binary persons. We argue that it is important to include non-binary genders when investigating potential gender differences even though total counts may not be high enough to reach statistical significance. However, researchers should approach these analyses cautiously, and understand that substantial gender diversity may exist even within the non-binary category.
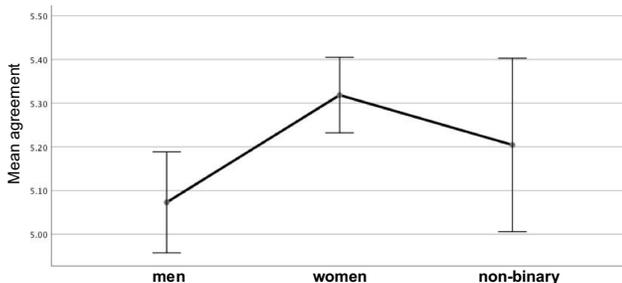
Fantasy Football

We ran the same MANCOVA tests on the Fantasy Football data. Figure 3 presents the findings comparing mean responses to the question about the extent (on a five-point scale) of the importance of the following motivation to play Fantasy Football: "I enjoy the community aspects of Fantasy Sports." Means are presented by gender, using our tri-partite recoding of gender into the categories men, women, and non-binary. The differences between means are significant ($F[2, 54861]) = 11.211$, $p < .001$, partial eta square $<.001$, observed power = .96; Figure 3). Though the effect is statistically significant, the effect size is negligible. Similarly, the MANCOVA analysis comparing mean responses to the question about the extent (on a five-point scale) of the importance of the motivation, "It's a way to keep up with my friends" also varies significantly by gender ($F[2, 54,680] = 41.241$, $p < .001$, partial eta squared = .002, observed power = 1.000; Figure 4). To summarize, we found no strong gender differences with respect to the question on community aspects. However, we found that men are more motivated than any other group to use Fantasy Football to stay in touch with friends.

Both tests suggest that non-binary users may be less motivated to play Fantasy Football by social dimensions of community and keeping in touch with friends. The confidence intervals overlap with other gender categories, so neither result is conclusive. Yet these results highlight the importance of including survey data from non-binary participants to uncover the full picture about gender diversity in research phenomena like online sociality.

Figure 1. Variance by gender in response to "The most rewarding part of livestreaming is connecting to my friends" in Tumblr. Means calculated from 7 point scale.
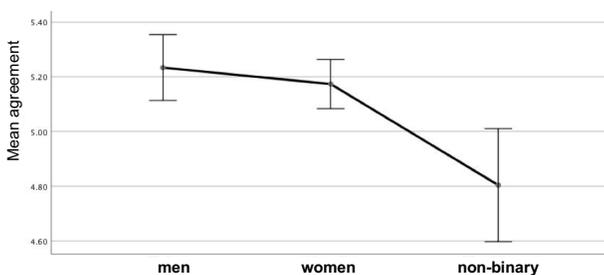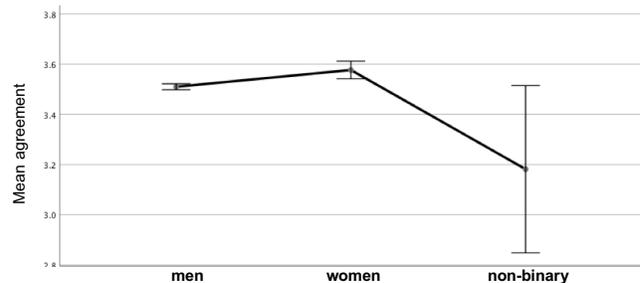

Figure 2. Variance by gender in response to "Hanging out with friends is my favorite way to spend my time" in Tumblr. Means calculated from 7 point scale.

Figure 3. Variance by gender for motivation being "I like the community aspects of Fantasy Sports". Means calculated from 5 point scale.
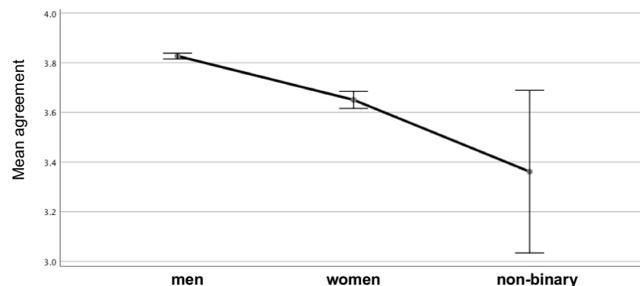

Figure 4. Variance by gender for motivation being "It is a way to keep in touch with my friends" in Fantasy Football. Means calculated from 5 point scale.

DISCUSSION

We discuss how HCI researchers can approach survey-based data collection with a balance of researcher reflexivity, inclusion of gender minorities, and mitigation of trolling behaviors. We detail our theoretical and methodological contributions of survey wording and analysis recommendations. Finally, we provide a set of guidelines to enable HCI researchers to responsibly and respectfully account for and include non-binary gender responses.

Researcher Reflexivity

Because studying gender was not our intention at the outset of collecting this data, but emerged as a concern for the researchers independently, we conducted a methodological revisit of our data [33]. In the research with the Fantasy Sports datasets prior to this study, for example, all open-ended gender responses were set aside as "other" or omitted. At our institution and others, this is a standard and accepted practice. While these responses composed a statistically small proportion of the data, our users for both Tumblr and Fantasy Football were using the surveys to convey a message, either about their own gender identity or, more often in the case of Fantasy Football, indicating their displeasure with the political or social tone of the question. As researchers, we wanted to listen, but lacked a clear way forward.

In any research, there is a need to acknowledge the relationship between the researcher and participants. Participatory or qualitative methods are often lauded by critical theory researchers and those practicing feminist methodologies for their ability to give voice to those who are otherwise marginalized. However, when trying to collect data at scale, yet still be gender inclusive, surveys can become a challenge – survey designs with pre-written options can be prescriptive, assuming, and incomprehensive. We see mitigating the risk of marginalizing non-binary as our responsibility as researchers. [52] argued "researchers are good at looking after participant wellbeing, but less attentive to their own." To practice self-care, we adjusted the open-ended format of the Fantasy Football survey question after receiving abusive responses. Our decision to create a hybrid approach (with both pre-set radio button options and an open-ended textbox if male/female options did not represent one's gender) was a reaction to mitigating the potential risks to our own emotional wellbeing as researchers due to the vitriolic response.

Inclusion of Gender Minorities

As researchers creating surveys, our responsibility is to collect data in a rigorous, valid, and comprehensive manner. We have shown the importance of not excluding non-binary gender responses from survey instrument design by identifying statistically significant differences between gender identities, including non-binary respondents. While effect sizes were small or negligible, we argue that they are important to include. Methodologically, we review and recommend best practices for gender-inclusive survey design by providing suggestions for how to word questions for both inclusion and to manage the reduction of trolling or abuse which can impact researcher wellbeing

Trolling Mitigation

We were initially surprised to see the amount of aggressive responses and political commentary. Upon reflection, we understood that the way a survey asks gender questions is, in fact, a signal for how the survey authors construct gender: as either binary or not. Thus, through this lens, it is not surprising that respondents notice and react to how the gender question is asked, especially if the question's phrasing is out of line with their own mental construction of gender. With regards to our dataset, there were no stimuli for trolling other than the survey question itself. Those who trolled our survey may be motivated by the cognitive dissonance of encountering gender portrayed as something other than binary, though prior work [35,66] suggests that some of our trolls are not offended at the non-binary gender concept, rather they see a vulnerability to exploit.

Survey Design Recommendations for HCI Researchers

Our analysis leads to a number of recommendations for gender-inclusive yet trolling-resilient survey design in HCI research: 1) request the minimum information necessary, 2) use language in line with the participant community, 3) consider priming respondents for socially acceptable behavior to minimize trolling, and 4) phrase gender questions using the guidelines detailed below.

Request the minimum information necessary. One principle of ethical research is to impose as little burden as possible on participants [72]. This is especially important when asking sensitive information, such as gender. Aligning with previous studies [2], we recommend asking for only the gender dimensions required for analysis. For example, in health research, biological sex is often important [2]; In HCI research, it is probably not. The amount of detail needed about participants' genders should be in line with the research question. We found this reflected in our iterative coding process. In health-related work, it may be important to differentiate between those who describe their gender as both versus something else, however for our analyses the umbrella category of non-binary was sufficient.

Use language in line with the respondent community. Our findings lead us to recommend framing survey questions using language appropriate for the respondent community. For example, the language of "most closely identify" in the Fantasy Football question likely triggered more aggressive and resistive responses than a simple "gender" prompt. While we are confident this would not eliminate aggressive responses given our experience running alternate iterations with other Fantasy Sports surveys, we expect that different language would reduce the incidence rate.

Terminology changes quickly among non-binary, queer, and trans populations; thus, we expect that the gender identity terms we uncovered in our data for this paper, and the ways that we coded them, will not fully reflect the range of gender identities in future years. As such, we present categories and identity labels to provide an example of how to methodologically approach gender in an inclusive way, not as an exhaustive list.

Consider priming respondents for socially acceptable behavior. Because nearly all of our users who provided aggressive, resistive and mischievous responses declined the opportunity for a paid follow-up interview, we suspect there is some social desirability at play. These users may recognize that their trolling language is an outsized reaction to an online survey and double down on their anonymity. Though studies [see 49] suggest that humans tend to interact with computers in ways that mirror interpersonal etiquette, trolls may have motivations for deviance from this general principle. We recommend including a priming message – one that reminds respondents that researchers are reading their comments, such as a "thank you for your time" note on the page asking demographic questions - on the page that asks demographic questions, such as invitations to future studies or a thank you message from the researchers.

How to phrase survey gender questions. The challenge in capturing gender on general population surveys is designing questions to be trans and non-binary-inclusive, while at the same time not confusing to cisgender people, and without posing too many questions [3]. The gold standard in health research since 2013 has been a two-step procedure that asks participants to identify both their current gender identity and their sex assigned at birth [49,60,73]. This approach is considered the easiest and simplest way to differentiate between cis and trans, men and women, and binary and non-binary [49,59,60,73]. Yet the two-step measure does not fully capture gender's complexity, and does not properly account for many non-binary genders [3]. Thus, [3] introduced a new Multidimensional Sex/Gender Measure that uses three questions to determine gender identity and lived gender. This would be a useful method for HCI research that deals specifically with trans and non-binary populations and for some health HCI research.

For HCI survey research broadly, we recommend using a question similar to the first question in [2]'s measure (as quoted in [3]) – "Are you…?" with three response options: "man," "woman," "something else: specify [text box]" – and allowing respondents to choose multiple options. This question will not identify all trans participants [3], but is inclusive to non-binary and trans people and will identify gender at a level necessary for most HCI research. To reduce trolling, we recommend providing the fill-in-the-blank text box as a second step *only* for those respondents who choose the "something else" option.

CONCLUSION

This study presents descriptive qualitative findings and quantitative analysis from two independent surveys that ask about gender and behavior in online communities.

As HCI researchers continue to make use of qualitative and quantitative methods, we offer guidelines and a practical case study in the careful and ethical analyses of gender beyond the binary in survey methods. We argue that careful and sensitive study design, analysis and interpretation is an important commitment for the HCI research community. By probing our categories, we can better excavate our biases and blind spots, facilitating a more inclusive and exhaustive field of inquiry moving forward. To do so, we recommend taking up the approach of infrastructural inversion set out by [11]. In the case of gender, the binary categories of man and woman are the dominant scaffolding that shape our understanding of the social world [45]. By inverting the question to ask users to identify their categories without binary constraints, we uncovered nuance and variation among our respondents that moves beyond binary categories and instead reflects users' range of identity and expression. We encourage quantitative and qualitative researchers within the HCI community to account for and be inclusive of marginalized (non-binary) gender populations within data sets. We hope our research is a starting point for future studies in which non-binary gender data is given more attention and inclusion. Categories, by definition, delimit what we can know about the social world. As such, on principle and for empirical reasons, we make the infrastructure of our methods and analysis categories visible.

REFERENCES
1. Shaowen Bardzell and Jeffrey Bardzell. 2011. Towards a feminist HCI methodology: social science, feminism, and HCI. *Proceedings of the SIGCHI Conference on*. Retrieved September 15, 2017 from http://dl.acm.org/citation.cfm?id=1979041

2. Greta Bauer. 2012. Making Sure Everyone Counts: Considerations for Inclusion, Identification and Analysis of Transgender and Transsexual Participants in Health Surveys/Pour s'. Retrieved September 15, 2017 from https://open.library.ubc.ca/cIRcle/collections/facultyresearchandpublications/52383/items/1.0132676

3. Greta Bauer, J Braimoh, AI Scheim, and C Dharma. 2017. Transgender-inclusive measures of sex/gender for population surveys: Mixed-methods evaluation and recommendations. *PloS one*. Retrieved September 15, 2017 from

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0178043

4. Greta Bauer, R Hammond, R Travers, and M Kaay. 2009. "I don't think this is theoretical; this is our lives": how erasure impacts health care for transgender people. *Journal of the*. Retrieved September 15, 2017 from http://www.sciencedirect.com/science/article/pii/S1055329009001071

5. Bo Bernhard and Vince Eade. 2005. Gambling in a Fantasy World: An Exploratory Study of Rotisserie Baseball Games. *UNLV Gaming Research & Review Journal* 9, 1: 29–43.

6. Andrew Billings, B. J. Ruihley, and Y. Yang. 2016. Fantasy Gaming on Steroids? Contrasting Fantasy Sport Participation by Daily Fantasy Sport Participation. *Communication & Sport*. https://doi.org/10.1177/2167479516644445

7. Andrew C Billings and Brody J Ruihley. 2013. Why We Watch, Why We Play: The Relationship Between Fantasy Sport and Fanship Motivations. *Mass Communication and Society* 16, 1: 5–25. https://doi.org/10.1080/15205436.2011.635260

8. Rena Bivens. 2017. The gender binary will not be deprogrammed: Ten years of coding gender on Facebook. *New Media & Society*. Retrieved September 15, 2017 from http://journals.sagepub.com/doi/abs/10.1177/1461444815621527

9. Rena Bivens and OL Haimson. 2016. Baking Gender Into Social Media Design: How Platforms Shape Categories for Users and Advertisers. *Social Media+ Society*. Retrieved September 15, 2017 from http://journals.sagepub.com/doi/abs/10.1177/2056305116672486

10. Karen Blair. Ethical Research With Sexual and Gender Minorities. *The SAGE Encyclopedia of LGBTQ Studies*.

11. Geoffrey C. Bowker and Susan Leigh Star. 1999. *Sorting things out : classification and its consequences*. MIT Press. Retrieved September 15, 2017 from https://bibdata.princeton.edu/bibliographic/2702762

12. Geoffrey C. Bowker and Susan Leigh Star. 2000. Invisible Mediators of Action: Classification and the Ubiquity of Standards. *Mind, Culture, and Activity* 7, 1–2: 147–163. https://doi.org/10.1080/10749039.2000.9677652

13. Samantha Breslin and B Wadhwa. 2014. Exploring Nuanced Gender Perspectives within the HCI Community. *Proceedings of the India HCI 2014 Conference*. Retrieved September 15, 2017 from http://dl.acm.org/citation.cfm?id=2676709

14. Judith Butler. 2011. *Gender trouble: Feminism and the subversion of identity*. Retrieved September 15, 2017 from https://books.google.com/books?hl=en&lr=&id=gTbbCgAAQBAJ&oi=fnd&pg=PP1&dq=Judith+Butler.+1999.+Gender+Trouble.+Taylor+%26+Francis.&ots=h-PHGSTOr5&sig=Aah2uU-SKjGeDu-85byuTZsxQCY

15. Benjamin Cerf Harris, Lee Badgett, Kitt Carpenter, Richard Gabryszewski, and Sonya Rastogi. 2015. Likely Transgender Individuals in U.S. Federal Administrative Records and the 2010 Census. Retrieved September 16, 2017 from https://www.census.gov/content/dam/Census/library/working-papers/2015/adrm/carra-wp-2015-03.pdf

16. Alexander Cho. 2015. Queer reverb: Tumblr, affect, time. *Networked affect*. Retrieved September 15, 2017 from https://books.google.com/books?hl=en&lr=&id=fwhgBwAAQBAJ&oi=fnd&pg=PA43&dq=Alexander+Cho.+2015.+Queer+Reverb:+Tumblr,+Affect,+Time.+In+Networked+Affect.+MIT+Press.&ots=R0aI3toq6O&sig=eDMkM-tjUr04i4y0ZUnOybNywLU

17. Avery Dame. 2016. Making a name for yourself: tagging as transgender ontological practice on Tumblr. *Critical Studies in Media Communication*. Retrieved September 15, 2017 from http://www.tandfonline.com/doi/abs/10.1080/15295036.2015.1130846

18. Emma Dargie, KL Blair, and CF Pukall. 2014. Somewhere under the rainbow: Exploring the identities and experiences of trans persons. *The Canadian Journal of*. Retrieved September 15, 2017 from http://www.utpjournals.press/doi/abs/10.3138/cjhs.2378

19. Heath Fogg Davis. 2014. Sex-classification policies as transgender discrimination: An intersectional critique. *Perspectives on Politics*. Retrieved September 15, 2017 from https://www.cambridge.org/core/journals/perspectives-on-politics/article/sex-classification-policies-as-transgender-discrimination-an-intersectional-critique/8DB5FEB0A5FE6BCA6F27480604C9680B

20. Nickolas W. Davis and Margaret Carlisle Duncan. 2006. Sports Knowledge is Power. *Journal of Sport and Social Issues* 30, 3: 244–264. https://doi.org/10.1177/0193723506290324

21. Petra L Doan. 2016. To Count or Not to Count: Queering Measurement and the Transgender Community. *WSQ: Women's Studies Quarterly*. Retrieved September 15, 2017 from https://muse.jhu.edu/article/632148/summary

22. Brendan Dwyer. 2011. Segmenting motivation: an analysis of fantasy baseball motives and mediated sport

consumption. 20, 1: 2011.

23. Brendan Dwyer, Sl Shapiro, and Joris Drayer. 2011. Segmenting motivation: An analysis of fantasy baseball motives and mediated sport consumption. *Sport Marketing Quarterly* 20, 3: 129–137. Retrieved from http://sportleadership.vcu.edu/people/dwyer/SegmentingSMQ.pdf

24. Xitao Fan, Brent C. Miller, Kyung-Eun Park, Bryan W. Winward, Mathew Christensen, Harold D. Grotevant, and Robert H. Tai. 2006. An Exploratory Study about Inaccuracy and Invalidity in Adolescent Self-Report Surveys. *Field Methods* 18, 3: 223–244. https://doi.org/10.1177/152822X06289161

25. Lee K. Farquhar and Robert Meeds. 2007. Types of fantasy sports users and their motivations. *Journal of Computer-Mediated Communication* 12, 4: 1208–1228. https://doi.org/10.1111/j.1083-6101.2007.00370.x

26. Marty Fink and Quinn Miller. 2014. Trans media moments: Tumblr, 2011–2013. *Television & New Media*. Retrieved September 15, 2017 from http://journals.sagepub.com/doi/abs/10.1177/1527476413505002

27. Andrew R Flores, Jody L Herman, Gary J Gates, and Taylor N T Brown. 2016. *HOW MANY ADULTS IDENTIFY AS TRANSGENDER IN THE UNITED STATES? INTRODUCTION AND SUMMARY.* Retrieved September 16, 2017 from https://williamsinstitute.law.ucla.edu/wp-content/uploads/How-Many-Adults-Identify-as-Transgender-in-the-United-States.pdf

28. Oliver L Haimson, JR Brubaker, and L Dombrowski. 2015. Disclosure, stress, and support during gender transition on Facebook. *Proceedings of the 18th*. Retrieved September 15, 2017 from http://dl.acm.org/citation.cfm?id=2675152

29. Oliver L Haimson, JR Brubaker, and L Dombrowski. 2016. Digital footprints and changing networks during online identity transitions. *Proceedings of the 2016*. Retrieved September 15, 2017 from http://dl.acm.org/citation.cfm?id=2858136

30. Oliver L Haimson and GR Hayes. 2017. Changes in Social Media Affect, Disclosure, and Sociality for a Sample of Transgender Americans in 2016's Political Climate. *ICWSM*. Retrieved September 15, 2017 from http://www.oliverhaimson.com/PDFs/HaimsonChangesSocialMediaAffect.pdf

31. Oliver L Haimson and Gillian R Hayes. 2015. Toward Trans Inclusion in Feminist HCI. February: 8–11. Retrieved September 15, 2017 from http://oliverhaimson.com/PDFs/HaimsonTowardTransInclusion.pdf

32. Jean Hardy and S Lindtner. 2017. Constructing a Desiring User: Discourse, Rurality, and Design in Location-Based Social Networks. *CSCW*. Retrieved September 15, 2017 from http://www.silvialindtner.com/s/ConstructingADesiringUser_CameraReady.pdf

33. Eszter Hargittai and Christian Sandvig. 2015. *Digital research confidential : the secrets of studying behavior online*. London, England: The MIT Press. Retrieved September 17, 2017 from https://bibdata.princeton.edu/bibliographic/9234036

34. Jack Harrison, Jaime Grant, and Jody L Herman. 2012. A gender not listed here: Genderqueers, gender rebels, and otherwise in the National Transgender Discrimination Survey. *LGBTQ Public Policy Journal at*. Retrieved September 15, 2017 from http://escholarship.org/uc/item/2zj46213.pdf

35. Susan Herring, K Job-Sluder, and R Scheckler. 2002. Searching for safety online: Managing trolling; in a feminist forum. *The Information*. Retrieved September 15, 2017 from http://www.tandfonline.com/doi/abs/10.1080/01972240290108186

36. Anna Lauren Hoffman. 2017. Data, Technology, and Gender: Thinking About (And From) Trans Lives. In *Spaces for the Future: A Companion to Philosophy of Technology*. 3–13. Retrieved September 15, 2017 from https://scholar.google.com/citations?view_op=view_citation&hl=en&user=ZjpHidXCGwQC&citation_for_view=ZjpHidXCGwQC:0EnyYjriUFMC

37. Luke Howie and Perri Campbell. 2015. Fantasy Sports: Socialization and Gender Relations. *Journal of Sport & Social Issues* 39, 1, SI: 61–77. https://doi.org/10.1177/0193723514533200

38. Sandy E. James, Jody L. Herman, Susan Rankin, Mara Keisling, Lisa Mottet, and Ma'ayan Anafi. 2016. *The Report of the 2015 U.S. Transgender Surey*. Washington, DC. Retrieved September 16, 2017 from http://www.transequality.org/sites/default/files/docs/usts/Executive Summary - FINAL 1.6.17.pdf

39. Adam N Joinson. 2008. Looking at, looking up or keeping up with people?: motives and use of facebook. *Proceedings of the SIGCHI conference on Human*. Retrieved September 15, 2017 from http://dl.acm.org/citation.cfm?id=1357213

40. Gopinaath Kannabiran. 2011. Themself : Critical Analysis of Gender in Facebook. 1–6. Retrieved September 15, 2017 from https://feministhciworkshop.files.wordpress.com/2010/11/gkannabiran_feministhci2011.pdf

41. Amanda M Kimbrough, RE Guadagno, and NL Muscanell. 2013. Gender differences in mediated

communication: Women connect more than do men. *Computers in Human*. Retrieved September 15, 2017 from http://www.sciencedirect.com/science/article/pii/S0747 563212003342

42. Rebecca Joyce Kissane and Sarah Winslow. 2016. "You're Underestimating Me and You Shouldn't." *Gender & Society* 30, 5: 819–841. https://doi.org/http://dx.doi.org/10.1177/089124321663 2205

43. Yong Ming Kow and Timothy Young. 2013. Media technologies and learning in the starcraft esport community. *Proceedings of the 2013 conference on Computer supported cooperative work - CSCW '13*: 387. https://doi.org/10.1145/2441776.2441821

44. Catherine Kreatsoulas, Mary Crea-Arsenio, Harry S Shannon, James L Velianou, and Mita Giacomini. 2016. Interpreting angina: symptoms along a gender continuum. *Open Heart* 3, 1: e000376. https://doi.org/10.1136/openhrt-2015-000376

45. Michèle Lamont and Virág Molnár. 2002. The Study of Boundaries in the Social Sciences. *Annual Review of Sociology* 28, 1: 167–195. https://doi.org/10.1146/annurev.soc.28.110601.141107

46. Seunghwan Lee, Won Jae Seo, and B. Christine Green. 2013. Understanding why people play fantasy sport: development of the Fantasy Sport Motivation Inventory (FanSMI). *European Sport Management Quarterly* 13, 2: 166–199. https://doi.org/10.1080/16184742.2012.752855

47. Woo Young Lee, Dae Hee Kwak, Choonghoon Lim, Paul M. Pedersen, and Kimberly S. Miloch. 2011. Effects of Personality and Gender on Fantasy Sports Game Participation: The Moderating Role of Perceived Knowledge. *Journal of Gambling Studies* 27, 3: 427–441. https://doi.org/10.1007/s10899-010-9218-9

48. Susan Leigh Star. 2010. This is Not a Boundary Object: Reflections on the Origin of a Concept. *Science, Technology, & Human Values* 35, 5: 601–617. https://doi.org/10.1177/0162243910377624

49. Emilia Lombardi and Swagata Banik. The Utility of the Two-Step Gender Measure Within Trans and Cis Populations. *Sexuality Research and Social Policy* 13, 3: 288–296. https://doi.org/10.1007/s13178-016-0220-6

50. Danielle Lottridge, Frank Bentley, Matt Wheeler, Jason Lee, Janet Cheung, Katherine Ong, and Cristy Rowley. 2017. Third-Wave Livestreaming: Teens' Long Form Selfie. In *MobileHCI*. https://doi.org/10.1145/3098279.3098540

51. A Massanari. 2017. # Gamergate and The Fappening: How Reddit's algorithm, governance, and culture support toxic technocultures. *New Media & Society*. Retrieved September 15, 2017 from http://journals.sagepub.com/doi/abs/10.1177/14614448 15608807

52. Wendy Moncur and Wendy. 2013. The emotional wellbeing of researchers. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems - CHI '13*, 1883. https://doi.org/10.1145/2470654.2466248

53. Viviane K. Namaste. 2000. *Invisible lives : the erasure of transsexual and transgendered people*. University of Chicago Press.

54. Clifford Ivar. Nass and Corina. Yen. 2010. *The man who lied to his laptop : what machines teach us about human relationships*. Current. Retrieved September 17, 2017 from https://bibdata.princeton.edu/bibliographic/6509233

55. Abigail Oakley. 2016. Disturbing Hegemonic Discourse: Nonbinary Gender and Sexual Orientation Labeling on Tumblr. *http://dx.doi.org/10.1177/2056305116664217*. https://doi.org/10.1177/2056305116664217

56. Anthony Daniel Perez and Charles Hirschman. 2009. Emerging American Identities. *Source: Population and Development Review* 35112, 1. Retrieved January 2, 2018 from http://www.jstor.org/stable/25487641

57. Whitney Phillips. 2015. *This is why we can't have nice things: Mapping the relationship between online trolling and mainstream culture*. Retrieved September 15, 2017 from https://books.google.com/books?hl=en&lr=&id=pjYhB wAAQBAJ&oi=fnd&pg=PR7&dq=3.+Whitney+Philli ps.+2015.+This+Is+Why+We+Can't+Have+Nice+Thi ngs:+Mapping+the+Relationship+Between+Online+Tr olling+and+Mainstream+Culture.+MIT+Press.&ots=T FJ0bM-scA&sig=pJYk97lSnrdNZlaLF4DNMk19NFU

58. Stephanie Poon, Shaun G. Goodman, Raymond T. Yan, Raffaele Bugiardini, Arlene S. Bierman, Kim A. Eagle, Nina Johnston, Thao Huynh, Francois R. Grondin, Karin Schenck-Gustafsson, and Andrew T. Yan. 2012. Bridging the gender gap: Insights from a contemporary analysis of sex-related differences in the treatment and outcomes of patients with acute coronary syndromes. *American Heart Journal* 163, 1: 66–73. https://doi.org/10.1016/j.ahj.2011.09.025

59. Sari L. Reisner, Kerith J. Conron, Scout, Kellan Baker, Jody L. Herman, Emilia Lombardi, Emily A. Greytak, Alison M. Gill, Alicia K. Matthews, and The GenIUSS Group. 2015. "Counting" Transgender and Gender-Nonconforming Adults in Health Research. *TSQ: Transgender Studies Quarterly* 2, 1: 34–57. https://doi.org/10.1215/23289252-2848877

60. Sari L Reisner, Kerith J Conron, Laura Anatale Tardiff, Stephanie Jarvi, Allegra R Gordon, S Bryn Austin, J Horm, and MJ Mimiaga. 2014. Monitoring the health of transgender and other gender minority populations: Validity of natal sex and gender identity survey items in a U.S. national cohort of young adults. *BMC Public Health 2014 14:1* 49, 2–3: 59–67. https://doi.org/10.1080/00224499.2011.596954

61. Bryce J Renninger. 2014. "Where I can be myself … where I can speak my mind" : Networked counterpublics in a polymedia environment. *http://dx.doi.org/10.1177/1461444814530095*. https://doi.org/10.1177/1461444814530095

62. B. J. Ruihley and A. C. Billings. 2012. Infiltrating the boys' club: Motivations for women's fantasy sport participation. *International Review for the Sociology of Sport* 48, 4: 435–452. https://doi.org/10.1177/1012690212443440

63. Brody J Ruihley, Andrew C Billings, and Coral Rae. 2014. As Time Goes By: Deciphering the Fantasy Sport Playing Teenager. *Sport Marketing Quarterly* 23, 4: 187–197. Retrieved from https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=100121385&site=ehost-live

64. Ritch C. Savin-Williams and Kara Joyner. 2014. The Dubious Assessment of Gay, Lesbian, and Bisexual Adolescents of Add Health. *Archives of Sexual Behavior* 43, 3: 413–422. https://doi.org/10.1007/s10508-013-0219-5

65. Ari Schlesinger, W Keith Edwards, and Rebecca E Grinter. Intersectional HCI: Engaging Identity through Gender, Race, and Class. https://doi.org/10.1145/3025453.3025766

66. P Shachaf and N Hara. 2010. Beyond vandalism: Wikipedia trolls. *Journal of Information Science*. Retrieved September 15, 2017 from http://journals.sagepub.com/doi/abs/10.1177/0165551510365390

67. Frank M Shipman. 2009. Blending the real and virtual in games: the model of fantasy sports. *Proceedings of the 4th International Conference on Foundations of Digital Games* 23: 169–174. https://doi.org/10.1145/1536513.1536547

68. Susan Leigh Star. 1999. The Ethnography of Infrastructure. *American Behavioral Scientist* 43, 3: 377–391. https://doi.org/10.1177/00027649921955326

69. Sandy Stone. The Empire Strikes Back: A Posttranssexual Manifesto. Retrieved September 15, 2017 from sandystone.com/empire-strikes-back.pdf

70. Susan. Stryker. 2008. *Transgender history*. Seal Press. Retrieved January 5, 2018 from https://bibdata.princeton.edu/bibliographic/5493967

71. JE Sumerau, Lain AB Mathers, Alexandra CH Nowakowski, and Ryan T Cragun. 2016. Helping quantitative sociology come out of the closet. *http://dx.doi.org/10.1177/1363460716666755*. https://doi.org/10.1177/1363460716666755

72. The National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. 1979. *The Belmont Report*. Retrieved September 18, 2017 from https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html

73. Los Angeles CA The Williams Institute. Best Practices for Asking Questions to Identify Transgender and Other Gender Minority Respondents on Population-Based Surveys. *The GenIUSS Group*.

74. Son Vivienne. 2017. "I will not hate myself because you cannot accept me ": Problematizing empowerment and gender-diverse selfies. *Popular Communication* 15, 2: 126–140. https://doi.org/10.1080/15405702.2016.1269906

75. L Westbrook and A Saperstein. 2015. New categories are not enough: Rethinking the measurement of sex and gender in social surveys. *Gender & Society*. Retrieved September 15, 2017 from http://journals.sagepub.com/doi/abs/10.1177/0891243215584758

76. Rhys H. Williams. 1999. Visions of the Good Society and the Religious Roots of American Political Culture. *Sociology of Religion* 60, 1: 1. https://doi.org/10.2307/3711806

77. Langdon Winner. 1980. Do Artifacts Have Politics ? Author (s): Langdon Winner Do Artifacts Have Politics ? *Modern Technology: Problem or Opportunity (Winter, 1980)* 109, 1: 121–136.

78. Documenting Gender - Williams InstituteWilliams Institute. Retrieved September 15, 2017 from https://williamsinstitute.law.ucla.edu/research/transgender-issues/documenting-gender/

79. About Tumblr. Retrieved January 5, 2018 from www.tumblr.com/about

80. FSTA | Catch The Fantasy Momentum. Retrieved September 20, 2016 from http://fsta.org/

81. FSTA. *Fantasy Sport Trade Association*, Research. Retrieved September 18, 2017 from http://fsta.org/research/

82. I Sexually Identify as an Attack Helicopter. *Know Your Meme*. Retrieved September 15, 2017 from http://knowyourmeme.com/memes/i-sexually-identify-as-an-attack-helicopter