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# Gender Inequalities in the Consumption and Production of Jazz: Perspectives from Genre-Specific Survey and Social Network Analysis

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## Abstract

Jazz is remarkable among genres in emerging from marginalised communities to a position of status, perceived as complex and challenging by audiences, and with jazz musicians forming an elite among commercial musicians. It is also evidently male-dominated in terms of both audiences and musicians. Using the Taking Part surveys of cultural participation and engagement in England, we investigate the gender gap in jazz by examining its variation by birth cohort, how female status interacts with social status in terms of attendance at jazz concerts, and how the gender gap compares with those in classical music and rock. We find women attend jazz concerts less frequently than men; and that while social status is positively associated with attendance, the status gradient is significantly flatter for women than men. We also draw on a unique dataset of 983 musicians, and find that unlike male jazz musicians, female musicians exhibit gender heterophily. Women also feature significantly lower recording productivity. The gender penalty is not clearly reducible to musical background, education, career experience, or period of birth; while network position accounts for part of it, the negative effect of female status appears to work primarily directly. We argue that equality of access to cultural advantage requires that we attend to how gender inequalities operate within genres, even where less strongly associated with legitimate culture or less symbolic in public terms. This is both to inform measures for debiasing within the genres themselves, and also to uncover mechanisms of gender inequalities which may hold in other social contexts.

Keywords: Consumption, Creative Work, Gender, Jazz, Social Network Analysis, Social Surveys

## Introduction

During its early growth in the first decades of the twentieth century, jazz was perceived by much of American and British society as marginal and was certainly subcultural. In a study of jazz as a specialised status community, Stebbins summarised the genre's perception as 'associated with narcotics, murky slum-area bars, prostitutes, the criminal element, loose morals, and the renegades of society' with musicians forming 'one of society's deviant groups and part of its social problem' (1966: 197). Nevertheless, even at that point it was becoming 'respectable' with musicians training in conservatoires and shifting towards a middle-class

existence (1966: 211). Lopes similarly identified a jazz ‘art world’ as having risen in the 1950s (Lopes, 2002). Accordingly, by 2007, Chan and Goldthorpe were able to point to ‘opera and jazz’ as both comprising elitist music cultures that, while of minority appeal and indeed often rejected by the culturally-omnivorous, were nevertheless both considered higher-status (2007: 14). As a genre, jazz is perceived as sophisticated and ‘a variety of music perceived as complex, intelligent, and inspiring’ (Rentfrow et al, 2011: 1153). Accordingly, jazz has found a narrow but high-status niche through its reputation as demanding, ‘alien and aloof’ (Nicholson 2014: 18). Further, the community producing it is internally-elitist, with status within the community of commercial musicians (Stebbins, 1966; Nylander and Melldahl, 2016). From its humble beginnings in New Orleans, jazz is now part of elite culture across the world.

Given its association with status, it is notable that it is also associated with maleness. The underrepresentation of women is not necessarily self-evident since the genre has a democratic ethos, valuing musicianship over ascribed status. But Stebbins’ study was of ‘jazzmen’, as was Becker’s canonic and slightly earlier study (1951). This described in remorseless detail how jazz musicians tended to perceive themselves as free spirits and tortured geniuses, viz., ‘as an artist who possesses a mysterious artistic gift setting *him* apart from all other people. Possessing this gift, *he* should be free from control by outsiders who lack it’ (Becker, 1951: 137, italics added). Jazz musicians and fans are stereotyped as both male and masculine, evidenced by a satirical ‘Bloke Newington Annual Festival of Male Improvisation’ poster cited by McKay in a deeply-considered discussion of masculinity in jazz (2005: 250). While clearly different to hegemonic masculine ideals, the genre arguably enshrines an alternative, challenging form of masculinity sharply distinct from femininity.

Different explanations have been offered for female underrepresentation, lying in the genre’s distinctive musical and social architecture. It is ‘inherently social’ (Author date) with musicians dependent on personal networks, to assemble flexibly in different combinations depending on the booking (Faulkner and Becker, 2009; Dowd and Pinheiro, 2013). The genre also requires extensive musical training. Becker, accounting for how musicians learn how to accompany unfamiliar tunes, or musicians they have not played with before, explained that the experienced do so unthinkingly, building on ‘understanding the conventional musical language—of time signatures and keys and chords and circles of fifths’ (2015: online). Women may well experience barriers to acquiring formal and tacit musical knowledge. Instrument choices made in childhood are gendered, and jazz tends to foreground instruments often perceived as male: brass instruments, drums, bass. Traditionally, training in brass instruments is often provided in brass and military bands to which women have only latterly had access. Indeed, the best-known female musicians have been vocalists. Voice artist Maggie Nicols has described it thus: ‘I was socialised - we all were: women sing, men played instruments’ (McKay, 2005: 276). Further, the genre is still closely associated with improvisation and taking a solo (‘a necessary part of jazz’ – Ratliff, 2000), risky endeavours for musicians and identified by Alexander as particularly difficult for adolescent girls (Alexander, 2011). McKay however argues convincingly that it is how improvisation is practiced that is gendered rather than the nature of improvisation itself, which can also be dialogic and intuitive (McKay, 2005: 248). Professional survival also depends on extensive performance

and touring, particularly difficult for care-givers. In addition, McKay notes that jazz is heteronormative: musicians and fans alike position themselves as ‘opposite’ to show music, disco, and opera, and actively work to create music which represents certain forms of masculinity (McKay, 2005: 267).

Even so, it is conceivable that jazz is hardly divergent in being gendered. Genres tend to have distinctive audiences, and be hosted in distinctive venues (Lena and Peterson, 2008). It is conceivable that some cultural forms attract audiences primarily made up of women who prefer to consume cultural products created by men; others, men who prefer to observe women; and still others men or women who prefer genres which tend to represent artists of the same gender. Such examples of gender homophily and heterophily (for example, the popularity of boy bands with young women, or opera divas with male audiences) is clearly evident at the level of the individual production or act. It may then be that women and men exhibit different preferences at the genre level, partly because of the differing socio-structural positions of women and men, and partly because of differences in gender representation by genre. This is sufficient to motivate a sociological analysis of gender differences in jazz consumption, to investigate how cultural and status systems differ by gender.

A further motivation relates to further effects arising from gender biases in production and consumption. Such biases are of interest to social scientists in that they involve deviations from rationality and/or efficiency. In this case, gender specificity in either artist representation or tastes may discourage creative labour market participation of or consumption by one particular gender, compared with what their ‘true’ preferences would imply. On the production side, members of minority groups may withdraw from contexts where they are perceived as ‘other’. On the audience side, it is well-established that preferences are interdependent, with the implication that those consuming music may align choices with chosen reference groups rather than making rational choices in social isolation (Merton and Kitt[Rossi], 1950; Rogers, 1958). Accordingly, prior gender specificity begets more specificity, which may be limiting for those working within the genre and for audiences alike.

### **Gender Differences in the Consumption of Jazz**

The literature on genre and consumption has tended to prioritise the question of whether cultural omnivorism predominates with regard to higher social status, or whether traditional homology between social status and consumption of elite cultural forms persists (Bourdieu, 1984; Peterson and Kern, 1996). The Bourdieusian approach assumes that the socially-advantaged prefer forms of culture revered in their societies, whilst rejecting mass and popular cultural forms. From the 1990s this conception of elite cultural consumption has been challenged, with several authors (Peterson and Kern, 1996; Chan and Goldthorpe, 2007) positioning against ‘symbolic violence’ as a salient mechanism within society. Evidence from these studies pointed to the socially-advantaged in the US and UK consuming both elite and popular cultural forms, distinguished from the less advantaged in their range and volume of cultural consumption.

Ironically, gender has been less prominent in this discussion, used almost exclusively as a control variable with little explication, perhaps surprisingly so in Bourdieu’s case given the expansiveness of his conceptual

schemata. Lizardo (2006b) provides an important exception, stressing the interplay between occupation, gender and status via three different mechanisms driving gender differences in highbrow culture consumption: occupational segregation, differential values and preferences, and differential social networks within the workplace. Lizardo notes that at least in the US, ‘there is no such thing as “the” gender gap in highbrow culture consumption’ (2006: 2); instead, it applies only to those who participate in the labour market.

As presented earlier, jazz is nowadays perceived as higher-status, even if this was not historically the case. Tampubolon (2008) estimated latent musical classes and the socio-structural drivers of their membership, identifying as higher-status a ‘dominant’ musical class where members were more likely to attend rock, jazz and classical concerts, and attend operas and musicals; and listen to classical, music and jazz recordings. A second ‘popular’ music class was comprised of those who tended not to attend live performances and preferred to listen to rock and pop. Higher occupational status was positively associated with membership of the dominant class; gender, however, was non-significant. Using Canadian survey data, Veenstra (2015) identifies jazz as ‘relatively highbrow’, finding that alongside classical, opera, world music and choral music, it tends to be appreciated by the more-educated. There is little, though, on the interaction of gender and status; or the association between gender and jazz consumption in particular. Anecdotally, jazz is well-known to be of minority taste: McKay cites critic Jane Cornwell writing in *Jazzwise* in 2002 that “[j]azz is often seen as a ‘serious’ music, a genre that demands total involvement and knowledge of past and present details to be enjoyed. Dare I say it, but that’s rather anal, rather male’ (McKay, 2005: 252).

### **Gender, Creative Networks and Jazz**

The community of jazz musicians is well-known to be extremely networked; it is also well-established that personal networks vary by gender, with consequence for occupational success, including in musical careers (Burt, 1999; Author, date). Such network differences may explain part of the difference between male and female musicians in their representation in music scenes. Women tend to have relatively smaller and denser networks, and may be deficient in the more extensive weak ties important for success (Granovetter, 1973). Gender differences in friendship are apparent from the age of 4 (Bott, 1928); girls’ friendship groups are smaller and more homogenous through primary and early secondary school (McPherson et al, 2001: 422-3). Moreover, when strong dyadic friendships are relatively lacking, women tend to feel lonelier than men (Stokes and Levin, 1986). Such differences have been corroborated by data from online games (Szell and Thurner, 2013): owners of female avatars demonstrate lower preference for risk and greater competence at trading. Significantly, gender differences in strategic networking are identifiable in the workplace: men tend to choose men for both expressive and instrumental ties, while women tend to prefer men for instrumental ties, and women for workplace friendship. Status and education attract connections for both, but men are better able to convert their status into increased network centrality (Burt, 1999).

Burt's findings from the study of a hierarchical firm are likely to have significance for the creative sector, which tends to be organised in network terms with bureaucratic policies formalising recruitment and regulating relationships relatively lacking. He finds that organisational leaders have little time to evaluate outsiders' credibility, accordingly looking for reliable cues (Burt, 1999: 18). It is plausible that decision-makers in the creative sector operate similarly. Accordingly, those who lack legitimacy benefit from sponsorship:

'Legitimate members of a population succeed by building their own social capital. Illegitimate members of the population have to borrow. In my analysis [of a computer equipment manufacturer], the illegitimate members of the population turn out to be women and young men. The young men eventually compete as legitimate members of the population when they enter the more senior ranks (like an assistant professor promoted to a position with tenure). Women remain illegitimate across the senior ranks' (Burt, 1999: 2).

In other words, 'illegitimate' members are not perceived as of equal value. A significant body of work is available on female musicians' experience of male-dominated music worlds, and how genres are actively 'produced' as male, with regard to the rock and classical worlds (Cohen, 1997; Scharff, 2019; Bull, 2019). For jazz, McKay estimated that some 85 percent of jazz musicians were men, a heavier bias than for other genres, and noted the genre's reputation of being '[m]en supporting men... men compensating for their societal inadequacy or familial indolence with a solo' (McKay; 2005: 246). Faulkner and Becker use male pronouns throughout their participant-observation study of jazz: '[t]he music business is overwhelmingly a male business, almost all the women involved being singers' (2009: 13). Of the fifty musicians they interviewed, three were female. Stein begins her trade study of women in jazz with '[j]azz remains stubbornly misogynistic, stuck in some self-imposed time-warp' (Stein, 2018: iii). She notes in particular 'an aggressive atmosphere which does not suit women' (Stein, 2018: 191). Interview respondent Camille Thurman (b.1986, composer, vocalist and saxophonist) referred to earlier generations 'having harsher experiences (out-front encounters making it clear that women were not wanted)' (Stein, 2018: 144). Stein specifically considers

'brutal "cutting" sessions... One musician (male who organizes free improvisation sessions recently told me he felt women were more suited to free improvisation... because of the sharing and collective nature of the experience. However, cutting sessions were definitely more of a male thing... a question of last musician standing or, as it has been put, who has the biggest dick. Women have no tool to bring to a cutting session' (Stein 2018: 105-6).

With regard to more implicit biases, trombonist Sarah Gail Brand (b.1971) discussed how

'[t]he men I work with never consider my gender to be anything to do with my ability. In general though, there is the notion (as with a lot of art forms that require intellectual understanding of the process we go through) that women aren't perhaps bright enough to understand the technical requirements in terms of harmony, form, composition and that sort of thing. Also, in jazz, you need to be confident and people don't expect women to be confident' (Stein, 2018: 123).

Similar themes were identified by Davies (2001) in her analysis of the representation of female artists and fans in rock, a genre she deemed ‘homosocial’. Jazz can be understood similarly, as a genre created by and for men who promote genre-specific segregation and symbolic distance from women (Bird, 1996). Credentialization, accessing the support of a central male artist, and separation are among the range of strategies adopted in response. Opera-trained vocalist Debbie Gifford formed her own band after experiencing lack of respect: ‘I was looked down on as if I was not a musician, just the ‘girl singer who didn’t know anything about music’ (Stein 2018: 131). Saxophonist Ivy Benson led all-female bands for some 40 years, often employing women who had been trained in northern brass bands (McKay, 2005: 282). Over her forty years she trained a number of accomplished musicians: Gracie Cole, Crissy Lee, Deirdre Cartwright, Annie Whitehead, and Gail Thompson among others. Another notable group following a separation strategy was the Feminist Improvising Group of the 1970s (McKay, 2005: 253), which in turn evolved into Lydia D’Ustebyn’s Swing Orchestra in the 1980s (McKay, 2005: 283).

Before the expansion of conservatoires, such female-only spaces provided an alternative route to acquiring tacit knowledge and achieving professional standards. Cartwright suggested that ‘[i]n classical music there may be prejudice and discrimination... but at the same time you know where you can go - there are grades, exams, orchestras, structures or lines that you can follow to get some sort of career or recognition. For young women wanting to start out in jazz that simply was not the case - except for Ivy... She offered a professional band, with high standards’ (McKay, 2005: 284). As jazz has evolved to become a genre taught formally in conservatoires and universities, the generation of musicians born in the 1970s and thereafter have largely acquired formal credentials.

In sum, the extant literature suggests that jazz audiences and musicians alike have homosocial preferences and that the genre excludes female fans and musicians. This informs the following research questions:

1. Do jazz audiences exhibit a gender gap between men and women?
2. How does gender interact with social status with regard to consumption of jazz?
3. Are women segregated within the community of jazz musicians?
4. Is female status associated with lower musical productivity in the jazz world?

## **Data and Methods**

In answering these questions, we follow a mixed analytic strategy. We first examine gender differences in reported frequency of attendance at jazz performances using survey data, and follow this with analysis of differences between male and female jazz performers in their connections and recording productivity. In doing so, we follow Lizardo’s prescription that ‘we must attend to the historical origin and trajectory of the system of production of symbolic goods in the West, and how this has interacted with the system of scholastic

“production” of consumers’ (2008: 3). This enables us to understand the evolution of systems of cultural stratification which separate different status groups and valorise genres.

### ***(a) Gender and Jazz Consumption***

In beginning with our analysis of frequency of attendance at jazz concerts, we draw on the high-quality Taking Part surveys. Taking Part is commissioned by the UK government’s Department for Digital, Culture, Media and Sport to generate cultural participation indicators relevant to subsidized cultural institutions. Surveying adults aged 16-plus in England, it has run annually since 2005-6, with 13 waves available for secondary analysis (descriptive statistics available in Table A1). Recurrent items on the questionnaire include as follows:

***In the last 12 months, have you been to any of these events? Film at a cinema or other venue; exhibition or collection of art, photography or sculpture; craft exhibition (not crafts market) [...] opera/operetta; classical music performance; jazz performance; other live music event...***

Those who attended another live music event were then asked,

***Can you tell me what sort of music you have been to see? Rock music; soul, R&B or hip-hop music; folk or country and western music; reggae/calypso/Caribbean music; African music; South Asian music; Spanish or Latin American music; Other (specify).***

***How often in the last 12 months have you been to this type of event? At least once a week; at least once a month; at least 3 or 4 times a year; twice in the last 12 months; once in the last 12 months.***

We accordingly generated measures of jazz attendance: a measure of reporting attending any jazz performance in the last 12 months; and a measure of frequency of attendance, whereby those who reported they had not attended were scored zero, those attending once in the last 12 months scored 1, those scoring twice scored 2, those attending at least 3 or 4 times a year 3, at least monthly 3, and at least weekly 5. We repeated the exercise for attendance at classical concerts, and rock events. We chose classical and rock as comparators for jazz given data availability and sufficient sample sizes among those reporting attendance.

We examined variation in reported attendance by gender via exploratory and multiple regression analysis. First, we graphed the percentage of men and women reporting any attendance at jazz, classical and rock concerts over the previous 12 months by five-yearly birth cohort (Figure 1). Secondly, we graphed the gender gap by birth cohort for each of the three genres, relativising the gap to take account of the different propensities to attend the three genres. In doing so we draw on Voas et al (2013)’s suggestion to use the square root of the odds ratio (or geometric mean of the relative risk that men attend concerts and women do not) to measure the gender gap across cohorts and genres.



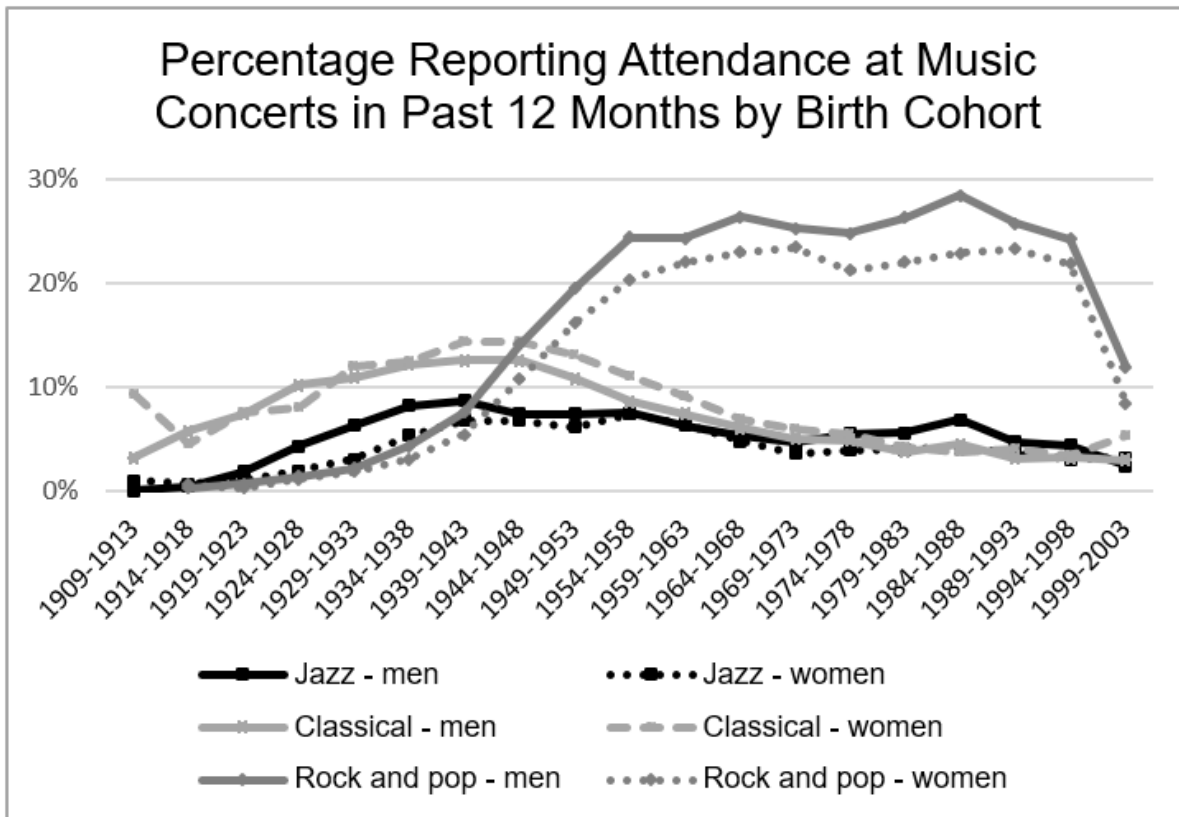


Figure 1: Percentage Reporting Attendance at Music Concerts in Past 12 Months. Source: Taking Part Surveys, authors' analysis.

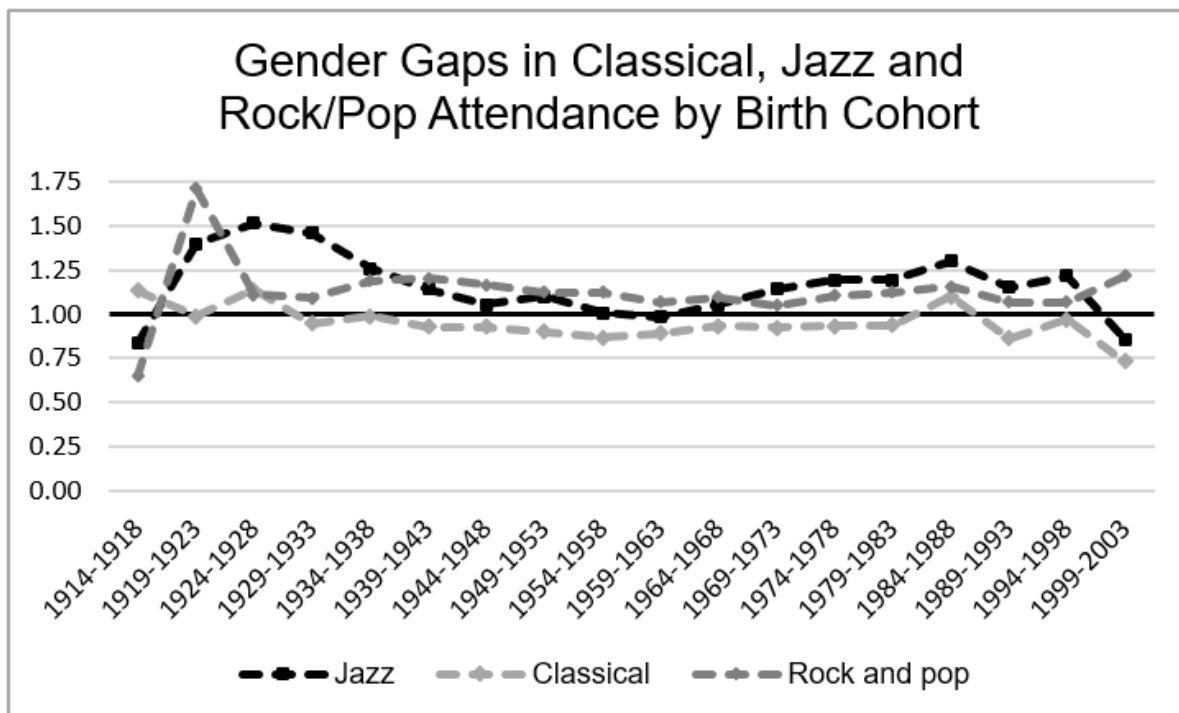


Figure 2: Gender Gap in Attendance at Music Concerts in Past 12 Months, by Genre. Source: Taking Part Surveys, authors' analysis.

Findings are given in Figures 1 and 2 above, with the gender gaps relativised in the latter. Classical music attendance generally exhibits a gender gap in favour of women (namely, women are more likely to attend than men), while jazz and rock have gender gaps in favour of men for almost all cohorts. Moreover, the size of the gap appears significantly larger for jazz than rock for the older and younger birth cohorts, while that for rock is larger for the middle-aged cohorts. For jazz, the gender gap is largest in favour of men for those born during the 1920s, 1930s and 1940s, narrowing substantially for those born in the 1950s and early 1960s. It increases again for those born in the later 1960s and 1970s, though this may be a result of women in early middle age having less leisure time and resources, and likely to dissipate with age and fewer caring responsibilities. For the very youngest cohort visible in our dataset, the gender gap appears to be in favour of women: whether this is an age or cohort effect remains to be seen in further survey waves.

For a more concrete test of the effect of gender on attendance, we ran a multivariate multiple regression model, with frequency of attendance at jazz, classical and rock performances as joint dependent variables, gender as our key explanatory variable of interest, and a range of socio-demographic variables as controls.<sup>1</sup> Results are presented in Table 1. This method allows testing of whether the coefficient for ‘female’ is equal across the three models. Moreover, we include Chan-Goldthorpe status scale scores (Chan and Goldthorpe 2004), created from multidimensional scaling analysis of the dissimilarity of the occupational distributions of randomly sampled respondents’ friends, and from which a leading dimension identifiable as ‘social status’ was found. To identify whether the relationship between status and concert frequency attendance differs for women and men, we interact this scale with gender. We also include multiple sociodemographic variables as controls, including year of birth (linear and squared terms), housing tenure, number of children in the household, socio-economic occupation, education, health, whether the respondent identifies as ethnically White, religious affiliation and practice, whether they live in an urban area, and survey wave.

Examination of the average marginal effects (Table 2a) demonstrates that, taking control variables into account, and setting social status aside, female status predicted less frequent attendance at jazz and rock than that for men, but more frequent attendance at classical concerts. The negative coefficient for being female was notably larger for rock attendance than jazz attendance, and postestimation testing confirmed that the coefficient for female differed significantly across the three models (Table 2b). This is extremely interesting, provoking the suspicion that differential ticket cost particularly hampers female attendance at ‘prestige’ rock concerts; alternatively, women may also perceive rock as ‘not for them’, to a greater extent even than jazz.

The average marginal effects for social status (not shown here) reveals that it is positive for attendance frequency for each of the musical forms, confirming Tampubolon’s findings regarding status and mode of

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<sup>1</sup> It does require that the dependent variables are treated as continuous, involving a strong assumption in this case given the preponderance of non-attendance (see Table A1). However, running multivariate zero-inflated ordinal probit models would be technically-demanding. Comparison of the coefficients and predicted attendance frequencies between the model reported here and ordinal probit models run separately suggested that they are essentially similar, and that this is a reasonable modelling compromise.

music consumption. Of more specific interest is the term for the interaction between status and gender reported in Table 1: negative for jazz and rock, positive for classical music. In other words, the status-attendance relationship is relatively weaker for women than men with regard to both jazz and rock, and relatively stronger for women than men for classical music. It seems plausible to hypothesise that for those women who do attend jazz (and rock) concerts, attendance generates less status than it does for men. At least, status is a less powerful motivator of attendance for women compared with men, for jazz and rock alike.

Why genre-specific differences arise is an interesting question, particularly with regard to jazz. As mentioned by Brand above, jazz is often considered serious in a way that excludes women; and yet classical music, apart perhaps from some light classical, is hardly less heavyweight. We suspect that the difference partly lies in how the genres have connotations of more or less conformity, respectability, risk and esotericism. These characteristics are themselves gendered. In addition, people often prefer to attend concerts with other friends, and to attend as part of a wider audience with which they identify; gender is an important source of identification. More conclusive evidence would require alternative methodological approaches, to examine the precise characteristics of different genres driving gender differences in attendance and tastes.

	<b>JAZZ</b>			<b>CLASSICAL</b>			<b>ROCK</b>		
	<i>Coefficient</i>	<i>St. error</i>	<i>p-value</i>	<i>Coefficient</i>	<i>St. error</i>	<i>p-value</i>	<i>Coefficient</i>	<i>St. error</i>	<i>p-value</i>
<b>Constant</b>	-0.039	0.017	0.022	0.065	0.019	0.001	-0.398	0.032	<0.001
<b>Birth year</b>	0.004	<0.001	<0.001	0.001	0.001	0.977	0.012	0.001	<0.001
<b>Birth year squared</b>	0.000	<0.001	<0.001	0.001	0.000	<0.001	0.001	0.001	<0.001
<b>Female</b>	-0.024	0.002	<0.001	0.007	0.003	0.010	-0.054	0.005	<0.001
<b>Partnered vs single/other</b>	-0.012	0.003	<0.001	-0.005	0.003	0.071	-0.063	0.005	<0.001
<i>Reference: Owner-occupier</i>									
<b>Mortgage-holder</b>	-0.021	0.003	<0.001	-0.068	0.004	<0.001	0.076	0.006	<0.001
<b>Social Renter</b>	-0.018	0.004	<0.001	-0.048	0.004	<0.001	-0.052	0.007	<0.001
<b>Private Renter</b>	0.011	0.004	0.007	-0.040	0.005	<0.001	0.053	0.008	<0.001
<i>Reference: No children in household</i>									
<b>1 child in household</b>	-0.031	0.003	<0.001	-0.027	0.004	<0.001	-0.098	0.007	<0.001
<b>2+ children</b>	-0.042	0.003	<0.001	-0.037	0.004	<0.001	-0.135	0.006	<0.001
<i>Reference: No qualifications</i>									
<b>Some qualifications</b>	0.032	0.003	<0.001	0.077	0.004	<0.001	0.042	0.006	<0.001
<b>Degree or higher</b>	0.088	0.004	<0.001	0.197	0.005	<0.001	0.082	0.008	<0.001
<i>Reference: Routine Occupation</i>									
<b>Professional/managerial</b>	0.014	0.004	0.001	0.016	0.005	0.001	0.030	0.008	<0.001
<b>Intermediate</b>	0.018	0.003	<0.001	-0.001	0.004	0.836	0.036	0.006	<0.001
<b>Never worked/unclassified</b>	0.064	0.007	<0.001	0.065	0.008	<0.001	0.122	0.013	<0.001
<i>Reference: Other economic activity</i>									
<b>Student</b>	0.000	0.011	0.979	-0.007	0.013	0.582	-0.001	0.022	0.964
<b>Retired</b>	0.010	0.004	0.028	0.009	0.005	0.070	-0.070	0.008	<0.001
<b>White vs other ethnicity</b>	0.022	0.005	<0.001	0.077	0.006	<0.001	0.238	0.009	<0.001
<i>Reference: No Religious Affiliation</i>									
<b>Christian</b>	-0.027	0.003	<0.001	-0.041	0.003	<0.001	-0.064	0.005	<0.001
<b>Other religion</b>	-0.041	0.006	<0.001	-0.041	0.007	<0.001	-0.109	0.012	<0.001
<b>Actively practices religion</b>	0.016	0.003	<0.001	0.078	0.003	<0.001	-0.029	0.005	<0.001
<i>Reference: Bad/very bad health</i>									
<b>Good health</b>	0.019	0.005	<0.001	0.060	0.006	<0.001	0.034	0.009	<0.001
<b>Fair health</b>	0.011	0.005	0.036	0.026	0.006	<0.001	0.019	0.010	0.061
<b>Active sport last 4 weeks</b>	0.031	0.002	<0.001	0.027	0.003	<0.001	0.099	0.005	<0.001
<b>Lives urban area</b>	-0.002	0.003	0.587	-0.005	0.003	0.112	0.014	0.005	0.007
<b>Chan-Goldthorpe status</b>	0.071	0.005	<0.001	0.084	0.006	<0.001	0.101	0.010	<0.001
<b>Status*female</b>	-0.037	0.006	<0.001	0.032	0.007	<0.001	-0.043	0.012	<0.001
<b>R<sup>2</sup></b>	0.030			0.085			0.098		
<b>N</b>	111,856								

Table 1: Multivariate multiple regression of frequency of attendance at jazz, classical and rock concerts in the previous 12 months. Taking Part Survey Waves 1-8, authors' analysis. Survey wave fixed effects included. Design weights applied

<b>(a) Average marginal effect of female vs male status</b>	<b>AME</b>	<b>p-value</b>
<b>Equation for jazz concert frequency</b>	-0.022	<0.001
<b>Equation for classical concert frequency</b>	0.006	0.032
<b>Equation for rock concert frequency</b>	-0.053	<0.001
<b>(b) Size of coefficient for ‘female’</b>	<b>F-statistic</b>	<b>p-value</b>
<b>Equal to 0 in all three equations</b>	80.77	<0.001
<b>Equal in predicting frequency of attendance at jazz concerts vs frequency of attendance at classical concerts</b>	86.22	<0.001
<b>Equal in predicting frequency of attendance at jazz concerts vs frequency of attendance at rock concerts</b>	40.40	<0.001
<b>Equal in predicting frequency of attendance at classical concerts vs frequency of attendance at rock concerts</b>	138.77	<0.001

Table 2: (a) Average marginal effect of female versus male status for frequency of attendance at jazz, classical and rock concerts; (b) Tests of the coefficient for ‘female’ across the different outcome variables (frequency of jazz attendance, classical concert attendance, rock attendance). Taking Part Survey Waves 1-8, authors’ analysis.

### ***(b) Gender and Jazz Production***

To account for gender and production we proceed to an analysis of gender specificity on the supply side, building on an established body of work analysing jazz using social network analysis and perspectives. Phillips (2011) modelled the number of re-recordings that a set of 1752 midwestern recordings listed in the Lord Discography had achieved, finding that the presence of a female bandmember was significantly and positively associated with the number of ‘covers’ achieved. He also noted that 31 percent of the recordings in his sample featured at least one female member. Pinheiro and Dowd (2009)’s analysis of a respondent-driven survey identified that male performers (81 percent of their sample) tend to report higher incomes; however, this difference appears to be mediated by variables such as age, instrument choice, and stylistic flexibility. They also found that connections matter: members of the musicians’ union, and those more strongly connected to musical friends, earn more than the less-connected (2009: 504). In a further study they model social capital, operationalised as number of local musicians known to the respondent and whether they are a union member; again, they find that female musicians do not differ significantly from men (Dowd and Pinheiro, 2013).

Social network analyses have also been conducted of jazz musician and recording data. Author date provide an overview of the structure of jazz networks and how performers’ characteristics are associated with winning jazz awards, albeit with no specific reference to gender. A further body of work uses advanced computational and automatic data extraction methods (Gleiser and Danon 2003, Venturini et al 2019), although generally lacking musician-level data providing the detail sociologists value. Vedres reports an innovative study relating the productivity of individual recordings in

achieving re-releases to the prevalence of ‘forbidden triads’, namely connected triplets with two strong triads and an open dyad (Vedres, 2017: 2), theorised to form the foundations of ‘fold networks’. While an extremely important study for insights into creativity, it nevertheless does not take gender into account.

To turn attention to gender, we use a unique dataset on the social background, social networks and musical profiles of jazz musicians compiled by the authors, using musician and jazz writer John Chilton’s acclaimed *Who’s Who of British Jazz* (2004). Cultural economists and sociologists of culture alike have increasingly turned to directories of notable figures, including musicians, to generate valuable datasets, a strategy we follow here (O’Hagan and Hellmanzik 2008, Borowiecki 2013, Reeves et al 2017). We add a measure of recording output using data from the Lord Discography.<sup>2</sup> Both are high-quality sources recognised by academic researchers (McKay 2005, Phillips 2011, Vedres 2017). Data were extracted manually rather than automatically, to ensure that individual musicians sharing names could be disambiguated, and so descriptive information on career and sociodemographics could be captured. This combination yields data on 983 musicians either raised in Britain or whose careers were primarily based there, of whom 39 (4 percent) are female. Figure 3 illustrates change in the representation of female musicians by decade of birth, with dramatic change from the mid-century.

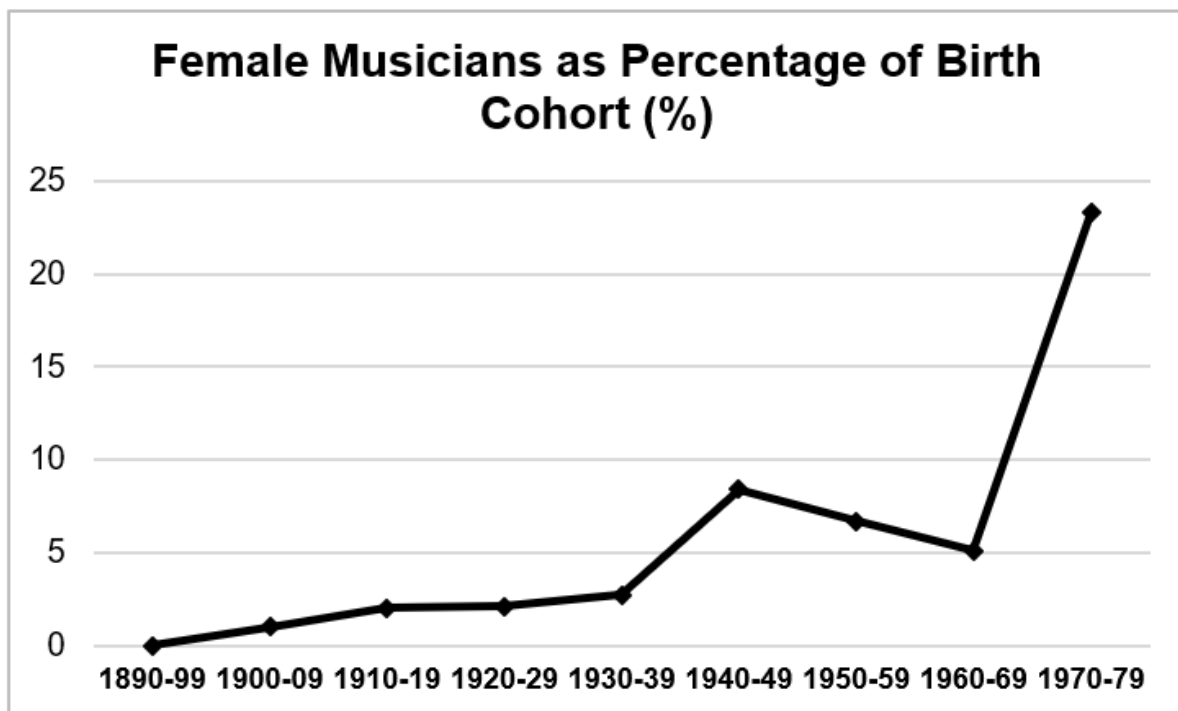


Figure 3: Female Musicians as Percentage of Birth Cohort. Source: Chilton’s *Who’s Who of British Jazz* (2004), authors’ analysis.

<sup>2</sup> The coding and data extraction was conducted by a team of research assistants with the authors in 2013, accordingly relating to recording data as of that time.

Descriptive statistics are provided in Table A2 (see supplementary data appendix). A majority of musicians in the sample are leaders: more than half have led their own live bands. A majority have performed also overseas; this is a transnational genre. The measure of recording productivity also exhibits the skew common to artistic rewards (Rosen 1981), with a clear disparity between men and women. Male musicians feature 54.7 (SD = 65.2) recordings on average, female musicians 29.2 (SD = 37.5). A test of the null hypothesis of equality of means was rejected at the 1 percent level of significance ( $t[981] = 2.379, p < 0.001$ ).

Given scholarly findings regarding gender and networks, and social networks and productivity, we now explore the network of musicians. Chilton's *Who's Who* includes a wealth of data on musicians' musical relationships: familial, educational, through friendship, and professional collaborations. We find that 971 musicians form a single major component; 12 are isolates. Figure 4 below illustrates the full network recorded in Chilton's *Who's Who*, including the pop, rock, folk and other artists to which the 983 were connected via freelance and other work, sized by betweenness centrality. The community in the upper-right was associated with the dance-band music the first half of the century, with band leader Bert Ambrose the most central. Over time, the community became more stylistically-differentiated, illustrated by the partial separateness of the cluster on the left. Figure 5 then illustrates the distribution of female musicians within the network of 983 musicians achieving their own entry in Chilton's *Who's Who*, sized by the number of recordings on which they feature. Here, we see very few women in the upper-right 'dance band' cluster, with the women who achieve an entry primarily distributed in the other two clusters.

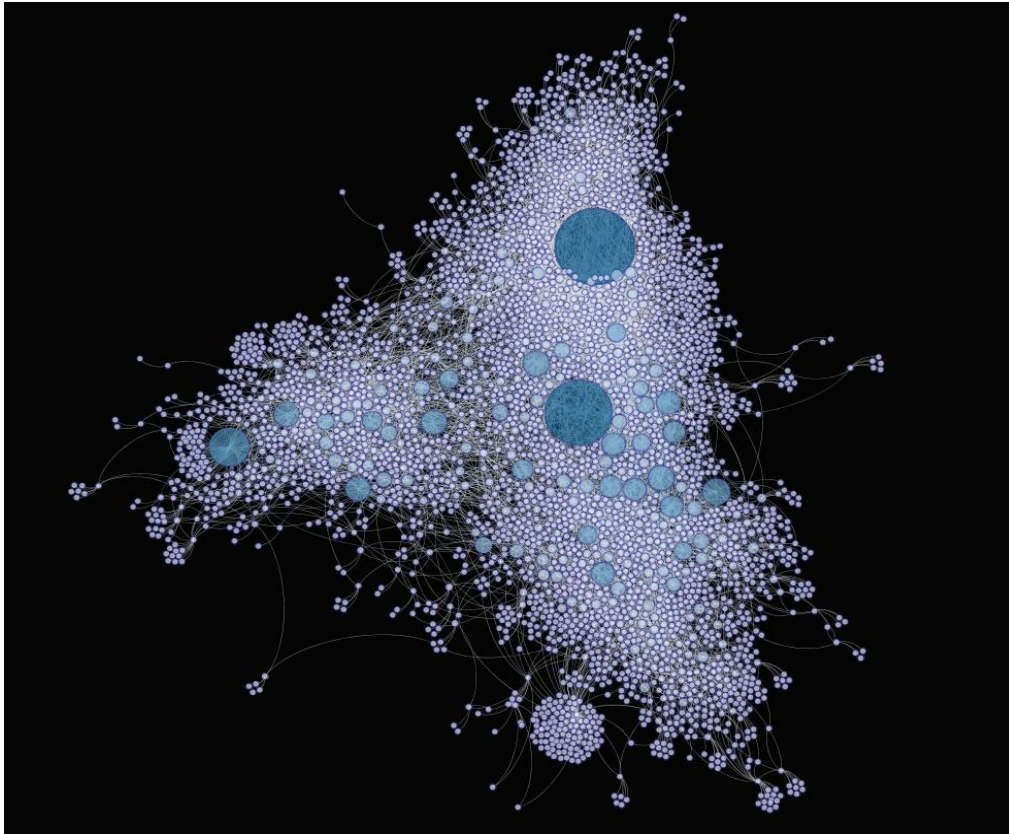


Figure 4: Main Component of Chilton Sample in Network Context (N = 3558). Nodes sized by betweenness centrality, positioned using ForceAtlas2 (continuous graph layout algorithm in Gephi). Source: Chilton’s *Who’s Who of British Jazz* (2004), authors’ analysis.

We next examine how centrality varies between male and female musicians in the network, via *t*-tests with significance based upon a permutation test to take account of network structure (Table 3). Female musicians do not differ from male musicians in their Freeman (degree) centrality, nor in their betweenness centrality. However, they do feature significantly lower centrality in terms of eigenvector centrality (connectedness to highly-connected alters) and closeness centrality (thought to capture the ability to mobilise a network; see Prell 2011: 107).

Centrality score	Average male score	Average female score	Test of differences: two-tailed test
Freeman centrality	11.0 (11.1)	8.3 (7.4)	0.120
Eigenvector centrality	0.021 (0.025)	0.011 (0.015)	0.014
Betweenness centrality	1128.7 (2749.1)	627.7 (1043.8)	0.207
Closeness centrality	315.4 (50.5)	284.6 (75.5)	0.001
<i>N</i>	944	39	

Table 3: Centrality Scores for Male and Female Jazz Musicians in the Chilton Sample. Source: Chilton’s *Who’s Who of British Jazz* (2004), authors’ analysis. Closeness measure is sum of reciprocal distances. Permutation-based tests (10000 runs).



We also tested whether male and female musicians exhibited different patterns in terms of tendency to connect with other musicians of the same gender (Table 4). E-I indices indicate homophily is significantly lower among female musicians. This, however, could be accounted for by female musicians having a much smaller pool from which to make connections with others of the same gender. Yule's Q adjusts for group size; results here indicate that male musicians exhibit homophily, and female musicians heterophily. It is plausible that male musicians tend to have higher status, and status (rather than gender) attracts connections, although other mechanisms are possible. A further perspective is given by the network of female-female connections in Figure 6: while there is an identifiable set of connections between musicians such as Ivy Benson, Annie Whitehead and high-profile vocalists including Cleo Laine, it is *de minimis* by comparison with the male-male network (not shown) where the extraction of the female musicians is hardly visible. While arguably marginalised, female musicians are not segregated within the network.

	<b>Percent homophily</b>	<b>E-I Index</b>	<b>Yule's Q</b>	<b>N</b>
Male musicians	97.0	-0.94 (0.01)	0.68 (0.61)	944
Female musicians	10.5	0.86 (0.04)	-0.50 (0.79)	39
Test for difference in means: <i>p</i> -value	< 0.001	< 0.001	< 0.001	

Table 4: Homophily among Male and Female Jazz Musicians in the Chilton Sample. Source: Chilton's *Who's Who of British Jazz* (2004), authors' analysis. Permutation-based tests (10000 runs).

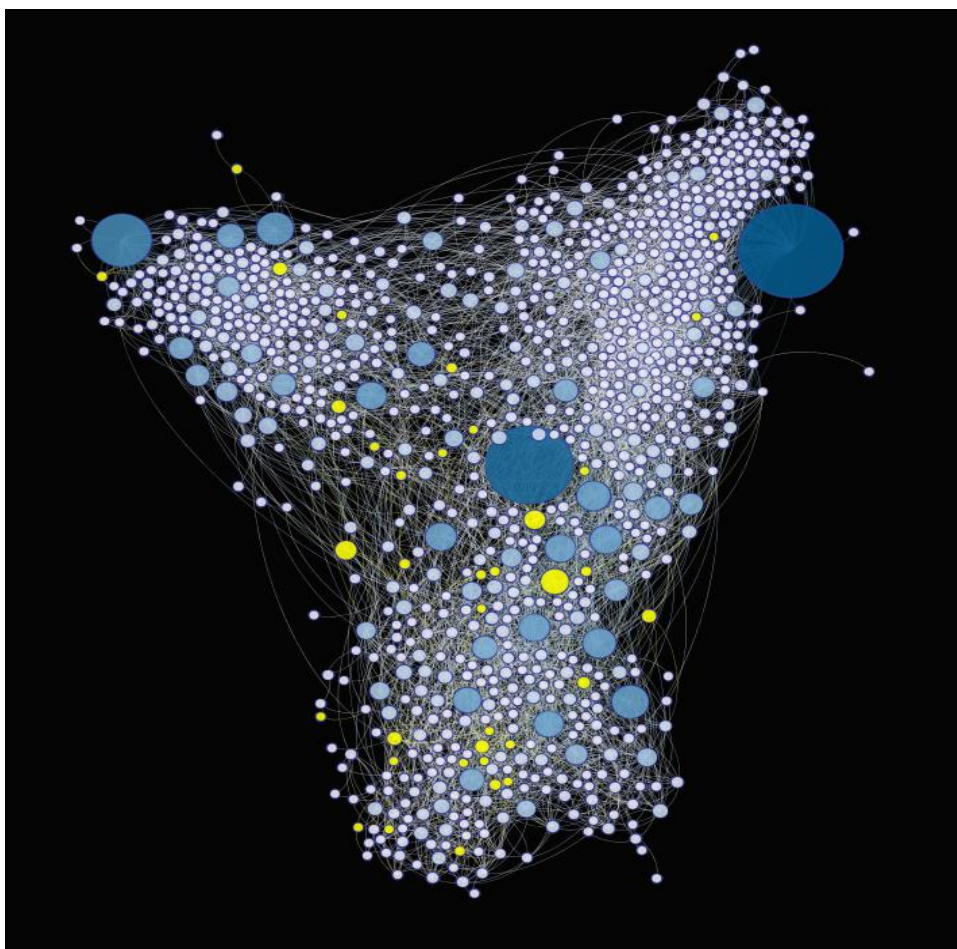


Figure 5: Main Component of Chilton Sample. Nodes Sized by Number of Recordings, Coloured by Gender. Source: Chilton's *Who's Who of British Jazz* (2004), Lord's *Jazz Discography* (2020), authors' analysis.

Next, we probe the implications of this gender inequality further through examining the gap between male and female musicians in their recording output. We coded the available biographical data in Chilton's *Who's Who* and modelled recording output in terms of birth cohort, education, musical characteristics and career type – for example, working on cruise ships, touring overseas, or working as a composer. We captured number of instruments played and whether the musician was a vocalist. Finally, we calculated centrality measures to examine the association between network position and recording output: Freeman, eigenvector, closeness and betweenness. They are the four most commonly-used centrality measures, with each 'represent[ing] a different process by which key players might influence the flow of information through a social network' (Valente et al 2008: 19). While there are moderate-to-strong correlations between the measures (ranging from  $r = 0.477$  to  $r = 0.855$ ) we nevertheless include them separately due to their capturing distinct, if conceptually-related, phenomena (Valente et al 2008: 22).

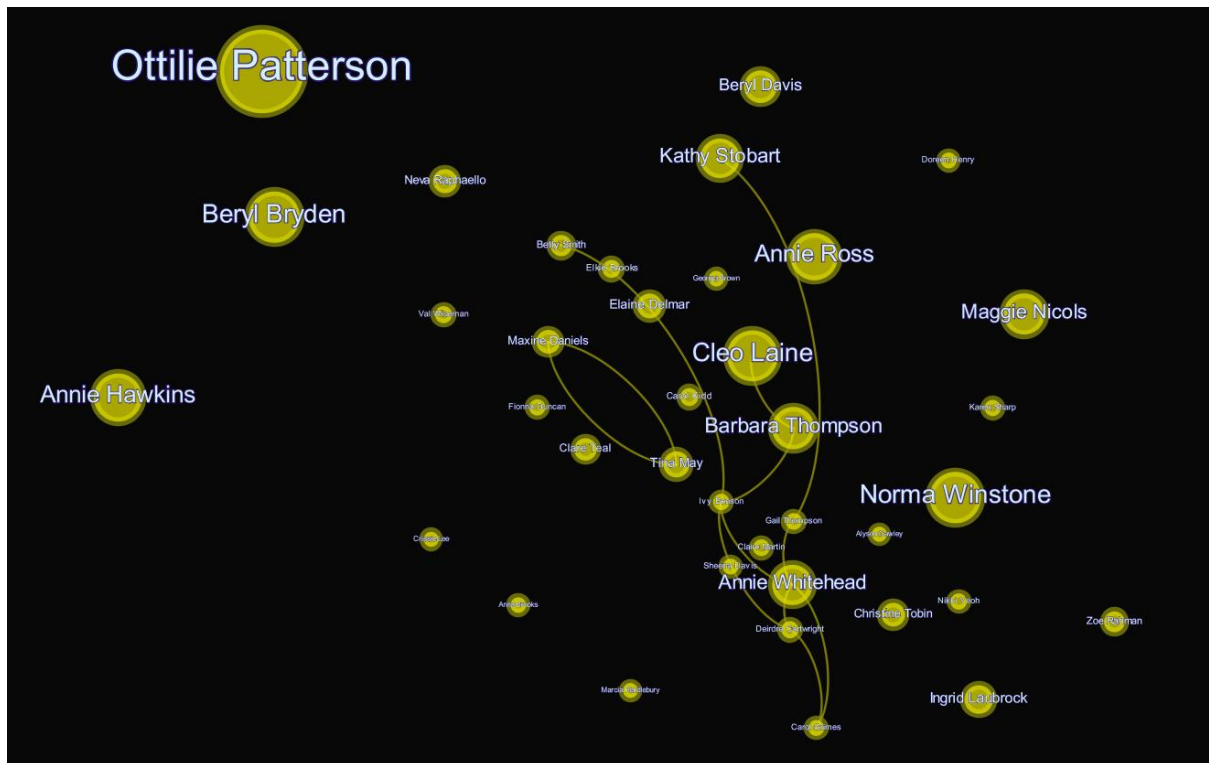


Figure 6: Ties Between Female Musicians Achieving Entries in Chilton (2004). Nodes Sized by Number of Recordings. Source: Chilton's *Who's Who of British Jazz* (2004), Lord's *Jazz Discography* (2020), authors' analysis.

We then run a series of hierarchical linear regressions on the same set of musicians ( $N = 971$ ) to examine the extent to which the gender gap appears to be mediated by, first, the social and musical environments in which musicians grow up and enter the profession (proxied by birth cohort); secondly, differences in musical career type; and finally, differences in network centrality. To take account of skew in number of recordings, as well as the non-trivial number of musicians who have not recorded at all, we use the inverse hyperbolic sine transformation.

We find as summarised in Table 5. In the base model, formed of only a constant and term for female status, the coefficient for 'female' is -0.709. This remains of similar magnitude (-0.699) even after terms for birth cohort are entered in Model 2, somewhat to our surprise in suggesting that differences in social environments associated with birth cohort do not mediate the gap. It reduces only slightly when terms for musical background and career type are entered in Model 3. Finally, it does decrease somewhat in Model 4 once the centrality terms are added, suggesting that some of the difference lies in women's different position in the network of musicians. However, the decrease is comparatively small. We tentatively conclude that the gender gap lies as much in disadvantage due to being female, rather than disadvantage associated with those characteristics into which women are more likely to select (for example, instrument choice). Admittedly, the analysis does not permit causal inference; and the women who are represented in the Chilton directory have already cleared a screening hurdle

to reach the point of being considered notable jazz musicians, one we do not observe. Nevertheless, our findings are suggestive, and should motivate further studies with this and other datasets into gender and other inequalities in creative work.

The following additional caveats should be born in mind. First, it is possible that both the Chilton and Lord sources are incomplete or biased in their coverage. However, these sources are the *best-available* data on the population of notable professional jazz musicians in Britain. It is more plausible that the data we use to create explanatory variables were captured more unevenly, depending on musicians' level of cooperation with Chilton and the availability of other sources. Where we are not given information on educational background, service in the armed forces and so on, musicians are coded as zero rather than missing, and model coefficients accordingly likely biased towards zero to the extent that such characteristics were not recorded. We also acknowledge that for the youngest cohorts of musicians in particular, data on their careers after 2004 is missing. Again, this means that our findings are more conservative than otherwise, and less rather than more likely to generate false positives. Further, a more complete biographical source on British jazz musicians does not exist; an improved source would require significant archival research effort. Additionally, we can be relatively confident that our outcome variable is valid and reliable: the Lord Discography (2020) has been augmented and updated continuously since the first edition in 1992, drawing on existing discographical sources, the cooperation of recording companies, and a range of jazz periodicals.

Secondly, we note that the dataset was created by a team of 5 human coders, potentially increasing scope for inconsistency. We mitigated this via a highly-specified specifying frame explicitly; in addition, Chilton's thoroughness aided coding. The set of 983 nodes was also checked repeatedly against the hard copy of the text for completeness and spelling errors. We also acknowledge that number of recordings is arguably an imperfect measure of career output, in that it does not take into account record sales, or other types of success, such as income earned from composition, arrangement or live performance; or non-pecuniary rewards such as prizes and awards, or the regard of peers or wider society. 'Success' is multidimensional as well as subjective. Nevertheless, the number of recordings on which musicians feature does capture to an extent their musical output in relating to how far they were in demand by recording companies and bandleaders.

	Model 1 Female status only	SE	p-value	Model 2 Female status plus birth cohort	SE	p-value	Model 3 Female status plus cohort/education/ career characteristics	SE	p-value	Model 4 Female status plus cohort/education/c areer characteristics and network variables	SE	p-value
<b>Constant</b>	3.931	0.049	<0.001	3.776	0.095	<0.001	3.327	0.146	<0.001	-10.368	2.820	<0.001
<b>Female</b>	-0.709	0.251	0.005	-0.699	0.255	0.006	-0.688	0.323	0.033	-0.603	0.307	0.049
<b>Born 1890-99</b>				-0.105	0.313	0.738	-0.023	0.309	0.942	0.022	0.300	0.943
<b>Born 1900-09</b>				0.203	0.177	0.251	0.155	0.177	0.383	0.302	0.171	0.077
<b>Born 1910-19</b>				-0.038	0.177	0.828	-0.093	0.176	0.596	0.018	0.167	0.916
<b>Born 1930-39</b>				0.259	0.138	0.061	0.162	0.138	0.239	0.355	0.134	0.008
<b>Born 1940-49</b>				0.455	0.163	0.005	0.409	0.170	0.016	0.581	0.164	<0.001
<b>Born 1950-59</b>				0.270	0.237	0.257	0.102	0.247	0.679	0.409	0.240	0.088
<b>Born 1960-69</b>				0.254	0.194	0.190	0.111	0.208	0.596	0.415	0.205	0.043
<b>Born 1970-79</b>				-0.445	0.306	0.147	-0.683	0.324	0.035	-0.288	0.312	0.356
<b>Formal music education</b>							0.141	0.137	0.305	0.107	0.130	0.411
<b>Armed forces</b>							0.215	0.116	0.065	0.151	0.111	0.175
<b>Church music background</b>							0.465	0.447	0.298	0.034	0.427	0.936
<b>Live performance band leader</b>							-0.158	0.105	0.132	-0.241	0.100	0.016
<b>Recording band leader</b>							0.435	0.157	0.006	0.198	0.152	0.193
<b>Composer</b>							0.313	0.124	0.011	0.234	0.120	0.052
<b>Arranger</b>							0.049	0.133	0.711	0.031	0.126	0.807
<b>Emigrated</b>							0.118	0.146	0.419	0.191	0.139	0.170
<b>Immigrated</b>							-0.268	0.176	0.128	-0.161	0.168	0.338
<b>Toured overseas</b>							0.361	0.101	<0.001	0.190	0.097	0.052
<b>Cruise ships</b>							-0.042	0.236	0.859	-0.228	0.225	0.312
<b>Teacher</b>							0.083	0.162	0.610	0.025	0.155	0.871
<b>Number of instruments played</b>							0.089	0.045	0.049	0.079	0.043	0.067
<b>Vocalist</b>							0.003	0.310	0.992	0.036	0.295	0.903
<b>Freeman centrality</b>										39.688	11.682	0.001
<b>Eigenvector centrality</b>										-6.240	2.617	0.017
<b>Closeness centrality</b>										2.069	0.438	<0.001
<b>Betweenness centrality</b>										-7.785	18.034	0.666
<b>N</b>	971			971			971			971		
<b>Adjusted R2</b>	0.007			0.016			0.060			0.129		

Table 5: Hierarchical regression of recording productivity. Source: Chilton *Who's Who in British Jazz* (2004) sample of jazz musicians and authors' analysis.

In addition, the network could be criticised as partial. It does not reflect the entirety of the British jazz universe, which also included agents, publishers, promoters, festival directors, recording company executives, producers, critics and so on. To reiterate, provision of a complete universe would require a major research effort, and our questions of interest can be at least partly answered with the data at hand.

## **Conclusion**

In its earliest years, jazz was dominated by male musicians, admitting a small minority of women (primarily vocalists) and largely performed in male spaces. As the decades progressed and the genre gathered prestige, female musicians have clearly been disadvantaged. Women remain less likely to attend jazz concerts, and they also appear to derive less status from consuming jazz than classical music, at least in that status is a weaker driver of attendance for women than men.

Moreover, our analysis of women in the space of jazz performance is consistent with Burt's conception of gender and social capital. The qualitative literature suggests that women are perceived as lacking legitimacy and credibility as musicians within a male genre. Female jazz artists therefore strategise differently to men: they require (male) sponsors to progress. While we do not examine careers longitudinally, our tests for differences in centrality for women and men demonstrates that while they do not differ significantly in terms of Freeman or betweenness centrality, female jazz musicians feature significantly lower eigenvector and closeness centrality. Moreover, while male musicians demonstrate homophily, female musicians demonstrate heterophily in their connections: they are more likely to connect to men. This is so even taking into account the connections generated by women-only bands and initiatives. Results from our models of recording output suggest that the negative association between female status and recording output is overwhelmingly direct rather than mediated by differential career and musical characteristics, or network position.

Implications are twofold, relating to symbolic recognition, and more wholesale change. There are clear cases in the qualitative literature of male musicians serving as sponsors: allyship is salutary even if it cannot solve structural problems. It is possible that more formalised institutions and policies - such as recruitment strategies by the National Jazz Youth Orchestra, recruitment to jazz degree courses, programming choices by public interest broadcasters, and establishment and allocation of awards - may work effectively to address structural biases. Equally, our analysis of Taking Part suggests that programming biases may well originate within audiences as much as within communities of musicians and the music industry more broadly: audiences more heavily dominated by men have power as consumers, and tend to know what they want. The challenge for a more progressive jazz world is for those with more agency, whether consumers or producers, to change what they want.

Finally, we return to the question of why female exclusion from jazz *matters*, given that other genres are also heavily-gendered, and careers in jazz risky and badly-paid.<sup>3</sup> There is no shortage of highly-accomplished jazz musicians; with live performance and recording markets unable to sustain secure careers, much of which are ultimately supported via teaching, it is understandable that gatekeepers select for characteristics they perceive will improve their position. Indeed, homosociality is perhaps a consequence of the intensity of competition among performers rendering careers fragile for women and men alike. However, social scientists and society more broadly should not only care about inequality of access to totemic professions and roles, such as representation at the annual BBC Proms, the Oscars, in politics or on the boards of major companies. These questions matter for those working within the jazz community, and those who would otherwise benefit if it were debiased. Structural redress also requires attention to sectors and fields where there is little wider public awareness and which do not generate emotional responses outside the scene itself, otherwise leaving the marginalised within them to their own efforts and resources.

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<sup>3</sup> Over half of jazz musicians surveyed in 2008 reported earnings of less than £10000 (Riley and Laing 2010: 31).

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*Datasets for this article available on request from the corresponding author.*

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