Style shifting and the phonetic performance of gay vs. straight

A case study from French

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This article examines the phonetic characteristics of speech performed in straight and gay styles by French males. Analysis considers features shown in other languages or in antecedent literature to be associated with perceptions of sexual identity: segmental quality (vowels, /s/, liquids), suprasegmental features (pitch, duration), and a number of language-specific variables. Results suggest that straight performances are characterized by decreased segmental duration and gay performances by differential use of vowel space, especially F2, nasal vowel duration, and fundamental frequency. A closing section provides comparison of these results to previous study and to other languages, while also addressing epistemological concerns raised by questions of identity, performance, and linguistic form.

Keywords: French, gay, straight, performance, phonetics

1. Introduction

It is frequently acknowledged that an individual's real or perceived sexual orientation can be inferred from speech patterns, among other attributes. While it would be simplistic to assert that identity and phonetic performance are inherently linked, the suggestion that phonetic patterns may be associated with socially salient identities – including sexuality – is one that leads to several interesting questions, particularly concerning the features or components of articulation or phonetic styles are associated with identity and how similar these features and their implementation are across languages and speech communities. This study looks to French data, building upon an Italian study by the present author as well as other antecedent research.

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Although there has been a good deal of interest in language and sexuality in French (see e.g. Ince 2002, Provencher 2010, 2011), there has been little attention given to the intersection of speech or phonetics, performance and style, and sexual identity. This article examines French male speakers' style shifting, focusing on those segmental and suprasegmental features that are suggested to be associated to gay speech in previous studies, or which have been shown as such in related languages. This article proceeds as follows. A first section provides a background to the question at hand, noting the conclusions drawn from prior research, while also offering measured critique of these. Next, the study methodology is reviewed, making particular reference to antecedent works that frame it. Subsequent sections are dedicated to a study of French male speaker output and to data emerging from their stylized performances. Reviewed in conclusion are questions pertaining to methodological, epistemological, and theoretical issues.

2. Background

Even before the advent of gay and lesbian rights movements, the putative particularity of gay styled speech had been documented and theorized, initially as a clinical or diagnostic approach to supposed deficiencies (see e.g. Hayes 1981). So-called "gay speak" proved fertile enough ground that researchers could in the mid-1990s make reference to a menu of linguistic cues implicated in the linguistic encoding of sexual identity, especially that of gay males (Zwicky 1997). One constellation of research activity has concentrated on the speech patterns associated with the reality and content of supposed gay accents, sometimes referred to as the auditory component of "gaydar," i.e. the ability to distinguish a gay from a straight individual, absent overt declarations of orientation. Consensus about the content of this accent is lacking, even if a number of trends may be noted in the literature. For example, several sources attests to the salience of sibilant and lateral qualities (e.g. Crist 1997, Gaudio 1994, Linville 1998, Munson, Jefferson & McDonald 2006), gay-straight distinctions concerning vowel formants and the use of vowel space (e.g. Linville 1998, Munson, McDonald, DeBoe & White 2006, Pierrehumbert, Bent, Munson, Bradlow & Bailey 2004), and the relative distinctiveness of gay pitch patterns (e.g. Smyth, Jacobs & Rogers 2003), as well as prosody and intonation contours (e.g. Gaudio 1994, Munson et al. 2006). Other research has situated the locus of distinctiveness in the perceptual dimension, i.e. on what listeners attribute to gay identity, including perception of segmental and auto-segmental features seen in Gaudio (1994), Linville (1998), Smyth, Jacobs & Rogers (2003), and Levon (2006), as well as the intersections between these perceived sexual and

socio-economic or – cultural identities, noted especially in Pharao, Maegaard, Spindler Møller & Kristiansen (2014).

Assertions that gay individuals use language in a way that is inevitably or incontrovertibly distinct from non-gay individuals have been called into question, generally coalescing around two considerations. Firstly, many sources and the research underpinning them appear to be based on an *a priori* acceptance of heterosexual speech patterns as normal and, conversely, of gay patterns as divergent: this would seem to imply that straight speakers use language in an unmarked manner, but gay speakers in a marked manner (see discussion in Kulick 2000, Levon 2006). Secondly, essentialist tendencies are noted: these rest on an assumption that behavior is innately borne of or inevitably arises from identity or psychological "truth." To cite but a few examples, Levon (2006) argues that a bidirectional implication between psychological reality (orientation) and linguistic behavior (articulation) reifies identity and reinforces a homogeneous division of speakers and communities along sexual lines. Similarly, Eckert and Podesva (2011) argue that all speech acts are imbued with identity, asserting that "sounding gay" and "sounding straight" are both positive, effortful, learned behaviors. In this respect, the association of identity to output can be seen as an attribution error, by which a behavior is understood to be the byproduct of intrinsic properties of the person, without reference to any other factors or forces (McConnell-Ginet 2011: 41; see also Pettigrew 1979).

Critiques of previous work and methodologies should not be taken to deny the existence of a gay speech style – or a straight one, for that matter. Rather, it may be argued that speech patterns need not be inevitably or inextricably correlated to identity: for example, a straight-identified male might well be perceived as gay, whereas a gay-identified male might be perceived as straight. Furthermore, speakers of any identity may shift between styles for any number of reasons, depending on a host of social and psychological factors and constraints (see e.g. Podesva 2011a, 2011b for discussion and example analysis of style shifting and its association to socially-constructed stereotypes, e.g. the "gay partier persona" in California English). If research is to fully contend with phonetic patterns as a salient vehicle of identity demarcation among many others, as well as a means of situating the self within a speech community, it is more tenable to consider the phonetic surface forms to be performances indexed to social status, rather than the byproduct of a psychological status.

As can be noted above, research into the phonetic characteristics of gay speech has overwhelmingly focused on English, with moreover a particular emphasis on North American varieties of the language (cf. Munson & Babel 2007). Among the few published sources looking at other speech communities, a handful may be

cited: German (Guzik 2006); Puerto Rican Spanish (Mack 2010); Danish (Pharao et al. 2014); and Italian (Russell 2015). Regarding French, in particular, there have been very few studies, most of which concern lexico-semantic characteristics (Higgins 2004, Paveau 2008): among the features frequently cited in popular press and social media for the *accent gay* or *homosexuel* are those also found in English (lisping or *zézaiement*) and statements that point to increased pitch range and maxima, and exaggerated vowel length. Sisson (2003) and Bourgeois and Quillet (2004) are the only sources known to this author specifically attending to phonetic characteristics in the language; their observations and the variables they consider, along with those noted in other languages, form a baseline for and define the scope of the present study.

Using recordings of scripted speech in Canadian English and Quebec French, Sisson (2003) investigated divergences in pitch range and sibilant qualities, concluding that gay speech is distinguished from straight speech by increased pitch window or range in English, and by increased sibilant duration in French. One potential shortcoming of this study concerns the correlation between output (i.e. measured patterns) and identity (i.e. gay or straight), as the link between orientation and performance assumed: participants were divided according to self-identified orientations, and were presumed to be representative of these, although the author did conduct stereotype fitting by asking native-speaker judgments of whether the participants indeed sounded "gay" or "straight."

A much broader study of French was undertaken by Bourgeois and Quillet (2004), who compare the vowel and fundamental frequency characteristics of different homo- and heterosexual pairings: gay men vis-à-vis straight women and straight men vis-à-vis lesbian women. While their study is suggestive of phonetic trends, several foundational problems leave their conclusions open to criticism. Firstly, the authors selected as participants "hommes homosexuels à la voix plus aiguë et des femmes homosexuelles à la voix plus grave" ('homosexual men with higher voices and homosexual women with lower voices') (Bourgeois & Quillet 2004: 124), effectively establishing a circuitous logic, especially since they also define female vocal characteristics as involving a higher timbre and that of males as being lower (Bourgeois & Quillet 2004: 122–123). Given this parameter, it should come as no surprise that they found similarities between fundamental frequencies of straight women and gay men, as well as a handful of similarities involving the articulatory characteristics of vowels, especially mid and rounded, however non-uniform these may be across the subjects and pairings.

3. Methodology and foci

The present work applies the methodology outlined in Russell (2015) to the study of gay- and straight-styled speech in French and, as such, represents an extension of the research agenda outlined therein. This methodological approach compares overtly performed speech acts, building on e.g. Bell's (1984, 2001) audience design model or Schilling-Estes' (1998) understanding of performance-predicated style shifting (see also Coupland 2001). This investigation is thus unconcerned with the truth of psychological identity (here, a speaker's sexuality) or the socio-psychological content and construction of the binary – and certainly questionable – opposition between gay and straight categories. Instead, it focuses on the instantiation of salient, socially-construed categories and the differences between performances provided by carefully selected speakers who are presumed to be sufficiently familiar with both sub-groups, as well as the speech styles commonly associated with them. Thus, it is not only individual acts that are compared, but the differences between acts predicated by performative goals: how speakers change their behavior when they are asked to "sound gay" or "sound straight." In what follows, an outline of the methodology is provided; the last section of this article discusses a number of theoretical and epistemological concerns that arise from it.

3.1 Subject recruitment and selection

Eighteen native French-speaking males were contacted during a research residence in Paris and from a list of expatriate contacts affiliated with the graduate and professional schools at the University of California, Davis.[1] During the initial phase of contact, potential subjects were asked to complete a three-part self-assessment used to infer familiarity and comfort with persons of different sexual orientations than their own (see Appendix A). Part one asked subjects to rate weekly interaction with persons of a number of different backgrounds on a scale of 1 (no or very infrequent interaction) to 5 (regular or very frequent interaction); part two focused on subject openness to close friendship with persons of the same descriptors, ranked on a scale of 1 (very uncomfortable) to 5 (very comfortable); and part three asked potential subjects to indicate approximate percentages of intimate relations, defined as "friend or family member with whom you interact regularly and would discuss private matters, such as relationships or personal difficulties," who could

1. The reader will note that the socio-cultural background of participants (educated urban dwellers) inevitably restricts any inferences that may be drawn with regard to the wider speech community.

be described according to twenty identifiers. For each assessment, sexual identity was included among a number of distractors, e.g. persons of different religious or socio-economic statuses. Additional screening concerned self-reported pathologies (hearing and/or motor skill deficiencies).

Speakers who reported a high degree of comfort with persons of differing sexual orientation than themselves or reported more than 33% of their intimate relations as being LGBT-identified were invited to participate in the study ($n = 8$). Ultimately, six speakers aged 25–34 (average age 31.7) were able to participate; two others were selected and agreed to take part, but ultimately did not complete the study for reasons unrelated to the project or its parameters. Among these six (hereafter referred to as participants), the average self-reported frequency of interaction with persons of a different sexual identity was 3.33 on the scale noted above (range 2–5) and the average self-reported comfort with these persons was 4.83 (range 4–5). Participants self-assessed an average 28.3% of persons with whom they had an intimate relationship as being gay-identified (range 10–70%). From this, it can be reasonably inferred that the participant subject pool was comprised of individuals who had regular, if variable, contact with both gay and straight French-speakers; furthermore, all indicated that one of their closest relationships was with a person who identified as being of a different sexual orientation than their own. Participants were not asked to disclose their sexual orientation or identity at any time, although some did in follow-up interviews: two self-identified as gay and one indicated that friends had chided him for "sounding gay," although he identified as straight.

Four of the six participants were born, educated, and had close ties to the northern regions of France (one each from Nord-Pas-de-Calais and Centre, and two from Ile-de-France). Of the remaining participants, one indicated only "France" as his place of origin (stating he had moved frequently as a child), and another New Caledonia as a place of birth, with formative years and education having taken place in a number of locales in Hexagonal France. Regional or non-standard speech patterns were controlled for by means of additional self-reporting: all selected participants stated that they spoke without an identifiable regional accent, a fact confirmed by both the author and two other native speakers' anonymous judgment: one participant indicated that he was able to employ "un accent méridional" ('a southern accent') when visiting family in and around Toulouse, although this was not noted in the recordings. All selected participants reported proficiency in English, with varying knowledge of additional languages, including Spanish, Italian, Mandarin, and German; notwithstanding, all listed French as the language used in family from birth, their dominant language at present, and their usual means of daily communication with intimate relations (family, spouses/partners, close friends).

3.2 Stimuli and recording

Participants were asked to read three passages varying according to communicative task: an introductory passage in which the speaker presented himself as a third person, a scientific paragraph (taken from the Wikipedia entry on snow),[2] and a narrative retell describing the speaker having witnessed a traffic accident (see Appendix B; viz. Smyth, Jacobs & Rogers 2003). All stimuli texts were controlled for obvious lexical indices to sexual orientation. Participants were provided transcripts of the three passages between one and four days prior to recording, in order that they familiarize themselves with these and provide feedback as necessary (for example, if they felt words should be modified, added, or deleted). They were told they would be recorded reading each passage at least three times, and that they would be asked to employ varying speech styles; speakers were not informed of the specific performative requests or of the goals of the study prior to the recording session. All speakers indicated that they were comfortable reading the passages prior to the recording sessions; none made modifications to the textual stimuli.

Recordings were conducted in a semi-insonorized room with only the author and each participant present. During these sessions, speakers were given an initial period of practice to familiarize themselves with the procedures and equipment, and allowed to complete at least one trial instantiation of each paragraph. Recordings were made using CA Digital USB headphone-speakers directly onto a PC running Audacity 1.3.13, using a 22.05 kHz sampling rate; files were saved in *.wav format for subsequent analysis.

For the first round of recordings, participants were asked to read each paragraph in a neutral style, which was described as neither overly formal nor informal, neither particularly fast nor slow, as if they were interacting with a group of unknown native collocutors in a manner that would be usual for them. Importantly, no mention was made for the first block of recordings of any association with or projection of sexual identity. Speakers were recorded reading each of the paragraphs in this style before moving on to subsequent tasks: these recordings and resulting data were labeled as neutral (N).[3]

Participants were then asked to reread each paragraph, in the same order, with the goal of ensuring an imagined audience that they identified and should be perceived as straight, i.e. to project a heterosexual persona. Participants were offered additional time to practice prior to recording, and were further instructed

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2. http://fr.wikipedia.org/wiki/Neige (consulted 20 July 2013)

3. It is not claimed that any style is truly neutral. In what follows, as in Russell (2015), data labeled "neutral" should be understood as unmarked for the positive activation of a sexual identity or persona.

that they should adhere as closely as possible to the scripted text, i.e. to avoid adding, removing, or modifying words, expressions, or parts of the text passage that were not present in the initial recording block.[4] These recordings were labeled straight (S) performances. Finally, this procedure was repeated using instructions complementary to those of the preceding task, with the only modification that participants were asked to read the respective paragraphs with the goal of projecting homosexuality, again regardless of whether this were real or imagined. These were labeled gay (G) performances. Participants were informed that they could stop the recording at any time or ask to redo or decline to participate in any task: all participants indicated that they understood and were comfortable with the requests and instructions.

3.3 Phonemic and phonetic variables

The features targeted in this parallel those from prior work on French, notably Sisson (2003) and Bourgeois and Quillet (2004): additional features were selected in order to facilitate comparison to other languages, especially the Italian liquid data and those pertaining to segmental and supra-segmental duration given in Russell (2015). Suprasegemental variables investigated include pitch (F0; high and low, measured over the rhythmic group, as well as pitch range, calculated as the envelope between high and low), the duration of phonological phrases and focal elements, and instances of obligatory, optional, and non-standard liaison. The latter variables were included as these are known to index style in French (see below).

Segmental investigation considered the phonemic vowels of French, i.e. those elements which were the focus of Bourgeois and Quillet (2004): the oral vowels /i, y, u, e, ɛ, o, a/, schwa (usually transcribed as /ə/ and variably manifest as [œ] or [ø], less frequently as [ɛ], and also frequently elided), and nasal vowels /ɛ̃, ɑ̃, ɔ̃/.[5] Additional focus was given to sibilant /s/, lateral /l/, and rhotic /ʁ/, the latter having been shown to be significant in both gay and straight styles in Italian (Russell 2015). Duration measurements for all segments were calculated from the onset of formant structure until its offset or interruption, including any obvious coarticulatory overlap with adjacent segments, in the case of vowels and liquids, and from the beginning and end of sibilant-like high frequency noise, in the case of /s/. For oral vowels and liquids, measurements of first (F1) and second (F2) formants were taken at the vowel midpoint and rounded to the nearest 5 Hz. The center of gravity

4. Hesitations, pauses, and phatic insertions variably employed by participants are not described or analyzed here.

5. /o/ and /ɔ/, which usually contrast according to phonotactic environment, were concatenated for purposes of description and analysis; no instances of [œ̃] were noted in the data.

(COG) of sibilant /s/ was calculated as the average peak frequency of the middle 50% of consonant duration and also rounded to the nearest 5 Hz. Also quantified were rates of schwa elision, i.e. the variable articulation or suppression of /ə/, which others have shown to be indexed to socio-cultural identity and provenance (see e.g. Hansen 2000, Léon 1993, Walter 1990).

Because of variable speech rates and vowel elision, especially those affecting clitics and schwa, the number of data points was not uniform across speakers and tasks. The duration of recordings also varied according to speech act and style (Introductory average 16.78s, range 13.89–25.87s; Scientific average 32.58s, range 28.42–42.43s; Narrative average 23.76s, range 20.95–28.04s). A maximum of 1434 possible data points were contained in the stimuli paragraphs, not including privative measurements (e.g. liaison): these included 49 instances of /s/, 45 of /l/, 57 of /ʁ/, 42 of nasal vowels, and 284 of oral vowels (39 /i/, 39 /e/, 34 /ɛ/, 62 /a/, 28 /y/, 15 /u/, 20 /o/, and 47 /ə/), as well as 38 phonological phrases and 51 focal elements. All quantitative measurement was done using Praat 5.3.23 running on MacOSX 10.7.5. For all speakers and recordings, pitch was calculated using Praat's tracking function and visually verified, e.g. to correct for microphone burst, and rounded to the nearest 0.1 Hz; duration for all variables was rounded to the nearest ms.

4. Results

This section reviews data emerging from participant performances, organized according to variable and feature. In what follows, probability and strength of correlation were calculated across all speakers and instantiations of a given variable using a two-tailed t-test and multiple regression analysis, respectively, providing three-way comparison: neutral to straight (N:S), neutral to gay (N:G), and straight to gay (S:G). This, in effect, demonstrates the extent to which participants diverged from their idiosyncratic baseline when performing the same task in one of the two marked styles. Measurements of correlation and reliability (R) were calculated using strict linear relationships defined according to the position of instantiation, e.g. measurements of the vowel of *neige* in the sentence "la neige se forme généralement dans les hautes couches…" was cast as a linear regression of relation between a given style pairing (N:G, N:S, S:G), and not compared to other instantiations of the same phonemic vowel in different positions or environments, e.g. in *celle* of "celle-ci n'a rien à voir…" Coefficiency was thus calculated between parallel token values (F1, F2, duration, etc.) distinguished by style, and simple linear regression conducted without a fixed intercept.

The results presented and reviewed below should be understood as indicative not of an absolute measure of any particular feature or property, but as an expression of the emergent differences pertaining to a feature or property compared

across stylized tasks, as well as the relative strength of predictive reliability across a given data set and of the relative linear predictability of variation. Elided or missing segments were untagged, such that averages, correlation, and probability were calculated only across instantiated tokens (i.e. elided elements were not calculated as zeroes). Speaker-specific averages are also given for both style and task, except in the case of pitch measurements, for which calculation was aggregated across all tasks due to the small number of tokens. In all discussion, only those results that were significant and of at least possible meaningfulness are presented.

4.1 Suprasegmentals

Although variably inclusive of other factors, pitch may be equated to fundamental frequency (F0) and pitch movements over time qualified on a gradient, relative scale of low to high. As it concerns the present study, one of the most common statements in popular literature hints that pitch patterns constitute a salient feature of gay style, a supposition supported by both Sisson (2003) and Bourgeois and Quillet (2004). For the purpose of data presentation and analysis, pitch measurements were made over phonological phrases, also referred to as intonational phrases or rhythmic groups, a prosodic unit with a single, relatively discernable intonation contour: measurements are given for average, maxima, minima, and envelope (expressed as the mean between pitch high and low), as in Table 1.

At first glance, these data appear to be demonstrative of G particularities, notably increased F0 maxima and minima, as well as wider F0 windows. Indeed, inter-speaker G data are robust and significant in this regard. However, closer inspection of individual results highlights a lack of uniformity: maxima and minima trends hold for only three speakers, and the differences in pitch window are significant for only two of them. It should also be noted that averages were influenced by one speaker (TC), whose G performances involved exaggerated intonation patterns; although results were similar when this speaker's data were excised, they were weaker for High, Low, and Window ($p < 0.1$ for N:G and G:S). For other speakers, the distinction does not appear to be between G and N or S, but between N and G/S, suggesting that they interpreted the latter two styles as less formal. Collectively, this suggests that increased pitch maxima, minima, and envelope may, but do not invariably characterize G styled speech.

Duration measurements were also taken of phonological phrases, as in Table 2, showing a generalized trend: the longest durations are seen in G and the shortest in S performances, with N being intermediate. Looking at speaker-specific results, the differences between G and S maintain: the former is always longer than the latter (and significantly so), but the distinction between these and N performances is not uniform. It is also consistently noted that S phonological phrases have the shortest average duration by speaker, even if there is some task-specific variability

Table 1. Pitch

		style		
		N	**S**	**G**
Average	**High**	142	143	183
	Low	105	107	118
	Window	37	37	65
		N:S	**N:G**	**S:G**
F0 High	***R***	0.700	0.203	0.267
	p	0.573	<0.0001	<0.0001
F0 Low	***R***	0.757	0.322	0.417
	p	<0.1	<0.0001	<0.0001
F0 Window	***R***	0.507	0.300	0.290
	p	0.621	<0.0001	<0.0001
speaker		**N**	**S**	**G**
DG	F0 High	177	177	168
	F0 Low	130	134	134
	F0 Window	47	43	35
HO	F0 High	156	136	151
	F0 Low	117	108	111
	F0 Window	39	27	40
KA	F0 High	144	156	192
	F0 Low	96	102	108
	F0 Window	48	54	82
MS	F0 High	117	119	147
	F0 Low	94	96	104
	F0 Window	22	22	42
TC	F0 High	140	145	307
	F0 Low	99	104	153
	F0 Window	42	41	155
XR	F0 High	118	125	127
	F0 Low	94	95	95
	F0 Window	24	31	32

in this regard. This is most suggestive of a negative (i.e. decreased) durational association with S and a positive association with G, with the latter being aligned with N for some, but not all participants.

Similar data were tabulated for sentential elements in prosodic focus positions, i.e. for elements appearing sentence-finally, post-verbally, or in clefted adjuncts.[6]

6. French places relatively strict conditions on focus arguments, which rarely – if ever – appear pre-verbally (Lambrecht 1994: 222–235).

Table 2. Phonological phrase duration (in ms)

		style		
		N	**S**	**G**
	Average	1683	1597	1733
		N:S	**N:G**	**S:G**
	R	0.948	0.908	0.931
	p	<0.0001	<0.1	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	1588	1485	1505
	Intro.	1060	940	860
	Scientific	2189	2146	2209
	Narrative	1562	1504	1414
HO	All	1557	1481	1550
	Intro.	1050	920	840
	Scientific	2117	2067	2221
	Narrative	1551	1462	1654
KA	All	1789	1575	1665
	Intro.	1130	900	920
	Scientific	2579	2500	2614
	Narrative	1712	1385	1521
MS	All	1684	1593	1729
	Intro.	970	900	980
	Scientific	2327	2067	2324
	Narrative	1819	1866	1951
TC	All	1742	1727	2107
	Intro.	1140	1150	1460
	Scientific	2356	2408	3060
	Narrative	1781	1676	1853
XR	All	1740	1715	1843
	Intro.	1130	1090	1120
	Scientific	2324	2252	2533
	Narrative	1814	1859	1941

These are given in Table 3. Focal data are similar to that noted for the phonological phrase: the shortest durations obtained in S and the longest in G performances. It should be noted that the association between G and increased duration is less than categorical: this holds for five speakers and is of questionable significance among several of these. Like the phonological phrase, focus data suggest a negative association with S and, albeit less categorically, a positive association with G.

Table 3. Focus duration (in ms)

		style		
		N	**S**	**G**
	Average	438	416	451
		N:S	**N:G**	**S:G**
	R	0.881	0.834	0.852
	p	<0.0001	<0.1	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	393	392	415
	Intro.	306	277	357
	Scientific	438	454	454
	Narrative	418	422	422
HO	All	443	417	461
	Intro.	384	334	359
	Scientific	498	489	496
	Narrative	430	401	511
KA	All	497	445	461
	Intro.	360	323	334
	Scientific	587	544	547
	Narrative	511	435	473
MS	All	444	412	450
	Intro.	318	297	341
	Scientific	514	471	494
	Narrative	471	444	494
TC	All	424	413	491
	Intro.	357	358	397
	Scientific	466	476	595
	Narrative	434	386	453
XR	All	425	412	437
	Intro.	351	341	360
	Scientific	464	446	472
	Narrative	443	435	465

Also quantified were inter- and intra-speaker rates of liaison, i.e. the realization of latent consonants in licensed environments and of any differences in these among the performances. It was expected variation, if any, would be noted for the so-called *liaisons facultatives*, e.g. "pouvant_être" or "avait_écrasé," whereas this was not expected to arise among *liaisons obligatoires*, e.g. "des_amis."[7] Although there was an unsurprisingly great deal of inter-speaker variability, the only noted intra-speaker shifts concerned N versus both G and S performances: there were, in fact, only three instances of variation contrasting the former with the latter two styles, and none in which G and S performances differed. This suggests that liaison does not index G or S, although it may play a role in the encoding of formality, an observation that is supported in antecedent literature (see e.g. Encrevé 1988, Mallet 2008).

4.2 Consonants

The spectral and temporal characteristics of sibiliants, particularly /s/, may well be the most caricatured and widely studied attributes of gay speech, notably in English (Mack & Munson 2012, Podesva & van Hofwegen 2014, van Borsel, de Bruyn, Lefebvre, Sokoloff, de Ley & Baudonck 2009). Results from this study pertaining to /s/ duration and COG, provided in Tables 4a and 4b, hint at a much more complex picture pertaining to the indexicality of sibilant qualities as characteristic of both G and S in French.

The durational data in Table 4a supports some of the conclusions drawn by Sisson (2003), with an important distinction: it is noted that the shortest /s/ obtain in S performances, although there is a good deal of inter- and intra-speaker variability in this regard and, for some speakers at least, the differences are of questionable significance. At the same time, G data were similar to N, with the obvious exception being participant TC (who employed exaggerated pitch contours, mentioned above). This suggests that durational attributes are negatively associated with S; however, the data are not strong enough to allow for a conclusive, positive association to G. By contrast, the data do hint at an association between increased COG and G, i.e. an increase in peak frequency averages that would obtain by the relatively greater protrusion of the tongue apex during occlusion. As can be seen in Table 4b, the highest average COG obtained in G performances; this trend maintains for all but one speaker. The data are far less conclusive as it concerns

7. The topic of liaison is certainly one of the more studied in French phonology, and full coverage of these matters far exceeds the scope and limitations of this study. Readers unfamiliar with the topic of liaison are referred to Tranel (1987) and Walker (2001) for general overview of the conditions and constraints on this phenomenon, especially *liaison facultative*.

Table 4a. /s/ duration (in ms)

		style		
		N	**S**	**G**
	Average	108	102	109
		N:S	**N:G**	**S:G**
	R	0.733	0.648	0.693
	p	<0.001	0.448	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	108	97	108
	Intro.	103	86	103
	Scientific	102	95	100
	Narrative	124	108	128
HO	All	102	99	106
	Intro.	103	95	104
	Scientific	96	94	101
	Narrative	115	112	120
KA	All	105	100	102
	Intro.	93	80	95
	Scientific	103	105	102
	Narrative	120	103	105
MS	All	109	103	107
	Intro.	102	97	101
	Scientific	108	102	107
	Narrative	118	110	112
TC	All	106	100	120
	Intro.	109	105	111
	Scientific	102	100	131
	Narrative	113	94	105
XR	All	112	112	110
	Intro.	103	112	94
	Scientific	113	110	110
	Narrative	116	116	122

any indexing of sibilant quality to S; the lowest average COG almost always obtain from these performances across all speakers and tasks, but the relative distinction between S and N or G is far from uniform, with some speakers' S output being more like N. It should be further noted that minor acoustic differences (e.g. of <100 Hz) may not be readily perceptible at higher frequencies, weakening any inferences that may be made from the above.

Table 4b. /s/ COG (Hz)

		style		
		N	**S**	**G**
	Average	4903	4914	4967
		N:S	**N:G**	**S:G**
	R	0.4088	0.419	0.474
	p	0.387	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	4990	4994	5017
	Intro.	4950	5107	5110
	Scientific	4944	4961	5001
	Narrative	5112	4988	4967
HO	All	4880	4824	4850
	Intro.	4992	4950	4941
	Scientific	4834	4786	4840
	Narrative	4878	4804	4790
KA	All	4834	4863	4925
	Intro.	4814	4808	4922
	Scientific	4824	4845	4908
	Narrative	4870	4931	4958
MS	All	4942	5028	5064
	Intro.	4989	5054	5157
	Scientific	4898	5046	5059
	Narrative	4988	4973	4997
TC	All	4863	4848	4994
	Intro.	4852	5009	5037
	Scientific	4858	4741	4969
	Narrative	4883	4931	5007
XR	All	4889	4925	4939
	Intro.	4963	5042	5076
	Scientific	4858	4889	4874
	Narrative	4886	4896	4972

Italian liquid data in Russell (2015) were among the strongest and most predictable associations to both G and S styles in that language. It was thus considered important to investigate French lateral /l/ (always articulated as a "clear," i.e. non-velarized continuant) and dorsal /ʁ/, the articulatory manner varies in both stricture and voicing, as in Tables 5a, 5b and 6, respectively.

Table 5a. /l/ duration (in ms)

		style		
		N	**S**	**G**
	Average	43	40	44
		N:S	**N:G**	**S:G**
	R	0.459	0.420	0.447
	p	<0.1	0.287	<0.001
speaker	***task***	**N**	**S**	**G**
DG	All	40	36	36
	Intro.	35	31	36
	Scientific	43	39	35
	Narrative	38	33	37
HO	All	41	33	53
	Intro.	43	34	58
	Scientific	42	35	53
	Narrative	37	29	51
KA	All	43	39	41
	Intro.	41	36	37
	Scientific	44	44	43
	Narrative	41	32	41
MS	All	46	46	44
	Intro.	44	49	33
	Scientific	50	45	48
	Narrative	39	45	43
TC	All	41	41	48
	Intro.	56	46	45
	Scientific	39	43	57
	Narrative	38	37	33
XR	All	43	46	44
	Intro.	54	39	42
	Scientific	44	49	46
	Narrative	38	46	43

French /l/ durational data suggest weak associations to style among some speakers, but are generally inconclusive. For all but one speaker, the relative duration of /l/ is less in S than in G, although this is not always significant and the distinction between N and G is far from categorical. F2 results are, however, strongly suggestive of an association with G, as in Table 5b. This holds both generally and for all but one speaker: significantly higher F2 measurements obtained in G vis-à-vis

Table 5b. /l/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	1604	1601	1627
		N:S	**N:G**	**S:G**
	R	0.731	0.740	0.766
	p	0.803	<0.1	<0.01
speaker	***task***	**N**	**S**	**G**
DG	All	1781	1738	1786
	Intro.	1820	1792	1961
	Scientific	1755	1722	1726
	Narrative	1802	1736	1779
HO	All	1617	1622	1653
	Intro.	1646	1701	1711
	Scientific	1642	1605	1645
	Narrative	1564	1622	1640
KA	All	1610	1600	1665
	Intro.	1687	1723	1810
	Scientific	1542	1527	1616
	Narrative	1682	1682	1678
MS	All	1571	1594	1549
	Intro.	1597	1698	1615
	Scientific	1559	1586	1520
	Narrative	1580	1550	1561
TC	All	1526	1526	1556
	Intro.	1568	1557	1602
	Scientific	1515	1550	1580
	Narrative	1524	1473	1490
XR	All	1568	1561	1593
	Intro.	1594	1624	1512
	Scientific	1578	1552	1583
	Narrative	1542	1537	1596

either N or S performances. Collectively, it appears that /l/ F2 is associated with G performances, whereas decreased /l/ duration, at least for some speakers, is associated to S.

In contrast with /l/, the duration of the dorsal (uvulo-velar or velar) rhotic /ʁ/ was significant for both S and G, establishing the three-way distinction noted in Table 6.

Table 6. /ʁ/ duration (in ms)

		style		
		N	**S**	**G**
	Average	63	51	74
		N:S	**N:G**	**S:G**
	R	0.645	0.462	0.416
	p	<0.0001	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	53	39	57
	Intro.	60	38	64
	Scientific	56	39	40
	Narrative	49	39	52
HO	All	67	58	74
	Intro.	64	51	74
	Scientific	66	58	77
	Narrative	68	58	72
KA	All	63	53	86
	Intro.	71	58	69
	Scientific	64	58	110
	Narrative	62	47	67
MS	All	75	60	79
	Intro.	63	59	78
	Scientific	78	63	86
	Narrative	74	57	73
TC	All	56	42	66
	Intro.	63	48	62
	Scientific	53	43	73
	Narrative	58	41	60
XR	All	64	57	79
	Intro.	68	60	76
	Scientific	53	45	69
	Narrative	73	67	88

As can be seen above, rhotic duration provides some of the most consistent correlation to both S and G: the longest /ʁ/ duration obtains in G and shortest in S for all speakers and nearly all tasks, with N results being generally intermediate to these. These results are similar to those obtained by (Russell 2015) in Italian, both in terms of their directionality and their scope. It should be noted that the formant characteristics of rhotic articulations, showed little variation by stylized performance (see e.g. Russell Webb 2002): no instances of non-dorsal rhotics were noted in participant recordings.

4.3 Vowels

Three features of vowels were measured, the results of which are presented below: duration, F1 and F2 mid-point averages. Concerning vocalic duration, it should be recalled that French syllables – and implicitly their nuclei – are not lexically-specified for stress or length, at least in convergent forms, although final syllables are generally acknowledged to be relatively longer (Tranel 1987: 49–50; Walker 2001: 42–44). Vowel duration results are given in Tables 7a through 7f. As above, only significant and possibly meaningful differences are discussed: for four vowels (/i, e, a/), no pattern was observed. Also note that, for purposes of presentational economy, presentation of nasal vowels /ɛ̃, ɑ̃, ɔ̃/ is concatenated.

Table 7a. /y/ duration (in ms)

		style		
		N	**S**	**G**
	Average	61	59	70
		N:S	**N:G**	**S:G**
	R	0.688	0.621	0.646
	p	0.462	<0.001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	59	59	63
	Intro.	97	82	102
	Scientific	51	52	58
	Narrative	57	58	58
HO	All	58	45	71
	Intro.	121	101	112
	Scientific	47	41	69
	Narrative	53	35	64
KA	All	69	62	70
	Intro.	79	96	108
	Scientific	66	71	68
	Narrative	69	50	66
MS	All	58	51	60
	Intro.	66	57	71
	Scientific	54	53	53
	Narrative	59	48	63
TC	All	62	67	87
	Intro.	81	97	122
	Scientific	49	61	89
	Narrative	68	65	78
XR	All	54	69	66
	Intro.	77	118	96
	Scientific	45	49	43
	Narrative	55	72	76

Table 7b. /u/ duration (in ms)

		style		
		N	**S**	**G**
	Average	77	73	91
		N:S	**N:G**	**S:G**
	R	0.739	0.489	0.601
	p	0.182	<0.1	<0.001
speaker	***task***	**N**	**S**	**G**
DG	All	71	57	65
	Intro.	59	49	59
	Scientific	67	55	61
	Narrative	79	63	70
HO	All	75	63	90
	Intro.	44	42	68
	Scientific	66	50	81
	Narrative	91	78	101
KA	All	94	83	106
	Intro.	95	68	150
	Scientific	84	81	68
	Narrative	99	90	109
MS	All	70	68	86
	Intro.	61	58	73
	Scientific	61	45	68
	Narrative	79	84	99
TC	All	69	82	108
	Intro.	61	81	171
	Scientific	70	60	70
	Narrative	72	90	95
XR	All	81	81	92
	Intro.	84	65	67
	Scientific	74	60	81
	Narrative	83	97	108

Table 7c. /ɛ/ duration (in ms)

		style		
		N	**S**	**G**
	Average	76	76	85
		N:S	**N:G**	**S:G**
	R	0.759	0.814	0.698
	p	0.896	<0.0001	<0.001
speaker	***task***	**N**	**S**	**G**
DG	All	64	67	75
	Intro.	57	55	52
	Scientific	80	96	86
	Narrative	58	56	80
HO	All	75	73	80
	Intro.	48	43	52
	Scientific	117	117	111
	Narrative	60	58	74
KA	All	96	88	99
	Intro.	62	51	59
	Scientific	169	152	169
	Narrative	57	59	67
MS	All	71	65	83
	Intro.	54	54	67
	Scientific	91	81	107
	Narrative	65	60	73
TC	All	72	85	85
	Intro.	61	71	71
	Scientific	93	100	105
	Narrative	62	81	76
XR	All	77	77	90
	Intro.	57	60	61
	Scientific	107	103	120
	Narrative	64	67	85

Table 7d. /o/ duration (in ms)

		style		
		N	**S**	**G**
	Average	69	66	73
		N:S	**N:G**	**S:G**
	R	0.711	0.463	0.514
	p	0.149	0.218	<0.1
speaker	***task***	**N**	**S**	**G**
DG	All	67	58	53
	Intro.	69	64	65
	Scientific	72	59	53
	Narrative	58	52	49
HO	All	66	56	79
	Intro.	66	80	85
	Scientific	65	54	77
	Narrative	67	48	78
KA	All	79	79	85
	Intro.	99	76	91
	Scientific	79	79	85
	Narrative	69	80	83
MS	All	56	56	69
	Intro.	54	57	69
	Scientific	55	56	58
	Narrative	60	56	90
TC	All	70	79	82
	Intro.	63	73	113
	Scientific	70	84	75
	Narrative	73	73	78
XR	All	78	71	67
	Intro.	97	76	73
	Scientific	79	67	66
	Narrative	66	77	65

Table 7e. /ə/ duration (in ms)

		style		
		N	**S**	**G**
	Average	50	49	53
		N:S	**N:G**	**S:G**
	R	0.520	0.411	0.422
	p	0.426	0.117	<0.1
speaker	***task***	**N**	**S**	**G**
DG	All	52	40	55
	Intro.	60	42	49
	Scientific	47	40	72
	Narrative	49	40	42
HO	All	45	38	45
	Intro.	45	38	33
	Scientific	42	39	48
	Narrative	48	38	46
KA	All	51	53	57
	Intro.	48	52	59
	Scientific	54	53	61
	Narrative	51	53	53
MS	All	50	49	52
	Intro.	51	54	51
	Scientific	50	44	53
	Narrative	49	52	52
TC	All	53	55	57
	Intro.	53	55	53
	Scientific	51	57	65
	Narrative	47	51	47
XR	All	52	52	49
	Intro.	52	53	51
	Scientific	58	56	51
	Narrative	46	48	45

Table 7f. /ɛ̃, ɑ̃, ɔ̃/ duration (in ms)

		style		
		N	**S**	**G**
	Average	89	87	105
		N:S	**N:G**	**S:G**
	R	0.660	0.649	0.665
	p	0.455	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	75	77	88
	Intro.	123	107	157
	Scientific	69	72	75
	Narrative	65	73	86
HO	All	87	70	109
	Intro.	164	125	209
	Scientific	77	65	99
	Narrative	69	56	77
KA	All	108	101	116
	Intro.	142	113	125
	Scientific	110	105	123
	Narrative	80	82	87
MS	All	90	78	103
	Intro.	119	101	152
	Scientific	90	79	95
	Narrative	71	62	96
TC	All	89	106	125
	Intro.	150	157	180
	Scientific	79	103	127
	Narrative	80	86	84
XR	All	87	92	95
	Intro.	129	131	137
	Scientific	86	90	90
	Narrative	66	73	81

For two of the above vowels, durational data are of questionable significance, with increased duration hinting at a possible, but far from uniform association to G: this is the case for two speakers in the case of /ə/ and for three speakers in the case of /o/. The results are, however, suggestive of duration being associated with performed style in the case of high rounded vowels /y/ and /u/, as well as nasal

vowels. /y/ were observed to be longer in G than in either N or S performances, both generally and for all but one speaker, although this trend is significant for only three of them (and for another the reverse obtained). Likewise, G /u/ instantiations were significantly longer than N and S both generally and for five of the speakers. Finally, the most categorical differences are noted for nasals vowels /ɛ̃, ɑ̃, ɔ̃/: both generally and for all speakers G nasals were longer than N and S, even if the differences between the latter two styles were mixed (for some speakers, S being shorter, and for others being nearly identical to N).

As in other languages, the acoustic qualities of French vowels are distinguished by a combination factors associated with articulatory parameters: tongue height (associated with the first formant or F1), tongue position (second formant or F2), and lip rounding (having an overall damping effect on formant resonances); unlike many other languages, there is no bilateral association between lip rounding and tongue position in French, providing contrast between front rounded and unrounded phonemes (e.g. /i/ and /y/). Additionally, contrast between mid-vowels can be understood as deriving from relative tenseness or laxity, which shows a strong association to syllable structure following the so-called *loi de position* (Delattre 1959, Morin 1986).[8] Finally, vowels also contrast for nasality, by which the concomitance of velic lowering and oral-nasal airflow has a significant effect on the quality and frequency of lower formants, also influenced by the presence of a nasal formant and acoustic zeroes (Beddor & Hawkins 1990).

Generally speaking, tongue height correlates to the acoustic properties of F1: lower frequencies derive from the relative restriction of the vocal tract achieved by reduced aperture resulting from a raised tongue, closed mandible, or (typically) a combination of the two, with higher frequencies obtaining in complementary configurations. Tables 8a through 8f provide F1 averages for those vowels in which significant style shifting was observed.

8. Not taken up in the present work is the status and strength of the *loi de position*, especially as it concerns the regularity of final mid vowels, which alternate between tense and lax surface forms for many speakers, e.g. 'traversais' as either [tʁavɛʁsɛ] or [tʁavɛʁse].

Table 8a. /i/ F1 (Hz)

		style		
		N	**S**	**G**
	Average	272	282	285
		N:S	**N:G**	**S:G**
	R	0.710	0.627	0.661
	p	<0.001	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	270	277	269
	Intro.	279	292	272
	Scientific	261	269	261
	Narrative	276	283	278
HO	All	274	280	286
	Intro.	299	302	305
	Scientific	257	265	284
	Narrative	281	284	277
KA	All	276	275	298
	Intro.	273	263	286
	Scientific	275	263	279
	Narrative	278	295	328
MS	All	316	337	323
	Intro.	338	355	322
	Scientific	303	324	303
	Narrative	322	347	350
TC	All	256	263	276
	Intro.	256	269	276
	Scientific	253	249	252
	Narrative	259	278	309
XR	All	234	248	256
	Intro.	235	248	270
	Scientific	231	246	240
	Narrative	238	252	269

Table 8b. /y/ F1 (Hz)

		style		
		N	**S**	**G**
	Average	306	314	311
		N:S	**N:G**	**S:G**
	R	0.646	0.613	0.629
	p	<0.1	0.188	0.518
speaker	***task***	**N**	**S**	**G**
DG	All	288	308	282
	Intro.	255	270	257
	Scientific	291	272	269
	Narrative	293	340	297
HO	All	305	312	315
	Intro.	252	285	265
	Scientific	297	316	296
	Narrative	321	316	339
KA	All	307	338	312
	Intro.	230	278	260
	Scientific	307	339	315
	Narrative	322	349	317
MS	All	351	361	356
	Intro.	338	267	298
	Scientific	338	368	375
	Narrative	363	375	356
TC	All	286	284	315
	Intro.	247	208	247
	Scientific	284	267	283
	Narrative	297	310	351
XR	All	291	283	282
	Intro.	228	233	200
	Scientific	325	320	319
	Narrative	276	268	274

Table 8c. /e/ F1 (Hz)

		style		
		N	**S**	**G**
	Average	369	380	377
		N:S	**N:G**	**S:G**
	R	0.728	0.654	0.726
	p	<0.001	0.299	<0.1
speaker	***task***	**N**	**S**	**G**
DG	All	335	343	300
	Intro.	296	325	269
	Scientific	349	356	301
	Narrative	354	342	328
HO	All	396	380	389
	Intro.	396	381	391
	Scientific	396	379	392
	Narrative	396	381	382
KA	All	375	387	392
	Intro.	373	375	411
	Scientific	381	396	389
	Narrative	370	382	378
MS	All	405	425	400
	Intro.	435	429	394
	Scientific	405	442	401
	Narrative	374	391	406
TC	All	342	376	385
	Intro.	345	392	400
	Scientific	344	366	369
	Narrative	337	379	395
XR	All	332	336	351
	Intro.	340	338	373
	Scientific	327	329	333
	Narrative	334	343	359

Table 8d. /o/ F1 (Hz)

		style		
		N	**S**	**G**
	Average	415	420	406
		N:S	**N:G**	**S:G**
	R	0.679	0.630	0.730
	p	0.401	0.173	<0.1
speaker	***task***	**N**	**S**	**G**
DG	All	389	385	328
	Intro.	375	352	273
	Scientific	419	403	348
	Narrative	345	368	310
HO	All	424	400	422
	Intro.	390	397	408
	Scientific	449	414	445
	Narrative	393	375	386
KA	All	438	442	440
	Intro.	380	422	392
	Scientific	476	454	469
	Narrative	395	432	411
MS	All	453	460	448
	Intro.	427	433	363
	Scientific	463	470	468
	Narrative	448	453	440
TC	All	403	447	413
	Intro.	350	408	397
	Scientific	438	473	403
	Narrative	364	418	438
XR	All	379	378	379
	Intro.	387	347	305
	Scientific	396	404	421
	Narrative	344	344	339

Table 8e. /ə/ F1 (Hz)

		style		
		N	**S**	**G**
	Average	373	374	365
		N:S	**N:G**	**S:G**
	R	0.508	0.503	0.477
	p	0.802	<0.1	<0.1
speaker	***task***	**N**	**S**	**G**
DG	All	338	344	288
	Intro.	321	318	283
	Scientific	343	364	292
	Narrative	348	337	291
HO	All	387	363	385
	Intro.	380	320	350
	Scientific	390	374	389
	Narrative	388	368	394
KA	All	387	393	407
	Intro.	365	358	395
	Scientific	387	403	417
	Narrative	405	385	399
MS	All	392	412	399
	Intro.	414	420	411
	Scientific	388	405	387
	Narrative	376	419	405
TC	All	350	362	361
	Intro.	333	349	340
	Scientific	344	368	356
	Narrative	369	367	380
XR	All	390	372	361
	Intro.	404	370	361
	Scientific	389	386	363
	Narrative	379	364	360

Table 8f. /a/ F1 (Hz)

		style		
		N	**S**	**G**
	Average	536	553	545
		N:S	**N:G**	**S:G**
	R	0.798	0.727	0.757
	p	<0.0001	<0.1	<0.1
speaker	***task***	**N**	**S**	**G**
DG	All	473	476	407
	Intro.	432	441	357
	Scientific	497	500	438
	Narrative	478	476	414
HO	All	560	555	576
	Intro.	549	549	569
	Scientific	578	567	582
	Narrative	545	543	576
KA	All	601	604	619
	Intro.	590	572	582
	Scientific	607	621	639
	Narrative	605	613	627
MS	All	509	526	534
	Intro.	512	523	534
	Scientific	520	530	536
	Narrative	491	524	533
TC	All	519	577	558
	Intro.	506	547	492
	Scientific	525	577	580
	Narrative	522	577	596
XR	All	554	572	577
	Intro.	561	576	583
	Scientific	557	576	579
	Narrative	542	563	568

The inter-speaker trends seen in these data are somewhat surprisingly lacking in strength and conclusiveness. Indeed, the only patterns noted for the majority of vowels (/i, y, u, e, ɛ, a/) appear to derive from hyper- versus hypo-articulatory considerations: these are suggestive of speakers having interpreted G and S as being less-formal styles than N, resulting in relatively – and not always significantly – higher formant averages, as might obtain by decreased mandible or tongue displacement. Two exceptions may be noted, however, which concern mid-rounded vowels /o/ and /ə/ (the latter which, if articulated, most frequently surfaces as [œ]). For these, F1 is

generally lower in G, although data averages may have been overly influence by two of the speakers, for whom stylistic differences are clearly significant.

The acoustic properties of F2 correspond to tongue position along the front-back axis: higher formant values obtaining from a more anterior and lower values from a more posterior tongue position. In the case of back rounded vowels /u, o/, this is coupled with variable lip rounding that results in an, at times, appreciable narrowing of acoustic space between F1 and F2. Tables 9a through 9g provide average F2 results for those vowels in which results support at least a weak association to style.

Table 9a. /i/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	2005	2007	2028
		N:S	**N:G**	**S:G**
	R	0.699	0.592	0.710
	p	0.771	<0.01	<0.01
speaker	***task***	**N**	**S**	**G**
DG	All	2100	2091	2078
	Intro.	2086	2108	2095
	Scientific	2078	2094	2074
	Narrative	2138	2080	2075
HO	All	2059	2060	2097
	Intro.	2079	2049	2099
	Scientific	2086	2110	2101
	Narrative	2018	2016	2092
KA	All	2091	2080	2124
	Intro.	2120	2084	2246
	Scientific	2082	2096	2120
	Narrative	2088	2058	2092
MS	All	1896	1902	1913
	Intro.	1833	1903	1958
	Scientific	1915	1916	1904
	Narrative	1900	1884	1905
TC	All	1953	1940	1990
	Intro.	1940	1938	1903
	Scientific	1839	1934	1986
	Narrative	1953	1940	1990
XR	All	1968	1967	1963
	Intro.	1938	1967	1926
	Scientific	1964	1971	1971
	Narrative	1983	1962	1971

Table 9b. /u/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	880	903	958
		N:S	**N:G**	**S:G**
	R	0.782	0.742	0.754
	p	0.194	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	1007	1104	1098
	Intro.	1310	1506	1335
	Scientific	1020	1024	1068
	Narrative	848	943	994
HO	All	863	858	994
	Intro.	998	1122	1277
	Scientific	931	785	1017
	Narrative	779	796	880
KA	All	763	814	964
	Intro.	857	918	1068
	Scientific	649	717	975
	Narrative	786	811	913
MS	All	987	1029	1088
	Intro.	1400	1413	1392
	Scientific	955	894	1064
	Narrative	849	953	986
TC	All	908	809	845
	Intro.	1073	1034	855
	Scientific	903	806	913
	Narrative	828	698	806
XR	All	737	773	761
	Intro.	812	793	903
	Scientific	765	758	703
	Narrative	695	774	736

Table 9c. /e/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	1857	1855	1887
		N:S	**N:G**	**S:G**
	R	0.833	0.711	0.745
	p	0.653	<0.01	<0.01
speaker	***task***	**N**	**S**	**G**
DG	All	1972	1963	1930
	Intro.	1949	1945	1880
	Scientific	1965	1956	1916
	Narrative	2007	2025	2003
HO	All	1917	1912	1969
	Intro.	1899	1948	1982
	Scientific	1928	1906	1970
	Narrative	1918	1892	1953
KA	All	1946	1922	1961
	Intro.	1985	1897	1977
	Scientific	1909	1914	1933
	Narrative	1968	1959	1990
MS	All	1716	1711	1765
	Intro.	1711	1648	1732
	Scientific	1682	1730	1747
	Narrative	1780	1747	1831
TC	All	1769	1793	1826
	Intro.	1761	1798	1688
	Scientific	1739	1775	1874
	Narrative	1821	1817	1888
XR	All	1880	1879	1873
	Intro.	1855	1864	1860
	Scientific	1860	1868	1865
	Narrative	1935	1909	1902

Table 9d. /ɛ/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	1741	1748	1776
		N:S	**N:G**	**S:G**
	R	0.750	0.718	0.649
	p	0.304	<0.0001	<0.01
speaker	***task***	**N**	**S**	**G**
DG	All	1840	1833	1827
	Intro.	1774	1867	1846
	Scientific	1825	1806	1774
	Narrative	1888	1832	1855
HO	All	1764	1760	1851
	Intro.	1765	1748	1854
	Scientific	1761	1740	1858
	Narrative	1765	1780	1845
KA	All	1814	1779	1814
	Intro.	1822	1794	1773
	Scientific	1799	1748	1787
	Narrative	1805	1800	1844
MS	All	1621	1635	1696
	Intro.	1646	1663	1711
	Scientific	1606	1621	1681
	Narrative	1619	1630	1698
TC	All	1665	1690	1724
	Intro.	1650	1733	1658
	Scientific	1665	1639	1701
	Narrative	1674	1706	1788
XR	All	1728	1785	1751
	Intro.	1737	1801	1701
	Scientific	1720	1769	1759
	Narrative	1733	1790	1778

Table 9e. /o/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	1034	1040	1081
		N:S	**N:G**	**S:G**
	R	0.815	0.730	0.744
	p	0.532	<0.001	<0.01
speaker	***task***	**N**	**S**	**G**
DG	All	1190	1222	1216
	Intro.	1188	1210	1108
	Scientific	1125	1096	1133
	Narrative	1299	1459	1425
HO	All	1113	1106	1188
	Intro.	1068	1095	1205
	Scientific	1036	1050	1124
	Narrative	1276	1215	1297
KA	All	960	936	1028
	Intro.	873	947	957
	Scientific	955	947	1023
	Narrative	1010	912	1071
MS	All	1042	1064	1063
	Intro.	1075	1075	915
	Scientific	989	1035	1031
	Narrative	1122	1112	1173
TC	All	1018	1009	1028
	Intro.	1005	1012	958
	Scientific	966	976	936
	Narrative	1119	1069	1231
XR	All	916	945	982
	Intro.	900	903	935
	Scientific	889	943	987
	Narrative	972	970	995

Table 9f. /ə/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	1499	1515	1564
		N:S	**N:G**	**S:G**
	R	0.726	0.696	0.756
	p	0.118	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	1603	1604	1659
	Intro.	1670	1639	1634
	Scientific	1598	1620	1676
	Narrative	1555	1572	1680
HO	All	1544	1550	1646
	Intro.	1621	1650	1833
	Scientific	1553	1563	1653
	Narrative	1485	1491	1566
KA	All	1488	1535	1599
	Intro.	1461	1440	1633
	Scientific	1547	1543	1613
	Narrative	1444	1555	1571
MS	All	1453	1482	1510
	Intro.	1445	1475	1547
	Scientific	1443	1493	1482
	Narrative	1474	1468	1513
TC	All	1465	1456	1511
	Intro.	1448	1507	1578
	Scientific	1485	1432	1499
	Narrative	1454	1440	1492
XR	All	1552	1536	1558
	Intro.	1546	1569	1560
	Scientific	1545	1509	1523
	Narrative	1546	1525	1583

Table 9g. /a/ F2 (Hz)

		style		
		N	**S**	**G**
	Average	1463	1470	1512
		N:S	**N:G**	**S:G**
	R	0.887	0.853	0.877
	p	0.145	<0.0001	<0.0001
speaker	***task***	**N**	**S**	**G**
DG	All	1584	1620	1599
	Intro.	1539	1613	1574
	Scientific	1592	1632	1600
	Narrative	1618	1610	1626
HO	All	1471	1460	1556
	Intro.	1476	1478	1567
	Scientific	1462	1444	1542
	Narrative	1479	1467	1566
KA	All	1439	1451	1516
	Intro.	1399	1428	1530
	Scientific	1468	1445	1493
	Narrative	1438	1483	1534
MS	All	1396	1416	1477
	Intro.	1391	1402	1473
	Scientific	1426	1444	1477
	Narrative	1359	1388	1481
TC	All	1398	1389	1422
	Intro.	1357	1399	1395
	Scientific	1416	1377	1442
	Narrative	1413	1395	1419
XR	All	1483	1496	1502
	Intro.	1480	1500	1539
	Scientific	1484	1480	1475
	Narrative	1486	1514	1503

Unlike F1, F2 results show a much stronger association to performed style – especially to G. Indeed, F2 averages were greater in G than either N or S for all but nasal vowels and /y/, although it should be noted that inter-speaker trends in this regard are far from robust in the case of /u/ (higher F2 obtains for only three participants; for two speakers the opposition seems to derive from N versus G/S). For most vowels, however, the relative increase in F2 measurements in G performances is significant and holds across a majority of speakers (for three in the case of /ɛ/,

four for /i, e, o/ and five for /ə, a/). The data are not suggestive of any association between F2 and S, the result of the latter performances being generally, if variably aligned with N. Collectively, this suggests that increased F2 is a characteristic of G performances, except in the case of /y, u/ – the vowels for which durational considerations serve to distinguish G from N or S performances.

4.4 Synthesis

The results of this study suggest that phonetic characteristics of gay and straight styles are variably coopted by speakers. Data point to a number of similarities – as well as important differences – regarding the phonetic attributes of gay-styled speech in French and in other languages (investigations of straight-styled speech being largely lacking). Echoing work in other languages, notably Zimman (2013), the results of this study are also suggestive of a complex variability, rather than straightforward uniformity, in the phonetic projection of identity.

Straight-styled speech in this study appears to be associated with the decreased duration of sibilants and rhotics, as well as shorter focal elements and phonological phrases; the data are also suggestive of possible associations for /l/, at least for some speakers. As it concerns the encoding of straightness for other phonetic variables under investigation, the results of this study are not particularly robust. Furthermore, results support some of the conclusions reached in two previous studies: Sisson (2003) as it concerns /s/ duration and (Russell 2015) for rhotic /ʁ/. Clearly, however, there is more to say about sounding straight and more investigation to be done about the performance of this (somewhat ironically) understudied identity, as well as its association with other identities or attributes, e.g. machismo or hyper-masculinity. It is possible that participants interpreted straight performances as being less divergent from the neutral-labeled performances; this situation might arise because heterosexuality and hetero-normative behavior, including linguistic behavior, is less socially marked and/or less salient, i.e. is thought to be more normative and therefore is not considered to be as divergent from the instructions used to engage speakers in the initial performance. Indeed, in follow-up interviews, several participants indicated that, while they agreed that certain speakers "sound straight," especially in comparison to those who "sound gay," they were less certain as to how to perform this.

The results of this study are far more substantial as it concerns the phonetic characteristics of gay-styled performances. Here, it appears that a combination of qualitative and durational considerations carry the functional burden of projecting identity: in G performances /s/ showed increased COG, /ʁ/ and high rounded and nasal vowels were longer, and there appears to be a general tendency for increased

F2 for most non-rounded vowels. Pitch data were also relatively conclusive: not only were maxima and minima higher in G than either S or N, the envelope between these was increased, indicating that speakers employed greater pitch range, rather than simply shifting F0. Interestingly, the durational measurements of both focal elements and phonological phrases did not provide conclusive evidence of the enregistering of G styled speech, although it appears tenable to assert that they may have been for a subset of participants.

It is useful to note that in neither this study or in Russell (2015) were cohorts of phonetic features examined for their interdependency. While it appears highly likely that no single phonetic variable acts as a "smoking gun" in the instantiation of identity, some are much more and others much less likely to work in concert. This is notably the case for duration. For instance, it is noted that phonological phrase and focal elements are generally longer in G performances: given the robust association between the length of rhotics and nasal vowels, it appears that these variables are interleaved. However, duration is not uniform across all classes of vowels or consonants studied here. Also, none of the data emerging from this study suggest that either marked style follows patterns associated with geographic provenance, particularly the speech of younger, urban Parisians (see Hansen 2012).

This study paints a complex picture of how French speakers phonetically perform salient sexual identities. Interestingly, results here are both similar to and distinct from those obtained by others. For example, Pierrehumbert et al. (2004) observe that the speech of gay identified males exploits more expansive vowel space more than that of straight identified males. French speakers do not seem to proceed in such a straight-forward manner: gay styled speech shifts vowel space forward (generally, except for high round vowels) and up (for mid-round vowels), rather than simply becoming more exaggerated, which would imply the increase in low vowel F1 and a decrease in back vowel F2. This suggests that French gay-styled speech is not more peripheral, but more fronted and, in some cases, more raised (or alternatively more tensed). At the same time, gay-styled speech from this study presents important similarities to other languages, especially Italian, and notably as it concerns pitch and rhotic duration. In both languages, gay-styled speech appears to imply greater pitch windows and increases in pitch maxima (results also supported by Bourgeois and Quillet 2004), as well as significantly longer rhotic duration (shorter rhotic duration is apparently also characteristic of straight-styled speech in both French and Italian). Further parallels were noted between the two studies as it concerns F2 quality, although the implications of these observations do not apply uniformly within vowel inventories. Unlike Italian results provided in Russell (2015), the present results offer evidence for sibilant quality being positively associated with gay-sounding speech, albeit in a manner distinct from the results provided in Sisson (2003).

Collectively, the results of this study point to the complexity and variability of the associations between speech production and socially salient identity. This is unsurprisingly acknowledged for other variables in the literature, including geographic and socio-economic provenance and age (see Foulkes & Docherty 2006, Foulkes 2010). Results here suggest that speakers tend to employ one or another parameter when activating an identity, while also showing that only a few features (e.g. pitch, rhotics) are nearly inevitably called upon for one or another performance.

5. Discussion

A significant advantage of the present approach is that it allows for the comparison of both gay and straight performances to an unmarked baseline, assuming that neither gay nor straight styled speech are accidental behaviors (viz. Cameron & Kulick 2003). Importantly this comparison is not just made among a cohort of speakers, but within a subset of the same speaker's performances, such that both inter- and intra-speaker comparison is made. However, when interpreting the results of this or any similar study, it is important to keep in mind what the study attends to and, equally importantly, what it does not. This issue harks to Zimman (2013), who highlights the complexity of investigative work at the intersection of behavior and identity. Although his work on the characteristics of English-speaking straight, gay, and trans men shows important trends as it concerns the characteristics of different speaker-cohorts, he is quick to point out that surface forms and regularities may not be as directly linked to identity as might be assumed, while also highlighting limitations inherent to the type of performative study he pursed. The sibiliant qualities of trans men are, for example, distinct from both gay and straight men, but this pattern may be only tangentially associable to their identity (and could be due to other factors). At the same time, he notes that there is no unified gay, trans, or straight identity, nor a singular style associated with these: all are bound up in complex, socially-constructed categories, which intersect with others. And yet, it cannot be ignored that speakers are recognized as "sounding" like one or another identity, reductive as this may be. Hence the present study, which explores features implicitly expected by participants to be associated with the projection of a persona.

It is acknowledged that the performance-oriented methodology of this study lends itself to results that can be described as likely arising from exaggeration or stereotyping, as participants were asked to perform in a way that they believe best ensured listeners would cue onto projected gayness and straightness. In recognition of this, it is crucial to keep the objectives and goals outlined above in mind.

This work does not seek to assert how gay or straight French speakers sound, but to describe differences between the production of French speakers when they are asked to project one or the other sexual identity and to describe the content of practices – in this instance, phonetic – that are putatively associated with identity. It does not inquire about the psychological, sociological, or epistemological content of sexual identities, nor does it consider the variability or granularity of identities as social constructs: while important and in need of serious study, these issues far surpass its scope. The present work does assume, and acknowledges the limitations emerging from this assumption, that gay and straight are salient, if frequently reductively understood social identities. It also acknowledges that the means by which individuals associate speech with social categories is often bound up in stereotypes or archetypes: a certain speech style "sounds gay" (or straight, educated, etc.) because the content of that style is categorized as "gay" based on experiences, themselves biased and predicated by pre-existing frames of understanding.

One reviewer of this article quite rightly points out that asking participants to perform unproblematized "gay" and "straight" identities is in itself a form of essentialism, not to mention being reductive. This observation and any critique arising from it is perhaps inevitable, but should not be understood as a fatal flaw in the methodology or data: rather, it should be understood as a cautionary observation against the over-application of these data and results. If the goal is to examine not "true" identities or their contents, but the mechanisms by which socially expected and salient identities are activated, the fact that data are the byproduct of reductive understandings is only an inevitable limitation. It bears reiteration that this study makes no pretense at describing the phonetic characteristics of actual gay speech – or that any other socially defined collectivity, for that matter – even if this were to be hypothesized as possible: this study seeks to indirectly arrive at a better understanding of what phonetic variables are susceptible to lead to the assumption that a speaker is gay or straight. It inquires about, in effect, what speech patterns are strongly associated with gay and straight male personae, even if these are stereotypical, archetypal, and reductive – in part because speech communities and their members often view identities through such optics, for good or for bad.

Future research will hopefully build from and refine the present methodology and apply it to other languages, speaker groups, and contextually salient identities. It would, for instance, be of use to look at style shifting among self-identified gay male speakers among different, socially salient and culturally-defined tasks (building on the work of Podesva 2011a, for example). This would allow greater inroads into understanding the phonetic characteristics of speech patterns beyond a stereotypical or expected "gay style," taking into account different situational

registers, as well as possible intersections between a number of salient identities (e.g. gay *beur* [Franco-Arabic]). Taken collectively, and any shortcomings notwithstanding, this study hopefully provides a foundation of understanding, at least as it concerns the expected and enregistered features of gay male – and to a lesser extent, straight male – phonetic patterns in French, while also outlining a means to study the performance of sexuality in different languages.

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Appendix A. Participant self-assessment[9]

How often do you interact on a weekly basis with people who…

1 = no or very infrequent interaction					5 = regular or frequent interaction
…speak a language other than your native language(s)	1	2	3	4	5
…speak a language you do not know/understand	1	2	3	4	5
…are of a different nationality than your own	1	2	3	4	5
…are of a different gender identity than your own	1	2	3	4	5
…are of a different sexual orientation than your own	1	2	3	4	5
…are of a different civil/social status than your own (for example married/unmarried/domestically partnered)	1	2	3	4	5
…are of a different socio-economic status than your own (for example, someone much poorer than you)	1	2	3	4	5
…are of a different political background than your own (for example, someone much more conservative than you)	1	2	3	4	5

How comfortable would you feel having an intimate relationship with a person who…

1 = very uncomfortable					5 = very comfortable
…speaks a language other than your native language(s)	1	2	3	4	5
…speaks a language you do not understand	1	2	3	4	5
…is of a different nationality than your own	1	2	3	4	5
…is of a different gender identity than your own	1	2	3	4	5
…is of a different sexual orientation than your own	1	2	3	4	5
…is of a different civil/social status than your own (for example married/unmarried/domestically partnered)	1	2	3	4	5
…is of a different socio-economic status than your own (for example, someone much poorer than you)	1	2	3	4	5
…is of a different political background than your own (for example, someone much more conservative than you)	1	2	3	4	5

Approximately what percent (%) of your friends and relations could be described as follows?
(Note: a friend or relation might be described by more than one term)

Athletic _____
Bisexual _____
Conservative _____
Divorced _____
Female _____
Gay male _____
Healthy _____
Intellectual _____
Lesbian _____
Liberal _____
Male _____
Married/Partnered _____

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9. Self-assessment was provided in French (all translations of the author).

Middle class _____
Overweight _____
Recent immigrant _____
Transgendered _____
Non-citizen/allochtone _____
Poor _____
Student _____
Wealthy _____

Appendix B. Stimuli (with approximate English translations)

a. Introductory

Salut, je m'appelle Jean. Je suis de Paris et je passe cette année à UC DAvis. Ça fait trois mois que je suis là et cela me plaît bien. Je me suis fait beaucoup d'amis, surtout avec d'autres étudiants. J'aime passer du temps avec des amis, jouer au foot et, si j'ai le temps et l'argent, voyager.

'Hi, my name is Jean. I'm a student from Paris and this year I'm studying at UC Davis. I've been here for three months and I like it a lot. I've made lots of friends, mostly with students. I like to spend time with my friends, play soccer and travel, when I have time and money.'

b. Scientific

La neige est une forme de précipitation, constituée de glace cristallisée et agglomérée en flocons pouvant être ramifiés d'une infinité de façons. Puisque les flocons sont composés de petites particules, ils peuvent avoir aussi bien une structure ouverte et donc légère qu'un aspect plus compact voisin de celui de la grêle, même si celle-ci n'a rien à voir dans sa formation. La neige se forme généralement par la condensation de la vapeur d'eau dans les hautes couches de l'atmosphère et tombe ensuite plus ou moins vite à terre selon sa structure.

'Snow is a form of precipitation composed of crystalized ice, bound into snowflake taking an infinite number of shapes. Because snowflakes are made of small particles, they can have an open, and therefore light, structure, as well as a more dense form, similar to that of hail, although the latter is distinct in its composition. Snow is generally formed by condensation of water vapors in the upper levels of the atmosphere, subsequently falling to earth at a speed determined by its structure.'

c. Narrative

Une voiture noire roulait trop vite dans la rue que je traversais. Je n'y prêtais pas vraiment attention quand il y a eu un bruit terrible dans le carrefour tout près. J'ai couru aussi vite que possible dans cette direction. La voiture noire avait écrasé une berline rouge. Il y avait de la fumée et du verre cassé partout. De la voiture rouge j'ai entendu une femme qui hurlait. D'autres passants sont venus au secours et j'ai appelé la police.

'A black car sped down the street going very fast, but I didn't think much about it until I heard a crash at the nearby intersection. I ran as fast as I could in the direction of the intersection. The black car had hit a red sedan. Smoke was everywhere and the street was covered in broken glass. Inside the red car, I heard a woman screaming. Other people rushed to help and I called the police.'

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