A philosophy, a methodology, and a gender identity: Bringing pragmatism and mixed methods research to transformative non-binary focused sociophonetic research

LeAnn Brown
Sorbonne-Nouvelle University

Mixed methods research (MMR) based in a *pragmatic* research philosophy involves the integration of qualitative and quantitative methods to triangulate research findings and strengthen interpretations. This especially holds for complex research questions and/or data. Non-binary focused sociolinguistic research often deals with multiple complexities, including dynamic and contextually dependent ways of identifying and variation in body modification affecting speech production. While echoing prior calls for researchers to apply, when appropriate, a pragmatic/MMR framework (Angouri 2010), I uniquely argue that it can empower non-binary researchers and research collaborators, ultimately generating positive social change. My objective in presenting non-binary focused sociophonetic research is to demonstrate the framework's advantages. These include foregrounding non-binary voices and experiences to generate rich, nuanced research questions, data, and analyses. These elements, as well as demonstrable ecological validity and multiple (collaborative and/or cross-discipline) perspectives are the hallmarks of *transformative research* which focuses on fostering social change.

1 Introduction

Linguists across subdisciplines have called for mixed method research (MMR) in sociolinguistics (Angouri 2010; Blaxter and Kinn 2018), applied linguistics (Hashemi and Babaii 2013; Riazi 2016; Mirhosseini 2018; Bacon 2020) and voice therapy research (Azul and Neuschaefer-Rube 2019). Angouri (2010: 30) notes that “[i]t is still quite common however for the two paradigms [qualitative and quantitative] to be directly contrasted”. Even when identified as a possible method in sociolinguistic textbooks, MMR may not adequately be described, nor its benefits explained. For example, in Bijeikienė and Tamošiūnaitė (2013) it is described in a single sentence.

It is especially important to explore MMR because the phenomena of interest, the research questions, the data sets accessed/generated, and the analyses conducted in sociolinguistics are often complex. MMR is particularly well suited to deal with multiple levels of complexity (Hashemi and Babaii 2013; Riazi 2016; Blaxter and Kinn 2018), capture underlying ideologies (Bacon 2020), and to result in more robust research outcomes including increased ecological validity (Blaxter and Kinn 2018; Azul and Neuschaefer-Rube 2019; Bacon 2020). These are important aspects for language researchers focusing on non-binary populations and whose goals are to generate authentic and transformative research (detailed in Section 2) with positive real-world applications (e.g., Zimman 2020).

For many researchers, transformative research linked to political change, activism and social justice is also key (Ortega 2005). There is a growing demand for transformative research across disciplines (Szostak 2013). Real world outcomes and applications are increasingly important: “Any

research field in the social sciences has as its ultimate goal the improvement of human life...” (Ortega 2005: 430). Within trans linguistics, which includes non-binary research, there is a clear call for research that empowers the populations under study (Zimman 2020; Konnelly 2021). Being open to theories of knowledge or research paradigms, such as pragmatism, and methods, like MMR, can help those focused on non-binary research meet their goals for transformative research.

The lack of engagement into what constitutes MMR or the crucial role of an underlying theoretical paradigm of knowledge (such as pragmatism, detailed in Section 2) does a disservice to all researchers. It makes it difficult to be critically reflexive about the dominant research methods and theories within one’s own field, to develop an understanding of or expertise with an array of skill sets, and to gain insights across subdisciplines within linguistics and across disciplines. It also affects researchers’ abilities to do collaborative, especially interdisciplinary, research, which is often fundamental to doing transformative research with real-world implications (Azul and Neuschaefer-Rube 2019). Perhaps more profoundly, this lack of understanding and/or acceptance affects the kinds of research generated – one key benefit of MMR and pragmatism is tackling complex data sets, complex questions, and complex results (Hashemi and Babaii 2013; Riazi 2016).

Angouri (2010: 39) states that “apart from contributing to more in-depth analyses of research questions, mixed methods research also has an important part to play in reaching diverse audiences and overcoming challenges associated with certain research settings.” The emergent nature of non-binary focused linguistic research, coupled with the complexities of the population itself (e.g., multiple and dynamic gender identifications, diversity of gender presentation/performance (Butler 1999), and heterogeneous speech communities) as well as the underrepresentation of the population can make non-binary focused research challenging, requiring innovative and responsive research methods. In a nutshell, MMR has the potential to deliver the kinds of enriched research necessary to make non-binary people’s lives better.

This paper is about empowerment – ensuring the representation of non-binary people via linguistic research, as researchers, as co-creators, as participants and as of consumers and/or benefactors of research. Transformative research has an important role to play in all gender and sexuality focused linguistics, but particularly for underrepresented populations and communities such as trans/non-binary ones. Ensuring that non-binary participants are included in research outside of gender and sexuality focused research is also important.

The foremost goal of this paper is to advocate for inclusive research in which non-binary people are fully represented in non-binary linguistic research. This includes ensuring non-binary people’s voices are central, as researchers, as collaborators, and as consultants and participants, to gender and sexuality research more generally, and non-binary focused linguistics specifically. Zimman’s (2020) conceptualization of trans linguistics for example, foregrounds the empowerment and centering of trans (which includes non-binary) researchers. In Zimman’s discussion of trans linguistics, the importance of the dynamic and evolving nature of identity is highlighted, suggesting a focus on micro-level research. In such a framework, focusing on identity at a macro-level may be viewed as essentializing and problematic. However, it is also critical to look at identity at the system level to address systemic problems and locations of injustice. This requires the development of generalizations via large sample sizes, which erases individual experience. But macro-level research in and of itself is valuable and can contribute to the empowerment of groups of people and individuals. This can be as simple as re-evaluating the use of *gender* as an explanatory variable in a quantitative method to ensure that everyone’s data can be included in an analysis. For example, being reflexive as to why participants in perception tasks are asked their gender can lead researchers to question hypotheses surrounding gender. Rather than attribute traits to individuals because of gender group membership, it is clearly better to use tools that measure those traits, such as social openness or degree of transphobia. Doing so also means genders with smaller populations can be retained in statistical analyses in macro-level data.

A secondary goal is to add my arguments to the previous calls for (socio)linguistic research as a discipline to minimally learn about and maximally embrace (when appropriate) a pragmatic MMR framework. This is important because every young non-binary, trans, queer, or gender researcher should have access to training and supervision that validates their research goals. These goals may involve transformative research, with its foci on fostering real-world research applications as well as social and/or policy changes. By outlining the key benefits of a pragmatic MMR framework, and demonstrating how various research decisions and challenges can be addressed through this framework,

I hope to generate dialogue about and interest in exploring and supporting research philosophies and methods that are outside discipline and/or subdiscipline norms, such as pragmatic based MMR.

In the next section, I begin with brief exploration of transformative research, and then present an outline of pragmatism as a philosophy of knowledge and some of its characteristics. Then MMR is formally defined and its benefits outlined. In Section 3, some of the complexities involved in doing non-binary focused sociophonetic research are explored, with examples from previous research to demonstrate some of the specific ways in which non-binary focused sociophonetic research has addressed these complexities using pragmatism and/or MMR. This is followed by concluding remarks.

2 A primer on transformative research, pragmatism as a research philosophy, mixed methods research

2.1 Transformative research in a complex nutshell

Transformative research is characterized in various ways over time and across disciplines and fields, adding a level of complexity (e.g., National Science Board 2007; Mertens 2009; Dietz and Rogers 2012). It is not a set of methods but a set of research objectives. The most basic characteristic of transformative research is that it aims to alter well-established paradigms and norms, fundamentally changing disciplines or society more generally.

Mertens (2009) in her discussion of transformative research and transformative paradigms however captures the sense of transformative research most applicable for this paper. She suggests that “[i]f we ground research and evaluation in assumptions that prioritize the furtherance of social justice and human rights, then we will utilize community involvement and research methodologies that will lead to a greater realization of social change” (*ibid*: 3). Like Ortega (2005), Mertens sees the role of research is to result in positive social change.

2.2 The role of pragmatism

Research in the social and behavioral sciences in the late 20th century was predominately informed by two competing research paradigms or philosophies: *Postpositivism/Positivism* is held by researchers using quantitative methods and *constructivism* by researchers using qualitative methods. On one hand, postpositivism/positivism is based on the belief that social phenomena should be studied using the same empirical methods used in studying physical phenomena. By doing so it is argued, one’s research is objective and unaffected by time, context, or researcher bias. Crucially, with this belief system, research is replicable and valid because it is performed apart from the phenomena and/or participants. *Constructivism*, on the other hand, rejects postpositivism/positivism. In a constructivist paradigm, “multiple-constructed realities abound, ... time- and context-free generalizations are neither desirable nor possible, ... research is value-bound, ... it is impossible to differentiate fully causes and effects, ... logic flows from specific to general (e.g., explanations are generated inductively from the data), and ... knower and known cannot be separated because the subjective knower is the only source of reality” (Johnson and Onwuegbuzie 2004: 14). These two research paradigms, and therefore their *methods*, may largely be seen as incompatible.

During these ‘wars’ some researchers did integrate quantitative and qualitative methods in their research. However, the underlying research paradigms of postpositivism/positivism and constructivism were barriers to greater acceptance. Before these methods could be integrated, a philosophy of knowledge was necessary. The philosophy of *pragmatism* offered such a middle ground, viewing “[k]nowledge [...] as being both constructed and based on the reality of the world we experience and live in” (Johnson and Onwuegbuzie 2004: 18).

Pragmatism is not solely focused on methodologies. It encourages looking beyond one’s own discipline in terms of data sources, definitions, and codified “ways of doing things”. It “[e]ndorses eclecticism and pluralism (e.g., different, even conflicting, theories and perspectives can be useful; observation, experience, and experiments are all useful ways to gain an understanding of people and the world)” (*ibid*). This is especially important when one’s research focus involves new, evolving, dynamic and/or complex phenomena (e.g., ideologies, gender identity construction, trans/non-binary linguistics). For such research, it is helpful to move beyond discipline or subdiscipline norms.

Otherwise, researchers risk overlooking important aspects of the phenomena under study, generating more limited research questions or less complete data, or misinterpreting results.

2.3 Defining MMR

Complex research questions, especially those with strong social variables (e.g., those elements that have the greatest effects on an outcome) or multiple social variables, are answered more fully when approached from a pragmatic research philosophy combined with a greater variety of research methods (Angouri 2010; Blaxter and Kinn 2018). Arguably, the most promising research method available is MMR. Creswell (2015: 2) defines MMR as “[a]n approach to research in the social, behavioral, and health sciences in which the investigator gathers both quantitative (closed-ended) and qualitative (open-ended) data, integrates the two, and then draws interpretations based on the combined strengths of both sets of data to understand research problems.”

Adopting a pragmatic philosophy means MMR can be used in the way(s) that best fit one’s research needs. Qualitative and quantitative methods can be equally weighted or one method can be supplemental, supporting the data collection, results, analysis, and/or interpretation of the more heavily weighted method. Qualitative and quantitative methods may be used in parallel, converging later, or sequentially, with one type of method informing the development or instantiation of another type of method. Pragmatism views knowledge making as interactional, so incorporating unplanned methods (quantitative or qualitative) is unproblematic. Research can therefore be responsive and allow the integration of new information into research designs (Meixner and Hathcoat 2019).

Within a single study, MMR can also allow for *triangulation*, which Denzin (2015: 1) defines as “the application and combination of several research methodologies in the study of the same phenomenon.” It can occur at the data, investigator, theory, or methodological levels, or in a combination of these levels (*ibid*; Johnson et al. 2007). Triangulation is not validation (Creswell et al. 2003; Anjour 2010) as the concept of validation is inherently positivist, suggesting that there is an external ‘truth’ that multiple methods will collectively point to. Instead, triangulation is an *alternative to* validation and occurs when MMR and characteristics of pragmatic philosophy are integrated: “The combination of multiple methodological practices, empirical materials, perspective, and observers in a single study is best understood as a strategy that adds authenticity, trustworthiness, credibility, rigor, breadth, complexity, richness, and depth to any inquiry” rather than validation, according to Denzin (2015: 1). Triangulation is a key advantage of adopting a pragmatic MMR framework because it aids in developing a richer and more complex understanding of the phenomena under study, not because it duplicates results. For example, Angouri (2010: 38) suggests that “multilayered designs are often preferred to one-dimensional ones for eliciting rich findings.”

An ‘added bonus’ of MMR is that it promotes collaborative interdisciplinary research, a growing trend in many fields of research (Riazi, 2016). Benefits of interdisciplinary research are numerous (Szostak 2013) but include (1) addressing more complex research questions by incorporating important insights from various specialized fields; (2) mitigating weaknesses of individual theories and methods by using multiple theories and methods; and (3) the integration of the best of multiple fields creates greater understanding. In other words, integrated interdisciplinary research also leads to triangulation as “[i]nterdisciplinary integrate the best elements of disciplinary insights in order to generate a more comprehensive (and often more nuanced) appreciation of the issue at hand. (This may come in the form of a new understanding, new product, or new meaning.)” (*ibid*: 2). Indeed, some within queer linguistics for example, see interdisciplinarity as transgressive and therefore desirable because it challenges research norms (see Kibbey to appear).

Interdisciplinary collaborations are not always possible, but MMR and pragmatism endorse incorporating methodologies, tools and prior research findings from other disciplines. For Johnson and Onwuegbuzie (2004: 17) “[mixed methods research] is inclusive, pluralistic, and complementary, and it suggests that researchers take an eclectic approach to method selection and the thinking about and conduct of research.” The flexibility and responsiveness of MMR to research needs and complexities, rooted in pragmatic research philosophy, therefore can foster research that is creative, challenging, and more participatory/interactional, resulting in richer, deeper data, leading to more holistic analyses, interpretations, and applicable, actionable outcomes. In terms of linguistic research specifically, Angouri (2010: 41) states, “Overall, mixed methods research can and does cross-disciplinary [*sic*]

boundaries and overcome limitations that have been associated with mono-dimensional approaches to the study of complex phenomena and research sites.” For researchers whose goals are to generate transformative non-binary focused sociolinguistic research, the arguments for pragmatism and MMR are compelling.

3 Meeting the challenges of complexity in non-binary research

There are three aspects of non-binary populations which illustrate the appropriateness of a pragmatic MMR framework for sociophonetic research (and sociolinguistic research more broadly). First, non-binary people may have complex and/or context dependent ways of identifying (Burnes and Chen 2012; Ryan 2019). This makes comparative sociophonetic research (a staple of queer linguistics and cisgender focused linguistics) challenging. Second, non-binary people have diverse vocal tract configurations, including forms of vocal modification (e.g., voice therapy, surgery, and/or hormone therapy). This has substantial implications for speech analysis and requires rethinking and adapting the methods and tools used. Third, because this is an emergent field, investigating indexical phonetic (production) or acoustic cues (perception) is uncharted territory. There is no rich landscape of previous literature to draw from. Published research often looks at a small number of non-binary speakers, and it is unclear how generalizable these results are for more macro-level research. These three areas of complexity in non-binary research are important to consider and are not insurmountable. Various researchers demonstrate ways of addressing these challenges using aspects of a pragmatic MMR framework. Few explicitly identify this framework, but their research decisions and methods fall within it.

3.1 Identification within non-binary populations

Zimman’s conceptualization of trans linguistics includes non-binary speakers (Zimman 2020), however not all non-binary speakers identify as *trans* explicitly nor use *trans* as an umbrella term. In addition, non-binary can itself be an umbrella term or a specific gender identity. As an umbrella term, *non-binary* collectively identifies people who may individually identify using a number of evolving terms such as *gender queer*, *genderfuck*, *agender*, *gender neutral*, *neutrois*, *gender non-conforming*, or *gender ambivalent* (Richards et al. 2016; Skinner 2017; Losty and O’Connor 2018).

This complexity is an issue for sociophonetic researchers in two ways. First, the researcher generally needs to identify some criteria for inclusion. Second, complex identification can make doing comparative research more challenging. For example, Kirtley (2015) uses ‘non-binary’ as an umbrella term for her research. She focuses on three “individuals...who identify with non-binary gender” (*ibid*: 1). Yet none identifies as non-binary specifically. The author chose participants who all were assigned female at birth but who have masculine identities: Larz identifies as a masculine female, defined as a ‘non-transitioned, female assigned, masculine identifying individual’ (*ibid*) but also as *mahu*, a traditional Hawai’ian gender identity for an individual with aspects of the ‘other’ gender (*ibid*). Jody prefers no labels but is identified as a man and as a trans man. Dawn is identified as a masculine lesbian.

Rather than focus on individual specific gender identities, Kirtley develops her data set using MMR: There are multiple ethnographic interviews recorded for speech analysis at the phonetic level but discussed in terms of stances and contexts, which are participant specific. Each participant is explored in-depth, over multiple contexts and analyzed in terms of stances or social roles. For example, Larz and her speech are qualitatively and quantitatively analyzed (an example of integrated MMR), in subsections including “Larz as counselor”, “Larz as tough”, and “Larz as knowledgeable”. Crucially, it was possible for Kirtley to use ‘non-binary’ as an umbrella term to identify participants because her participants were never treated as a group identifying under that label. By integrating themes emerging from interview and participant observation data with speech analysis results, Kirtley creates three rich individual profiles of her participants in her exploration of how individuals using linguistic means to “build and communicate their gendered selves” (*ibid*: vi).

Gender identities can also be much more dynamic and interactionally driven. Ryan (2019) found through a series of interviews conducted in the UK, that some individuals with ‘trans identities’ (including non-binary speakers) identify using different terminology depending on the physical context (e.g., medical interactions, queer positive environments, potentially harmful or dangerous situations). For example, in a medical care environment, individuals may add ‘trans’ to their gender identification

(e.g., ‘trans woman’) because this impacts their health and the care they receive. In a dangerous environment the same person may identify as a ‘woman’ in order to avoid discrimination or violence. Some individuals also indicated that how they identify depends on the options or instructions given on written forms, such as having the option to select multiple gender options. Balarajan et al. (2011) developed research methods to better capture gender identity information on survey forms for healthcare environments. In the concluding suggestions, the authors provided a list of possible gender identities as well as a fill-in option, and instructed survey participants to “tick all that apply”, acknowledging that people can have multiple gender identifications. These recommendations were developed from qualitative interviews and lead to the improvement of a survey (often a closed-question or quantitative tool), to gather data that will ultimately be analyzed with statistics.

In addition, some non-binary individuals have multi-faceted identities that indicate specific identities on the gender spectrum. Some identify using different terminology with people outside peer groups for example, or those who may not understand a more nuanced identity (Ryan 2019), illustrating the importance of data gathering contexts. Complex and/or multiple gender identities provided by participants from the GenSpecS corpus (Abbou et al. 2018) includes *gender neutral and non-binary*, *gender non-conforming/androgynous female*, and *non-binary transmasculine*. Identification varied for some corpus participants depending on whether it was the recruitment phase, the background survey, or the following Skype interview. These findings for American and Canadian speakers support Ryan (2019) findings for UK respondents. This is an important component of non-binary identity and it is critical to note that identity terminology continues to evolve, at the macro- and microlevel, and can change depending on the interactional context and/or over an individual’s lifetime.

Another strategy to address this complexity in identification is to explore research available in other disciplines. This was especially helpful prior to 2018, when non-binary linguistics was nascent and linguistic resources that touched upon these types of complexities were unavailable. Accessible sociophonetic research often had small sample sizes: For instance, Kirtley (2015) had three speakers, Gratton (2016) had two speakers, and Corwin (2017) had one. This made it difficult to understand how generalizable these complexities of identification were. This problem could be bypassed because a pragmatic framework encourages researchers to look at literature across disciplines. Brown and Pillot-Loiseau (2019) for example, found that research within healthcare settings, such as Balajaran et al. (2011), Richards et al. (2016), and Losty and O’Connor (2018) were invaluable to developing a working definition of non-binary people early in their sociophonetic research. Over time, large scale research projects like the one in Ryan (2019) (done within a sociology framework), have the potential to uphold earlier findings, identify new findings, and support generalizations. The insights of other disciplines can be vital.

All this underscores the need to have interactional data gathering methods such as qualitative interviews or well-developed surveys informed by interview data (i.e., MMR) to more clearly understand how gender terminologies are being used/understood. This becomes especially important in comparative sociophonetic research where there is a need to very specifically define the groups being compared as discussed in the next section.

3.2 *Speech and body modification effects on non-binary speech analysis*

Adding to the complexity of non-binary inclusive sociophonetic research are the effects of voice and/or vocal tract modification. Speech language-pathologists and other voice therapy specialists have developed specific voice transitioning or modification resources for transgender and non-binary speakers (Adler et al. 2012; Davies et al. 2015; Mills and Stoneham 2020). These traditionally have focused on masculinizing or feminizing voices, but more recently have added ways to ‘neutralize’ one’s voice. This is generally related to a goal of either ‘matching’ one’s voice to one’s external presentation or to developing a voice that aligns with one’s internal sense of self. These therapies focus on changing one’s articulatory gestures to produce a desired change. For instance, these changes can affect fundamental frequency (F0, perceptually labeled as ‘pitch’), vowel formants, resonance, and intonation or pitch variance.

Vocal modification can also occur through surgery or hormone therapy. For example, a glottoplasty shortens and/or thins vocal folds to increase F0 to meet feminization/gender-affirming goals (Song and Jiang 2017). Masculinization and/or gender-affirming goals often involve lowering F0 so individuals

may take testosterone to increase the length and mass of their vocal folds (Irwig et al. 2017). There are several factors that affect testosterone results, including dosage (e.g., micro-dosages vs typical doses), length of treatment, and testosterone type (e.g., gel vs injections).

Understanding if and how non-binary individuals have modified their voices (consciously or not) as well as any modification goals is dependent on personal knowledge, in-depth and lengthy interviews, or detailed and long surveys. It also requires an understanding of what kinds of modifications are possible and the effects of such modifications on phonetic output (and perception of that phonetic output). This often requires exploring cross-disciplinary research within medicine, gender and sexuality studies, trans studies, psychology, and sociology, in addition to the insights of non-binary researchers and collaborators. As a result, sociophonetic research often asks non-binary participants to provide very personal information including assigned-sex-at-birth, the type, dosage and length of hormone therapy, any voice altering surgeries, or any speech therapy or use of voice changing self-help books. Phonetic research focusing on cisgender speakers hasn't traditionally required that researchers gather such in-depth personal information. This puts an additional burden on non-cisgender research participants in sociophonetic research.

Researchers may also find it more complicated to determine the data required, develop tools to get that data, and then integrate this knowledge into how speech is analyzed, as well as to integrate interview and speech analysis data in meaningful conclusions. For example, at a very basic level, factors that permanently affect vocal tract configuration need to be understood in order to analyze vocal output including vowel formants and F0/pitch. Speech analysis software like Praat (Boersma and Weenink 2019) currently has parameter settings based on data from cis women and men. Specifically, sex typical pubertal changes in the vocal tract configuration generally determines parameter settings for fundamental frequency and vowel formants. Cisgender based parameters in speech analysis tools like Praat can be bypassed on an individual basis (i.e., taking into account each speaker's assigned sex at birth and modifications of the vocal tract). However, this makes automating speech analysis using Praat scripts with fixed parameter settings problematic. With large sample sizes or with multiple types of analyses per speaker, this becomes cumbersome to do on an individual basis. For example, Brown and Pillot-Loiseau (2019) performed automated analyses of spectral slope, but individually analyzed 95 separate sound files (five per speaker) for F0 and pitch variance. As non-binary populations increase and/or become more socially salient, these tools may be re-envisioned to be more inclusive of genders across the spectrum.

Despite these challenges, non-binary participants and researchers in the field are increasingly taking on these additional tasks and generating interesting sociophonetic research. For example, Steele (2019) and Schmid and Bradley (2019) were investigating non-binary speakers' linguistic production and conducted research in laboratory settings. Steele compared non-binary speakers who were assigned female at birth (AFAB) to non-binary speakers who were assigned male at birth (AMAB). Schmid and Bradley (2019) compared cis women and men to non-binary AFAB and AMAB speakers. However, Steele (2019) omitted AFAB non-binary speakers who had taken testosterone because this affects the length and thickness of the vocal cords, lowering F0 for example. This demonstrates that the author asked for and received this kind of personal information. In contrast, Schmid and Bradley (2019) make no mention of omitting speakers based on hormone therapy and it is unclear if they sought this kind of background information though they do indicate that speakers completed a survey that asked about gender identification.

What is interesting is that both studies additionally included quantitative self-reports of masculinity/male characteristics and femininity/female characteristics: Participants assessed themselves on two separate scales from 0 to 100. This kind of quantitative self-assessment scale is common in disciplines such as psychology and is becoming more common in sociolinguistics. These self-assessment scores were used as independent variables in statistical analyses in both studies and the femininity/female characteristics most strongly positively correlated with higher F0 production in both. This is important, because it demonstrates multiple ways to gather complex personal information – rather than assume an individual's gender identity directly indicates levels of femininity or masculinity, the researchers used a tool to quantify these levels. Cross group comparisons (e.g., AFAB non-binary speakers compared to AMAB non-binary speakers) yielded less interesting results than comparisons based on self-assessment scores.

Corwin (2017), also interested in vocal cues that might index non-binary gender, used quite different methods. The author qualitatively assessed the vocal production, physical gender expression and body language of one speaker (Henry) in detail. The data source was a series of video recordings of ethnographic interviews. In this case, the author incorporated qualitative assessments of Henry's linguistic variance, attire and body language/gestures (supported in-text with still photographs of him) – a method more commonly found in linguistic anthropology. Through these diverse methods, Corwin was able to reveal how Henry's use of semiotic resources indexing masculinity expressed both himself as 'male' and as genderqueer (*ibid*: 264). In this case, Corwin bypassed using speech analysis software with cisgender-based parameters, instead qualitatively assessing Henry's linguistic output. Rather than using a survey, Corwin gathered important demographic and background information about Henry (e.g., his multiple identities) through ethnographic interviews.

Recall that Kirtley (2015) was also a sociophonetic assessment of speakers but the author wasn't constrained by the participants' specific gender identities and there are no direct comparisons between participants being made. Kirtley also didn't select participants with a shared speech community, which may be important to other sociophonetic researchers (e.g., Gratton 2019).

The sociophonetic research outlined above demonstrates that cross-discipline research is crucial to understanding the effects of voice and body modification on speech analysis. It also demonstrates the types of open-ended questions that non-binary people may be asked in order to determine how to analyze each person's voice. The role of qualitative data gathering in order to make possible quantitative analysis possible is one way of integrating methods. Speech analysis software parameters based on cisgender speaker norms are problematic but can be over-ridden and potentially revised to be more gender inclusive.

3.3 Indexical cue possibilities in sociophonetics: Production and perception

Finally, it is important to acknowledge that non-binary gender expression and perception does not occur in a vacuum but within a pre-existing binary gender paradigm. Gender paradigms include gender identities, which are associated or indexed with multiple cues. Linguistic cues (amongst other cues) exist in indexical fields (Silverstein 2003; Eckert 2008). The field is a group of semantically associated meanings that are connected or indexed with specific (linguistic) cues. Multiple interpretations of an indexed cue are possible, and it is through context and interaction that the listener assigns a specific meaning to the speaker's output. As new meanings enter an indexical field, older meanings may be lost or may become indexed in different ways.

Some non-binary individuals may utilize linguistic (or other) cues that have traditionally indexed binary genders such as femininity and masculinity.¹ When such cues are uniquely combined in a *bricolage* (Eckert 2005), they can come to index (elements of or types of) non-binary identities. For instance, Jonathan Van Ness, a co-host of the show *Queer Eye*, is non-binary. Part of Jonathan's external gender expression (and potentially other roles, stances, or traits) incorporates elements/features that are indexed with women/femininity (e.g., long hair, makeup, and skirts) and with men/masculinity (e.g., facial hair) to create a bricolage. This resulting bricolage of separately indexed elements is part of his non-binary expression, but the effects go beyond the individual: as non-binary individuals express gender by iteratively using cues that were once exclusively associated with binary genders or sexes, gender paradigms and associated indexical are re-configured (Corwin 2009; 2017; Gratton 2016). A gender paradigm shift could mean moving from a binary conceptualization of gender to viewing gender as a continuum. Gratton (2016) presents the frequency of two variants of -ING produced by two non-binary consultants – Flynn, who was AFAB and Casey, who was AMAB. The 'standard' variant of words like 'walking' end with a velar nasal and the 'non-standard' variant ends with an alveolar nasal. Standard variants are generally used more by women and non-standard variants are used more by men². Gratton found that in a queer environment, the frequency of standard variants was similar for both

¹ This is a simplification of indexicality and gender, as it does not look at other social meaning, roles or stances that may be indexed by the same cues that index binary gender.

² Gratton (2016) makes clear that it isn't simply a case of indexation of gender with variants but that variants may play a role in more complex styles and registers.

speakers. In a non-queer environment, Casey significantly increases their use of the standard variant, and Flynn significantly decreases their use of the standard variant. Gratton suggests that both consultants increase their use of the variant *not* indexed with their assigned sex at birth to create distance between themselves and their assigned sex at birth when their environment makes being misgendered more likely (i.e., the non-queer space). This conclusion is generated by both the quantitative results (i.e., frequency of variant production) as well as Gratton's in depth knowledge of the speakers which comes from multiple group sociolinguistic interviews in various environments. Again, the integration of qualitative research and quantitative research (MMR) makes possible a nuanced interpretation of the results. Gratton's focus on environment and particularly notions of locations being 'queer safe' is one found across disciplines; education (Flint et al. 2019), healthcare (Goldhammer et al. 2018), law (Reineck 2017), psychology (Ryan 2019) and music education (Sauerland 2018).

Brown and Candea (2021) is another example of research that focuses on indexicality. However, in this case, it is presented in terms of the perception of non-binary speakers. This research focused on the kinds of input (bottom-up versus top-down) that affect listeners' gender paradigms. The researchers wanted to know which phonetic cues listeners, who had little or no experience with gender non-conforming speakers, would use to 'identify' gender non-conforming speakers. To answer this, a categorical quasi-experimental perception task was developed, focusing on the effects of the socially emergent gender category of *gender non-conforming person* on pre-existing gender schemas within American listeners. The perception task was simple: listeners heard a sample of read speech from an array of GenSpecS speakers, then assigned a gender category to each speaker using a forced choice. The options, which appeared in random order, were *gender non-conforming person*, *woman*, and *man*. In the first experimental condition, participants were not given any information about the options and in the second experimental condition *gender non-conforming person* was defined.

Because follow up interviews were not possible, a background/demographic questionnaire with the express goal of giving participants opportunities to comment and clarify was developed. In contrast to the closed (quantitative) listening task, participants were explicitly told that they could comment on anything they wanted to (e.g., the task, the voices, demographic background questions, experiences, thoughts) at the end of the survey. Within the survey itself, multiple options, including 'prefer not to answer', 'do not understand the question', and 'other' as well as clarification text boxes were provided. In both conditions, most participants made at least one comment or clarification. By giving participants physical spaces to express themselves throughout the survey, useful data was generated.

Another reason the open (qualitative) component of the survey was important was the type and breadth of information that participants provided. This proved important in the interpretation of the statistical findings. One of the research questions was whether or not listeners would use the GNCP option. A secondary question was what the common social factors were for listeners who did not use the GNCP option. A quarter of the listeners never perceived any of the speakers to be a GNCP and a preliminary statistical analysis indicated this was the strategy of women with higher levels of education and men with lower levels of education. The results for the women with higher education were not as predicted, as within social research, women and individuals with higher levels of education are generally found to be more open to social change (Webb et al. 2017). Women with higher levels of education, therefore, were predicted to incorporate GNCP into their gender schema.

The rich data-eliciting questionnaire was instrumental in understanding some of the results. For example, one well-educated cis woman who never used the GNCP option commented that she had a non-binary partner and was uncomfortable with the task because it relied on gender stereotypes. She explained that her strategy was to use binary gender stereotypes and leave GNCP out of the 'badness'. In contrast, all the GNCP participants did use acoustic cues to index GNCP and none indicated that they found the task itself problematic. This cis woman's comment supported new insights. For example, failing to use a new gender category does not necessarily indicate a low level of social acceptance of change. It also supports that an individual can have multiple gender schemas which are activated in specific environments. Without providing the supportive framework and the open text comment boxes throughout the survey, this participant may have quit mid-survey or offered no commentary. As it is, her comments deepened the researchers' understanding of multiple elements of their research and made their interpretation of the existing data much more nuanced. This illustrates not only the importance of ensuring non-binary participants co-create research but also that the communities they are engaged with are included.

A key take-away from this example is that even with something as essentially quantitative as this survey, it is possible to consciously build qualitative aspects into quantitative tools. For example, part of what was qualitative in this project was the framework provided, the options developed, and the dialogue fostered for and with participants. The integration of the statistical analyses and the comments resulted in greater insights into participants' motivations and interpretations of the task at hand. In research settings, there are often time and funding constraints, making follow-up interviews for example, impossible. By redesigning questionnaires with a focus on capturing as much feedback and explanation as possible, more explanatory data is generated, and potentially, participants will feel more engaged in the research.

These various aspects of complexity in non-binary focused research demonstrate that simply using quantitative or qualitative methods individually may not yield the most useful data sets or interpretations of those data sets. Instead, the adaptability and responsiveness of pragmatism, with its embracing of cross-discipline theories, methodologies and tools, as well as MMR seems ideal to explore and document (binary and non-binary) gender at micro-, meso- and macro-levels.

4 Conclusion

I have reiterated the call for more (socio)linguistic research with a conscious pragmatic approach with MMR framework as it can foster more collaborative and creative research (Angouri 2010; Hashemi and Babaii 2013; Riazi 2016; Blaxter and Kinn 2018; Mirhosseini 2018; Azul and Neuschaefer-Rube 2019; Bacon 2020). I have also demonstrated how English sociophonetic research with a focus on non-binary speakers or the perception of non-binary speakers, has benefited from this framework, in whole or in part. I have argued that MMR and pragmatism combined can best meet the challenges of dynamic and complex nature of non-binary linguistic data, within interdisciplinary and/or collaborative research contexts, resulting in richer data sets, innovative research questions, more fulsome interpretations of results which ultimately empower non-binary people by better representing findings. One of the goals of this paper is to encourage a broadening of the research landscape, fostering research that can be transformative, echoing Ortega's more general claim, that such research should make non-binary people's lives better. This can mean collaboratively creating and supporting research that positively informs policy-making, or medical or legal reform to improve non-binary people's experiences, and to validate their valuable voices and experiences. It can also be as simple as resulting in more inclusive conversations about gender in classrooms, at dinner tables, or across social media platforms.

As calls for more intersectional research are answered, as transformative research becomes the norm, and as researchers engage with more complex research questions, pragmatism and MMR will become increasingly important. By positively educating ourselves about pragmatism, quantitative and qualitative methods and MMR, by not engaging in "QUAN-QUAL paradigm wars", and by ensuring that MMR research is published in our journals, we as linguists better our research and our discipline.

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