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Deposited in *Repositório ISCTE-IUL*:

2019-03-20

Deposited version:

Post-print

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Fasoli, F. & Maass, A. (2018). Voice and prejudice: the social costs of auditory gaydar. *Atlantic Journal of Communication*. 26 (2), 98-110

Further information on publisher's website:

10.1080/15456870.2018.1432617

Publisher's copyright statement:

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Voice and Prejudice: The Social Costs of Auditory Gaydar

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ABSTRACT

It is a widespread belief that individuals are able to detect other people's sexual orientation from vocal information alone (auditory gaydar). We argue that auditory gaydar, although often inaccurate, leads to stereotyping, avoidance and discrimination of gay/lesbian-sounding speakers. Much like "social vision", these voice-based inferences are driven by two distinct processes, a direct feature-based path and an indirect path mediated by categorization. As a way to either underline their social identity or to prevent stigmatization, gay/lesbian speakers tend to modulate their voice depending on the interlocutor and on their conversational goals. Together, our findings suggest that vocal information plays a subtle but powerful role in intra and intergroup communication.

Key words: gaydar, sexual orientation, social perception, stigma, intergroup communication, intergroup relations, social identity

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Social interactions are often guided by social group membership: The way in which individuals communicate and behave toward each other depends on the group they belong to (Giles, Reid, & Harwood, 2010; Tajfel & Turner, 1979). Many social categories such as race or age can be perceived with relative ease, whereas others are private and require implicit or explicit self-disclosure to be understood. Indeed, very often group membership cannot be ascertained, but can only be guessed on the basis of subtle cues like appearance, symbols, gait, voice sound (see Dragojevic & Giles, 2014).

One of the social categories that is private and “ambiguous” is sexual orientation¹ (henceforth SO; see Tskhay & Rule, 2013). Individuals believe that SO can be detected (Barton, 2015), and the presumed ability to “read” others’ SO from minimal cues is generally referred to as *gaydar* (Fasoli, Maass, & Sulpizio, 2016). Possibly, by activating *gaydar*, people assume the interlocutor to be gay/straight from minimal cues with the consequence of affecting verbal and non-verbal communication (for a review, see Fasoli, 2018). Knöfler and Imhof (2007), for instance, have shown that straight individuals interact differently with a gay or a straight same-sex person even if they do not explicitly know their interlocutor’s SO. At this regard, Herek (1996) talks about the “master status of homosexuality” indicating that the saliency of someone’s group membership determines the development of the social interaction that follows (see also Becker, 1963).

Furthermore, gay and lesbian (henceforth LG) individuals may decide to communicate their SO explicitly by coming out, to signal it implicitly (e.g., by displaying clothing, symbols or gadgets indicative of SO), or they may decide to conceal it altogether and to keep it private. LG individuals may want to disclose their SO in situations where they feel comfortable and accepted, but prefer to conceal their SO if they feel at risk of discrimination (Herek, 1996).

Hence, interpersonal communication very much depends on the person's intents to communicate their group membership.

For the reasons mentioned above, *gaydar* represents an interesting phenomenon to test whether the saliency of the inferred group membership shifts the interaction from being “interpersonal” to being “intergroup”. As it happens in many intergroup situations, we argue here that this is associated with potential social costs for the target of *gaydar*, who is likely to be stereotyped, discriminated, and ostracized in societies where negative attitudes towards Lesbian Gay Bisexual Transgender (LGBT) individuals prevail.

The public debate surrounding *gaydar* was recently fueled by a publication of Wang and Kosinoski (2017) that hit the headlines in many countries around the world. This research claimed that Artificial Intelligence greatly outperforms humans in accurately detecting SO from facial cues. This finding gave rise to a public debate on the validity of *gaydar* as a strategy to categorize individuals as LG or straight and on its implications. LGBT groups, such as GLAAD and Human Rights Campaign (Wong, 2017), have strongly criticized researchers for claiming that *gaydar* is accurate and stated that supporting this idea may put people at risk, especially in those contexts where discrimination of LG individuals occurs (see also Heitner, Muenks, & Sherman, 2015). On methodological grounds, Wang and Kosinoski's research was criticized for the fact that the facial stimuli were taken from dating sites whose users may be motivated to intentionally disclose their SO.

Starting from this debate, this paper focuses on our work on *auditory gaydar* with the aim of understanding what inferences listeners draw when listening to others' voices and how these inferences promote intergroup phenomena such as stereotyping and discrimination. Our work focuses on voice and *auditory gaydar* for two main reasons. First, most *gaydar* research has

focused on visual cues (faces and gait, in particular) whereas research on voice is relatively rare, despite the fact that voice may affect everyday interactions more than appearance (see research on non-standard accents, Rakić, Steffens, & Mummendey, 2011). Second, vocal cues – similarly to gait (Lick, Johnson, & Gill, 2014) but differently from static cues like face and body shape – are more likely to be modulated according to the situation and the interlocutor (e.g., if they feel comfortable in disclosing SO or instead fear discrimination). Indeed, as shown by Lambert, Hodgson, Gardner, and Fillenbaum (1960), speech can affect the way listeners perceive the speaker in relation to his/her group membership. Also, speech can highlight a stigmatized status posing the speaker in a specific position in the status hierarchy (in this case to the stigmatized LG minority). Hence, by focusing on voice, we were able to examine what inferences people draw from vocal cues, whether these inferences affect their behavior, and how speakers modulate their voices in line with their communicative intent to either disclose or conceal their SO identity.

We will discuss these issues in four sections. We will first introduce literature that tries to investigate whether auditory *gaydar* involves an accurate categorization of speakers as LG vs. straight. We will then provide evidence that people with LG-sounding voices² are likely to become targets of gender-inverted stereotyping and we will examine which mechanisms drive voice-based stereotyping. In the fourth section, we will ask whether voice-based stereotyping translates into tangible discriminatory behaviors against LG individuals. Finally, in the last section, we will inquire whether speakers can intentionally modulate their voices so as to communicate or disguise their SO.

Accuracy of Auditory Gaydar

Based on his review of the existing literature, Rule (2017) concluded that auditory *gaydar* has a 63% accuracy rate. Given that chances of correct recognition are generally 50% (with most

studies using an equal number of LG vs. straight stimuli), this means that performance exceeds chance by about 13%. Thus, individuals are, to some degree, able to distinguish LG from straight speakers, although their performance is all but perfect.

However, accuracy greatly depends on how it is defined and on how SO is conceptualized and measured (dichotomous or continuous). When using continua (e.g., from *exclusively gay* to *exclusively straight*), studies often found evidence for “relative accuracy” such that LG speakers are, on average, perceived as less heterosexual than straight speakers (Sulpizio et al., 2015; Valentova & Havlíček, 2013), but not for “absolute accuracy” given that mean ratings for LG speakers are generally located on the heterosexual side of the continuum. Put simply, LG speakers are, on average, perceived as heterosexual, although to a lesser degree than straight speakers.

This reflects an overwhelming tendency to use “heterosexual” as the default response option – since heterosexuality represents the norm in many societies – and, hence, to misclassify LG speakers as straight (see “*straight categorization bias*”, Lick & Johnson, 2016). Surprisingly, this is true even when listeners are informed beforehand that half of the speakers are straight and half gay (Sulpizio et al., 2015). The reluctance to identify speakers as “gay” is also confirmed by studies using the Mouse Tracking procedure (Freeman & Ambady, 2010), in which people tend to move the mouse in a rather hesitant way when identifying targets as “gay,” but with a relatively straight line when identifying them as “straight” (Sulpizio et al., 2015). Categorization of individuals as straight appears to be straightforward and immediate, whereas deciding whether someone is LG may be more complex as it requires to evaluate different alternatives. Thus, LG speakers are rarely and reluctantly identified as gay/lesbian, although they are perceived as less heterosexual and less masculine/feminine than straight speakers.

Also, accuracy rates in auditory gaydar vary greatly across studies, with some studies showing relatively good performance (Gaudio, 1994; Pierrhumber et al., 2004; Rieger et al., 2010; Tracy, Bainter, & Satariano, 2015; Valentova & Havlíček, 2013;) and others showing very low accuracy rates (Munson et al., 2006; Smyth et al., 2003; Sulpizio et al., 2015). The latter studies have often found considerable agreement between judges (even between judges of different languages), but these judgments were often unrelated to the speakers' actual SO. Also, mean differences in perceived SO of LG vs. straight speakers is often driven by a few clearly straight or gay/lesbian-sounding exemplars, suggesting that there is considerable variance within both groups. Speech styles vary greatly within each group, for instance, as a function of the speaker's self-concept and the SO of friends they interact with (Kachel, Simpson, & Steffens, 2017). Thus, there is great variability not only across studies, but also across speakers and, possibly, across situations (we will return to this issue later on).

Some studies on auditory gaydar have also tried to identify the acoustic cues that may distinguish LG from straight speakers (e.g., formant frequencies of some vowels, vowel length, and spectral features of sibilant /s/ for men), but these patterns vary greatly across languages for gay men (e.g., Sulpizio et al., 2015) and are practically absent for lesbians (Kachel et al., 2017).

Another question that was advanced, and that found mixed responses in literature, was whether LGBT individuals are better than straight people at identifying the SO of others. Gaydar was originally conceived as a strategy used by LG individuals to detect the minority SO of others. The few studies available on this issue have mainly considered visual or multiple cues. Ambady, Hallahan, and Conner (1999) have, for instance, found that LG individuals were better in judging SO from pictures and very short videos (see also Rieger et al., 2010). Other authors have instead shown that, rather than being more accurate, LG people are more likely to label

others as gay than straight people do (see Berger, Hank, Rauzi, & Simkins, 1987; Brewer & Lyons, 2016). Our own research supports this claim as we found across studies that sexual minorities were not better in categorizing SO from multiple or vocal cues only, but they were more open to the idea that others may be LG and therefore more likely to label others as such (Fasoli, Maass, Castriota, & Bargella, 2018).

Voice-based Stereotyping

Regardless of the speakers' communication intents, vocal cues are often taken as signs of SO and may guide listeners in forming a first impression. It is well established that gay men are seen as feminine and lesbian women as masculine (e.g., Blashill & Powlishta, 2009) and that expectations about their preferences and likely behaviors are driven by these stereotypes. Gender Inversion Theory (Kite & Deaux, 1987) claims that LG individuals are seen as gender-inverted, namely, similar to their opposite gender. But, can minimal cues such as voice trigger gender-inversion-based stereotypes?

The answer is “yes”. First evidence for gender-inverted stereotyping based on voice comes from Gaudio's (1994) seminal work, finding that gay speakers were not only perceived as gay and effeminate but, also, as more emotional and less reserved than straight speakers. Subsequent research has shown that speakers with gay-sounding voices, or those whose voices were digitally modified to sound more gay, are perceived as less competent (Campbell-Kibler, 2011; Tracy, 2016), as more attentive to their look and appearance, and as physically weaker and less muscular (Fasoli, Maass, & Antonio, 2016). In addition, gay-sounding speakers come across as more confident, mad and outgoing, whereas straight-sounding speakers were perceived as older, bored and sad (Tracy, 2016). Together, these studies suggest that vocal cues related to SO trigger a host of inferences about the speaker's personality.

In our own research, we took this argument one step further by showing that vocal cues lead to a broad range of stereotypical inferences well beyond personality (Fasoli, Maass, Paladino, & Sulpizio, 2017a). We asked participants to listen to LG and straight speakers, matched for age and regional background, whose voices had been pretested to assure that they were revealing of the speaker's SO (i.e., they sounded in a way coherent with the SO they identified with). Participants were never informed of the speakers' actual SO, but were free to infer this information from voice as it may happen when encountering a stranger. Next, participants were asked to report the likelihood that the speakers were enrolled in typically feminine (e.g., psychology) and typical masculine (e.g., engineering) degrees at university, that they were performing typically feminine (e.g., dance) and typically masculine (e.g., football) sports, and that they had typically feminine (e.g., emotional) and typically masculine (e.g., dominant) personality traits. In line with predictions, compared with their straight counterparts, gay speakers were associated with more feminine and lesbian speakers with more masculine characteristics, interests and fields of study. What is striking about these results is, on the one side, the consistency and robustness of the findings across measures and, on the other side, the fact that such strong inferences were drawn from a single and rather neutral sentence that was unrelated to SO and to gender- or SO-stereotypes (*il cane correva nel parco / the dog ran in the park*).

Voice-based stereotyping goes even further as shown by a subsequent set of studies in which listeners guessed the targets' health status on the basis of vocal cues alone (Fasoli, Maass, & Sulpizio, 2017b). Participants listened to brief sentences pronounced by LG and straight speakers, all of whom were young and without signs of poor health. Participants rated the likelihood that the speakers may suffer from diseases that are stereotypically associated with men

(e.g., alcoholism) and women (e.g., anorexia), or that are stereotypically associated with gay (e.g., AIDS/HIV) and straight men (e.g., obesity). Importantly, none of these were voice-related disorders. Findings showed that gay-sounding speakers were perceived as more likely to suffer from typically gay male and typically female diseases. Vice versa, lesbian-sounding women were perceived as more likely to suffer from male diseases. Moreover, straight-sounding speakers were perceived to suffer from typical disease related to their gender (i.e., male diseases for straight male speakers, and female diseases for straight female speakers). Thus, in the absence of knowledge of the speakers' true health status, people drew stereotype-based inferences in line with Gender Inversion Theory. Again, these inferences were based on minimal information, namely, the way in which speakers without any evident signs of poor health had pronounced one or two brief sentences (*the dog ran in the park* and *the English course starts on Monday*).

However, it remains to be seen whether experienced health care professionals will show a similar tendency or whether they are immune to this bias, given that they generally have access to highly diagnostic information (such as test results). It is conceivable that even health care professionals are influenced by voice when working for services (e.g., medical helplines or hotlines) where advice is provided over the phone. In these situations, voice may be treated as a “backup signal” or proxy for other potentially relevant dimensions such as weight, height, masculinity and possibly SO (Smith, Dunn, Baguley, & Stacey, 2016). Although we are not aware of any research that would speak to the use of auditory cues by health care professionals, we can conclude from the (limited) current research that lay people spontaneously use vocal cues to infer the type of diseases strangers may suffer from.

Besides its applied implications, this finding is interesting when analyzed from an evolutionary intergroup perspective. Schaller and Neuberg (2012) have argued that prejudice and

intergroup discrimination derive from distinct types of perceived threat, including safety threat and fear of contagion. The latter typically elicits disgust and avoidance, reflecting an attempt to reduce the transmission of infectious diseases. Similarly to other groups that pose a perceived threat to safety and are seen as potentially transmitting infectious diseases (Blacks and immigrants; Faulkner, Schaller, Park, & Duncan, 2004; Navarrete & Fessler, 2006), gay men are often perceived as posing a health threat and are met with disgust, distancing and a denial of gay rights (Cottrell & Neuberg, 2004, 2005; Cottrell, Richards, & Nichols, 2010; Herek & Glunt, 1988; Schaller & Neuberg, 2012). In line with this claim, it is conceivable that listeners may pay close attention to health-related vocal cues when groups are believed to pose a health threat (e.g., gay people). Reid, Zhang, Anderson, Gasiorek, Bonilla, and Peinado (2012) have indeed shown that accent can lead to perceived similarity or dissimilarity in relation to perception of disease threat and disgust, suggesting that vocal cues are related to outgroup triggered health threats.

Although research on voice-based stereotyping is still limited, the small but growing body of literature reviewed here suggests that voice triggers a representation of the speakers' appearance, personality, professions, interests, and even of their potential diseases that matches the stereotypes generally associated with the opposite gender. We believe that these inferences reflect socially shared stereotypes, although one may also argue that they are, to some extent, accurate as LG individuals have been shown to have gender-inverted occupational preferences (Lippa, 2008) and to be objectively at higher risk for some specific health conditions (e.g., gay men being at higher risk of eating disorder; French, Story, Remafedi, Resnick, & Blum, 1996). Thus, if LG people had truly different preferences and health risks and if listeners were able to correctly identify people's SO from voice, then their inferences would, to some degree, be an accurate description of reality.

Gaydar and Mechanisms of Voice-based Stereotyping

The available literature has so far shown that vocal cues are often taken as signal of the speaker's SO, and that auditory *gaydar* is accurate in relative, but rarely in absolute terms. Does this mean that most LG speakers are protected from voice-based stereotyping simply because they are not perceived as homosexual?

Our own research suggests that LG speakers may be subject to stereotyping *even* when they are misclassified as straight. The logic behind this argument is based on Blair, Judd, Sadler, and Jenkin's (2002) dual process model according to which stereotyping does not necessarily require categorization, but may also occur in a feature-based fashion (see also Johnson, Lick, & Carpinella, 2015, for a discussion on "social vision"). For instance, both European American and African American people with more afrocentric facial features will be seen as possessing more typically African Americans characteristics than those with fewer afrocentric features (although neither will be misclassified as belonging to the other race). Extending this idea to what one may call "social hearing," we have argued that gay-sounding speakers may become subject to stereotyping either because they are categorized as gay (category-based stereotyping), or because they are perceived as having gender-atypical features (feature-based stereotyping; see Fasoli et al., 2017a).

Even when wrongly categorized as straight, gay men are at risk of stereotyping and discrimination simply due to the fact that their voice is gender-atypical, that is lacking masculinity or "straightness". This feature-based process is particularly problematic because it makes stereotype inhibition very difficult (Blair, Judd, & Fallman, 2004). Although most people have learned early on that they should not exhibit prejudice and discrimination against people belonging to other categories (such as sex, race and SO), nobody has been socialized to avoid

prejudiced responses to others because they look a bit more like a Black or sound a bit more like a gay person. Similarly, research on visual gaydar has shown that walking in a gender-atypical way elicits negative judgments in observers, independent of the target's SO (Lick & Johnson, 2014), supporting the idea that both category- and feature-based processes may play a role. Thus, being misidentified as straight may not protect LG individuals from stereotyping and discrimination.

To test these two routes of “social hearing,” we reanalyzed our data on stereotyping by comparing participants who correctly categorized the speakers as gay/lesbian or straight and those who did not (Fasoli et al., 2017a). Our analyses supported the existence of the dual path in social hearing. The feature-based process emerged, as speakers whose SO was incorrectly categorized were still stereotyped as gender-inverted. Thus, stereotyping occurred even in the absence of accurate categorization. However, a correct SO categorization (category-based process) elicited even stronger stereotyping and discrimination. Hence, supporting the idea of a dual-route model of voice-based judgments, both feature- and category-based processing of voice were likely to affect the impression that straight listeners formed of the target and their intention to engage in discriminatory behaviors, an issue addressed in the next section.

Voice-based discrimination and social exclusion

From an applied perspective, the most pressing question is whether the voice-based stereotyping described above translates into concrete discriminatory behaviors. There is ample evidence, that LGB individuals frequently become targets of verbal abuse and physical attacks (Swim, Johnston, & Pearson, 2009) and that they are discriminated in many domains including civil rights, housing, healthcare, and employment (for overviews see Badgett & Frank, 2007;

McFadden, 2015; Nadal, Withman, Davis, Erazo, & Davidoff, 2016) with detrimental consequences for their well-being (Bostwick, Boyd, Hughes, & West, 2014; Meyer, 2003).

However, there are only few studies that have investigated the possibility that LG speakers may be discriminated on the basis of voice alone. In two of our studies (Fasoli et al., 2017a, Studies 1a and 1b), we assessed behavioral intentions by asking participants to select one of two people with whom they would like to interact in a subsequent discussion about social networks. The choice was based on minimal vocal information only, namely a simple sentence pronounced by one gay/lesbian and one straight male/female speaker, since no other information was provided and speakers had similar age and regional background. Over 80% of the male participants who had to choose among the two male speakers chose the straight interaction partner, whereas women did not show such preferences. In contrast, there was no bias against the lesbian speakers (46%) who were selected with approximately equal likelihood as straight female speakers (54%), and equally by male and female participants. These findings confirm prior research showing that straight men tend to avoid contact with, and actively distance themselves from, gay men (but not from lesbians; Falomir-Pichastor & Mugny, 2009). At the same time, they go beyond prior research by showing that having a gay-sounding voice is sufficient to become a target of social exclusion.

In a subsequent study (Fasoli et al., 2017a, Study 2), heterosexual participants showed a preference for straight-sounding over LG-sounding speakers when these were presented as candidates applying for a CEO position. Heterosexual participants not only rated the LG candidates as less suited for the leadership position than the straight candidates but, if appointed, they would also offer them a lower salary. Discriminatory intentions also emerged in a very different social context, namely when deciding on adoptions. In a recent study (Fasoli, Maass, &

Dusi, 2017), we asked participants to judge two individuals who had called an adoption information center and to indicate whom they would prefer as a foster parent for a child. The only information available about the potential fathers was their voices while inquiring about adoption at the information center. Heterosexual, but not sexual minority participants, showed a bias in favor of the straight- (vs. gay-sounding) man and indicated the former as more secure and adequate to be a foster father.

Gowen and Britt (2006) also found that voice matters in deciding whether a student should receive a college scholarship. However, in their case, they found that having a gay-sounding voice had a negative impact only for speakers who self-disclosed as straight. Hence, a discriminatory behavioral intention emerged only when vocal cues and explicit information about SO were incongruent. Overall, these studies indicate that vocal cues not only affect the impressions heterosexual listeners form of the speaker, but also their intentions to interact with the speaker, and their likelihood to engage in discriminatory behavior in a range of different situations (job application, adoption and the like). Therefore, the risks highlighted in the current debate about *gaydar* appear very real in light of our findings that even small voice samples elicit stereotyping and discriminatory reactions.

Voice Modulation and Intentionality

Given the social risks associated with cues that communicate minority SO (such as gait and voice), it would not be surprising if LG individuals were to display or to disguise their SO depending on the social context, the interaction partner and the like. If voice were to change depending on the speaker's communicative intent, this could also explain why *gaydar* accuracy varies greatly across speakers and situations (Kachel et al., 2017).

Indirect evidence for this idea comes from the literature on body movement and facial cues. Deliberate changes in movement affect the way SO is perceived by observers and targets showing gender-atypical non-verbal features are perceived as deliberately trying to communicate their SO (Lick, Johnson, & Gill., 2013, 2014). Hence, real and perceived communicative intents may matter in the perception of SO.

One of the main criticisms of *gaydar* research using photographs of faces is that stimuli were often taken from dating websites. Targets portrayed in these pictures aim to meet a partner and are, therefore, motivated to communicate their SO along with others characteristics (e.g., sexual and romantic preferences; see Cox, Devine, Bischmann, & Hyde, 2016). These experimental stimuli may not be “neutral” but rather the result of a specific communicative intent that may be quite different the way the self is portrayed in other settings (e.g., job applications, professional websites). Similarly, in many of the *auditory gaydar* studies, speakers were aware of the aims of the research and of the fact that they were being recorded because of their SO (for an exception, see Sulpizio et al., 2015). Therefore, they may have, consciously or unconsciously, modulated their voice either to emphasize or to conceal their SO.

Although voice modulation has been investigated intensively in other domains (among them, see communication accommodation theory [CAT], Giles, 2016), to our knowledge there are only few studies that have explored whether individuals can and/or do modulate their behaviors (including their voice) in order to signal or disguise their SO. There is some evidence that LG people modulate their behavior in certain circumstances (Crist, 1997; Sylva, Rieger, Linsenmeier, & Bailey, 2010) and that LG people change their way of speaking depending on their interlocutors (Podesva, 2007). However, these studies did not test whether this voice modulation, in turn, affects the perception of SO.

As a first step of our research on voice modulation, we examined whether LG and straight individuals thought their voices revealed their SO and whether these beliefs were related to disclosure preferences (Fasoli, Hegarty, Maass, & Antonio, 2017). Participants in this study rated whether their own voice sounded gender-typical or atypical, whether it was telling about their SO, and whether they would like their voices to disclose their SO when meeting a stranger. LG speakers who thought their voices had a gender-atypical sound (masculine for women and feminine for men) and straight speakers who thought their voices had a gender-typical sound (masculine for men and feminine for women) believed that their voices were revealing of their SO. Apparently, our participants endorsed the idea that gender-atypical voice sound is a sign of homosexuality and gender-typical sound a sign of heterosexuality. Importantly, this effect was moderated by coming-out that can be defined as a “momentous act” of self-disclosure and self-exposure to others (Chirrey, 2003; Plummer, 1995). Speakers who were less out were also less prone to believe that their voices were revealing of their SO, suggesting, again, that speakers’ intentionality matters. Finally, compared to straight participants, LG individuals were less at ease with the idea that their voices may disclose their SO in a first encounter with a stranger. In line with these findings, an independent study by Mann (2012) found that gay men who disliked sounding gay were likely to be perceived as straight, presumably because they modulated their voices to avoid sounding, and being perceived, as gay. According to CAT, such practice could be interpreted as a convergence strategy to conform to the norm (heterosexuality) and to avoid being segregated in a stigmatized group or in a stereotype.

Following this line of research, we conducted a series of studies to test whether LG individuals are able to mold their voices and whether they do so spontaneously in reaction to different social contexts and interlocutors (Daniele, Fasoli, Antonio, Sulpizio, & Maass, 2018).

In the first study, we showed that both straight and gay speakers were able to modulate their voices when instructed to sound gay and that listeners perceived them as more gay than when they were speaking with their usual voice. Subsequently, using both experimental and archival data, we found that LG individuals spontaneously modify their voices in order to sound gay/lesbian or straight (see also, Sylva et al., 2010), depending on their state of coming out and depending on the person they interact with. We first recorded LG speakers while they simulated a conversation with people they knew and with whom they either had or had not come out. Then we asked a separate group of participants to listen to the speakers' voices and to judge their SO. Our findings indicated that voices of LG speakers sounded more gay when they were talking with someone with whom they had come out successfully than when they were talking with someone who was unaware of their SO. Therefore, voice was more revealing in a situation where the speaker felt comfortable with sounding gay.

The idea that coming out may be a turning point at which the gay speakers' voice changes also emerges in a documentary entitled "Do I sound gay?" In the movie, there is a reference to the fact that the protagonist, David Thorpe, started sounding gay after he came out and that old friends who knew him before the coming-out could not recognize his voice anymore. The hypothesis that voice changes as a function of coming-out is also supported by our archival data (Daniele et al., 2018, Study 3) involving straight and gay YouTubers. Participants were asked to judge the SO of speakers on the basis of YouTube audio registrations before and after their public coming out and, indeed, rated speakers as more gay/lesbian-sounding and as more likely to be gay after their coming out. Such changes over time were not observed in heterosexual control speakers. Together, this research suggests that voice is not a stable marker of SO but, rather, a

versatile communication device used in a flexible way to underline or to disguise the speakers SO.

Another aspect that may influence communication of SO is the content of what has been said. In Rieger et al.'s (2010) audio stimuli, the targets spoke about their interests and lifestyle and both target voices and interests influenced the perception of their SO. This result was confirmed by one of our studies in which we videotaped young men (half gay and half straight) while reading task instructions, describing a picture in their own words, and, at the end, answering questions about their childhood (Fasoli et al., 2018). Results showed that voice – together with other features such as gesture and facial expression – was a cue that participants used to guess the targets' SO (see also Keblusek, Giles, & Maass, 2017). When also receiving information about personal experiences during childhood, listeners felt more confident and became more accurate in their *gaydar* judgments. This study, together with Rieger et al. (2010), indicates that content is important when guessing SO and that listeners use personal information (such as music preferences or personal interests) as cues of SO. This is particularly relevant since speakers can decide, and have control over, what to communicate in order to disclose or conceal their SO. The possibility to intentionally modulate one's voice, together with the contents, has often been underestimated in prior research on *auditory gaydar*. Although we do not deny that many voice features represent relatively stable characteristics of the speaker, the above studies suggest that voice also operates as a rather flexible communication device.

Discussion

Although SO is a private and largely invisible matter, people are convinced that it can be understood from indirect cues such as voice. This is partially true given that people can distinguish LG and straight speakers to some degree, although LG speakers are very frequently

misclassified as straight. In making *gaydar* judgments, individuals rely on social norms that regulate intergroup relations, such as that the majority is represented by straight individuals and the minority is composed by those who “deviate” from the prototype, usually defined in terms of masculinity/femininity (Lick & Johnson, 2016). This strategy may however make *gaydar* judgments difficult. It has been shown that individuals are hesitant in judging someone has LG (see Sulpizio et al., 2015), and this may be explained in different ways. For instance, due to the stigmatized status attached to being LG in many societies, individuals may be hesitant to label someone as non-heterosexual. But even when not labeled as LG these targets are still stereotyped and discriminated. Alternatively, one could argue that due to the fact that “SO” is an ambiguous category people cannot be sure about someone’s SO and therefore engage in a longer decision making process. This may be in line with the fact that individuals look for multiple cues that confirm their guess (see Fasoli et al., 2018; Rieger et al., 2010).

This poses an important question that has not been investigated so far, namely the interplay between explicit self-disclosure and SO vocal cues (for an exception see Gowen & Britt, 2006). In intergroup communication, many are the cues of SO. Indeed, along with vocal cues highlighting the speaker’s SO, SO can also be communicated explicitly or indirectly (e.g., referring to the gender of one’s partner; see Fasoli, 2018). This issue is particularly important as there may be situations in which voice and message content convey the same SO, but others in with the cues lead to incongruent information. As a consequence the intergroup situation could become more complex and reactions may be influenced by the importance of group membership, group status and social norms.

Also, *gaydar* research should take in consideration differences related to target gender and other social categories. For instance, Fasoli, Hegarty, Maass, and Antonio (2017) have found

that women believe their voices to be less informative of their SO than men, but research has lacked in comparing whether *gaydar* judgments are more accurate for men than women (different from research on visual *gaydar*, Brewer & Lyons, 2016). Following this line, it would be interesting to look at the intersectionality between SO and other categories such as age (see Hajek & Giles, 2002) or nationality. Preliminary work has shown that some vocal cues are predominant over others in highlighting social categories (Campbell-Kibler, 2011), but much remains to be explored.

To complicate things further, voice can be consciously or unconsciously modulated in order to meet communication goals, to express one's identity, to accommodate to others, or to adapt to social demands. Our research provides evidence for the flexible use of voice to express or disguise SO, but many research questions remain to be answered. For instance, little is known about what acoustic parameters drive the expression or disguise of SO, how listeners integrate visual and vocal information (e.g., Freeman & Ambady, 2011), how they integrate vocal and semantic information (Sumner, Kim, King, & McGowan, 2014), and how people mutually adapt their voices in LG-LG and in LG-straight interactions (see, again, CAT, Giles, 2016). Also, *gaydar* may serve different people to different degrees and for different purposes as argued by Fasoli and Hegarty (2017). *Gaydar* may be useful for interpersonal relations (e.g., friendship and dating) but can also be used to pursue less positive goals. The history of psychology provides many examples of how detecting SO was used to diagnose mental illness or to treat individuals differently on the basis of their group membership, and our own studies reported above show that vocal signs of SO do elicit stereotyping and discrimination and hence imply considerable social costs for minority SO individuals in current society.

This suggests that communicating one's SO has benefits (e.g., psychological well-being), but it also poses risks (e.g., disapproval, ostracism and discrimination; for an overview see Corrigan and Matthews, 2003). It may, therefore, not surprise that people often prefer to disclose their minority SO implicitly, thereby allowing some degree of ambiguity. On the international "coming-out day" (October 11th of every year) LG individuals celebrate the moment in which they came out of the closet. Reading the many stories that gay men and lesbian women published on social media, one recurrent observation captured our attention: Many people claimed that there was no need for them to explicitly state that they were LG, but that people around them "knew". This confirms that SO is often conveyed by, and understood through, implicit cues and that SO, similar to other social categories that are marked by more salient cues (e.g., ethnicity, age, etc.), still shapes interpersonal and intergroup relations.

Acknowledgment

We would like to thank all the researchers and students who have collaborated in the studies mentioned in this manuscript. The two authors contributed equally to this work.

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Footnotes

¹In this study the term “sexual orientation” is used merely to refer to a gay/lesbian and a heterosexual categories. Although we acknowledge the existence of other sexual orientations, we refer here to studies that conceptualized “gaydar” around the gay/straight binary categories.

²LG-sounding voices refer to voices of individuals who sound gay or lesbian regardless of whether they actually are gay/lesbian. Very often those voices sound less masculine in the case of male speakers and less feminine in the case of female speakers. However, other acoustic features (e.g., sibilant /s/, duration of vowels, speaking rate) play a role in triggering the perception of voices as LG-sounding (see Fasoli, Maass, & Sulpizio, 2016).