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Research Article

N.-M. Fronhofer*, C. Herbert, V. Durand, A. Alvergne, M. Raymond, M. Barkat-Defradas

Fear and cultural background drive sexual prejudice in France – a sentiment analysis approach

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Abstract: Sexual prejudice and its negative consequences remain major issues in Western societies, and numerous studies have tried to pinpoint its sociocultural underpinnings. However, most research has operationalized sexual prejudice via self-report measures or via implicit association tests (IATs), although it surfaces in language use and can be traced in spontaneous speech.

Here, we report results from an experimental study investigating sexual prejudice in a corpus of spontaneous speech samples. Specifically, we tested in a context-sensitive sentiment analysis approach which attitudes (negative vs. positive) and emotions (*joy, sadness, anger, fear, disgust*) were voiced by the participants in response to picture prompts displaying homosexual couples. We also considered the sociocultural basis of prejudicial attitudes, in particular the effects of the participants' cultural background (France vs. Maghreb), age and gender. We find strong effects of cultural background and gender both on the frequency of negative vs. positive attitudes expressed, and on discrete emotion categories, namely that male Maghrebian participants were more negative and conveyed more *fear*. The results are discussed in the context of current diversity approaches in France and their implications for potential prejudice regulation strategies. We further discuss in how far our context-sensitive sentiment analysis approach advances research on sexual prejudice.

Keywords: sexual prejudice; homonegativity; France.

Sexual prejudice (Herek, 2000; 2004) is increasingly common in Western societies and throughout the world, despite the fact that discrimination on the basis of perceived sexual orientation is considered wrong. Moreover, an increasing number of anti-discrimination laws have been adopted in many, but not all Western societies (cf. ILGA Europe 2021 or Eurobarometer 2019, which show that acceptance of LGBTI rights is very low in countries such as Hungary, 48% or Slovakia, 31%), in order to protect members of the LGBTI (lesbian, gay, bisexual, transgender, or intersex) community (Mendos et al., 2020; Equality & Human Right Commission, 2020). However, the consequences of sexual prejudice are severe. The explicit disclosure (e.g., in job applications) or implicit perception of sexual orientation (e.g., via vocal or facial cues) can lead to various forms of discrimination: it can limit job opportunities (Ahmed, Andersson, & Hammarstedt, 2013; Fasoli, Maass, Paladino & Sulpizio, 2017; Gowen & Britt, 2006; Rule & Alaei, 2016; Tilcsik, 2011) and may impact adoption success (Fasoli & Maass, 2020); sexual prejudice can lead to discrimination in teaching contexts (Taylor & Raadt, 2020) and may lead to an overall diminished quality of life and well-being (Blashill & Powlishta, 2009; Jackson, Hackett, Grabovac, Smith, & Steptoe, 2019; Lehavot & Lambert, 2007; Miller, 2018).

Therefore, we are in need of explaining its underlying motivations more than ever before. Previous research has provided multiple explanations for sexual prejudice. It might be, for example, motivated by previous unpleasant

*Corresponding author: N.-M. Fronhofer, ISEM, University of Montpellier, CNRS, EPHE, IRD, 34095 Montpellier, France; Department of Applied Emotion and Motivation Psychology, Institute of Psychology and Education, Ulm University, 89081 Ulm, Germany, E-mail: n.fronhofer@gmail.com
C. Herbert, Department of Applied Emotion and Motivation Psychology, Institute of Psychology and Education, Ulm University, 89081 Ulm, Germany

V. Durand, A. Alvergne, M. Raymond, M. Barkat-Defradas, ISEM, University of Montpellier, CNRS, EPHE, IRD, 34095 Montpellier, France
A. Alvergne, School of Anthropology and Museum Ethnography, University of Oxford, Oxford OX2 6PE, United Kingdom

interactions with individuals happening to be gay individuals, i.e. negative interactions, which are subsequently overgeneralized and applied to all gay individuals (Herek, 2004). Or, sexual prejudice and sexual orientation discrimination have been explained by a mismatch between heterosexuals' norms and values, both on an individual level and a group level, and those of the gay community (van Leeuwen, Miton, Firat & Boyer, 2016). And finally, gay individuals might be perceived as a threat to hegemonic masculinity by violating traditional gender roles (Blashill & Powlishta, 2009; Glick, Gangl, Gibb, Klumpner & Weinberg, 2007; Keiller, 2010; Lick & Johnson, 2015; Parrott, 2009). Importantly, the latter can be regarded as culturally shaped by heteronormative belief systems that value masculinity or femininity differentially (Herek, 1990; Valentova et al., 2011).

While previous research has mostly (with very few exceptions; e.g., Lemm, 2006; van Leeuwen et al., 2016) assessed sexual prejudice and its sociocultural basis via self-reports (i.e., via questionnaires that assess agreement to evaluative statements such as “Gay men/ lesbian women have all the rights they need”; Morrison & Morrison, 2002 or “Homosexuality can always/ never be justified”; Inglehart et al., 2014), we investigate sexual prejudice in a context-sensitive sentiment analysis approach that operationalizes sexual prejudice via language. In particular, we operationalize sexual prejudice via sentiments that surface in spontaneous speech that has been elicited in an authentic experiential setting. This allows us to access both explicit and implicit prejudicial attitudes and enables their appropriate contextualization. Moreover, we focus on identifying anti-gay attitudes and their sociocultural underpinnings in France. France is a multicultural society in which a large part of citizens has a recent migratory (Maghrebian, i.e. Algerian, Tunisian or Moroccan) background (INSEE, 2021), and is influenced by different belief systems. These culture-differential belief systems and accompanying stereotypes can constitute a challenge to multicultural societies (Lankester & Alexopoulos, 2020; Schiller et al., 2020; Verkuyten & Yogeewaran, 2020). The sociocultural basis of sexual prejudice in France, however, has largely remained unexplored. Although homosexuality became more and more accepted in France in recent years (OECD, 2019:22, Fig. 1.6, 1981-2000 vs. 2001-2014) and the recognition of LGBTI rights has generally improved (Eurobarometer, 2015 vs. 2019), the situation in France remains alarming: SOS Homophobia's annual report, for instance, revealed an increase in the number of French hate crimes against members of the LGBTI community, which constitutes an increase for the fourth consecutive year (Mendos et al., 2020).

The current study investigates, therefore, sexual prejudice in the sociocultural context of France via spontaneous speech. We consider in particular the effects of the social variables cultural background (France vs. Maghreb), age and gender on sexual stereotyping towards gay men vs. lesbian women. Specifically, we test in our context-sensitive sentiment analysis approach whether sexual prejudice surfacing in spontaneous speech in form of more negative or less positive attitudes and emotions, i.e. lexical items of positive or negative valence which can be categorized into discrete emotion categories (*joy, sadness, fear, anger, disgust*), towards male vs. female homosexuality/ gay men vs. lesbian women in France is motivated by these variables.

1 Heteronormative belief systems, gender roles and sexual prejudice

In France and Maghreb, societies can be assumed to follow heteronormative belief systems. The latter, however, as well as linked gender norms of masculinity and femininity might differ and be differently endorsed across these countries (Al-Ghafari, 2002; Herek, 1990; Moussawi, 2011; Siraj, 2006; Valentova et al., 2011). Heteronormativity can be regarded as an institutionalized social force that proscribes appropriate and acceptable behaviours under the assumption that heterosexuality is normal (Habarth, 2015; Herek 2007; Kitzinger, 2014; Yep, 2003). Heteronormativity is closely related to gender role expectations, i.e. expectations of how men and women should behave, how they should express themselves or which interests they should have (Deaux & Kite, 1987; Whitley, 2001). Typically men are expected to be “masculine”, i.e. strong and agentic, whereas expected “female” behaviours can be described as more passive and communal (Eagly & Mladinic, 1989). Gender role expectations include also expectations about relationships and sexual behaviours, i.e. heterosexual relationships and behaviours in heteronormative societies (Habarth, 2015; Kitzinger, 2005). Therefore, heteronormative men, who have internalized heteronormativity to a high degree and thus intertwine sex and gender, feel they must engage with women in order to conform to societal norms and to be or to appear sufficiently “masculine” (Herek, 1986; Kitzinger, 2005). A higher degree of endorsement of heteronormativity has been found to lead to an

increase in negative attitudes towards homosexuality (Nagoshi et al., 2019; Whitley & Ægisdóttir, 2000). In a system of social hierarchies, non-conformism with heteronormative ideals is associated with inferiority and lower status and leads to overall negative consequences (Deaux & Kite, 1987; Gordon & Meyer, 2007; Rudman & Fairchild, 2004), especially for men (Sirin, McCreary & Mahalik, 2004; Vandello, Bosson, Cohen, Burnaford, & Weaver, 2008). This is true because social hierarchies benefit the dominant who want to maintain their dominance (Herek 2016; Jost & Banaji, 1994; Pratto et al., 2006). If their dominance or masculine characteristics are threatened or perceived as threatened by non-conform behaviour (Herek, 1986; Kiss et al., 2018; Parrott, 2009; Parrott & Zeichner, 2008; Theodore & Basow, 2000; Whitley and Ægisdóttir, 2000), heteronormative ideology leads then to anti-gay attitudes or negative emotions (e.g., *disgust*; Ray & Parkhill, 2021). It sometimes leads even to avoidance behaviour (e.g., *fear*; Bosson et al., 2006; Bosson et al., 2011; Buck et al., 2013) in the observers (Nagoshi et al., 2019) who aim at differentiating oneself from the violator of heteronormativity (Bosson et al., 2011; Herek, 2016; Parrott, 2009; Parrott & Zeichner, 2008). Similarly, it has been shown in the frameworks of social identity theory and intergroup ideologies, and in particular in a series of studies on positive distinctiveness threat (Vieira de Figueiredo & Pereira, 2021), that heterosexuals, and in particular heterosexual men, strive to maintain a positive heterosexual identity that is distinct from homosexuals men's identity. This again explains why heterosexuals might feel uncomfortable with gay individuals and be highly motivated to differentiate themselves from them through sexual prejudice, discriminatory or aggressive behaviours (Vieira de Figueiredo & Pereira, 2021).

2 Sexual prejudice across cultural contexts

Heteronormative belief systems and norms of masculinity and femininity are grounded in specific cultural contexts and might vary accordingly (Herek, 1990; Valentova et al. 2011). Recent large-scale and longitudinal studies into attitudes towards homosexuality suggest that sexual prejudice is culturally shaped (Inglehart et al., 2014; OECD, 2019) and varies across countries or nations. Apart from heteronormative belief systems further ideologies have been examined for their association with sexual prejudice such as the intergroup ideologies of colorblindness, multiculturalism and polyculturalism (e.g., Rosenthal, Levy & Moss, 2011). Colourblindness is conceptualized as the belief that group categories are superficial and irrelevant to understanding and getting to know others. However, instead of reducing prejudice (Ryan et al., 2007; Wolsko et al., 2000), colorblindness fails to sufficiently recognize the existence of prejudice, since colorblind people ignore the rich histories and cultures of less dominant groups, including gay individuals (Neville et al., 2000). Multiculturalism emphasizes, in contrast to colorblindness, the relevance of people's ethnicity. However, instead of making people more knowledgeable and appreciative of other groups' histories and customs (Ryan et al., 2007; Sleeter, 1991; Takaki, 1993; Wolsko et al., 2000), it has been, similar to colorblindness, found to increase stereotyping and prejudice against gay men and lesbian women. This was argued to be the case since multiculturalism focusses on learning about differences between social groups (Ryan et al., 2007, 2010; Wolsko et al., 2000; also see Bigler, 1999). Finally, only polyculturalism, which underscores the importance of interactions between different groups who mutually influenced each other over the course of time, has been found to be associated with lower sexual prejudice (Rosenthal, Levy & Moss, 2011). Moreover, it has been shown that people who endorse polyculturalism may be less inclined to hold onto all cultural traditions and be more willing to criticize elements of their culture that promote discrimination against some groups, such as gay men and lesbian women (Prashad 2001, 2003; Rosenthal, Levy & Moss, 2011).

3 Age and sexual prejudice

Sexual stereotyping is most certainly not only varying across cultures, but also across different age groups. Sexual stereotyping is generally assumed to be higher in older populations, homosexuality being more accepted among the youth (OECD, 2019). This has been explained by an "ageing effect", i.e. the fact that people become less accepting towards homosexuality when they grow older. Recent studies, however, suggest a cohort effect whereby younger generations are more liberal, and therefore more conducive to greater acceptance of sexual minorities. The within-cohort study by Andersen & Fetner (2008), for instance, analyses the tolerance of homosexuality in Canada and the

United States, using a dataset from the World Values Survey (1981-2000). The study reveals younger cohorts as being typically the most tolerant; the researchers also find proof for improvements in acceptance of homosexuality over time within all cohorts, hereby refuting the age-stability hypothesis that claims that opinions on controversial social issues are formed by early adulthood, and change little with age.

By contrast, a recent study on anti-gay prejudice in Jamaica finds that especially young men (with lower income and less education) report more anti-gay behaviour than young women (Borras Guevara & West, 2020). Another study, conducted in non-Western populations, the three Asian cities Hanoi (Vietnam), Taipei (Taiwan) and Shanghai (China), identified mainly negative perceptions of homosexuality in young adults. Their homonegativity was explained by a lack of knowledge with respect to sexual and reproductive health as well as by traditional values influenced by Confucianism (Feng et al., 2012).

Overall, these results suggest that sexual stereotyping is less frequent in younger than older Westerners. However, this might not be true for non-Western countries due to different cultural belief systems where sexual prejudice is also high in younger populations. Additionally other factors such as socio-economic status or education might modulate the degree of homonegativity in younger age groups. If sexual prejudice in France is lower in younger people of French vs. Maghrebian background has not yet been sufficiently explored.

4 Gender and sexual prejudice

Closely related to heteronormative belief systems that mainly refer to norms of masculinity is the finding that sexual prejudice is stronger in men. Studies consistently find that in Western societies, in the United States (Davies, 2004; Potat & Anderson, 2012; Whitley, 2001, 2009) and in Europe (Ciocca et al., 2017; Lingiardi, Falanga, & D'Augelli, 2005; van den Akker, van der Ploeg, & Scheepers, 2013), for instance, men (vs. women) report more anti-gay attitudes. In a series of studies involving Brazilian participants, sexual prejudice as defensive reaction to ensure intergroup distinctiveness has also been found to be stronger in heterosexual men (vs. heterosexual women). Moreover, perceived distinctiveness mediated the relationship between gender and sexual prejudice in men (but not in women), and threats to intergroup distinctiveness have been identified to lead to more implicit prejudice in men (Vieira de Figueiredo & Pereira, 2021).

That men (vs. women) report more anti-gay attitudes is also supported by some cross-cultural investigations of sexual prejudice (Adamczyk & Pitt, 2009). However, if the association of sexual prejudice and gender varies as a function of culture remained largely unexplored. By contrast, some studies suggest that the finding of men being more negative towards homosexuality is not generalizable to non-Western societies (Feng et al., 2012; Proulx, 1997). Moreover, a recent large-scale investigation on attitudes towards gay men and lesbian women across overall 23 Western and non-Western countries suggests that the relationship between participant gender and sexual stereotyping is inconsistent in Western countries, but not in non-Western countries, where men (vs. women) hold more negative attitudes against gay men (Bettinsoli, Suppes & Napier, 2019). The impact of cultural belief systems and intergroup ideologies on sexual stereotyping in multicultural societies such as France has not yet been investigated.

5 Sexual prejudice toward gay men vs. lesbian women

Due to hegemonic masculinity, men hold more negative attitudes towards gay individuals, but they are also more often victims of sexual stereotyping. At least in Italy and the United States attitudes towards gay men are more negative than towards lesbian women (Herek, 2002, Whitley, 2001; Pistella et al., 2018). Overall, men report more negative attitudes towards gay men (vs. lesbian women) than females, the latter not differentiating between the type of homosexuality (Herek, 2000a, 2002; LaMar & Kite, 1998, Span & Vidal, 2003; but Proulx, 1997). A recent study on male distinctiveness threat also showed that men exhibit more prejudice against gay men than against lesbian women, and that heterosexual men differentiate more between heterosexual males and gay males than between heterosexual females and lesbian women (Vieira de Figueiredo & Pereira, 2021). Whether sexual prejudice in French citizens towards gay men (vs. lesbian women) is higher in men than women has not yet been investigated. Moreover, it remains largely unclear whether differences in sexual prejudice towards gay men vs. lesbian women hold cross-culturally, and in particular

across French citizens with French vs. Maghrebian cultural background. So far, investigations with a cross-cultural focus have mostly neglected to specify the type of homosexuality, the target items only asking respondents to report their views on “homosexuals” or “homosexuality” which is very likely understood as targeting male homosexuality (Herek, 2002; Kite & Whitley, 1998; but Bettinsoli, Suppes & Napier, 2019).

6 Previous approaches to sexual prejudice: Self-reports and implicit association tests (IATs)

In previous research and the studies cited so far, sexual prejudice has mainly been operationalized via self-report measures, single-items and multi-item scales (e.g., Haddock et al., 1993, Herek, 2002b; Wilcox & Norrander, 2002), such as the Modern Homonegativity Scale (MHS; Morrison & Morrison, 2002) or the Attitudes towards Lesbians and Gay Men Scale (ATGL Scale; e.g., Cardenas & Barrientos, 2008). Such scales require respondents to indicate their agreement with several evaluative statements (e.g., “Gay men/ lesbian women have all the rights they need.”) about homosexuality (e.g., Herek 1994, 2002a; Herek & McLemore, 2011) or to report their comfort or discomfort at meeting or interacting with a gay man or a lesbian woman in different social settings (e.g., Herek, 2009; Ricketts & Hudson 1998). Respondents holding prejudices are, however, often unwilling to express their prejudiced attitudes overtly, because they know those are generally not accepted. Moreover, respondents might be acting in settings where they are highly motivated to appear non prejudiced (e.g., Morrison & Morrison, 2002; Rye & Meaney, 2010). In order to circumvent this “measurement challenge” (Herek & McLemore, 2013:313), researchers have developed on the one hand more suitable and less openly negative prejudice scales, and have, on the other hand, integrated implicit assessment methods involving physiological measures (e.g., startle response or accelerated heart rate; Mahaffey et al., 2005; Shields & Harriman, 1984) or implicit association tests (Implicit Association Test, IAT; e.g., Dasgupta & Rivera, 2006; Steffens, 2005), for instance. The latter involve language (and emotion words), but only in form of decontextualized word-pair associations.

7 The current research

7.1 Sexual prejudice in spontaneous speech

Despite the fact that prejudice is frequently expressed via language, for example in form of hate speech (e.g., DelVigna et al., 2017; Whillock & Slayden, 1995), slurs (e.g., Croom, 2011; Felmlee et al., 2020) or disparaging (humorous) remarks (e.g., Thomas et al., 2020), and despite the fact that language clearly has the potential to offend (Stollznow, 2020), spontaneous speech has seldom been used in order to operationalize sexual prejudice (but cf. IAT studies; e.g., Steffens, 2005 or van Leeuwen et al., 2016). However, operationalizing prejudice via language, and in particular spontaneous speech, bears several advantages. First of all, by investigating spontaneous speech we get more openly access to prejudicial attitudes. Moreover, both explicit and implicit attitudes surface in spontaneous speech samples which additionally, and in contrast to implicit association tests, enable the contextualization of those attitudes, i.e., we potentially learn more about motivations that might underlie sexual prejudice. And finally, we might be able to circumvent the measurement challenge, especially when we examine implicit sexual prejudice surfacing in spontaneous speech via picture prompts of same-sex couples displaying physical contact (e.g., Herek & McLemore, 2013; Lemm, 2006). Such experimental setting might also be more authentic than traditional self-report measures or manipulations, as we might frequently be exposed to similar prompts in everyday life.

7.2 Sexual prejudice and emotions

As discussed above, heteronormative ideology can lead to sexual prejudice in form of anti-gay attitudes or negative emotions, sometimes even avoidance behaviour in the observers, aiming at differentiating oneself from the violator

of heteronormativity. In this context, emotions play an important role. They can be regarded as adaptive mechanisms that produce specific cognitive, physiological and behavioural responses to challenging, i.e. (perceived as) threatening, environmental stimuli (Damasio, 1994; Schwarz & Clore, 1996), and are therefore crucial for intergroup relations. *Joy* (or *happiness*), for instance, can point at satisfaction, *sadness* can signal personal loss and the need for caution (Bodenhausen et al., 1994). *Anger* has been found to signal the need for approach and rapid action, and has been discussed in the context of aggressive homophobia (van Leeuwen et al., 2016). *Fear* has been investigated as anxiety and avoidance response to imagined, anticipated, and actual contact with a lesbian or gay individual (Buck et al., 2013). *Disgust* has been found to be an emotional response to contagious, offensive, distasteful, or unpleasant environmental stimuli and has lately been investigated in the context of intergroup relations, in particular as heterosexual men's response to gay men (Ray & Parkhill, 2021). Therefore, we investigate sexual prejudice (and its sociocultural basis in France) in particular via positive and negative sentiments and discrete emotion categories towards homosexuality/gay men vs. lesbian women that surface in spontaneous speech, and can be considered as linguistic indicators of the cognitive, physiological and behavioural responses discussed above. The latter can be regarded to be triggered by the picture prompts in our experimental set-up which are perceived by the participants as more or less challenging and threatening environmental stimuli.

7.3 Sexual prejudice and sentiment analysis

In order to analyse the sentiments and discrete emotions that surface in the experimentally elicited, spontaneous speech samples, we employ sentiment analysis techniques. Sentiment analysis is the automatic determination of emotion in text, comprising valence (i.e., positivity, negativity or neutrality), emotions (e.g., *anger*, *joy*, *disgust*), and other affectual states, using computer algorithms (Mohammad, 2021). More generally, sentiment analysis can determine one's attitude towards a particular target or topic, i.e. one's evaluative judgment (positive/ negative), one's affectual attitude (e.g., *frustration*, *anger*, etc.) or one's emotional state (Mohammad, 2021). Sentiment analysis is specially suited in order to explore our data and in particular sexual prejudice and its sociocultural basis in France. It has been successfully applied before in studies aiming at a better understanding of social groups which focussed, for instance, on differences in emotions in language used by different social groups or on differences in language mentioning people from diverse backgrounds (Grijalva et al., 2014; Mohammad & Yang, 2011; Montero, Munezero, & Kakkonen, 2014).

However, sentiment analysis comes with some challenges. The most important challenge is that language in use is complex and subtle, i.e. the meaning of a sentence or text (utterance meaning or pragmatic meaning) is not just simply the sum of the meanings of its parts (word or lexical meaning; Mohammad, 2021). Moreover, language can be used creatively and in non-standard ways (Mohammad, 2021). To provide one specific example from our dataset, *homosexuality* or *homosexual* is not simply a negative lexical item, as is assumed by default in common affect lexicons, but can be positively or negatively construed in context (e.g., *homosexuals as friends*), or lexical items might be modified, i.e. negated, amplified or intensified (e.g., *I am not disgusted/ very disgusted*). These challenges can, however, be met by using algorithms that have been trained on a sufficiently large and high-quality dataset, or by manual analyses. While automatic analyses are error prone, manual analyses are costly and time-consuming (Abdaoui, Azé & Bringay, 2017). Another challenge to the analysis of the French dataset is that work on sentiment analysis in languages other than English are rare, and therefore, less accurate (Abdaoui, Azé & Bringay, 2017). However recently, there has been an increasing interest in French sentiment analysis and efforts to leverage the resources available in English for sentiment analysis in French and other resource-poor languages (Kooli & Pigneul, 2018; Paroubek et al., 2018; Tapi Nzali et al., 2017).

In our approach, we combine automatic with context-sensitive manual analyses, and therefore, resolve the challenges outlined above. Moreover, our analysis yields a French affect lexicon on 'homosexuality' that might be applied or extended to future research.

7.4 The present study

Using a corpus of experimentally elicited, spontaneous speech samples by French participants of differing cultural background, age and gender, we investigate in a context-sensitive sentiment analysis approach the sociocultural underpinnings of sexual prejudice towards gay men vs. lesbian women. Specifically, we test whether sexual prejudice in France in form of positive vs. negative sentiments and emotions towards homosexuality/ gay men vs. lesbian women surfacing in spontaneous speech is dependent on the cultural background, on age, on the gender, and the type of homosexuality (male vs. female homosexuality). Hereby, we consider the surfacing sentiments and emotions to be linguistic indicators of cognitive, physiological and behavioural responses to challenging, i.e. (perceived as) threatening, environmental stimuli (i.e., the picture prompts). We also specifically differentiate between negative attitudes towards gay men vs. lesbian women, which has been largely neglected (but cf. Bettinsoli, Suppes & Napier, 2019) by questionnaire-based investigations which do not define the type of ‘homosexuality’. Moreover, our experimental design targets attitudes towards homosexuality implicitly, via picture prompts, and avoids therefore to a certain degree that the participants are not straightforward.

7.5 Hypotheses

Based on previous research outlined above, we hypothesize that French Maghrebians may hold more negative attitudes compared to French participants without Maghrebian background and use affect lexis associated with *anger*, *fear* or *disgust* (Hypothesis I) based on culture-differential belief systems, intergroup ideologies and accompanying stereotypes. Moreover, younger people should be less prejudiced towards gay men and lesbian women, therefore be more positive and use affect lexis associated with *joy* (Hypothesis II). Following heteronormative ideology and the related masculinity threat hypothesis and the male distinctiveness threat hypothesis, males should be more prone to sexual prejudice than females, therefore use more negative items and affect lexis conveying *anger*, *fear* or *disgust* (Hypothesis III), and finally male homosexuality should be less accepted than female homosexuality (Hypothesis IV), and therefore lead to more negative sentiments and conveyed *anger*, *fear* or *disgust*.

8 Methods

8.1 Participants

We recruited study participants by means of advertisements in the city of Montpellier, France. All participants gave written consent prior to the study and were given a financial compensation for their participation. In total, in the framework of a larger study on homosexuality and speech characteristics, 148 women and 181 men (N= 329) provided speech samples (Median (M)= 25, Interquartile Range (IQR) = 22-29) in response to several experimental tasks, and completed a questionnaire assessing their sexual orientation (i.e., they had to state whether they considered themselves as being homosexual, heterosexual, bisexual, or other), nationality, age, as well as country of birth of their parents and grandparents.

The resulting samples comprised participants from various backgrounds, i.e. countries of birth such as France, Maghreb (i.e., Algeria, Tunisia, Morocco), Germany, Italy, Russia, the Netherlands, Peru, Senegal or Canada. We considered only the samples of the French-born (with or without Maghrebian background) and Maghrebian-born participants, and only those speech samples collected in response to the picture task (cf. Procedure & measures; cf. Table 1 A, “full sample”, N=192). Subsequently, we only focused on the heterosexual participants, due to the imbalance in the sexual minority sample (cf. Procedure & measures and Table 1 B “final subsample”, N=135, N=57 were excluded; cf. below). The French National Commission on Informatics and Liberty approved of all protocols used in this study (CNIL Number 2-17029\UMR5554).

Table 1A. Descriptive statistics of the “full sample” – corpus size, i.e. participant numbers, of participants with varying ‘sexual orientation’ across the sociocultural variables ‘gender’ and ‘French’ vs. Maghrebian background’.

Sexual orientation	French		Maghrebian	
	female	male	female	male
homosexual	1	40	2	3
bisexual	5	2	1	3
other	0	0	0	0
heterosexual	40	24	33	38

Table 1B. Descriptive statistics – corpus size and sociocultural variables. ‘N’ stands for ‘number’, ‘M’ stands for ‘median’, ‘IQR’ stands for ‘interquartile range’ in ‘()’.

	French		Maghrebian	
	female	male	female	male
participants N (total)	40	24	33	38
lexical tokens N (raw frequencies)	4985	3136	4729	5725
age (M and IQR)	(22) 23 (28)	(22) 23 (32)	(21) 24 (26)	(21) 23 (26)

8.2 Procedure & measures

The participants were randomly presented with one of eight pictures evoking homosexuality. Half of the pictures showed two males, the other half two females intimately involved (e.g., french-kissing). Each participant was asked to describe freely what the picture evoked to them without prior knowledge of the study aim. Subsequently, the data was manually transcribed. Data analysis was performed on a subset of the speech samples wedding sentiment analysis and discourse analytical procedures. This complementary approach allowed us to retrieve subjective information with respect to homosexuality and to perform a context-sensitive analysis, e.g., to retrieve negative and positive polarity items (word-level polarity) conveying negative or positive meaning in their linguistic context (sentence-level polarity). The subsample analysed (N=135) comprised speech samples by the heterosexual participants of the complete dataset, participants of French (40 women, 24 men) and Maghrebian origin (33 women, 38 men; cf. Table 1B). We focused on heterosexual speech samples because of two reasons: First, we assumed that sexual prejudice would be most visible in populations that endorse heteronormative belief systems and norms of masculinity and femininity to a high degree, i.e. heterosexual men and women. Although, of course, gay individuals as well might hold prejudiced attitudes towards themselves (e.g., in form of internalized homophobia; Rosser et al., 2008). Secondly, our sexual minority sample was unbalanced across French and Maghrebian participants. Maghrebian origin was defined as having at least one Maghrebian, i.e. Algerian, Tunisian or Moroccan, parent or grand-parent.

8.3 Sentiment analysis

8.3.1 Polarity lexicon

In order to perform a polarity analysis of the data, an association lexicon was created in a corpus-driven approach. The creation of the association lexicon was facilitated by the web-based annotation tool Webanno, provided within the CLARIN-EU infrastructure (Eckart de Castilho et al., 2016; Yimam et al., 2014). This annotation tool allows custom-layer annotations and the export of the annotated data files which enables subsequent data exploration and statistical analysis.

Lexical items in the corpus that referred to homosexuality (cf. examples below) and had a core positive (e.g., *bien*, ‘good’) or negative (e.g., *mal*, ‘bad’) meaning (i.e., denotation) or were closely associated with positive (e.g., *libre*, ‘free’) or negative (e.g., *péché*, ‘sin’) valence (i.e. connotation) were included in the lexicon. Hereby, word-level valence (lexical meaning) was established in context. That means that the linguistic context (utterance meaning) of the words was taken into account in order to decide whether an item was positive or negative (i.e., pragmatic meaning). This included taking negations into account, since negation can change the truth value of the proposition. After identification of the negation, the polarity of the items under the scope of negation, that is, those affected by the negation word, were changed to the appropriate polarity: a negated positive item was not counted as positive, but negative (e.g., *c’est [l’homosexualité] pas naturel*, ‘this is not natural’); and a negated negative item was not counted as negative, but

neither as positive (e.g., *je ne suis pas contre [l'homosexualité]*, ‘I am not against [homosexuality]’), since the negation of negative items does generally not allow for overall inference of positivity (Taboada et al., 2011) – or in other words “not being against homosexuality” in general does not mean that the participants are in favour of it. Degree modifiers (e.g., *un peu*, ‘slightly’), intensifiers (e.g., *très*, ‘very’) or modals (e.g., *peut, pourrait*, ‘can, could’) have not been taken into account, since they do not change the propositional value of the utterances, which we wanted to determine in this approach, but modify its emotionality, i.e., the degree of the overall sentiment. We neither focused specifically on figurative language, sarcasm/ irony or metaphor.

Overall, we were interested in the speaker’s positive and negative sentiments towards homosexuality, and we included in these categories both utterances that expressed first-person sentiment ([...] *je suis dégoûté*, ‘I am disgusted’) and third-person sentiment e.g., *c’est [l'homosexualité] parfois très mal vue, voir condamnée à mort*, ‘it [homosexuality] is sometimes very poorly looked upon, even condemned to death’). Therefore, also utterances were included that evoked positive or negative events or descriptions, and strictly speaking, not speaker’s sentiment. Despite this, we included third-person sentiment, since we found that it substantially contributes to the way in which homosexuality was positively or negatively construed, i.e. perceived and experienced by the participants.

We also distinguished in our analysis between different parts-of-speech (POS), focussing separately on nouns, verbs and adjectives/ adverbs, that were associated with positive or negative sentiment. The reason for this is that these POS can realize positive or negative sentiment differentially (Fronhofer, 2020), which became also clear from a preceding qualitative analysis of the corpus: nouns primarily refer to the ways in which gay men or lesbian women are addressed (e.g., *pédé*, ‘faggot’), provide reasons for the negative or positive sentiment (e.g., *crime*, ‘crime’), and describe positive or negative events (e.g., *manifestations*, ‘demonstrations’); the category of verbs mainly subsumes positive or negative sentiments in form of actions towards gay individuals (e.g., *insulter*, ‘to insult’ or *tolérer*, ‘tolerate’) or constitutes first-person sentiments (e.g., *ça me dégoûte*, ‘it disgusts me’, *j’accepte*, ‘I accept’); and finally the category of adjectives/ adverbs puts together evaluative attributes of gay men’s and lesbian women’s orientation (e.g., *normal*, ‘normal’ or *malade*, ‘ill’).

8.3.2 Conveyed emotions

In order to analyse the conveyed emotions *joy, sadness, fear, anger* and *disgust* of the corpus, we performed an automatic, dictionary-based sentiment analysis using a tidy text mining approach (Silge & Robinson, 2017). As dictionary and for emotion classification we used the FEEL lexicon (Abdaoui, Azé & Bringay, 2017), which is one of the rare dictionaries for French sentiment categories that exist, and which obtained competitive results, especially for emotion classification. Moreover, FEEL was compiled combining automatic translation with human professional translation, i.e. the French lexicon was automatically translated departing from the English NRC Word Emotion Association Lexicon (NRC-EmoLex; Mohammad & Turney 2013) and was subsequently validated by a human translator. A subset of the classifications were subject to further evaluations by three different annotators to assure consistency. For our analysis of conveyed emotions in the corpus we screened the manually created affect lexicon for the discrete emotion categories *joy, sadness, fear, anger* and *disgust*. In order to perform this analysis, we used the inner join function (Silge & Robinson, 2017). Subsequently, the emotion categorizations were controlled and miscategorizations due to contextual effects, i.e. negations, for instance, have been corrected and the corresponding emotion category has been assigned manually.

8.4 Statistical analysis

All statistical analyses were performed using R (version 4.0.5; R Development Core Team 2021) and binomial GLMMs (‘lme4’ package version 1.1-27; Bates et al., 2021; Levshina, 2015; estimation method: maximum likelihood; link function: inverse logit; random intercept model). This allowed us to analyse the number of negative and positive polarity items (separately for adjectives, verbs and nouns) relative to the total number of words per speech sample as response variable, using cultural background, sex, the interaction of cultural background and sex, age, and the sex of the kissing couples on the picture prompts as explanatory variables. An observation-level-random effect was included in order to account for overdispersion. For the analysis of conveyed emotions, we calculated the number of affect lexemes per

emotion category (*joy, sadness, fear, anger, disgust*) relative to the total number of affect lexemes per speech sample as response variable, using emotion category, gender and cultural background, as well as the interactions between cultural background and sex, emotion category and sex as well as emotion category and cultural background as explanatory variables. We excluded the variables of age and photo gender in the analysis of conveyed emotions, since these variables had shown no or weak effects in the polarity analysis. A participant-level random effect was included here in order to take into account that one study participant could contribute emotion lexemes to different categories.

In both analyses we used ratios in order to take the slightly unbalanced corpus with respect to French gender into account, and we used model selection based on corrected AICs for small sample sizes (Goodness-of-fit-method: AICcs; ‘MuMIn’ package version 1.43.17). We report the top ranked models (within 2 Δ AICc values of the best ranked model) as well as relative parameter importances (RI; sums of AICc weights; Burnham & Anderson, 2002) and show averaged model predictions (AICc weight-based prediction averaging) for these models. We report all measures, conditions and data exclusions for the experiment.

9 Results

9.1 Negative polarity

Focusing on the negative polarity items in our final sub-corpus, our AICc-based model selection analysis reveals an overwhelmingly strong effect of cultural background (relative importance, RI = 1), whereby study participants with Maghrebian background consistently used more negative lexical items across all POS, i.e. more negative adjectives, nouns and verbs (Fig. 1, Table 2), than participants with French background. Participant gender modulated the effect of cultural background, especially for nouns which becomes evident from the background x gender interaction retained by model selection (Table 2B): females with French background exhibited relatively more negative nouns than males with French background, while this difference was inverted for participants with Maghrebian background (Fig. 1B; Table 2B). Moreover, gender was also retained in the top model for verbs, females using more negative verbs than males (Fig. 1C; Table 2C). Finally, participant age (parameter: age; Fig 1; Table 2) and gender of the homosexual couples shown in the picture prompts (parameter: photo gender) had overall only weak additive effects.

9.2 Positive polarity

The AICc-based model selection analysis of positive polarity items in the final sub-corpus confirms the strong effect of cultural background (RI= 0.94 for adjectives, RI=0.83 for nouns, but not for verbs, RI=0.27; Fig. 2, Table 3) observed with respect to negative polarity. Participants of French background used more positive adjectives and nouns than participants with Maghrebian background, while no difference was observed for verbs. Moreover, model selection revealed a consistent effect of age (RI=0.46, RI=0.70 and RI=0.95 for adjectives, nouns and verbs respectively; Fig. 2), older participants using more positive polarity items across all POS independent of cultural background. In contrast to negative polarity items the analyses was overall less conclusive and the effects of other explanatory variables was weak or inconsistent as becomes clear from the low weights associated with the top models (Table 3) and the large confidence intervals (Fig. 2).

9.3 Context-sensitive qualitative analysis of the polarity lexicon

The qualitative analysis of the polarity lexicon in context (cf. Appendix, Tables 1-4) corroborates the results obtained in the quantitative polarity analysis. Focusing on negative polarity items, we find that the negative lexical items differ qualitatively across participants of Maghrebian and French background: the lexical items Maghrebian participants use with respect to homosexuality or gay men/ lesbian women are more negatively loaded. Examples comprise the nouns *maladie* (‘illness’) or *péché* (‘sin’), the adjectives *bizarre* (‘bizarre’), *pas normale* (‘not normal’), *rare* (‘rare’) or the verbs/

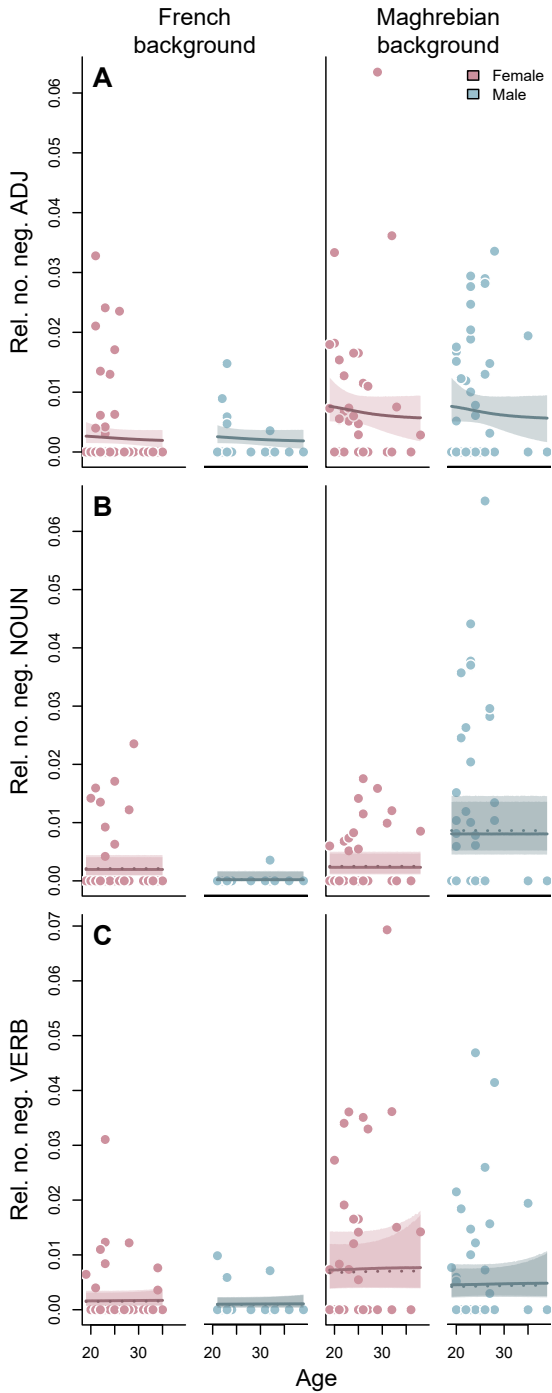


Figure 1: Relative frequencies (occurrence/ total words per text) of negative adjectives (A), nouns (B) and verbs (C) for participants of different age with French and Maghrebian background as well as females (pink) and males (blue). Full dots show data points. Solid lines visualize AICc-based averaged model predictions (prediction averaging based on AICc-weights) and shaded areas the 95% confidence intervals. When the parameter photo gender was retained in the best models selected (models with $\Delta AICc < 2$, cf. Table 2), solid lines show the model prediction for observing female photo gender, dotted lines visualize the model prediction for observing male photo gender.

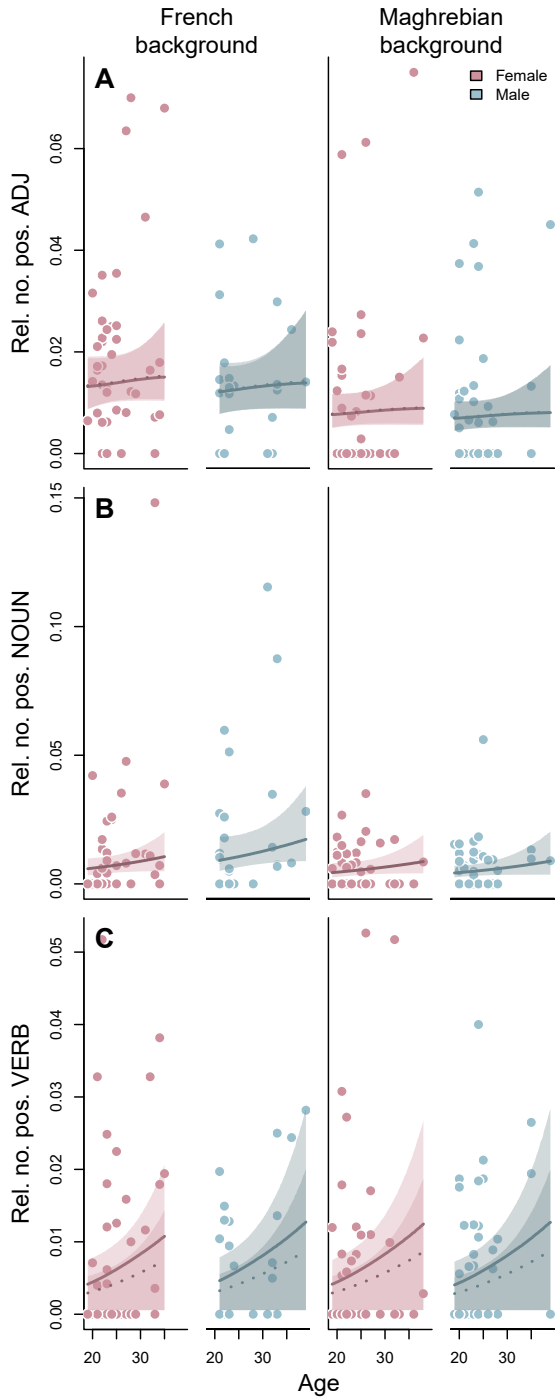


Figure 2: Relative frequencies (occurrence/ total words per text) of positive adjectives (A), nouns (B) and verbs (C) for participants of different age with French and Maghrebian background as well as females (pink) and males (blue). Full dots show data points. Solid lines visualize AICc-based averaged model predictions (prediction averaging based on AICc-weights) and shaded areas the 95% confidence intervals. When the parameter photo gender was retained in the best models selected (models with $\Delta AICc < 2$, cf. Table 3), solid lines show the model prediction for observing female photo gender, dotted lines visualize the model prediction for observing male photo gender.

Table 2: AICc-based model selection results for negative adjectives, nouns and verbs. We only show results for the models with $\Delta AICc < 2$ in detail.**A. ADJ – model selection table**

<i>Model</i>	<i>df</i>	$\Delta AICc$	W_{AICc}
background + age	4	0	0.25
background	3	0.24	0.22

Parameter	RI
background	1
age	0.52
gender	0.37
photo gender	0.26
background x gender	0.15

B. NOUN – model selection table

<i>Model</i>	<i>df</i>	$\Delta AICc$	W_{AICc}
background x gender	5	0.00	0.51
background x gender + photo gender	6	1.56	0.24

Parameter	RI
background	1
gender	1
background x gender	1
photo gender	0.31
age	0.25

C. VERB – model selection table

<i>Model</i>	<i>df</i>	$\Delta AICc$	W_{AICc}
background + gender	4	0.00	0.24
background + gender + photo gender	5	1.01	0.15
background	3	1.47	0.12
background + age + gender	5	1.64	0.11

Parameter	RI
background	1
gender	0.74
photo gender	0.37
age	0.30
background x gender	0.19

verbal phrases *ça me dégoûte* ('it [homosexuality] disgusts me'), *je ne comprends pas* ('I don't understand'), *je déteste* ('I hate') and *j'évite au maximum* ('I avoid the most possible [homosexuals/ homosexuality]'). By contrast, the French participants' negative nouns, adjectives and verbs mostly describe negative events (*une exposition qui a été détruite*,

Table 3: AICc-based model selection results for positive adjectives, nouns and verbs. We only show results for the models with $\Delta AICc < 2$ in detail.

A. ADJ – model selection table

<i>Model</i>	<i>df</i>	$\Delta AICc$	W_{AICc}
background	3	0	0.17
background + gender	4	0.34	0.14
background + age	4	0.36	0.14
background + gender + age	5	0.68	0.12
background + photo gender	4	1.72	0.07

Parameter	RI
background	0.94
gender	0.53
age	0.46
photo gender	0.28
background x gender	0.12

B. NOUN – model selection table

<i>Model</i>	<i>df</i>	$\Delta AICc$	W_{AICc}
background x gender + age	6	0	0.17
background + age	4	0.15	0.15
background + age + gender	5	1.06	0.1
background x gender	5	1.16	0.09

Parameter	RI
background	0.83
age	0.70
gender	0.59
background x gender	0.34
photo gender	0.26

C. VERB – model selection table

<i>Model</i>	<i>df</i>	$\Delta AICc$	W_{AICc}
age + photo gender	4	0	0.29
age	3	0.58	0.22
age + gender + photo gender	5	1.97	0.11

Parameter	RI
age	0.95
photo gender	0.57
gender	0.29
background	0.27
background x gender	0.02

‘an exposition that has been destroyed’) and difficulties gay individuals are confronted with (e.g., *c’est difficile* ‘it is difficult’, *ils sont persécutés*, ‘they are persecuted’).

9.4 Conveyed emotions

Focusing on the frequencies of discrete emotion categories *joy*, *sadness*, *fear*, *anger* and *disgust* present in the extracted affect lexicon, our analysis reveals a strong effect of emotion category and cultural background as well as an interaction between emotion category and cultural background (RI = 1; Table 4). Overall, *joy* was the most prevalent emotion category, *sadness*, *anger*, *fear* and *disgust* being less frequent (Fig. 3). Moreover, the affect lexemes were differentially distributed across cultural backgrounds, participants with Maghrebian background using less *joy* lexemes, but more *fear* lexemes. This mirrors the high number of negative items in the Maghrebian speech sample identified in the polarity analysis and suggests that the negativity is mainly driven by the emotion category *fear*, and less by *anger* and *disgust*. The results also reflect the high number of positive polarity items in the French speech samples, positivity being due to the conveyed emotion *joy*. Gender and the emotion category x gender interaction, as retained by the second best model (RI= 0.64, RI=0.46; Table 4), potentially point at a tendency of males conveying less *joy*, and more *fear*, *anger* and *disgust* instead.

Table 4: AICc-based model selection results for JOY, SADNESS, FEAR, ANGER, DISGUST lexemes (relative to the total number of affect lexemes). We show results for the two top models, $\Delta AICc < 2$, in detail.

Conveyed Emotions – model selection table

Model	df	$\Delta AICc$	W_{AICc}
emotion category x background	11	0.00	0.36
emotion category x background + emotion category x gender	16	0.10	0.34

Parameter	RI
emotion category	1
background	1
emotion category x background	1
gender	0.64
emotion category x gender	0.46
background x gender	0.17

10 General discussion

We successfully analysed in a novel, context-sensitive sentiment analysis approach sexual prejudice (towards gay men vs. lesbian women) in spontaneous speech samples, i.e. in form of positive and negative sentiments and conveyed emotions. We investigated a sample of French participants with varying cultural background (French vs. Maghreb), age and gender, and our analyses yielded two main findings.

10.1 Negative sentiments indicate sexual prejudice in spontaneous speech

Our analysis showed that sexual prejudice indeed becomes visible in language, and in particular in spontaneous speech in form of frequent negative polarity-items and/ or frequent negative emotion lexemes (e.g., negative polarity, *fear* in male Maghrebian participants) referring to homosexuality. Sexual prejudice can, therefore, be successfully operationalized

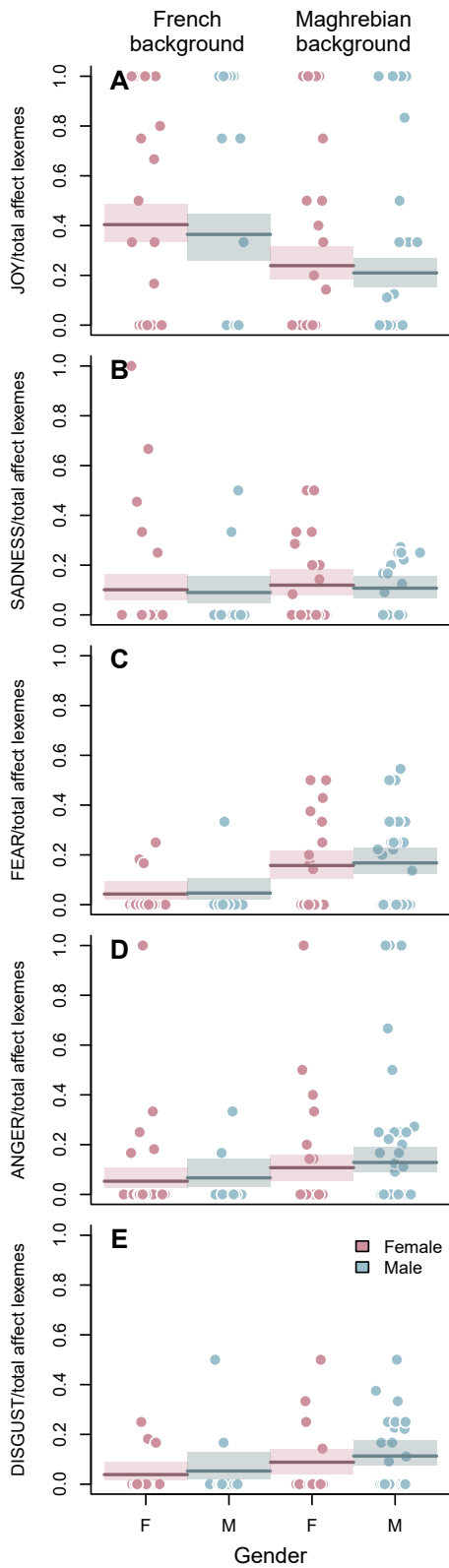


Figure 3: Relative frequencies (discrete affect lexeme/ total affect lexemes per text) of emotion categories joy (A), sadness (B), fear (C), anger (D), disgust (E) for female (pink) and male (blue) participants with French and Maghrebian background. Full dots show data points. Solid lines visualize AICc-based averaged model predictions (prediction averaging based on AICc-weights) and shaded areas the 95% confidence intervals (models with $\Delta AICc < 2$, cf. Table 4).

exploiting context-sensitive sentiment analysis techniques. Our approach goes beyond previous research on sexual prejudice that mainly employed self-report measures. Operationalizing sexual prejudice via (negative) sentiments further complements previous approaches that utilize word-pair associations (e.g., implicit association test, IAT) in so far as our approach includes not only taking the polarity of lexical items and their membership to a certain emotion category into account, but also their use, i.e. their contextualized meanings. By our approach we also address to a considerable degree some criticism (e.g., Blanton et al., 2009; Fiedler, Messner & Bluemke, 2006) that has been raised with respect to the IAT as prominent assessment method of implicit attitudes. For instance, the interpretation of difference in scores (in our case relative frequency scores) is far more straightforward, and our method is less susceptible to deliberate faking and strategic processing of attitudes. Ultimately, we learn therefore more about the explicit and underlying implicit sexual prejudice when we investigate spontaneous speech, in particular when it is elicited by an authentic, real-world and potentially threatening stimulus.

From a language in use perspective, we expand the above discussed literature on hate speech, slurs or disparaging (humorous) remarks (cf. 7 The Current study, 7.1 Sexual prejudice in spontaneous speech), as our context-sensitive sentiment analysis explicitly links linguistic expressions of negative polarity and negative emotion lexis in the linguistic context of homosexuality to its implicit deeper social meanings, i.e. underlying sexual prejudice, which emerges in particular language use, i.e. in specific linguistic, social and sociocultural contexts.

10.2 Cultural background modulates the expression of homonegativity

Our analysis yielded a strong effect of cultural background on the frequency of negative (all POS) and positive (for adjectives and nouns) items, suggesting that participants of Maghrebian background were more negative and less positive towards homosexuality/ gay men vs. lesbian women than the French participants without migratory background. This is also reflected in the analysis of emotion categories, participants with Maghrebian background conveying less *joy*, but more often *fear*. This validates our first hypothesis that French Maghrebians may hold more negative attitudes potentially based on culture-differential belief systems, intergroup ideologies and accompanying stereotypes. Moreover, it supports the general finding that suggests that sexual prejudice is culturally shaped.

However, these results have to be interpreted with caution. First of all, it would be interesting to look more closely at what exactly motivated the negativity or positivity, and *joy* vs. in particular *fear* in the present speech samples, i.e. what “makes” the specific cultural belief-systems that are at play, and which specific causes or justifications the participants provide for the positive or negative attitudes they voice, and the emotions that are conveyed. Moreover, some other variables that have not been assessed could play an important role in shaping the sexual prejudice voiced by the cultural groups in our study. It would have been interesting to know the time the participants actually have spent in France (e.g., Yeck & Anderson, 2019), and whether they have lived in or originate from rather urban or rural areas (e.g., OECD, 2019; Rault, 2016). Moreover, another important question is to which degrees the participants endorse (male) gender-roles (e.g., Whitley, 2001), and right-wing authoritarianism (e.g., Whitley, 1999), variables that have unfortunately not been assessed. Moreover, cultural belief-systems are closely related to religious affiliations and religiosity (Adamczyk & Pitt, 2009; Anderson & Koc, 2015; Bochow, 2003; Glick et al. 2007; Jäckle & Wenzelburger, 2015; Keiller, 2010; Kligerman, 2007; McDermott, Schwartz, Lindley & Proietti, 2013; Reese, Steffens & Jonas, 2014; Sakalli-Uğurlu & Uğurlu, 2016; Scull & Mousa, 2017; Sherkat et al., 2011; Simon, 2008; Smith et al., 2014). And religion has been found to be a strong predictor of sexual orientation prejudice (e.g., Haslam & Levy, 2006; Herek, 1988). Neither religious affiliations nor religiosity have, however, been at the focus in this study.

From a linguistic point of view, it would be interesting to know whether changing our approach of conceptualizing and analysing first-person negativity and third person negativity as one category, as is a viable approach in sentiment analysis, might substantially alter our results. Also, as the qualitative results suggest, it would be interesting to consider the overall emotionality of the speech samples across the cultural backgrounds, i.e. the intensity of the negativity, from a quantitative point of view.

More important, however, than identifying potential causes of operating cultural belief-systems in France might be to underline the fact that the diversity in belief systems creates important challenges to multicultural societies, and sexual stereotyping is but one example. So, the question of how to successfully cope with diversity on a societal level, crucial for fostering harmonious intergroup relations, remains to be tackled. As recent research highlights, the

recognition of diversity in France was and still is a delicate issue (Bertossi, 2016; Simon, 2013) as differences are still being contested and create deep-rooted anxieties about cultural differences (Schiller, 2020). So, it can be assumed that diversity in France is not efficiently addressed. Currently, two distinct norms of *Laïcité* in France, egalitarian *Historic Laïcité* and assimilationist *New Laïcité*, are used as sociopolitical tools to handle diversity (Lankester & Alexopoulos, 2021). The latter, assimilationist norm has been traditionally associated with cognitive regulation processes that lead to higher levels of prejudice in comparison to the egalitarian norm. However, recent findings suggest that this is not so straightforward (Lankester & Alexopoulos, 2021). The authors hypothesize that “the desire to appear non-prejudiced drives the suppression of prejudice within the realm of the egalitarian *Historic Laïcité* norm”, and vice versa, “the desire to release the pressure stemming from a relentless commitment to egalitarianism encourages the justification of prejudice within the realm of the assimilationist *New Laïcité* context” (Lankester & Alexopoulos, 2021: 9). In order to efficiently reduce prejudice the authors propose to reframe the *Historic Laïcité* norm as an “identity-conscious” norm and to adopt an approach to diversity (e.g., Leslie et al., 2020) in which similarities and differences with out-groups are highlighted, and which ultimately leads to effective prejudice regulation via perspective-taking, i.e. the active attempt to embrace and identify with the experience of other individuals (Todd & Galinsky, 2012). Focusing on similarities and differences, as in multicultural ideology, might, as has been outlined above (cf. 2), however not be enough, and future studies should focus on the potential regulatory effects of polycultural ideology instead (Rosenthal, Levy & Moss, 2011).

10.3 Gender modulates the expression of homonegativity

Our results showed that gender modulated the cultural background effect with respect to negative nouns, the French females and the Maghrebian males using more negative nouns than their counterparts. Moreover, females used more negative verbs than males. Gender and the emotion category x gender interaction played also a role in the analysis of conveyed emotions and was retained in the second best model. This only partly validates the masculinity threat/distinctiveness threat hypothesis (Hypothesis III) that men should be more prejudiced towards gay men and lesbian women than females, and our findings are only to a certain degree consistent with previous research.

However, the higher negativity in French females might be due to the fact that we coded first-person and third-person negativity together in one category. A qualitative analysis of the affect lexicon shows that negative nouns (e.g., *manifestation*, ‘demonstration’ or *victime* ‘victim’) used by the French females often describe negative events or comment on the negative situation gay individuals might find themselves in. This is by contrast not true for the nouns often used by Maghrebian males who consider homosexuality for examples as illness (e.g., *maladie*).

Moreover, it has to be noted that we do not observe inconsistencies of the kind Bettinsoli, Suppes and Napier (2019) report. Across nations, the researchers observe gender effects, the males being more negative towards gay men, but not towards lesbian women, and they find on a country-level that French men are more negative towards lesbian women.

11 Limitations and directions for future research

11.1 Does age modulate the expression of homonegativity?

At least in most Western societies, younger age groups have been found to accept homosexuality more, and therefore, we hypothesized (Hypothesis II) that participants of younger age in our sample should be less prejudiced towards gay men and lesbian women. Unexpectedly, we found only weak age effects with respect to negative polarity and conveyed emotions, but a strong age effect for positive polarity, older participants using more positive items than younger participants, and therefore pointing at less homonegativity.

The weak age effect (for negative polarity and conveyed emotions) might be due to the fact that the study was not exclusively designed to investigate sexual prejudice across different age groups, and therefore, the number of participants per each age group might not be sufficient in order to be conclusive. The age effect with respect to positive polarity, a higher number of positive items was used by older participants, might be explained by age-related changes in motivation that direct behaviour and cognitive processing, in particular by the positivity effect (e.g., Carstensen

& DeLiema, 2017). This effect states that older adults (vs. younger adults) attend to, remember and prefer positive information more than negative information (but cf. Grünh et al., 2005). From an evolutionary point of view, it has been hypothesized that post-reproductive members of groups who are emotionally stable focus their attention more on positive information, which ultimately benefits the larger group (Carstensen & DeLiema, 2017). However, as we have stated above, this remains a hypothesis due to the overall sampling in the study and overall age distribution. Alternatively, it might also be that people of (slightly) older age do perceive non-heteronormative behaviours, such as homosexuality represented by our picture prompts, less as a threat to their masculinity, having reached an age of maturity, while younger people, still in search for their identity, might still have to assert it. It might also be that older participants perceive, and consequently use, adjectives differently, i.e. use more positive items, but associate different meanings, and in particular a different valence, with them than younger adults do (but cf. Grünh et al., 2008).

Overall, our results are, however, non-conclusive with respect to the effects of age on sexual stereotyping, and future cross-generational studies tailored to this question are needed in order to shed more light onto this issue. Follow-up studies should also take further variables such as education or socio-economic background into account.

A very important limitation of our research is the absence of several control conditions. With respect to age, for instance, it would have been decisive to find out whether older participants generally use more positive adjectives irrespective of the content they are talking about. Unfortunately, our study does not include picture prompts displaying heterosexual couples. Moreover, due to the imbalance of the sexual minority sample (as reported in 8. Methods, 8.1 Participants, Table 1A), we were not able to analyse speech samples by homosexual individuals across sociocultural contexts, which certainly constitutes a necessary extension of this study and of previous research on sexual prejudice, in particular of studies employing IATs that only focus on heterosexual individuals and exclude homosexual individuals (cf. Dasgupta & Rivera, 2006; van Leeuwen, Miton, Firat & Boyer, 2016; Steffens, 2005).

11.2 Is homonegativity stronger toward gay men vs. lesbian women?

From our analysis of sentiments and conveyed emotions we cannot conclude that homonegativity is stronger towards gay men vs. lesbian women (Hypothesis IV), as the effects of the picture prompts (male vs. female homosexuality) were overall only weak. Therefore, we cannot validate our fourth hypothesis predicting that male homosexuality should be less accepted. Recent cross-cultural research (e.g., Bettinsoli, Suppes & Napier, 2019), however, has corroborated previous findings for the US (e.g., Herek, 2000a) or Italy (e.g., Pistella et al., 2018) that gay men are disliked more than lesbian women. So, either this is not true for French gay men vs. French lesbian women, or our study failed to detect this effect. As we did not ask explicitly about female vs. male homosexuality, it might be that the picture prompts left too much room for interpretation. Alternatively, male and female homosexuality in France is liked or disliked in the same ways, pointing perhaps at an increasing acceptance of both gay men and lesbian women who publicly assume their sexuality.

12 General conclusion

Although much research has examined the multiple reasons for sexual stereotyping, sexual prejudice has mostly been operationalized via self-report measures or IATs, and not via language, and in particular not via spontaneous speech. Moreover, the sociocultural basis of sexual prejudice in France has remained largely unexplored.

However, our analysis showed that sexual prejudice indeed becomes visible in language, and in particular in spontaneous speech in form of frequent negative polarity-items and/ or frequent negative emotion lexemes (e.g., negative polarity, *fear* in male Maghrebian participants) referring to homosexuality. Sexual prejudice can, therefore, be successfully operationalized exploiting sentiment analysis techniques.

Moreover, we provide novel insights into drivers and motivations of sexual stereotyping in France which might ultimately help mitigate or prevent sexual prejudice in multicultural societies. One way of doing this might be to actively embrace diversity, to responsibly raise awareness of both similarities and differences within and between groups, and

to valorize them, in order to create a climate conducive to taking others' perspectives. Furthermore, as polycultural ideology suggests, it might be equally crucial to underline the historical dimension of intergroup relations.

Despite the limitations of the present study and the remaining open questions, we showed that sexual prejudice in form of more negative or less positive attitudes and discrete emotion categories (*joy, sadness, fear, anger, disgust*) towards male vs. female homosexuality/ gay men vs. lesbian women in France is motivated by cultural background and gender. Results with respect to age and the type of homosexuality were less conclusive. This work should, therefore, be considered as a springboard for more detailed investigations into sexual stereotyping, both in France and across different cultures.

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Data Availability Statement: Data and analysis scripts (DOI 10.5281/zenodo.5761939) are available under <https://zenodo.org/record/5761939>.

Ethics Statement: The French National Commission of Informatics and Liberties approved of all protocols used in this study (CNIL Number 2-17029\UMR5554). All subjects gave written informed consent in accordance with the Declaration of Helsinki.

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Appendix

Table 1. French-French negative polarity items.

NOUNS	victime, crétin, difficulté, manifestation, attentat, pédé, homophobie, tare, problème, rejet, réticent, combat
ADJECTIVES (& adverbs)	(c'est) dommage, mal, choqué, pas naturel, virulent, (pas) accepté, mauvais, difficile, triste, négatif, (pas) d'accord, contre, frustrant, pas facile, compliqué, (pas) commun, moins bien, mal vu, condamné, inégal, étrange
VERBS	persécuter, détruire, marcher, choquer, rejeter, bannir, insulter, traiter, s'énerver, être contre, (trop) s'afficher, condamner, cacher, oser, mettre au rebut, protester, aller à l'encontre, gêner

Table 2. French-Maghrebian negative polarity items.

NOUNS	truc, tiquer, menace, péché, (pas) plaisir, histoire, barrière, dégoût, nature, obstacle, crime, tabou, insulte, origine, changement, réaction, perturbation, (pas) principes, problème, intolérance, gêne, maladie, sujet, direction, manière, (pas) envie, exception, personne, rejet, isolement, souffrance, lesbienne, bisexuelle, milieu, genre, choix, gens, trouble, distance, cause, liberté, fréquentation, parent, développement, éducation, jeunesse, chose, prise en charge, anti-naturage, logique, péché, religion, châtiment, psychologue, déséquilibre, catégorie
ADJECTIVES (& adverbs)	bizarre, (pas) habitué, surprenant, (pas bien) perçu, pas normal, homophobe, difficile, (pas) justifié, (pas) accepté, grave, dégoûté, (pas) permis, (pas) toléré, tabou, (pas) fréquent, interdit, (il n'y a pas) beaucoup, rare, (être) fait, mal vu, rejeté, stigmatisé, nouveau, contre (la nature), être gêné, développé, exceptionnel, mal, contraire, pas courant, dommage, dehors, illicite, illogique, pas bien, dégoûté, pas compréhensible, absent, malade, conçu, anormal, (contre la) relation (homme/ femme), (contre la) biologie (humaine)
VERBS	casser, perturber, avoir mal, déranger, (pas) devoir, pas entraver, dégoûter, critiquer, (pas) comprendre, être contre, souffrir, quitter, (pas) aimer, (pas en) parler, (pas) être pour, cacher, (pas) montrer, (ne pas) être à l'aise, (pas) tolérer, (pas) accepter, (pas) pratiquer, (pas) voir, être à contre-courant, affecter quelqu'un, dépasser quelqu'un, éviter, détester, (pas avoir) envie, (pas) plaire, (pas) se faire, cautionner, porter, (ne pas) être (homosexuel), déranger, infecter, (pas) vouloir, gêner, agresser, violer, (pas y) avoir (autant), chambouler, (pas) connaître, (pas) rencontrer, (pas) faire

Table 3. French-French positive polarity items.

NOUNS	câlin, amour, pote, copain, modernité, avancement, progrès, liberté, victoire, partage, baiser, énergie, mystère, être aimé, amitié, bonheur, indifférence, ami, joie, sourire, temps, caresse, sexualité, tendresse, célébrations, excitation, sensualité, délicatesse, simplicité, bisou, plaisir, euphorie, bonne humeur, bien-être, satisfaction, beaucoup d'attention, soleil, corps, pureté, amour, acceptation, forme, choix, vision, nature, attirance, vie, admiration, douceur, désir, amélioration, monnaie courante, avancés, évolutions
ADJECTIVES	heureux, amoureux, bon, normal, riche, amical, content, naturel, habitué, bien, attiré, souriant, agréable, joli, sensuel, tendre, doux, ouvert, rigolo, pur, sauvage, clair, fréquent, admis, accepté, prévisoniste, ravi, beau, familial, normal, répandu, (voir) plus, tolérant, toléré, libre, progressé, curieux, épanouies, plaisant, surprise, encre, juste, gay-friendly, banal, courant, assumé
VERBS	s'embrasser, sourire, fêter, partager, avancer, être bien (ensemble), gagner, célébrer, apprécier, se tuer (de rire), désirer, caresser, parler, mettre en avant, accepter, s'aimer, aimer, soutenir, donner, recevoir, évoluer, respecter, être pour, être d'accord, valoir, accepter, (pas/ aucun) soucis, reconnaître, favoriser, entrer, être quotidien, avoir droit

Table 4: French-Maghrebian positive polarity items.

NOUNS	joie, positivité, satisfaction, confiance, affection, sécurité, amour, vie, charisme, ami, choix, tendresse, bonheur, princesse, désir, liberté, amour, acceptation, plaisir, une forme d'amour, attirance, goûts, attirance, (pas d') inconfort, mœurs, loi, tolérance, logique, démocratie, accouplement
ADJECTIVES	content, banal, bien, proche, intime, d'accord, heureux, amoureux, beau, complice, excitant, charmante, libre, encre, normal, enrichissant, super, agréable, gentille, tendre, libre, affectueux, mignon, naturel, épanoui, heureux, bon, mieux, normalisé, pareil, tolérant, attiré, fréquent, (pas) bizarre, plus toléré, compréhensif, souriant, égal, chou, sympa, légitime, accepté
VERBS	sourire, caresser, avoir droit, s'embrasser, s'aimer, s'enlacer, câliner, s'attirer, fêter, aimer, accepter, respecter, changer, souhaiter, (pas) déranger, tolérer, accepter, légaliser, (m') aller, sourire, approuver, admettre, partager, faire (sa vie), décider, donner