Ambiguity tolerance towards non-binary sexuality concepts:

Evidence from British newspapers

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Abstract

Humans tend to construct their world view via binaries, i.e. two distinct, non-overlapping elements, such as the juxtapositions of human–animal, human–machine or male–female. Our research focuses on the binary categories of "heterosexuality–homosexuality" and explores how stable or malleable they are. For this, we analyse newspaper coverage of sexuality concepts in the UK from 1995–2010 and quantify if and how tolerance towards ambiguous concepts including "bisexuality" vary across time as well as with gender, political opinion and expertise. Our findings indicate a distinct "millennial effect" of intolerance towards sexual ambiguity, suggesting that resistance against ambiguity rears up during periods of instability. Conversely, we found higher levels of ambiguity tolerance in left-wing newspapers, broadsheet publications, female journalists and expert writers, as opposed to right-wing newspapers, tabloid publications, male journalists and novice writers. Our results can help to better understand to what degree concepts related to human sexuality are relatively hard-wired or rather fluid social categories.

Keywords: bisexuality, binary, essentialism, ambiguity tolerance

Introduction

Psychologist Sigmund Freud labelled childhood and adolescent developmental periods of seeming erotic plasticity as "polymorphous perversity", driven by undifferentiated impulses for pleasure (Freud, 1887–1904). Using a modern term, Freud hypothesized that humans are "naturally" pansexual, i.e., sexually or romantically attracted to people regardless of their biological sex or gender identity (Flanders, LeBreton, Robinson, Bian & Caravaca-Morera, 2016; Meskell, 1999). To date, it is hotly debated if and how "nurture" and/or "nature" mould our sexuality, and such discourses are scaffolded by particular societal frameworks (e.g. Diamond, 2008; Sommer & Vasey, 2006; Weinrich, 1987). For example, the last three decades have seen a shift in LGBT politics from a consolidated opinion that sexuality identity is a matter of choice to a more deterministic understanding that invokes "innate" causes (Weber, 2012). This rise of nativist ideas is typically at the expense of perspectives that view sexual behaviours and associated mental states as being more flexible and fluid (Muscarella *et al.*, 2005; Vrangalova & Savin-Williams, 2010).

Our research is not concerned with sexual orientation identity *per se*, and instead explores if and how perceptions of sexuality as either static identities or expressions of flexibility may vary across time as well as with gender, political opinion and expertise. For this, we study how stable or malleable the binary categories of "heterosexuality–homosexuality" are, as measured via attitudes towards non-dualistic concepts such as bisexuality, ambisexuality, fluid sexuality, etc. Our investigation focuses on a specific cultural context, as we analyse newspaper coverage of sexuality concepts in the UK from 1995–2010. We stress that we are not attempting to assess the validity of particular scientific or societal views of sexual behaviour. Instead, we simply aim to quantitatively measure the

resilience or plasticity of a common binary. Our work is therefore situated in wider discourses regarding *categorization*, *essentialism, dichotomization* and *ambiguity tolerance*.

The mental mechanism of *categorization* is at the heart of what humans believe is true. Often, categorization rests upon either/or thinking, i.e., something either belongs to one group or does not. Such dualistic thought is dependent upon there actually being a "true" essence to a category. In this way, *essentialism* – the idea that objects and/or concepts have immutable and deeply intrinsic properties (Fuss, 1989; Ross, 1951) – is related to *dichotomization* (Maybury-Lewis & Almagor, 1989), a split into two distinct elements that do not overlap. Common examples of black-and-white constructs are juxtapositions such as human–animal, human–machine, male–female – and, as relevant for our current work, heterosexual–homosexual.

Already as children we commonly categorize the concepts of age and gender with great vigour (Fine, 2010; Gelman, 2003), while adults essentialize gender most frequently (Carothers *et al*., 2013). Such *natural kinds* (Khalidi, 2013; for the following, see Gelman, 2003) possess traits that are perceived as intrinsic to individual category members and unalterable, such as a "black person". Natural kinds are not invented, but instead constitute inductive-rich sets considered to be discovered, e.g., animals, plants and substances like water or blood. Interestingly, certain social groups also may be perceived as natural kinds through the act of stereotyping. *Artefact kinds*, on the other hand, have the feeling of being invented. They are products of external forces, easily changed, transient, have low inductive potential, a superficial basis, overlapping traits and graded category membership. Examples are an "angry person" or human-created objects such as birdhouses or "knick-knacks", or grouping sets that are adjective-based, such as "striped things" (*ibid.)*.

In any case, our cognitive tendency to categorize, essentialize and stereotype might reflect a phylogenetic heritage of striving to reduce cognitive load (Pflum *et al*., 2015). The

reason for this is the benefit associated with arriving quickly at rule-of-thumb decisions during conflict, foraging and when encountering aggression from intraspecific enemies, predators and disease vectors (Trivers, 2011; Sommer, 2014).

Thus, while essentializing comes easy, this is not true for the reverse mental mechanism, *ambiguity tolerance* (*AT)*. Also known as "tolerance of ambiguity", the concept has a psychometric meaning (Frenkel-Brunswik, 1948). Those who are intolerant of ambiguity tend to resort to black-and-white solutions, and are "characterised by rapid and overconfident judgement, often at the neglect of reality. At the other end of the scale, ambiguous situations are perceived as desirable, challenging and interesting, usually by individuals who score highly on an Openness to Experience scale […] and show both sensation-seeking and risk-taking behaviour" (Furnham & Marks, 2013: 718).

These mechanisms may be related to observations that people often are uncomfortable with "fuzzy" concepts such as bisexuality, which may represent a hybrid of the two natural-kind "essences" of heterosexual–homosexual (Adriaens & de Block, 2006). There exists, moreover, evidence that increased sexual-orientation essentialism increases homophobic/homonegative responses (Grzanka, Zeiders & Miles, 2016; Hegarty, 2010; Morandini & Dar-Nimrod, 2015). Because many humans reify sexuality in strong terms, we often experience a corresponding cognitive load when faced with ambiguous notions (Hammack, 2005). This may explain the popularity of essentialist terms such as "sexual orientation" or "sexual identity", as they explicitly or implicitly assume an immutable kernel of one's sexual feelings.

Only occasionally is a third in-between category essentialized, namely bisexuality (Savin-Williams & Vrangalova, 2013). In fact, in terms of terminology, various attempts have been made, particularly since the second half of the 20th century, to develop "spectrum"-based models that are not blatantly binary or essentialist. This includes the

original Kinsey "scale" with its scores from 0 (exclusively heterosexual) to 6 (exclusively homosexual) (Kinsey, 1948; Kinsey *et al*., 1953; Schaffer, 2007), as well as "grids" that aim to weld together domains such as sexual attraction, sexual behaviour, sexual fantasies, emotional preference, social preference, lifestyle preference, self-identification and asexuality (cf. Klein, 1978; Storms, 1979; reviews in Galupo, Davis, Grynkiewicz & Mitchell, 2014; Galupo, Ramirez & Pulice-Farrow, 2016). Thus, instead of being essentialized, bisexuality is often grouped with alternative concepts such as sexual fluidity, sexual preference etc. that stress the potential of intra-individual choice and change.

These non-essentialist concepts demand more AT, something many people seem to struggle with (Burke, Dovidio, LaFrance et al., 2017). The concept of bisexuality in particular challenges heavily dichotomized gender constructs (Anderson & McCormack, 2016; Rubinstein, Makov, & Sarel, 2013; Katz, 2015). It is therefore not surprising that the practice of binarizing sexual orientation leads to stigmatization of intermediate states (Burke, Dovidio, LaFrance *et al*., 2017). Interestingly, self-identifying bisexuals may not be omitted from such lack of psychological flexibility (Hrehorciuc-Caragea & White, 2017).

Current Study

Our paper explores how resilient or malleable a particular prominent binary is: that of “heterosexual” versus “homosexual”. We are aware that these terms can be perceived as problematic and stigmatizing (APA, 1991), although there is no consensus regarding this (e.g. Sommer & Vasey, 2006). Our use of this binary is intentional, but purely strategic, as it would not be possible to explore the potentially changing dynamics of the use of these binaries without naming them, as “heterosexual” and “homosexual” were keywords for search terms via which we quantified the degree of AT associated with the heterosexual-homosexual binary by scrutinising a large set of British newspaper articles. Using descriptive and inferential statistics, we teased out trends and patterns, looked for potential relations

between variables. Based on such an exploratory analysis, we developed *a posteriori* working hypotheses ("What is the best model, given the data?"). We also compared our conjectures with those of similar studies, thus introducing elements of confirmatory research ("What can we conclude about the data?"). Our analyses are centred around the following variables and associated hypotheses.

Temporality

Turbulent times are likely associated with reduced AT (Biernat *et al*., 2003; Furnham & Ribchester, 1995; Haslam, 2006). Our sample years (1995, 2000, 2005, 2010) cover a period that includes a millennium change along with economic turmoil and a post-Cold-War shift of Western politics to the right, as well as the September 11th attacks and ensuing military conflict. We therefore predict to see a dip in AT around the year 2000.

Format

Those with access to more information are more likely to be more ambiguity tolerant (Rosch *et al*., 1976; Tanaka & Taylor, 1991). We therefore expect less binary determinism in broadsheet newspapers, which are considered serious and respectable, as compared to tabloids, which are perceived as more sensationalist and thus less information-rich (Sparks & Tulloch, 2000).

Political Leaning

Liberals (a.k.a. left-wingers in the UK context, see below) have been found to be more ambiguity tolerant than conservatives, who tend to think more in stereotypes (Kanai *et al*., 2011; Mooney, 2012; Thorisdottir & Jost, 2011). We therefore predict that this trend is mirrored in articles published by liberal versus conservative newspapers.

Gender

The literature about levels of AT in women versus men is ambivalent (Erten & Topkaya, 2009; Weissenstein *et al.*, 2014). However, men lean towards essentialist

explanations of homosexual behaviour (Haslam & Levy, 2006). We therefore predict that male journalists might be less ambiguity tolerant than female journalists.

Expertise

Some of our sampled articles were written by scientists or oft-quoted pundits in the field of sexuality studies, while others were by relative novices. Similar to the broadsheet versus tabloid dichotomy, we therefore expect increased AT from the more "educated" experts compared to relative novices, as some studies have suggested that experts may have higher degrees of AT (Bobo & Licari, 1989; ISI, 2010).

Seasonality

Our mood is susceptible to climatic effects (Meyer *et al*., 2016; Morken, 2001), and some researchers have argued that people tend to be more cheerful in spring and summer as opposed to autumn and winter, at least in the United States and Canada (Nillni *et al*., 2009). We therefore hypothesise higher rates of AT in UK pieces published during warmer than during colder times of the year, though we note that this is a qualified statement in terms of geography, given that seasonal effects will vary by region.

Our findings may help to better understand to what degree concepts related to human sexuality are relatively hard-wired or rather social categories.

Material and Methods

Rationale for a 1995–2010 UK Time-Slice

We measured the rigidity of the categorical dichotomy heterosexual–homosexual through newspaper articles. As journalists do not operate in a cultural vacuum (Fowler, 1991, Miljan & Cooper, 2003), popular media likely reflect the social construction of categories (Etzioni, 2001; Most, 2008), which are in turn influenced by prevailing socio-economic conditions. It therefore seemed prudent to restrict our analysis to a particular time and place.

We focused on newspaper reporting in the UK. A substantial part of our investigation concerns categorical boundaries related to scientific research into sex and sexuality. British newspapers regularly report on original scientific findings as soon as they are published, not least because English has become the *lingua franca* of much scientific writing. Moreover, English is the native language of the first author, who analysed the article pools. Having lived in the UK for two decades, she is an insider in "current British culture" and therefore can detect linguistic, political and social subtleties.

Our research covered a 16-year period through sampling of articles from 4 years (1995, 2000, 2005, 2010). A 5-year interval is the norm in longitudinal studies in the social sciences (Ruspini, 2000) and likely captures both social shifts and stasis. Our research does not cover the same cohort of persons, but instead the same cohort of news outlets. Its design is therefore pseudo-longitudinal or repeated cross-sectional. We selected 6 different newspaper groups, evenly divided between tabloids and broadsheets as well as between liberal versus conservative outlets (Table 01). The term liberal, while more commonly used in the US, is, in the UK context, broadly akin to left-wing, while conservative corresponds to right-wing or centrist (Smith, 2017).

The selected newspapers are digitally archived, which facilitates searching for keywords within a vast array of text. Comparable digital mining would not have been possible with media such as television, radio or books. For our research, we used *NexisUK* (www.lexisnexis.com.libproxy.ucl.ac.uk/uk/nexis), the UK-centred branch of *LexisNexis*. LexisNexis is currently the world's largest electronic private database (*Nexis.com*, 2011-2016). It was originally concerned with legal documents, but now encompasses other forms of digitised media, such as newspapers. At the time of our research, digital cross-sectional comparison of print newspaper reporting was only possible from 1995 onwards. This limited research to one and a half decades. The alternative – an internet-based approach – would have

restricted the timeframe more, given that online sources became widely popular only in the late 1990s. Moreover, internet reporting including social media output is much less regionally identifiable and "standardised" than printed newspaper articles.

Sampling Newspaper Articles

We identified newspaper articles where ambiguity was already present with respect to the heterosexual–homosexual dichotomy (see below for examples). For this, we searched the *NexisUK* digital pool for keywords that likely would bring up ambiguous articles: "homosexual" OR "heterosexual" OR "bisexual" OR "ambiguous" OR "homosexuality" OR "heterosexuality" OR "bisexuality" OR "ambiguous sexuality" OR "gay" OR "straight" OR "fluid" OR "lesbian" OR "confused" AND "sexuality". Other relevant terms such as "sexual orientation" would be picked up by the searches on "gay", "straight" or "heterosexual" combined with "sexuality".

We then read through the articles returned by *NexisUK,* looking for potential ambiguous connotations according to a list of so-called *intermediaries*: bisexual identity, bisexual behaviour, bisexual desire, pansexuality, omnisexuality, ambiguous sexuality, confused sexuality, chosen sexuality, sexual experimentation (in a bisexual context), fluid sexuality, sexuality spectrum, grey-area sexuality. Once an article satisfied our criteria – in that its content concerned one of the above-listed intermediaries – it was entered into our data pool. To arrive at the final set, we sampled the first 3 articles in terms of date, month-by-month for all 12 months of each year, from each newspaper group.

In about 15% of the sample, substitutions were necessary. They were like-for-like, e.g., the conservative tabloid *Evening Standard* being substituted by the conservative tabloid *Mail*. As there was no NexisUK archive for *Sun*/*News of the World* for 1995–2000, the online private pay-for *Sun*/*News of the World* archive was sourced instead. Moreover, in rare cases when not enough samples for a particular month were available, articles up to 2 subsequent

months were sourced from the same newspaper, e.g. *Guardian*, followed by 2 preceding months if no ambiguous subsequent *Guardian* articles were present. For subsequent statistical analysis, the actual substituted months were used to avoid distortions in the seasonality analysis.

The articles were collected on 21–22Aug12; with the exception of Oct–Dec00, which were collected 22-23Dec13. Our final set encompasses 864 articles (6 [newspapers] x 3 [first entries] x 12 [months] x 4 [5-year periods: 1995, 2000, 2005, 2010]).

Classifying Sentiment Towards Ambiguity: Negative, Positive, Mixed, Neutral

Once we had our article pool, we classified the writings as to whether the intermediate sexuality labels came across as *positive*, *negative*, *neutral* or *mixed*. *"*Positive" meant that a writer approves of or supports the existence of the featured intermediary, while "negative" indicates disapproval or denunciation. For illustrative purposes, we provide examples for each of these classifications.

Classification: negative. Paper: CB-T / Date: 01Dec05 / Author: Sheila Johnston (female) / Novice / Intermediary: bisexual identity / Article text: "Why has Atom Egoyan's new film provoked such outrage [article lead-in] […] After the film's first screening at Cannes, even the festival's seasoned critics raised eyebrows at the abundant nudity, its lesbian sex scene and threeway orgy and – perhaps most shocking of all – the former Mr Darcy as a bisexual sleaze with pathological urges."" / Remark: Classified "negative" because the journalist strongly associates negative comments ("outrage", "shocking", "bisexual sleaze") with the bisexual intermediary.

Classification: positive. Paper: CB-T / Date: 12Apr95 / Author: unknown / Expert-Novice: unknown / Intermediary: grey-area sexuality / Article text: "The tumultuous story of Dr David Hope, the Bishop of London, has now had a happy ending. Dr Hope – who so recently had to endure a crude quasi-blackmail 'outing' attempt by the gay rights group

Outrage – has been made Archbishop of York. Dr Hope gained the respect of the public when, after the bullying insinuations to which he was subjected, he made a dignified and candid statement to the effect that his sexuality was 'a grey area' [...]. If only we can be adult about this subject, it is clear that it does not have to be as acrimonious or divisive as various militants or reactionaries seem to think." / Remark: Classified "positive" because the journalist agrees with a non-essentialist perspective.

Classification: mixed. Paper: LT-D / Date: 03Mar05 / Author: Julian Brouwer (male) / Novice / Intermediary: bisexual identity / Article text: "Irish hunk Colin Farrell is set to shock his army of female fans by again enjoying a sizzling gay kiss […] Womanising star Farrell seems perfectly at ease with his sexuality and doesn't mind risking playing homosexuals on the screen. He portrayed Alexander the Great as bisexual and took another gay role in [a] low budget movie […] Colin's female fans may be relieved to know that he will be enjoying heterosexual romps with Chinese-born female co-star Gong" / Remark: Classified as a "mixed" response towards the bisexually identified intermediary – describes playing one in film as a "risk", alongside more positive language such as "enjoying" a same-sex kiss.

Classification: neutral. Paper: CB-T / Date: 05Mar10 / Author: Kate Muir (female) / Novice / Intermediary: grey-area sexuality / Article text: "The ten things to watch out for this Oscars night. [...] Lee Daniels, the director of Precious, [...] who is gay, also revealed that he was 'questioning his sexuality', as he told [female director Kathryn] Bigelow 'your movie is as beautiful as your legs'." / Remark: Classified "neutral" because the journalist remains purely descriptive towards sexual ambiguity.

Classification Rules and Potential Biases

To clarify our article classification, we draw attention to some sampling rules and potential biases.

The journalist counted as ultimate arbiter, i.e., their opinion on ambiguity was that which was classified, rather than that of any interviewee featured in the article. The journalist does not need to "believe" in ambiguous sexuality – just have an opinion regarding it. For example, we note that a disbelief in fluid sexuality is not uncommon (Brewster 2008). It is the authorial attitude towards ambiguity that is salient.

If an article was overwhelmingly "negative" towards ambiguity but only very incidentally "positive", it would be labelled as "negative" instead of "mixed" – and similarly for "positive" or "neutral" articles. The descriptor "controversial" (which comes up frequently in articles about homosexual behaviour) was considered a "mixed" quality, as it usually appeared with both positive and negative associations.

Classifications took the ambiguous nature of societal labelling practices themselves into consideration. Thus, homophobic articles can be ambiguity tolerant ("positive"; as in the example above, where a gay-rights group is targeted by the journalist). Vice versa, a pro-gay article can be ambiguity intolerant ("negative") towards bisexuality. By the same token, a "mixed" attitude would be recorded if intermediaries are mentioned positively, but other parts are "anti-gay" and this pejorative stance is narratively woven to the sexually ambiguous section.

We also carefully distinguished between *bisexual appeal* and *bisexual attraction*. Thus, we did not sample articles describing bisexual appeal, if the source desire was in fact monosexual. For example, an attractive man could appeal to straight women (monosexuality) and gay men (monosexuality), or a piece might describe "an actress whose appeal has enchanted both men and women with a sexuality that's perpetually simmering" (CB-T, 03Dec95). However, only if the attractive person in question desired both desirers back, indicating bisexual *desire*, would the piece be included in the article pool.

Still, our sample is permeated by a systematic bias because the default framework of popular newspaper reporting is heteronormative, if not outright heterosexist. This means articles will typically simply *assume* the heterosexuality pole of the dichotomy, without spelling this out. The term "heterosexuality" will thus often only come up as a "normal" alterity whenever "homosexuality" is mentioned – the pole of the dichotomy which, at least implicitly, is viewed as an aberration that needs explanation or justification. Similarly, newspapers often use the phrase of "admitting" one's sexuality (almost always one's homo- or bisexuality), a wording that links such disclosures with the admitting of a crime. Therefore, our coding of ambiguity often starts from a standpoint that is pejorative towards all same-sex sexuality (including bisexuality). However, this bias is systematic, and while it might affect absolute scores, it will not distort the direction of longitudinal trends or cross-sectional comparisons.

By the same token, all articles were classified subjectively by the lead author (KB). Again, since the temporal changes and weight of specific variables were measured rather than a sum total, as long as her own biases remained constant, then the results too would remain robust. To ascertain a consistent level of subjectivity, the classification exercise was repeated 2 years after the initial 2012/2013 codings for 200 masked sampled articles randomly selected across all 4 years (1995, 2000, 2005, 2010) and for a set of 4 dichotomies investigated as part of a broader project (*heterosexual–homosexual,* plus *human–animal*, *human–machine*, *male–female*: Bryson, 2017). The rate of variation in repeat classification was low, at 0.04, meaning that biases, if any, remained consistent through time.

Our statistical treatment (see below) assumes independence of observations. We nevertheless did not aim to limit journalists to one article each for two reasons. First, opinion pieces are particularly good sources of information but their authors are often anonymous. Second, the critical point in the publication process is less the writing of the article, but the

editorial decision whether or not to publish – and, hence, the newspaper – which limits the influence of journalist identity on published content. The 864 sampled pieces were written by at least 657 different journalists (10.1% of the articles had anonymous authors). This ratio of about 1.3 articles per journalist is fairly close to one piece per journalist. Of named journalists, 81.6% contributed a single article to our sample, 13.4% 2 pieces, 3.3% 3 pieces, and 1.7% between 3–13 pieces (spread out across years). While our approach therefore carries a small risk of increased Type 1 error, this diversity means that biases due to the overrepresentation of particular journalists are unlikely, and it allowed us to maximise the sample of informative content and consistently to adhere to our sampling strategy.

Analyses and Statistics

The resulting classifications were analysed both *longitudinally* (across the timeline from 1995–2010; or within individual years) and *cross-sectionally* (for all years; or within a given year). For this, we broke up the sample into several other, often binary, categories, to explore potential influences on the degree of displayed ambiguity (*temporality* [year], *political leaning* [of newspaper], *format* [of newspaper], *journalist gender*, *journalist expertise*, *season* [of publication]; see introduction). A few articles were excluded from further analysis, as they were written by journalist teams that included both novices and experts or both male and female authors. If gender or expertise level was unknown, articles were likewise excluded from the specific analysis.

Descriptive statistics were our first analytical step. Here, we did not control for distortions caused by potential linear relationships between explanatory variables; the most obvious bias is the fact that 2 of 3 tabloids are politically conservative, while 2 of 3 broadsheets are politically liberal – an asymmetry between format and political leaning that cannot be easily disentangled by descriptive statistics.

A subsequent *chi-squared contingency table* tested for variation in ambiguity tolerance through time (1995–2010). Residuals (*observed value - expected value) / square root of expected value*) were derived from the contingency table to identify year(s) and classifications (positive, negative, mixed, neutral) that deviated the most from the null hypothesis expectation of no variation through time or across classifications. Residuals cannot be classed in terms of statistical significance. Thus, we used the following terminology: values of >2 to <-2 indicate "substantially more" or "substantially fewer" classifications of a particular type, while values of >1 to <-1 are considered to indicate "clearly more" or "clearly fewer".

In addition, we used *multinomial logistic regressions* to test for the effect of a range of predictor variables on reporting types. We tested for effects of the following predictor variables on classifications (cf. Table 02): *temporality* (*year*; 4 categories: 1995, 2000, 2005, 2010), newspaper *publishing group* (6 categories: *Times*/*Sunday Times*, *Guardian/Observer*, *Independent/Independent on Sunday*, *Sun/Evening Standard/News of the World*, *Daily Mail/Mail on Sunday*, *Mirror/Sunday Mirror*), newspaper *political leaning* (2 categories: Liberal, Conservative), newspaper *format* (2 categories: Broadsheet, Tabloid), journalist *gender* (2 categories: Female, Male), journalist *expertise* (2 categories: Expert, Novice), *seasonality* (4 categories: Spring, Summer, Autumn, Winter). We tested for *year* as a categorical variable as opposed to interval data; as we are interested in time thresholds (i.e., "are particular events or times acting differently?"), *year* is more logically treated as a categorical variable than interval data. To account for collinearity between the categories of publishing group and of political leaning and format, we conducted two sets of analyses as for newspaper categorization: formula 1 according to publishing groups (*Reporting~Newspaper.group+Year +Gender+Expert+Season*) and formula 2 according to

political leaning and format

(*Reporting~Political.leaning+Format+Year+Gender+Expert+Season*).

We identified the *Minimum Adequate Model* (MAM – the most informative model that explains as much variation as possible with the lowest number of predictor variables), based on the Akaike Information Criterion (AIC). The AIC is a likelihood value penalised for the number of variables in a model: $AIC = 2k - 2\ln(L)$); where k is the number of estimated parameters in the model and L is the maximum likelihood value. The MAM is derived by eliminating, one by one, variables that do not contribute significantly to the model, as long as their elimination does not result in a higher AIC value.

Initially, we compared the effect of categories within a variable based on alphabetical order as default, with initial baseline categories against which the other categories were compared as follows: April (for 'month'), Broadsheet (for 'format'), CT-M [Daily Mail] (for 'publishing group'), Conservative (for 'political leaning'), Female (for 'journalist gender'), No (in relation to the yes / no question of 'journalist expertise'), and Autumn (for 'season').

For *Year*, the earliest date was chosen as the baseline by coding it as "A1995". Once MAMs had been derived, we also explored alternate baselines for those predictor variables that include more than 2 categories. Alternating baselines changes the perspective in the model and facilitate interpretation.

Analyses were conducted in R Version 3.0.3 (R Foundation for Statistical Computing, 2014). Multinomial logistic regressions were done with the package 'nnet' Version 7.3-9 (Venables & Ripley 2015). Significance thresholds were set to 0.05.

Results

We classified the degree of ambiguity tolerance (AT) displayed in a random sample of 864 newspaper articles with ambiguous reporting about the heterosexual–homosexual dichotomy that appeared in the UK between 1995–2010. For this, we analysed the

proportions of AT classification (negative / positive / mixed / neutral) in relation to various predictor variables. At first, we employed descriptive statistics (Table 02), followed by contingency tables with associated residuals (Table 03) as well as multinomial logistic regressions that included full models and minimum adequate models (Table 04, Table 05).

General Trends According to Descriptive Statistics

Without controlling for biases caused by asymmetrical ratios between the explanatory variables of *political leaning* and *format*, raw proportions of attitudes towards sexual ambiguity displayed by journalists (Table 02) were roughly equally divided between across three of our four classifications (negative 26.2%, positive 27.5%, mixed 27.8%), with a lower incidence of neutral reporting (18.5%). Thus, in a bit more than half of the pieces (53.7%), the journalist took a clear negative or positive stance. If we restrict our analyses to this segment of the data, then, by and large, the raw proportions confirmed our predictions.

Temporality. As predicted, the millennial year 2000 with its associated psychological uncertainty saw a dip of positive scores to its lowest level (18.1%), while negative scores were highest (32.3%).

Newspaper format. Our expectation was confirmed that the more information-rich broadsheets are more ambiguity tolerant (21.3% negative, 31.5% positive) than the more sensationalist tabloids, which show a reverse pattern (31.0% negative, 23.6% positive).

Newspaper political leaning. Our expectation was confirmed that liberal papers are more ambiguity tolerant (23.6% negative, 32.9% positive) compared to conservative papers (28.7% negative, 22.2% positive).

Journalist gender. Our expectation was confirmed that female journalists (24.7% negative, 35.4% positive) are more ambiguity tolerant than male journalists (26.5% negative, 23.8% positive).

Journalist expertise. Our prediction was supported that articles authored by experts were less stereotyping (13.6% negative, 47.0% positive) compared to pieces written by novices (26.2% negative, 28.9% positive).

Publishing season. Our expectation was confirmed that warmer seasons are associated with more AT than colder seasons. This is well exemplified by the difference between summer (27.0% negative, 32.6% positive) and winter (31.4% negative, 24.4% positive). There are no pronounced differences when comparing spring (23.2% negative, 25.0% positive) with autumn (25.3% negative, 25.5% positive).

General Trends According to Chi-Squared Results

When all newspapers were congregated (Figure 01), a comparison of the number of articles corresponding to the different reporting categories through time for all six newspapers combined shows statistically significant variation ($\chi 2$= 26.353, df = 6, p-value < 0.001) and a dip in positive codings and rise in negative codings in the year 2000, with a corresponding recovery by 2005 and a rise in positive-towards-ambiguity responses in 2010.

The residual values from the corresponding contingency table (Table 03) show that the most pronounced deviations from expected values include substantially more negative reports in 2000 than expected, substantially fewer negative reports in 2010 than expected, and substantially fewer positive reports in 2000 than expected.

When broadsheet and tabloid newspapers are compared against each other, tabloids show greater overall fluctuation in reporting type, but variation in both broadsheet and tabloid reporting through time is statistically significant (Figure 01). Broadsheet reporting is stable across the 1995-2000 period before an increase in positive counts and decrease in negative counts. There is also a gradual increase in neutral reporting through time. In contrast, there is a pronounced increase in negative and mixed codings and decrease in positive codings from

1995 to 2000 in the tabloids, followed by a gradual increase in positive counts and a slow, then pronounced, decrease in negative counts.

The residual values from the corresponding contingency tables (Table 03) show that the most pronounced deviations from expected values among broadsheet papers include lower than expected neutral counts in 1995 and higher than expected neutral counts in 2010, emphasising the gradual increase in neutral counts across the entire time period. Among tabloid newspapers, the most pronounced deviations from expected values include higher than expected positive counts in 1995 and lower than expected positive counts in 2000, emphasising the pronounced dip in positive counts from 1995-2000, as well as lower than expected negative counts in 2010.

When liberal and conservative newspapers are compared against each other, it is shown that they start out with similar counts of articles per category in 1995 (Figure 01). There is a dip in positive and rise in negative codings in 2000, followed by recovery of positive counts and a downwards trajectory of negative counts in 2005 and 2010 in both liberal and conservative newspapers, although the pattern is more pronounced in conservative newspapers, as confirmed by the difference in statistical significance between the two.

The residual values from the corresponding contingency table (Table 03) show that the most pronounced deviations from expected values include a lower than expected negative count in 2010 in liberal and conservative newspapers, and both higher than expected negative counts and lower than expected positive counts in the year 2000 in conservative newspapers.

Therefore, the observed descriptive statistics pattern is reaffirmed by results brought about via contingency tables and residuals (Table 03). This analysis reveals that positive or negative scores for the year 2000 are always substantially or clearly different from adjacent years, i.e., negative scores for AT are always higher, while positive scores are always lower –

no matter if we look at *all papers* or separately at the variables *broadsheets*, *tabloids*, *liberal* or *conservative papers*.

This pattern becomes even more obvious once if we display the scores graphically (Figure 01). We observe for all 5 variables (*all papers*, *broadsheets*, *tabloids*, *liberal papers*, *conservative papers*) an increase of negative classifications from 1995–2000 and invariably a corresponding decrease in positive scores. In fact, the year 2000 always represents the highest negative and the lowest positive scores. Moreover, this high of negatives is always followed by a decrease of these scores in 2005 and a further reduction till 2010. Correspondingly, the year-2000 low of positive scores is always followed by a recovery towards 2005 and a further increase in 2010. Often, residual values attest to the fact that the directions of these changes represent substantial or least clear differences.

Importantly, the inverse pattern between positive and negative is not caused by an "automatic" increase in one classification at the expense of the other, as scores could have drifted to mixed or neutral, which constitute almost half all article classifications.

The magnitude of change was measured by summing up, for all years, percentage values as they differed from expected average values. Accordingly, broadsheets accrued less fluctuation (87.7%) than tabloids (108.8%); liberal papers less (96.1%) than conservative papers (113.4%). However, there were virtually identical scores for female journalists (113.8%) compared to male counterparts (112.7%). This finding may indicate that (females aside), the more ambiguity tolerant pole of the oppositional variables is less swayed by temporal influences, with instead a more robust tendency to "stick to their [open-minded] opinions". Still, one result violated this interpretation, as the cumulative values for expert journalists (268.1%) were greater than those for novice writers (77.1%).

As for the same numerical comparison across classifications, there were similar levels of temporal fluctuation for negative (123.7%) and positive scores (128.0%), while neutral scores changed more (148.7%) and mixed scores only about half as often (78.0%).

General Trends According to Multinomial Logistic Regressions

We ran two parallel sets of analyses, classifying publications by newspaper group (Table 04) and alternatively by *format* and *political leaning* (Table 05).

Temporality. As predicted, in terms of *year* the MAMs show statistically significant decreases in positive relative to neutral reporting counts in 2000 relative to 1995, statistically significant decreases in negative counts in 2010 relative to all other years, as well as a statistically significant increase in positive counts in 2010 relative to 2000.

Newspaper format and political leaning. Our expectation was confirmed that yes, tabloids are less ambiguity-tolerant than broadsheets; and conservative publications are less ambiguity-tolerant than liberal publications. In addition, liberal publications are shown to report statistically fewer mixed articles than conservative publications. Newspaper publishing groups differed in their reporting with, in terms of statistically significant comparisons, the *Independent*/*Independent on Sunday* [LB-I] reporting less negatively to ambiguity than the *Daily Mail*/*Mail on Sunday* [CT-M] (Table 04), both CT-M] and the *Evening Standard* [CT-E] scoring more mixed reportings than the *Daily Mirror*/*Sunday Mirror* [LT-D], and CT-E also scoring more mixed reports than LB-I (Table 04).

Direct comparisons between publication years remain broadly the same, albeit with slightly different coefficient and probability values in the analyses categorizing publications according to *political leaning* and *format* (Table 05). There is a trend for tabloids to be less ambiguity-tolerant than broadsheets (Table 05), but no specific comparison to that effect reaches statistical significance. The same numerical trend, albeit to a lesser extent, can be

observed with ambiguity tolerance somewhat suppressed in conservative compared to liberal publications.

Publishing season. Our expectation was not confirmed that warmer seasons are associated with more AT than colder seasons. In the multinomial analyses, *season* was the only variable whose removal from full models resulted in lowering of the AIC value, albeit by a small amount (cf. Table 04, Table 05). Due to the descriptive statistics and chi-squared results, however, a potential seasonality effect cannot be entirely discounted.

Further, although no specific category comparison for *gender* and *expertise* reaches statistical significance, their inclusion into the MAM too was warranted, according to the AIC values:

Journalist gender. Our expectation was confirmed that *male* journalists were less likely to refer positively to ambiguity. This finding lacked statistical significance, though the inclusion of the variable was necessary for the MAM.

Journalist expertise. Our prediction was supported that experts are more likely to refer positively and less likely to refer negatively to ambiguity. This finding lacked statistical significance, though the inclusion of the variable was necessary for the MAM.

Our quantitative findings from descriptive statistics, chi-squared tests and multinomial regressions therefore imply that not only *temporality*, but *format*, *political leaning*, *gender* and *expertise* – though possibly not *seasonality* – affect whether article-authors exhibit essentialist attitudes regarding sexuality in modern UK culture.

Discussion

Our research investigates factors that influence the degree to which mental binaries are malleable. The tendency to think in dualistic modes in the first place might be linked to the construction of a sense of belonging. Thus, humans will often identify with certain modes of "we-ness" as signifiers of the ingroup (*entitativity*) while ascribing to a corresponding pole

of "otherness" (*alterity*) (Lickel *et al*., 2000). Ingroup and outgroup are often perceived as "real" categories, and thus essentialized as "natural kinds" (see introduction). Often, our distinction between ingroup and outgroup is maintained by the prejudice that what we are not – "the other" – is of less worth (Aosved & Long, 2006; Hubbard & de Visser, 2015).

In Western culture, homosexuals are often constructed as an outgroup, given a general climate of heteronormativity based on "taken-for-granted social and sexual arrangements in a heterosexual world-view" (Bettcher, 2014:3). The reverse mechanism exists at a sub-cultural level, too, i.e., a view of homosexuals as ingroup and heterosexuals as outgroup (Faiman-Silva, 2007; Kitzinger & Perkins, 1993). Under both scenarios, ambiguous concepts are likely to be viewed as particularly threatening to one's own identity. To question dichotomies based on in-group/out-group polarities thus requires the ability to entertain a mental tolerance of ambiguity.

These general dynamics can, in our view, help us to understand fluctuations in ambiguity tolerance with respect to "intermediary" concepts of sexuality that violate the essentialist homosexual–heterosexual binary. According to our research, while some mental mechanisms enforce binaries, they are not set in stone but instead malleable to a certain degree, by either hardening or softening – thus reflecting the extent of ambiguity tolerance (AT).

Temporality: the Zeitgeist

The high AT values in 1995 are severely reduced in the year 2000, to then steadily recover again until 2010. This pattern is likely associated with broader socio-cultural events that geared the general mood towards either optimism or anxiety. While optimism is known to increase AT, anxiety is known to reduce it (Pulford, 2009). Such a mental mechanism may explain our findings to a substantial degree. Of course, we cannot be sure of causal relationships here, but the correlation is interesting nevertheless.

As for sketching out the prevailing zeitgeist, we note that in 1995, the first year of our classification, the general ambience was one of freedom and aspiring towards internationalism in the wake of the Cold War having ended (Goldmann, 1997; UNDP, 1994). Right-wing governments often retreated, while in the West more liberal politics were influential, such as the administration of Bill Clinton in the USA, with the social democrats gearing up in Germany and then-popular New Labour in the UK. Thus, not long after the Berlin Wall had come down, there was a softening of boundaries – quite literally (Tarozzi & Torres, 2016). This easing of both visible and conceptual borders might well be reflected in our 1995 results, when British newspapers were fairly comfortable grouping bisexuals as being part of a shared conceptual set with heterosexuals and homosexuals – "them" with "us".

The mental landscape changed with the gear-up to the year 2000. Seismic events included a global economic crash in 1998, along with a plummeting of UK left-wing sentiment, the rise of climate-change discourse and the election of American president George W. Bush in November 2000. (Note that we feel justified to conflate UK/US Western contexts, given that such cross-cultural patterns are well-established, cf. Chadha & Kavoori, 2000; Foster, 2014; Lindoso, 2012; Sznycer *et al*., 2012) Moreover, a change-over of millennia, *per se*, creates anticipatory hype, akin to medieval *chiliasm* (aka Chilianism), which literally means "belief in the 1000". The modern-day millennium hype was associated with expectations of sudden change, doomsday cults and doomsday scenarios, such as the feared digital "millennium bug" (Jenkins, 2000; Mitchell, 2009).

Indeed, we see that the corresponding considerable reduction in AT in the "iconic" year 2000 bounced back in 2005, and eased up even further until 2010. Increased scores of AT for non-binary concepts of sexuality also are likely related to the fact that gay rights initiatives gained much traction in the post-2000 period. Specifically, since about 2004, there

was increased support to legalise same-sex marriage (Flores & Barclay, 2016; Silver, 2013; Wilkinson, 2010); These developments probably softened the widespread outgroup demarcations of homosexuals – with knock-on effects for non-binary concepts.

Our research also supports other predictions about who should be more or less ambiguity tolerant:

Newspaper Format and Political Leaning

We expected more AT in broadsheets and less in tabloids – a prediction generally supported by our findings. The regressions suggest that "tabloidism" itself may be more a driver of low AT than conservatism *per se*. This may be connected to the fact that tabloids are less substantial (and information-poor) compared to broadsheets (Sparks & Tulloch, 2000), and therefore may lack "expert"-level information-richness (which tends to correlate with AT; see below).

Likewise, our expectation was confirmed that conservatism correlates with lower ambiguity tolerance, with descriptive statistics, chi-squared tests and multinomial regressions in alignment, as well as the most ambiguity-positive newspaper being a liberal publication [LB-I] and the most ambiguity-negative newspaper being a conservative one [CT-M]. There is some evidence that conservative politics are associated with more amygdala-based fear responses – and potentially more stereotyped, essentialist thinking (Schreiber, 2013). It also has been hypothesised that conservatives typically know "less", and therefore may be less likely to be experts (Kanazawa, 2010). In addition, compared to liberals, conservatives evaluating issues may be operating under more requirements, e.g., the sanctity vs. degradation of a particular issue (a generally religious assessment); liberals do not apply a sanctity requirement when evaluating social issues (Haidt, 2013). With more requirements, perhaps conservatives therefore experience more cognitive load, which researchers have

claimed is associated with less AT (Hammack, 2005; Honey *et al*., 2011; Pflum *et al*., 2015; Sanchez *et al*., 2009).

Journalist Gender

Also in accordance with our predictions, women journalists were more likely to refer positively to ambiguity, while the opposite was true for male journalists. Some social scientists have hypothesised that women are more essentialist in times of stability, meaning they hold on to the status quo, thus displaying a "system-justification approach" (Jackman, 1994; Jost *et al*., 2003). Others suggests that essentialism and stability do not correlate when it comes to the disenfranchised party – in this case, females (Morton *et al.*, 2009). There is, however, a high correlation between essentialism, sexism and instability by the more socially enfranchised party (males), in that "the positive link between prejudice and essentialism emerged only when the dominant group was threatened by the prospect of social change" (*ibid.*, p. 663). In simple terms, those who are more powerful (here, men) use essentialist reasoning during times of social change; those less powerful (here, females) do not.

Expertise

Our prediction that experts might be more ambiguity tolerant due to information-richness than novices was upheld by descriptive statistics, chi-squared results and regressions. These findings support others according to which one is more tolerant if one has more education (Bobo & Licari, 1989). Possibly, as experts know more, they have less cognitive load and are less likely to be essentialist under stress. This also would match findings that the more college-educated an individual is, the less likely they are to be sexist, racist, xenophobic and homophobic (i.e., essentialist/ambiguity-intolerant) (*ibid.*).

Theoretically then, now that we have more information via the internet, more people might be seen to be "amateur experts", and this might in turn support increased AT. However, if the source of information is not accurate, then biases and prejudices will be

upheld (Fazio *et al*., 2015; Pennycook *et al*., 2017; Wineburg *et al*., 2016) – even more so, as internet settings may create severely biased filter-bubbles.

Seasonality

We measured only factors we could decode from newspapers. Yet other variables also will likely influence AT in the long term (rural versus urban setting: Waddimba *et al*., 2016; "race": Sanchez *et al*., 2009; migration experience: Legrain, 2007; van Compernolle, 2016) or short term (e.g., reproductive state: Navarrete *et al*., 2007; age: Tymula *et al.*, 2012a, Tymula *et al*., 2012b, van den Bos & Hertwig, 2017).

An additional factor that can have a short-term influence on the "mental landscape" is climate. Previous studies have shown positive mood susceptibilities associated with warmer weather (Kurlansik & Ibay, 2012; Meyer *et al*., 2016; Morken, 2001). However, our resulting expectation that warmer seasons would be more associated with AT was not clearly confirmed. In support of our prediction, the non-multinomial results show fewer neutral scores for the "warm" months (spring plus summer) once the "colder" months have been eliminated (-8.5%). This likely is due to the higher positive scores we see in the warmer months. These findings suggest a tendency to be more "positive" as opposed to merely "neutral" during the warm months of the year. That may be stating the obvious, but it may provide empirical evidence that people are more open-minded regarding sexuality in warm months.

That said, *season* was the only variable whose removal from the MAMs resulted in lowering of the AIC value, albeit by a small amount. This suggests that seasonality does *not* affect AT.

Implications

Our findings provide evidence for a certain conceptual plasticity in how categories related to sexuality are constructed. It therefore would seem naive to assume that these

dynamics are not also reflected in political stances associated with issues of sexuality as well as scientific discourses. For example, while earlier gay rights political movements stressed the idea of personal choice and autonomy in terms of sexual lifestyle, modern political movements tend strongly towards a “Born This Way” narrative (Copland, 2015), which implies nativism and thus leans towards essentialism. Scientific discourses are likewise not immune to cultural prejudices (Harding, 1991; McCaughey, 2007). Thus, sexuality studies often assumed exclusive heterosexuality as a default state, to which more recently, exclusive homosexuality has been added (Bailey *et al*., 2011; Rosenthal *et al*., 2011).

This naturally affects social policies, as sexuality statistics often are based on essentialist concepts of "orientation" and "identity", to the neglect of more fluid concepts based on "behaviour" (Pathela *et al*., 2006). Similarly, people do not as frequently identify as or conceive of themselves as bisexual (ONS Household Survey, cf. Joloza *et al*., 2010; National Health Interview Survey, cf. *Washington Post*, 2014), probably due to negative reactions to sexual fluidity (Yoshino, 2000). As a corollary, for example, bisexual asylum seekers escaping homophobic persecution are biased against given that governmental bodies do not acknowledge "bisexuality" as it is difficult to essentialize such a trait (Rehaag, 2008).

Humans may tend to conceptualise their own lives and surroundings via deeply engrained binaries, with concomitant difficulties in accommodating intermediary states. Nevertheless, our research demonstrates that there is also scope and potential for ambiguity tolerance, and that attitudes can and do change, however incremental. This societal process is negotiated through intertwined forces emanating from a multitude of factors such as *zeitgeist*, politics, education or gender. We plan to explore the entwinement of psychological and environmental variables also for other prominent dualisms, i.e., male–female, human–animal, and human–machine (Bryson, 2017). The only thing that seems clear is that these dynamics will not cease to exert themselves, and that we are well advised to regularly question our own

positions. This hopefully will mitigate the societal and scientific tendency to ignore proportions of the capacities with which we are born, including Freud's described quality of being "polymorphously perverse".

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Captions

Figure 01. Proportions of ambiguity tolerance classifications (negative, positive, mixed and neutral) in British newspaper articles. – For newspaper groups and acronyms, see Table 01. – (a) All papers ($\chi^2 = 26.353$, df = 6, $p < 0.001$). (b) Papers by format: 3 broadsheets ($\chi^2 = 22.224$, df = 9, p = 0.008) versus 3 tabloids ($\chi^2 = 24.212$, df = 9, p = 0.004). (c) Papers by political leaning: 3 liberal ($\chi^2 = 12.446$, df = 9, $p = 0.189$) versus 3 conservative papers ($\chi^2 = 21.0492$, df = 9, $p = 0.012$).

Figure 02. Absolute numbers of ambiguity tolerance classifications (negative, positive, mixed and neutral) in British newspaper articles. – For newspaper groups and acronyms, see Table 01. – (a) All papers ($\chi^2 = 26.353$, df = 6, $p < 0.001$). (b) Papers by format: 3 broadsheets ($\chi^2 = 22.224$, df = 9, p = 0.008) versus 3 tabloids ($\chi^2 = 24.212$, df = 9, p = 0.004). (c) Papers by political leaning: 3 liberal ($\chi^2 = 12.446$, df = 9, $p = 0.189$) versus 3 conservative papers ($\chi^2 = 21.0492$, df = 9, $p = 0.012$).

Table 01. Classification of British newspapers mined for 1995–2010 articles with ambiguous reporting about the heterosexual-homosexual dichotomy. The *Mail*, *Sun* and *Times* (in that order) are comparatively right-wing, while the *Guardian*, *Mirror* and *Independent* (in that order) are more left wing (*BBC*, 2009).

Table 02. Proportions of ambiguity tolerance classifications across predictor variables.

Table 03. Contingency tables and residuals for all mined newspapers combined; for papers by political leaning; and papers by format. – Residual terminology: underline and bold = "substantially more" resp. "substantially fewer" (bracket of >2 to <-2); bold only = "clearly more" resp. "clearly fewer" (bracket of >1 to <-1). – For newspaper groups and acronyms, see Table 01.

Table 04. Multinomial logistic regression with newspapers classed according to *publishing groups*. (a) Full model. (b) Minimum adequate model, with baselines for comparison alternated for the multinomial predictor variables (Publishing Group and Year). – Statistically significant values of $p<0.05$ and corresponding coefficients highlighted in bold and by asterisk. – For newspaper groups and acronyms, see Table 01.

Table 05. Multinomial logistic regression with newspapers classed according to *political leaning* and *format*. (a) Full model. (b) Minimum adequate model, with baseline for comparison alternated for the multinomial predictor variable (Year). – Statistically significant values of $p<0.05$ and corresponding coefficients highlighted in bold and by asterisk. – For newspaper groups and acronyms, see Table 01.

FIGURE 01.

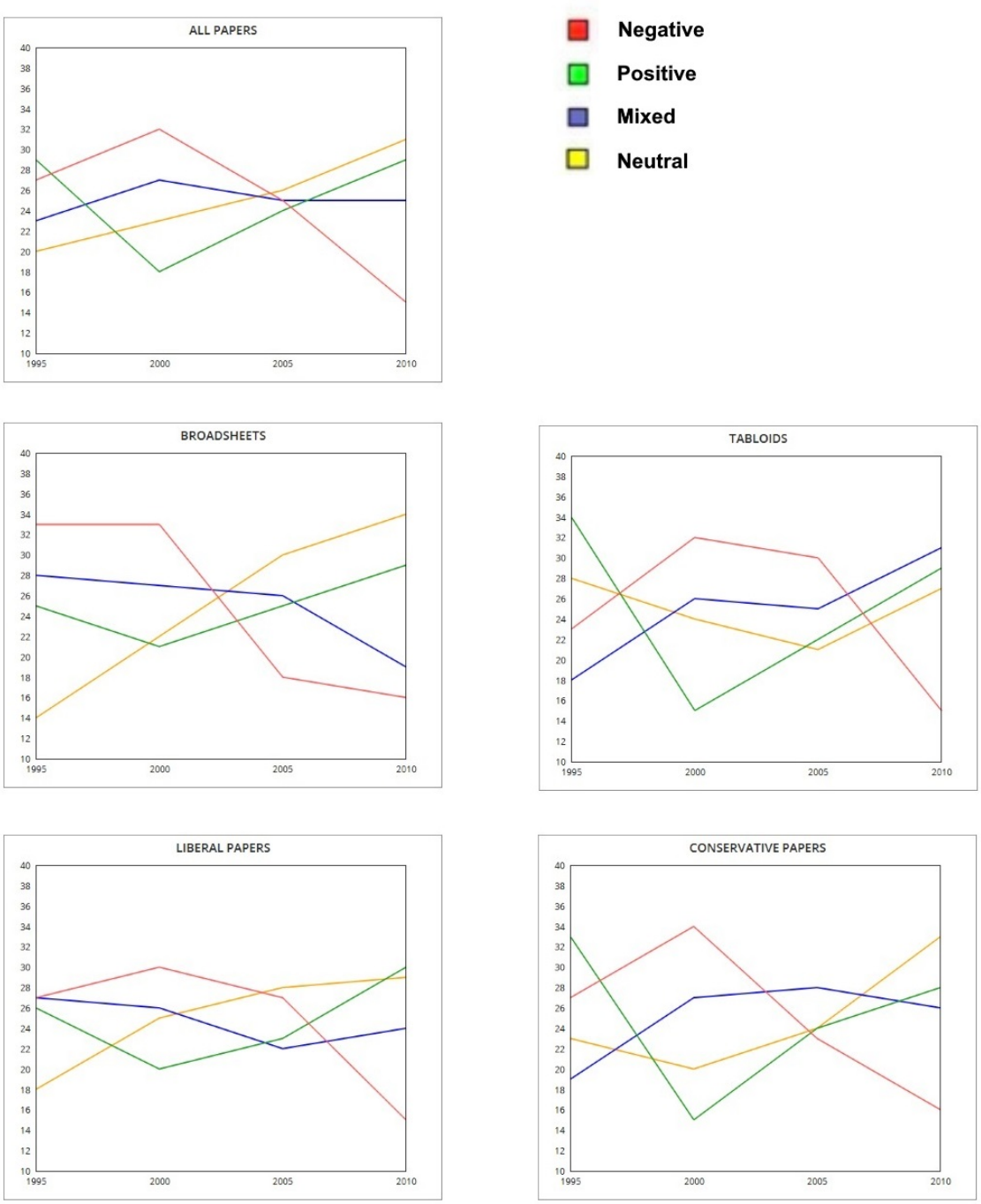
ALL PAPERS
BROADSHEETS
TABLOIDS
LIBERAL PAPERS
CONSERVATIVE PAPERS
Negative
Positive
Mixed
Neutral
1995
2000
2005
2010

Table 01

Newspaper group	Format (B = broadsheet, T = tabloid)	Political leaning (L = liberal, C = conservative)	Acronym
Daily Mail / Mail on Sunday	T	C	CT-M
Sun / Evening Standard / News of the World	T	C	CT-E
Daily Mirror / Sunday Mirror	T	L	LT-D
Guardian / Observer	B	L	LB-G
Independent / Independent on Sunday	B	L	LB-I
Times / Sunday Times	B	C	CB-T

Table 02

Variable		Article	Ambiguity tolerance classification (%)			
Main category	Subcategory	sample (n)	Negative	Positive	Mixed	Neutral
All newspapers		864	26.2	27.5	27.8	18.5
Temporality (year)	1995	432	27.0	32.3	25.2	15.5
	2000	432	29.0	18.1	23.5	29.4
	2005	432	22.5	26.7	25.4	25.4
	2010	432	20.0	22.5	26.3	31.3
Newspaper format	Broadsheet	432	21.3	31.5	25.7	21.5
	Tabloid	432	31.0	23.6	29.9	15.5
Newspaper political leaning	Liberal	432	23.6	32.9	23.8	19.7
	Conservative	432	28.7	22.2	31.7	17.4
Journalist gender	Female	295	24.7	35.4	24.1	15.8
	Male	452	26.5	23.8	30.8	18.9
Journalist expertise	Expert	49	13.6	47.0	25.3	14.1
	Novice	614	26.2	28.9	27.0	18.0
Seasonality	Spring	214	23.2	25.0	36.0	15.8
	Summer	236	27.0	32.6	22.2	18.1
	Autumn	195	25.3	25.5	23.8	25.5
	Winter	197	31.4	24.4	27.2	17.0

Table 03

	Observed / year (n)				Sum	Expected	Residuals / year			
	1995	2000	2005	2010	(n)	/ year (n)	1995	2000	2005	2010
All papers										
Negative	61	73	57	35	226	56.5	0.598	**2.195**	0.066	**-2.860**
Positive	69	43	56	70	238	59.5	**1.231**	**-2.139**	-0.453	**1.361**
Mixed	54	64	61	61	240	60.0	-0.774	0.516	0.129	0.129
Neutral	32	36	42	50	160	40.0	**-1.264**	-0.632	0.316	**1.581**
Format: Broadsheets										
Negative	30	30	17	15	92	23.0	**1.459**	**1.459**	**-1.251**	**-1.668**
Positive	34	28	34	40	136	34.0	0.000	**-1.028**	0.000	**1.028**
Mixed	31	30	29	21	111	27.8	0.616	0.427	0.237	**1.281**
Neutral	13	20	28	32	93	23.3	**-2.125**	-0.674	0.985	**1.815**
Format: Tabloids										
Negative	31	43	40	20	134	33.5	-0.431	**1.641**	**1.123**	**-2.332**
Positive	35	15	22	30	102	25.5	**1.881**	**-2.079**	-0.693	0.891
Mixed	23	34	32	40	129	32.3	**-1.628**	0.308	-0.044	**1.364**
Neutral	19	16	14	18	67	16.8	0.549	-0.183	-0.671	0.305
Political leaning: Liberal papers										
Negative	28	31	28	15	102	25.5	0.495	**1.089**	0.495	**-2.079**
Positive	37	29	33	43	142	35.5	0.251	**-1.090**	-0.419	**1.258**
Mixed	28	27	23	25	103	25.8	0.443	0.246	-0.541	-0.147
Neutral	15	21	24	25	85	21.3	**-1.355**	0.054	0.596	0.813
Political leaning: Conservative papers										
Negative	33	42	29	20	124	31.0	0.350	**1.975**	-0.359	**-1.975**
Positive	32	14	23	27	96	24.0	**1.630**	**-2.041**	-0.204	0.612
Mixed	26	37	38	36	137	34.3	**-1.400**	0.469	0.640	0.299
Neutral	17	15	18	25	75	18.8	-0.400	-0.866	-0.173	**1.443**

Table 04

Full model (AIC = 1778.113)

Baselines (CT-M; year 1995)	(Intercept)	LT-D	CT-E	LB-G	LB-I	CB-T	2000	2005	2010	Male	Expert	Spring	Summer	Winter
Mixed	0.460	-0.888	0.331	-0.157	-0.588	-0.062	0.093	-0.057	-0.171	-0.010	-0.055	0.378	0.031	0.474
Negative	0.641	-0.138	-0.162	-0.617	**-0.854***	-0.378	-0.034	-0.066	**-0.810***	0.025	-0.614	0.193	0.381	0.623
Positive	0.379	-0.071	0.739	0.537	0.435	0.135	**-0.871***	-0.234	-0.166	-0.216	0.326	0.170	0.328	0.365

Minimum adequate model (AIC = 1767.493)

Baselines (CT-M; year 1995)	(Intercept)	LT-D	CT-E	LB-G	LB-I	CB-T	2000	2005	2010	Male	Expert
Mixed	0.644	**-0.902***	0.311	-0.164	-0.595	-0.069	0.096	-0.023	-0.149	0.019	-0.062
Negative	0.936	-0.120	-0.193	-0.637	**-0.862***	-0.382	-0.030	-0.054	**-0.797***	0.020	-0.610
Positive	0.596	-0.050	0.725	0.525	0.425	0.130	**-0.871***	-0.232	-0.166	-0.222	0.337

Alternate baselines (LB-G; year 2000)	(Intercept)	CT-M	LT-D	CT-E	LB-I	CB-T	1995	2005	2010	Male	Expert
Mixed	0.576	0.164	-0.738	0.475	-0.431	0.095	-0.096	-0.119	-0.245	0.019	-0.061
Negative	0.269	0.637	0.517	0.444	-0.225	0.255	0.030	-0.023	**-0.766***	0.020	-0.611
Positive	0.250	-0.525	-0.574	0.200	-0.099	-0.395	**0.871***	0.639	**0.705***	-0.222	0.337

Alternate baselines (LT-D; year 2000)	(Intercept)	CT-M	CT-E	Guard	LB-I	CB-T	1995	2005	2010	Male	Expert
Mixed	-0.162	**0.902***	**1.213***	0.738	0.307	0.833	-0.096	-0.119	-0.245	0.019	-0.061
Negative	0.786	0.120	-0.073	-0.517	-0.742	-0.262	0.030	-0.023	**-0.767***	0.020	-0.610
Positive	-0.325	0.049	0.774	0.574	0.475	0.179	**0.871***	0.640	**0.705***	-0.222	0.337

Alternate baselines (CT-E; year 2000)	(Intercept)	CT-M	LT-D	LB-G	LB-I	CB-T	1995	2005	2010	Male	Expert
Mixed	1.051	-0.311	**-1.213***	-0.475	**-0.906***	-0.380	-0.096	-0.120	-0.245	0.019	-0.061
Negative	0.712	0.194	0.074	-0.443	-0.669	-0.188	0.030	-0.023	**-0.766***	0.020	-0.610
Positive	0.450	-0.725	-0.774	-0.200	-0.299	-0.595	**0.871***	0.639	**0.705***	-0.222	0.337

Alternate baselines (LB-I; year 2005)	(Intercept)	CT-M	LT-D	CT-E	LB-G	CB-T	1995	2000	2010	Male	Expert
Mixed	0.026	0.595	-0.307	**0.906***	0.431	0.526	0.023	0.120	-0.125	0.019	-0.061
Negative	0.021	**0.862***	0.742	0.669	0.225	0.480	0.053	0.024	**-0.743***	0.019	-0.611
Positive	0.790	-0.426	-0.475	0.300	0.099	-0.296	0.232	-0.639	0.065	-0.222	0.337

Table 05

Full model (AIC = 1773.899)

Baseline (year 1995)	(Intercept)	Liberal	Tabloid	2000	2005	2010	Spring	Summer	Winter	Male	Expert
Mixed	0.602	**-0.588***	-0.100	0.063	-0.083	-0.228	0.374	-0.004	0.445	0.031	-0.117
Negative	0.160	-0.183	0.439	-0.016	-0.049	**-0.776***	0.200	0.399	0.626	-0.007	-0.607
Positive	0.757	0.027	-0.173	**-0.913***	-0.272	-0.254	0.171	0.304	0.333	-0.143	0.265

Minimum adequate model (AIC = 1763.731)

Baseline (year 1995)	(Intercept)	Liberal	Tabloid	2000	2005	2010	Male	Expert
Mixed	0.761	**-0.588***	-0.102	0.064	-0.049	-0.207	0.062	-0.126
Negative	0.450	-0.172	0.451	-0.017	-0.039	**-0.767***	-0.014	-0.602
Positive	0.946	0.035	-0.157	**-0.913***	-0.270	-0.256	-0.147	0.278

Alternate baseline (year 2000)	(Intercept)	Liberal	Tabloid	1995	2005	2010	Male	Expert
Mixed	0.824	**-0.588***	-0.101	-0.064	-0.112	-0.270	0.062	-0.127
Negative	0.433	-0.171	0.451	0.017	-0.022	**-0.750***	-0.014	-0.603
Positive	0.033	0.035	-0.157	**0.913***	0.643	0.657	-0.147	0.277

Alternate baseline (year 2005)	(Intercept)	Liberal	Tabloid	1995	2000	2010	Male	Expert
Mixed	0.712	**-0.588***	-0.102	0.049	0.112	-0.158	0.062	-0.126
Negative	0.411	-0.172	0.451	0.039	0.022	**-0.728***	-0.014	-0.602
Positive	0.676	0.035	-0.157	0.270	-0.643	0.014	-0.147	0.278