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Now you see me, now you don't: applying automated content analysis to track migrant women's salience in German news

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ABSTRACT

Reading media headlines and articles about migration, one quickly gets the impression that the media discourse is focussed on migrant men. To investigate to what extend this perception actually holds true, in this study we examine the visibility of gender in media coverage about migrants. We present a validated keyword-based dictionary that allows for automatic and reliable measurement of migrants' salience (i.e., women, men) in German news coverage. A salience analysis of German migration-related news coverage published between January 2003 and December 2017 is undertaken. We investigate the salience of migrant women in migration news over time, their salience relative to migrant men, as well as across media outlets with different political leanings. We find that migrant women are salient in 12 to 26 per cent of migration-related news articles, whereas migrant men are referred to in almost all migration-related articles. We contextualize these results with actual immigration statistics, discuss the problematic nature of the findings, and weigh the opportunities for and limitations of automatically tracking women migrants in the media against each other.

Gender representation in the (news) media has received considerable attention in recent years (for an overview, see Rebecca L. Collins 2011). Yet, to date, hardly any of the studies that examine the salience of women in the media investigate the salience of migrant women more specifically. However, this seems to be an issue of great relevance, as more people than ever are on the move around the world (UNHCR 2018). The growing number of migrants and refugees globally also affects media reporting. Most notably, the media designate greater space to the topic. This is true in the United States (Nicholas A. Valentino, Ted Brader, and Ashley E. Jardina 2013) and Europe (Jakob-Moritz Eberl et al. 2018), and especially in Germany, one of Europe's main receiving countries (Eurostat 2019a), where migration media coverage has noticeably increased since the start of the so-called 'European refugee crisis' in 2015 (Christian S. Czymara and Stephan Dochow 2018). Arguably, in response to the rising importance of the immigration topic, the body of research concerned with immigration media discourse has rapidly grown (for an overview, see Eberl et al. 2018). The finding that women are generally underrepresented in

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national and international news media (Collins 2011), combined with the general under-representation of migrants in the media (e.g., Eberl et al. 2018) supports the assumption that being both a woman and a migrant may constitute a double disadvantage.

The media's selection of migration-related actors plays an active role in determining who is entitled—or not—to participate in the (mediated) public debate (Maxwell E. McCombs 2007). Accordingly, invisibility of women migrants may reduce the perceived importance of their needs in the audience. Further, learning about or from migrant women who are present in the media provides recipients with response patterns that are important for acceptance and understanding (Albert Bandura 2002). For women migrants, this might decrease their self-esteem and constrain them from taking powerful positions in society (Amanda Haraldsson and Lena Wängnerud 2019). Hence, the under-representation of women migrants in the media might have severe consequences for them as a social group and for society as a whole.

Against this background, we aim to take an intersectional approach by systematically analyzing the quantitative representation (i.e., salience) of women migrants in the news media. In doing so, we consider media representation as an indicator for the visibility or invisibility of women migrants. To discuss salience in the media, a reference point is necessary. Salience can be ascertained by either comparing the salience of the respective actor/issue with other actors/issues in the media (e.g., migrant women versus migrant men), or by focusing on a diachronic perspective. In this manuscript, we aim to do both. Overall, we provide a quantitative content analysis of news media regarding the salience of women migrants[1] that shows how visible they are in public discourse on immigration. To this end, we present and apply a validated keyword-based dictionary that allows for the first time automatic and reliable measurement—and therefore tracking—of migrant actor salience (i.e., women; men) in German news. More specifically, we review their salience in eight German news media outlets as long-term dynamics from January 2003 until December 2017. The decision to take the German news coverage as our case is motivated by the previously mentioned increase of migration media coverage and the general politicization of the migration topic in Germany. It further builds on the particularities of the German language and the native language expertise of the research team, which are important components to develop the here presented measurement approach.

Migrant women in the news media—a "doubly disadvantaged" group

The theory most concerned with effects of media visibility is agenda-setting (McCombs 2007). In short, agenda-setting identifies how elements (issues and actors) in the news (media agenda) affect public opinion (public agenda). A central assumption is that media salience of issues leads to increased perceived importance of those issues in the public. Further, news media direct the public's attention to specific aspects of these issues and thus the public's attention and learning about them.

Respectively, from an agenda-setting perspective, low salience of migrant women in the news media leads to weak presence of themselves as actors and subsequently their respective stories and needs in the public agenda. In the worst case, they are not seen at all or, as Gaye Tuchman, Arlene Kaplan Daniels, and James Walker Benét argued in 1978, (migrant) women are "symbolically annihilated", which means their actions, needs, and voices are systematically excluded. This issue is even more important if we consider that

women experience varying degrees of disadvantage and marginalization, both in media and society. Being both a woman and a migrant is a case of intersectionality that we examine in this study.

Migrant actors and women in the news

Before we focus on research dedicated to the specific role of women migrants in the media, we briefly provide an overview of both migrants' and women's general salience in the media.

In quantitative content analyses, the salience of migrant persons has mostly been researched in print media outlets and for example with regard to different ethnic minorities (e.g., Andrea Lawlor and Erin Tolley 2017). A general conclusion from this literature is that migrants are, compared to their real number, underrepresented in the media (Eberl et al. 2018).

Women are generally underrepresented across all types of media. Studies focusing on print news show that women are less likely to be featured than men in news items both in the United States (e.g., Joseph Schwartz 2011) and in Europe (e.g., M. Pilar Matud, Carmen Rodríguez, and Inmaculada Espinosa 2011). In 2015, women made up about one quarter of the persons presented in global newspaper, television and radio news, and only 16 per cent of the people in political news stories; moreover, this overall proportion has held almost steady at 10 per cent for a decade (GMMP 2015). In Germany, where this study was conducted, the numbers are slightly more equal, as women represent 28 per cent on average across all news media. This might be explained by Germany having a woman chancellor in 2015. However, analyzing a wider range of German print news, Jutta Röser (2006) identifies women in 18 per cent of cases. Women who are visible are mostly politicians, but even women politicians are not represented proportionally in the media.

Salience of women migrants in the news

Few studies have taken an intersectional approach to researching the media presence of actors being both women and migrants. Nevertheless, some studies note that there are (sometimes stark) gender differences in the media representation of marginalized groups. For instance, in the context of gay and lesbian marriage, gays were quoted over three times more often than lesbians in the media (Schwartz 2011). Kristen Gilchrist (2010) discovered that missing Canadian Aboriginal women receive half the coverage of missing White women. This may be seen as an indicator that relative invisibility can reproduce inequalities based on both racism and sexism.

Drawing on a diverse sample of television and print news media in the United Kingdom (UK), Iñaki Garcia-Blanco and Karin Wahl-Jorgensen conclude that there is no specific gender perspective to the issue of immigration; rather, it is often portrayed abstract and dehumanized as a whole (Kumarini Silva and Kaitlynn Mendes 2009, 256).

Many studies focusing on migrant women as actors only select news items covering women migrant persons, thus shifting the focus of research from their salience per se, on how they are portrayed or narrated. Carmen R. Lugo-Lugo and Mary K. Bloodsworth-Lugo (2014) conclude that historically, Latina women in the US context have been reduced to reproduction for a long time, but after the terroristic attacks on September 11 in the USA, this framing changed to Latina women as breeders posing a terrorist-like threat to the American way of life. Analyzing Italian newspapers, Alberta Giorgi (2012) finds that

migrant women are mainly portrayed as victims, and stresses the emerging connection between culture, tradition, and specifically Islam in the media coverage. In this field of research, Muslim women have been considered as a specific group of women migrants (e.g., Patricia Ehrkamp 2010; Esra Özcan 2013). This particular research focus may have emerged due to the veil or headscarf being a visible mark of both religious and cultural belonging. In most cases, Muslim women are used as a symbol of 'Islamization' and as representing a supposedly misogynous religious culture that forces women to be obedient (Rens Vliegenthart and Conny Roggeband 2007). In this way, migrant women in the media are made visible as a means of emphasizing the out-group stigma migrants face in their host society. However, much less is known about the salience of migrant women outside of their religious background (Margreth Lünenborg and Elfriede Fürsich 2014), or the salience of Muslim women as opposed to Muslim men.

Looking specifically at the political leaning of media, Margreth Lünenborg, Katharina Fritsche, and Annika Bach (2014) found that women migrants are most visible in left-leaning print outlets. In contrast, Ehrkamp (2010) did not discover differences between the political leanings of newspapers and their reporting about migrant women. Her interpretation is that media debates regarding Muslim women are of interest for various media outlets, albeit for potentially different reasons. Giorgi (2012) shows for example that leftist newspapers tend to focus more on positive examples of migrant women's emancipation and empowerment.

In sum, given our interest in the salience of migrant women in the media, we want to contribute to the literature reviewed above by addressing the following gaps. First, and often due to the methodological strategy taken, because most previous studies have utilized short periods of time, the salience of migrant women *over time* remains unclear. Second, as most studies are focused on depictions of migrant women, a *comparison with the salience of migrant men* remains missing. Further, most of the analyses have only focused on one type of medium. Hence, a comparison between *media outlets with different political leanings* is necessary. Consequently, the goals of this study are to investigate the media salience of women migrants over time (RQ1), in contrast to men migrants (RQ2), and across media outlets with different political leanings (RQ3). We take German news coverage as our case, and briefly introduce some of the country-specific context.

Context: immigration to Germany

The current population of Germany comprises about 41.9 million women and 40.8 million men (figures from January 1 2018, Eurostat 2019b). Moreover, the population is growing, since 1972 mainly due to migration surpluses (Herwig Birg 2003). Since 2000, migration movements to Germany have been especially associated with the enlargements of the European Union (EU) in 2003, 2007, and 2013. Aside from inter-European mobility, more recently Germany has become the country of destination for refugees and migrants from the Syrian civil war as well as from the Near East and Africa.

Most of those who have immigrated to Germany in recent years have been men. Indeed, between 2008 and 2017, on average 287,000 women and 403,000 men migrated to Germany per year (Eurostat 2019a). Nevertheless, if we consider the proportion of people born in another country from Germany in the total population, we find fairly equal

gender distributions. For the years 2009–2017, an average of six per cent of the total German population comprised women born in another country, the same proportion as men who were born abroad (Eurostat 2019b). If we look at statistics for a broader definition, for the years 2005–2016, on average 10 per cent of the population were women who either did not have German citizenship from birth or this was true of at least one of her parents, the same percentage as for men (Federal Statistical Office 2018).

Data and methods

Interested in the media salience of women migrants across several years and multiple media outlets, we utilized large quantities of news articles, and thus worked with computer-assisted content analysis tools.

Text corpus

The text corpus analyzed consists of migration-related German news articles.[2] It includes print and online news articles exclusively on the issue of human migration, published between January 1 2003 and December 31 2017. News articles were collected from LexisNexis and the Austrian Press Agency (APA, aomlibrary.apa.at) database using a validated search string.[3] For the analysis conducted here, the article corpus gathered was first deduplicated. We then excluded articles (n = 24,024) that exclusively mention search string keywords[4] that are not part of the core of the media discourse examined here. The final text corpus (n = 348,785 articles) included eight media outlets (for an overview, see Table 1), important national media sources, that mirror the broader range of different political leanings.

Figure 1 shows the monthly aggregated numbers of migration-related news articles per media outlet from January 2003 until December 2017 (note that the time series for one outlet did not start until 2004, for two outlets only in 2009, and for one in 2010). The two periods for which the migration topic received increased media attention across outlets (around 2004–2008 and 2015–2017) may be seen in the context of a new German immigration law (passed in August 2004, and entering into force in January 2005), the 2004 and 2007 enlargements of the EU (citizens of new member states enjoyed increased access to the EU and thus the German labor market), and the refugee movement to Europe beginning in 2015.

Table 1. Sample overview: characteristics of news media outlets.

News outlet [a]	Political alignment	From–To	Articles n
Welt Online	conservative	2009–2017	31,172
Bild	center-right	2010–2017	20,669
Frankfurter Allgemeine Zeitung	center-right	2003–2017	50,326
ZEIT Online	center-left	2009–2017	8,571
Frankfurter Rundschau	left liberal	2003–2017	61,166
Spiegel Online	left liberal	2003–2017	23,076
Süddeutsche Zeitung	left liberal	2004–2017	92,672
Die Tageszeitung, taz	left	2003–2017	61,133
Total			348,785

[a]If "Online" is not specified in the title, the news outlets listed are the print edition.
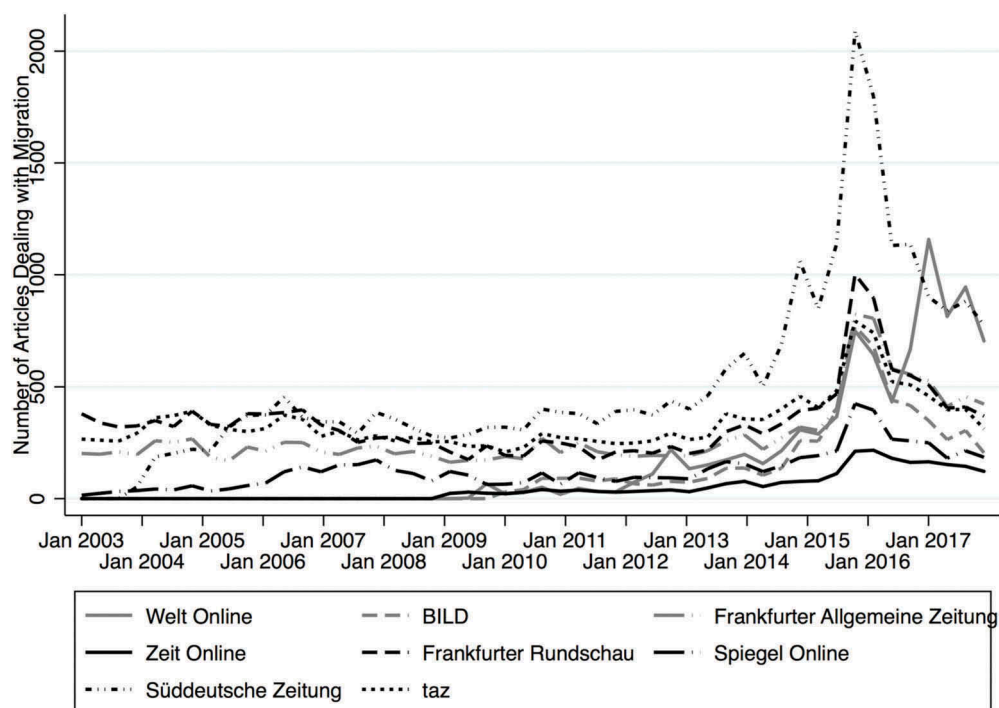
Figure 1. Absolute number of migration news articles for media outlets with a right-of-center political leaning (gray lines) or left-of-center political leaning (black lines). In total *n* = 348,785 migration-related articles). Article frequencies are aggregated per month.

Concept definition and measurement approach

The main concept studied here is *migrant women's salience*, which we define as an article's reference to a woman (or women) with migration experience. Common definitions refer to migration experience as a change of place of residence from one country to another, or relate migration experience with people who were born in another country, or with people who themselves or at least one parent had foreign citizenship at birth (see definitions in Eurostat 2019b; Federal Statistical Office 2018). Within these rough boundaries, we deliberately interpreted the definition of migration experience in content analysis broadly in order to accommodate the various terminologies and ways used by newspapers to describe a person with migration experience. The other examined concept—with equivalent concept definition—is *migrant men's salience*. More about this concept below.

To measure the salience of migrant women and migrant men, we worked with customized dictionaries. In computer-assisted text analysis, a dictionary is a predefined set of keywords (i.e., words, phrases) that represent the concept to be measured. The rate at which these words appear in a text determines its classification into categories. For more information on this approach, see Jelle W. Boumans and Damian Trilling (2016).

Women migrant dictionary creation and validation

We created a dictionary to measure *women migrants' salience* in a four-step iterative process, working with a randomly selected subsample of *n* = 500 news articles. In the first step, the researchers read all 500 articles and decided for each based on the above given definition whether women migrant persons were referred to or not (the intercoder reliability, assessed for *n* = 250 articles and two coders, was high: Kappa: .96). The second step was to create and apply a draft version of a dictionary; the third step was to access recall and precision (i.e., measures that assess the quality of the dictionary through a comparison of the classification decisions of the newly created dictionary and manual human coding); and the fourth step was to manually examine wrongly classified articles in order to add, remove, and refine the dictionary subcategories. Steps 2–4 were repeated until recall and precision were greater than .80. The goals were to extend the dictionary so that it would identify as many articles referring to women migrants as possible (i.e., good recall), while ensuring that additional words or components would not lead to the retrieval of too many false positives (i.e., good precision). Another important aspect was to avoid overfitting the measurement tool (perfect adoption to the specific subsample of 500 articles, but of low applicability to other parts of the text corpus).

The quality (i.e., validity) of the ultimate dictionary version was tested through a final assessment of recall and precision using of a fresh subsample of *n* = 450 randomly selected, manually coded news articles. We achieved a recall value of 0.67 and a precision value of 0.91. Hence, the automated approach retrieved 67 per cent of the articles where—according to the manual coders—women migrants were visible. Further, women migrants were visible in 91 per cent of all articles retrieved using the automated approach. An error analysis for the remaining misclassifications showed that the final dictionary failed to retrieve articles (responsible for imperfect recall) in which women migrants were referred to with their name or profession (e.g., French actress), thus the manual coders decided in such cases from contextual information that could not be recognized by the dictionary. False positives (responsible for imperfect precision) occurred when retrieved articles mentioned women who are not migrants in this context but rather tourists or locals (e.g., as occurs in foreign migration news, such as "But the opinion of the US-Americans about Mexico is consistently negative").

The final dictionary

The final dictionary to measure women migrants' salience included words and phrases grouped into six subcategories (Table 2). The dictionary can be accessed here: https://osf. io/yqbcj/?view_only=369e2004172b43bb91a39b536970e50b. The dictionary designed to measure *migrant men's salience* (see Table 2, column 4) held words that are the respective equivalents—when possible and meaningful—to the words and subcategories used to detect migrant women's salience. Due to their very close alignment with the validated migrant women's salience dictionary, we did not conduct a separate validation.

It is clear that the gender of a migrant person is unambiguously rendered visible within subcategories 3, 4, 5 and 6 (e.g., 'women from Poland'). This was more complex for subcategories 1 and 2 due to particularities of the German language, which we will explain now.

Table 2. Dictionary subcategories for the measurement of the concepts: migrant women's and migrant men's salience.

	Subcategory name	Description	Measured concepts (examples)	
			Migrant women's salience	Migrant men's salience
1.	Impersonal designation	General person nominations for migrants	(immigrant, asylum seeker, etc.) with female or gender-neutral word endings (-In,/-in, etc.)	(immigrant, asylum seeker, etc.) with generic masculine form or gender-neutral word endings (-In,/-in, etc.)
2.	Origin: Single words			
		Nominations that refer to the territorial origin of a person [a]	(French, African, Syrian, etc.) with female or gender-neutral word endings (-In, -/in, etc.)	(French, African, Syrian, etc.) with generic masculine form or gender-neutral word endings (-In, -/in, etc.)
3.	Origin: Combinations of different word groups [b]			
a		General gender-related person nominations + from + general territorial denominations [c]	(women, girl, mother, sister) + from + (France, Africa, Syria, etc.)	(man, boy, father, brother) + from + (France, Africa, Syria, etc.)
b		General territorial denominations (adjectives) [c] + General gender-related person nominations	(French, African, Syrian, etc.) + (women, girl, mother, sister)	(French, African, Syrian) + (man, boy, father, brother)
4.	In relation	Relational expressions: possessive pronouns + General gender-related person nominations	(my, your, her, his, our, yours, their) + (women, girl, mother, sister)	(my, your, her, his, our, yours, their) + (man, boy, father, brother)
5.	As phrase	Phrases	e.g., "women and children"	e.g., "men and children"
6.	Other expressions		e.g., "women from abroad"	e.g., "men from abroad"

As general notes, the dictionary includes the singular and plural version of all words, word endings (e.g., for prepositions) consider the different cases used in the German language.

[a]Downloaded from the CLDR (Unicode Common Locale Data Repository) http://cldr.unicode.org/, which holds standard name translations of countries and regions (version v33.1).

[b]Measured at the sentence level.

[c]Manually compiled by a native speaker for all CLDR territorial denominations, which the German language allows (e.g., no separate word for many smaller islands, e.g., Isle of Man, Curaçao). Assisted by the preeminent German language dictionary duden.de.

The generic masculine in the German language

In the English language, with a few exceptions (i.e., fish, series) nouns are either singular or plural, as reflected in their endings (the standard rule for pluralization being to add 's'). In contrast, in the German language noun endings do not only reveal the grammatical numeric of a noun (singular and plural), but also its grammatical gender. In German, nouns can be masculine, feminine or neuter. While this language feature is rarely loved by language learners, the grammatical female and male form of specific person denominations is of crucial importance for the text analysis conducted here. Relevant for subcategories 1 and 2 is the chance to collect commonly used nouns with female word endings that refer exclusively to women migrants. For example, in German the equivalents for the terms 'migrant' (subcategory 1) and 'African' (subcategory 2) for women persons are 'Migrant**in**' and 'Afrikaner**in**.' In contrast, the words 'Migrant' (subcategory 1) and 'Afrikaner' (subcategory 2) are used to refer to men. In addition, this word form—called the generic masculine—is also commonly used to refer to a migrant person in a general

sense when the gender of the person is not explicitly addressed. Given that experimental research in this area shows that when participants are required to name the gender of actors in a story, women are significantly less often thought about in the generic-masculine condition (e.g., Christopher Blake and Christoph Klimmt 2010), we decided to put the generic masculine words for subcategories 1 and 2 in the 'migrant men's salience' category.[5]

In the German language, a means of expressing that both sexes are explicitly meant is by making use of gender-neutral language, which means both men and women are always addressed by using 'Migrant und Migrant**in**' or making use of other common denominations (i.e., MigrantIn, Migrant/in, etc.). Building on the findings of media effects studies (e.g., Mykol C. Hamilton 1988), which confirm that gender neutral language triggers readers' awareness of both women and men, we assign articles with gender-neutral language to both *migrant women's salience* and *migrant men's salience*.[6]

Text corpus pre-processing and dictionary application

In matching the defined dictionary keywords, the capitalization of news article texts was retained to correctly distinguish 'Migrant**I**n' (capital letter I used in some forms of gender-neutral language, both men and women migrants addressed) from 'Migrant**i**n' (only migrant women are addressed). Most dictionary subcategories were searched at the article level. Only the word groups relevant for dictionary subcategory 3 were searched at the sentence level, which facilitated calculation of the co-occurrence of different keyword groups. Both the co-occurrence of certain keyword group combinations at the sentence level and the number of matches for other keyword groups were then aggregated at the article level. According to their conceptualization (Table 2), for each article, the presence of these groups of keywords was recoded to access whether an article mentioned migrant women and/or migrant men. We now show and discuss the dynamics of the salience of different groups of persons.[7]

Results

Looking at a time period of 17 years, we begin with a description of women migrants' salience in German news (RQ1). Over time, women migrants (black line) are referred to in 19 per cent of articles per month (Figure 2). Starting from being mentioned in about 16 per cent of migration-related articles in January 2003, women migrants become relatively more and more visible until 2009. Their salience then flattens out noticeably, sinking to a level of about 14 per cent during the refugee crisis (about 2015–2017).

Through the separate display of the subcategories (blue lines), Figure 2 also shows how the salience of women migrants has been composed, and thus through what means women migrants are made visible. Subcategories 3a, 5, and 6 have a rather equal frequency of use across time. Hence, over time, migrant women are about equally salient in being referred to as being from another country of origin (in the form of e.g., "women from Syria"), simply through a phrase or with additional expressions. Yet, other contexts occur with varying frequency. These dynamics are in turn responsible for the overall variation of women migrants' salience. References to the origin of a person (subcategory 2 and 3b) experience small peaks in 2005 and around 2008/2009, but lose relative frequency
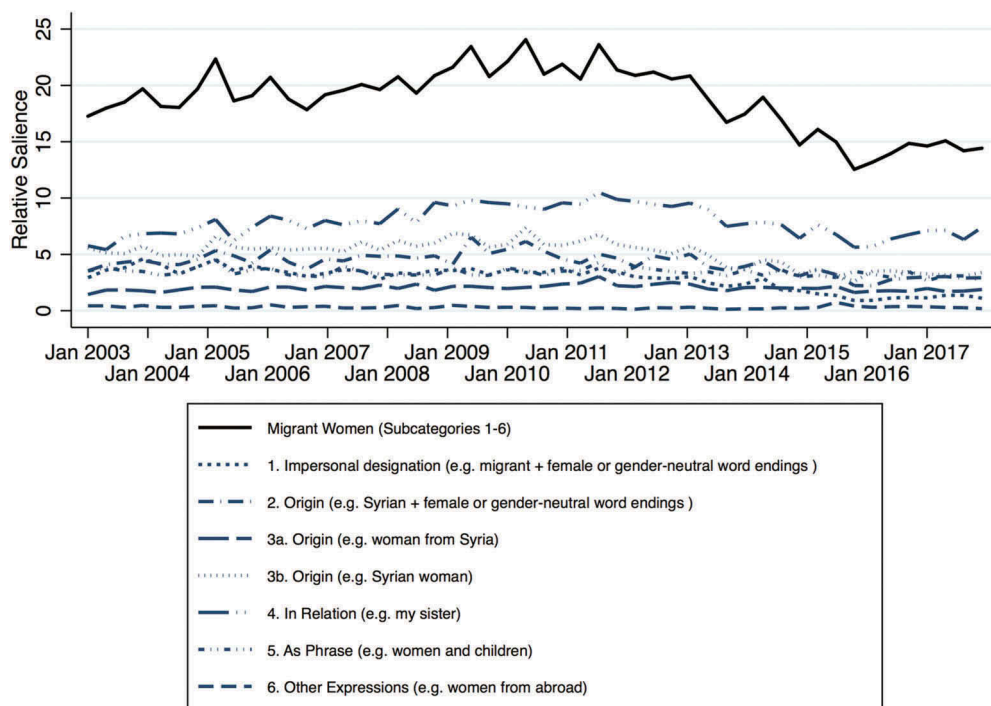
Figure 2. Migrant women's salience in German migration news coverage (*n* = 348,785 migration-related articles). Article frequencies are aggregated per month and presented relative to the total number of migration-related news articles per month. Black line: Migrant women's salience (overall, all subcategories combined). Blue lines: Individual subcategories (1–6) through which migrant women are made visible.

thereafter. This is slightly different in the case of subcategory 1, the impersonal designation of women migrants, which seems to constantly decrease over time. Remarkably, women migrants are most frequently made visible through subcategory 4, where women are, in comparison to other subcategories, referred to by means of or in relation to at least one another person.

In Figure 3, women migrants' salience is now shown in contrast to what we refer to here as men migrants' salience, and the share of articles that include at least one reference to any of these two (RQ2). A remarkable first observation is that between 81 per cent and up to 96 per cent of all migration-related articles in a given month mention at least one migrant person (black dashed line). Thus, few articles (in total *n* = 31,946) include not a single reference to a migrant person and discuss migration as a mere policy issue (an example headline of such an article being "Lower Saxony's Minister President Christian Wulff (CDU) has signalled willingness to compromise in the ongoing dispute over the red-green immigration law").

In comparing the share of measured concepts over time, it can be seen that almost every article with any mention of a migrant person (gray dashed line) includes at least one reference to a migrant man. We want to highlight that the relative growth of articles mentioning any migrant person—hitting almost 100 per cent of migration-related articles by the end—appears to be driven by increased mention of migrant men. In contrast,
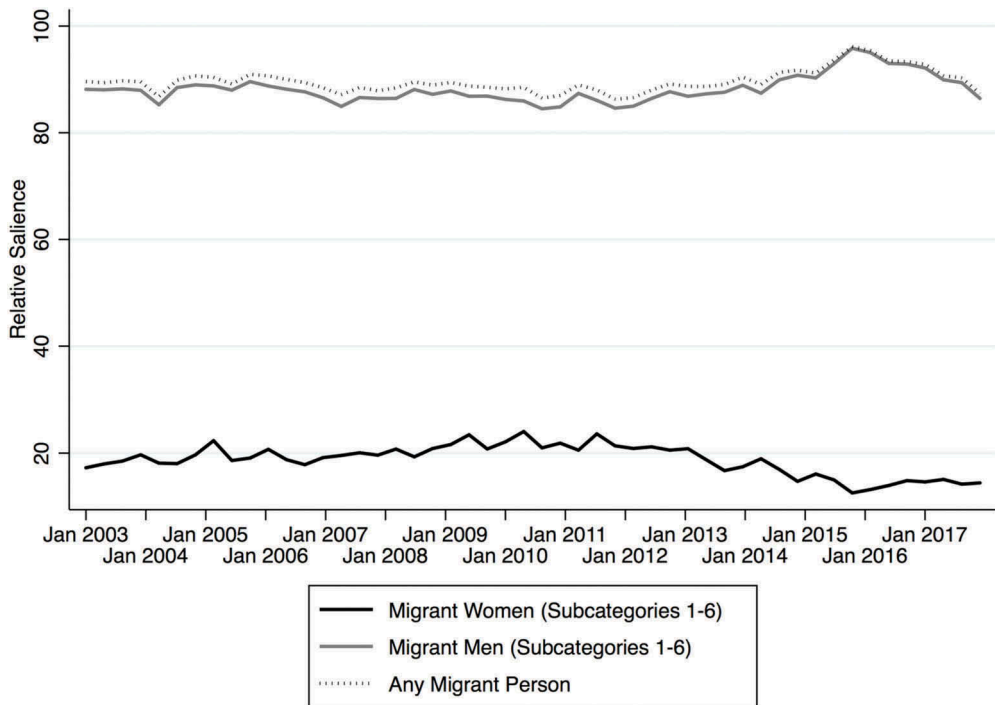
Figure 3. Migrant women's (black line) and migrant men's (gray line) salience in German migration news coverage ($n = 348,785$ migration-related articles). Article frequencies are aggregated per month and presented relative to the total number of migration-related news article per month. An article categorized as 'any migrant person' (gray dotted line) is an article that includes at least one reference to migrant women and/or migrant men.

starting around 2012, the mentioning of women migrants decreases considerably. Men migrants' visibility peaked in January 2016, being salient in 96 per cent of migration-related articles.

Compared to the previous graphs and turning to RQ3, we observe further dynamics when we consider the relative share of migrant women's salience separately for each of the eight media outlets (Figure 4). By distinguishing three time periods, some overall patterns can be noted. All media outlets (with the exception of *Welt Online, ZEIT Online* and *BILD*, for which our data only start from 2009 or 2010) appear to first make migrant women more and more visible (e.g., *Spiegel Online* from about 13 to 28 per cent). In 2012 at the latest and until about 2014, women migrants then experience declining attention across news outlets. Finally, during the refugee movement to Europe in 2015, migrant women's salience further declines for most outlets until 2016. With the exception of the conservative outlet *Welt Online*, where visibility continues to decrease, migrant women appear to gain increased attention, especially in the left-leaning outlet *taz*. Overall, there is no clear pattern concerning the political leanings of the media outlets. At some times, both more conservative and more left-leaning outlets give migrant women then considerable salience, whereas more moderate outlets show decreased salience. This applies to times both before and during the "refugee movement to Europe in 2015." Yet, looking at only the final year of coverage (2017), and with the exception of the *Frankfurter Allgemeine Zeitung*, it seems that greater
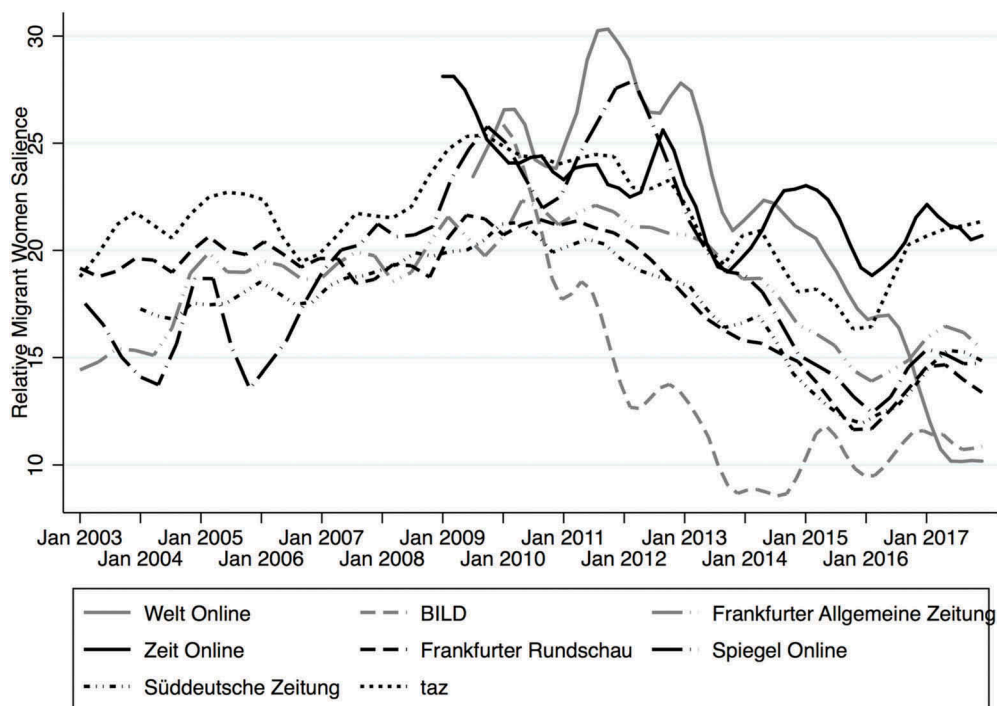
Figure 4. Migrant women's salience for media outlets with a right-of-center political leaning (gray lines) or left-of-center political leaning (black lines). In total *n* = 348,785 migration-related articles). News articles dealing with migrant women, relative to the total number of migration articles per media outlet.

salience is given in outlets with political leanings to the left of the center compared with those to the right.

Discussion

On automatically tracking women migrants in the media: opportunities and limitations

For this study, we decided to use a computer-assisted content analysis approach, more precisely a dictionary approach.[8] The main advantages of this text analysis strategy are the perfect reliability and transparency of the text annotation process, and its ability to process large amounts of text. On a critical note, it is apparent that classifying text based on keywords is not equivalent to a human understanding of a text. While hand coding can work with contextual information, automated dictionary-based methods must rely entirely on mere words (i.e., more manifest parts of text) and their assignment to categories. The decision for a dichotomous gender category (and thus a rather dichotomous distinction between men and women) for the here presented dictionaries is related to this restriction. Further, because of dictionaries' lack of ability to consider contextual information provided in an article, we did not include any keywords in the dictionary that refer to persons with foreign-sounding names. To name one viable option

for future projects, there are algorithms that indicate the popularity of different first names in various countries, as well as whether they are more commonly used for men or women. Relying on such algorithms has the potential to identify more relevant articles (i.e., increase recall for the dictionary), but would require additional manual validation efforts.

Despite these limitations, we have managed to create a research instrument with good recall and precision measures, and thus a reliable and valid measurement of the salience concepts studied here. With the present data and quality measures obtained, we can make confident statements about the media salience of different actors. In addition, Figure 2 provides some comparative insight into the wording and frequently used phrases by which women are referred in news texts (i.e., it offers some explanations for the observed gender hierarchy). For research interests aimed at more fine-grained gender concepts and contextual information, it is true that the applied method can for now only be considered a starting point. However, it is now for instance possible to filter key events or topics (e.g., the 2015/16 New Year's Eve in Cologne[9]) that mention women migrants or men migrants and subsequently apply hand coding, critical discourse analysis, or other automated text analyses approaches such as topic modeling or corpus linguistic methods to investigate the questions at hand.

In concluding this paragraph, we would like to emphasize the usefulness of the German language dictionary we have created. It may prove to be a helpful tool by which to investigate salience not only in German newspapers published in Germany, but with some additional validation, in German-language news published in Switzerland and Austria, too. Furthermore, following some domain-specific refinements, it may also prove useful for social media analysis or other political (e.g., speeches) or scientific texts (e.g., research articles and conference programs). We would also like to note that the dictionary components and specific expressions might be useful to those interested in creating a dictionary for English or for other languages.[10] The generic masculine is not unique to the German language, occurring for example in Spanish and French as well. Thus, the strategies that we applied here may be of use for dictionaries in these languages, too.

Conclusions and directions for future research

Throughout 2009 to 2017, about 12 per cent of the people living in Germany were born in another country (Eurostat 2019b). About 51 per cent of these people were women. Having considered in this study women migrants' salience in German migration-related news, such a figure was never reached in any month between January 2003 and December 2017. Rather, we have found that women migrant persons were salient in about 12 to 26 per cent of migration-related articles. In comparing different media outlets (Figure 4), we can note patterns of similarity rather than difference. The overall dynamic of women migrants' salience seems rather unlikely to be directly tied to the political align- ment of news outlets. Instead, real world events and a general shift in reporting style across news outlets appear to provide better explanations. Overall, although women migrants' salience increased from 2003 to about 2009, starting in 2011—the beginning of the Syrian civil war—their visibility decreased considerably. This decline may be explained by fewer articles referring to women migrants by means of relational expres- sions, such as "my mother" or "his sister" (Figure 2). To put these results in context, we

want to recall our conceptualization discussion (see Methods section) of the two salience concepts measured. If we assume that the use of the generic masculine incorporates a reference to both migrant women and migrant men, then our results would show that migrant women are actually as visible as migrant men. However, we take the position, again supported by media effects research (Blake and Klimmt 2010), that with the use of the generic masculine form (male word endings), migrant women are always less visible than migrant men.

Thus, we find that women migrants are generally underrepresented in migration news coverage compared to their real share in the German population. The consequences of such underrepresentation are unknown and have not yet been rigorously tested (Collins 2011). Returning to the points addressed in the Introduction, some potential social effects might be that women migrants as well as their concerns and needs lack a sufficient place in the public agenda. The finding that women are often referred to in relation to other (male) persons (Figure 2) demonstrates the danger that they are not presented as independent individuals, but rather in hierarchical relationships in which they are subordinate. Such forms of representation will most likely affect how migrant women view themselves (individually and collectively) as well as how they are viewed by others. It might even prevent them from taking powerful positions in society to fight for their needs and rights (Haraldsson and Wängnerud 2019). Such dynamics would over time reduce their visibility in both the media and the public agenda. This may again reinforce inequalities based on both racism and sexism. Lastly, women migrants' mere and independent visibility in the media could make an important contribution for the integration and inclusion of migrants as a social group. The basis to this assumption is that it has been shown in the context of gay rights that a lack of female representation might affect the nature and quality of political debate surrounding gay rights (Schwartz 2011). This logic might work for migrants as well. For instance, if migrant women are underrepresented relative to migrant men, yet (for various reasons) attitudes toward migrant men are more negative than toward migrant women (Rafaela M. Dancygier et al. 2019), public debate might be shifted toward the inclusion of migrants and refugees in a hostile direction.

We conclude by emphasizing that only visible (women) migrants are qualified to identify (women) migrant problems and to construct them in the public and political agenda. Increasing the visibility of women migrants in public discourse heightens the attention afforded to them and their specific needs. Further, it makes information related to female migration accessible in people's minds and provides examples for interaction. It hence sets the terms by which the topic of integration as a whole is seen and evaluated. Our research may be deemed a starting point to exploring the important intersection of gender salience and migration in the media. We perceive the numerical visibility of women migrants as one important aspect of representation. Yet, we are aware that this is only one part of the complex notion of media representation developed by critical cultural scholars (e.g., Dwight Brooks and Lisa Hébert 2006). The results above indicate that women migrants are treated differently by the media, and not only concerning matters of (in)visibility. We believe that the possibility of measuring women (and men) migrants' salience in German news texts by means of a validated dictionary is just the beginning. By relying on other automated content analysis techniques such as topic modeling, it is now possible to explore the topical focus of news articles where women migrants are salient. This may further complement media research that finds that migrant

women are often presented as victims of male patriarchs (e.g., Gudrun Hentges 2006), as weak, helpless and unfortunate (Silva and Mendes 2009), or in general in ways that reinforce stereotypes about the passiveness of women and the aggressiveness of men (Anne Johnston, Barbara Friedman, and Autumn Shafer 2014). The combination of dictionaries measuring salience (as applied here) with existing dictionaries designed to measure sentiment in German news texts allows for further exploration of not only salience, but also the tonality of actors' depictions. In addition, given that several studies have demonstrated that the representation of immigration-related persons and issues influences public opinion about immigration (Lauren McLaren, Hajo G. Boomgaarden, and Rens Vliegenthart 2017), a media effects study combining quantified salience measures with panel survey data would represent another possible extension of our dictionaries. Finally, we would like to stress that that the results relate to the German case under investigation. Keeping in mind that migration is an important topic of global scope, another useful extension would be to increase the scope of analysis to other countries and languages.

Notes

1. We are aware that many authors differentiate between sex and gender, and with that distinction, there are many more categories acknowledged and discussed than women and men. However, we would like to take a first look at media depictions of migrant women in comparison to migrant men, as we believe these are the most visible (and thus for an automated content analysis the most detectable) categories.
2. The data set was collected in the framework of the H2020 Project REMINDER, which determined the possibilities for selecting the time period and media outlets.
3. The search string (asyl* OR immigrant* OR immigriert* OR immigrat* OR migrant* OR migrat* OR flüchtling* OR ausländer* OR zuwander* OR zugewander* OR einwander* OR eingewander* OR gastarbeiter* OR "ausländische arbeitnehmer*" OR emigr* OR auswander* OR ausgewander* OR personenfreizügigkeit* OR arbeitnehmerfreizügigkeit* OR "freier personenverkehr*") was validated: One German native speaker manually coded whether $n = 1,203$ randomly selected news articles are migration related or not. Comparing these manual decisions with the search string retrievals, we achieved: recall = 0.89, precision = 0.94.
4. (i.e., emigr* OR auswander* OR ausgewander* OR personenfreizügigkeit* OR arbeitnehmerfreizügigkeit* OR freier personenverkehr*).
5. Additional analyses with alternative conceptualizations are available on request.
6. In our sample, gender-neutral language was rarely used: in total in $n = 2,607$ articles. Ninety-four per cent of these articles were published by the left-leaning news outlet *Die Tageszeitung* (*taz*). In this outlet, gender-neutral language has occurred relatively constantly over time in about four per cent of the migration-related articles.
7. Given that we are interested in overall developments, all graphs below are smoothed using a kernel-weighted local polynomial regression. Short-term spikes due to specific and singular events alone may thus be underemphasized.
8. See Justin Grimmer and Brandon M. Stewart (2013) for a comprehensive discussion of the benefits and limitations of computer-assisted content analysis methods for social sciences.
9. We refer to Stefanie C. Boulila and Christiane Carri (2017) for an overview on the related diversified media discourses.
10. The following link leads to the here used German dictionary as a way to collaboratively work on dictionaries in other languages: https://osf.io/yqbcj/?view_only=369e2004172b43bb91a39b5 36970e50b.

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