# Online media consumption in Germany: The role of political information: An analysis of German mass communication online

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An analysis of German mass communication online

**Abstract**

*Fragmented, thus, widely scattered, non-overlapping media-consumption patterns often are seen as a logical consequence of increasing numbers in online offerings, specialization and personalization, undermining a media-mediated common ground sufficient for democracy. Empirical evidence yet is missing maybe resulting from data lacking granularity in online-media consumption measured as aggregated online media offerings not detailing the level of single entities (subpages of a website).*

*Using social network analysis and the theoretical framework of news reading publics, this article exploratively analyses patterns of online-media consumption for ~4,000 single entities of commercially-driven, German websites and 339,423 people. A new methodological approach measuring overlapping media-consumption patterns accounting for individual online-media repertoires is suggested. Using community detection, two thematically driven online-groupings of overlapping audiences characterized by using/not using political- and digital-online-media offerings are identified. However, a total fragmentation in online-media patterns is missing: 43 percent of users observed are part of both news reading publics detected.*

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# 1. Introduction

Nowadays use of media has become an integral part of our everyday lives (Stark & Kist, 2020, p. 1138). Especially since the rise and diffusion of the internet, mediatization of societies increased. In Germany, 69 percent use the internet regularly, for 40 percent online media are the most important source of information (30 percent excluding social media) (Hölig et al., 2021). Particularly among young people (18 to 24 years), the popularity of online media is high: 70 percent see it as their main source of information. But also, for older people (45+ years) the relevance of internet continuously rises even though tv still is their primary source of information (Hölig et al., 2021). At the same time, the internet is seen as a "high choice" media (Mukerjee, 2021a, p. 3) with a high degree of self-selection due to the sheer number of online offerings available and the option of personalising media consumption online (Nechtushtai & Lewis, 2018; Stark, 2013, pp. 214f.). Therefore, many scholars see a high risk of audience fragmentation in the online sphere undermining "the democratic ideal of a public sphere, by drawing audiences into informational siloes, thereby reducing the common ground needed for informed debate, deliberation, information exchange, and political engagement (Habermas, 1989; Pariser, 2011; Sunstein, 2017; Williams & Delli Carpini, 2011)" (Mukerjee, 2021a, p. 3). Yet, empirical evidence for a siloing effect in online news consumption, where online audiences are highly fragmented, thus, "a situation where people increasingly use media they only share with small groups of like-minded individuals" (Fletcher & Nielsen, 2017, p. 476), is missing. By contrast, empirical studies on online news consumption find "massively overlapping" (Webster, 2014, p. 40) audiences rather than audience fragmentation. These studies are grounded in research on audience duplication, defined as "a situation where the audience for individual outlets may seem small and circumscribed, but most people in practice use many different media, and many media are used by people of many different persuasions" (Fletcher & Nielsen, 2017, p. 476). Or to put it more generally "the degree to which two media outlets share audience members" (Ksiazek, 2011, p. 237). However, audience duplication is analysed with very rough measures of online outlets and is usually restricted to a very limited number of online offerings: the level of measure often is the whole online outlet of a media brand like CNN.com (e.g. Fletcher & Nilsen, 2017; Ksiazek, 2011; Mukerjee et al., 2018; Taneja, 2020; Taneja et al., 2012; Trilling & Schönbach, 2013; Webster & Ksiazek, 2012), media categories like 'local newspapers online' (e.g. Olsen, 2020) or 'Tabloid' online media (e.g. Ormen, 2018). This aggregated level of measurement does not account for the high-choice options of users in online environments. Tendencies of audience fragmentation may be hidden in these aggregated metrics, as they do not capture the selective use of single subpages. Following, researchers indicated that "the inclusion of more discrete media resources" (Taneja et al., 2012, p. 965) as well as "[f]ar more 'granularity' – and a larger sample – is needed to

understand exactly what is being consumed" (Webster & Ksiazek, 2012, p. 51). Yet, sufficient data for more granularity in measuring online media consumption and corresponding analysis were missing.

This study will follow the request of more granularity based on a new and uniquely comprehensive as well as detailed big-data data source on online media use in Germany, the *IntermediaPlus 2014-2016* (Brentel et al., 2020; Brentel & Winters, 2021), which has been prepared for this purpose and made accessible for academia. With an explorative, data-driven approach as proposed by Mukerjee (2021a) online news consumption in Germany is analysed. The data relies on tracking and survey data allowing to measure the actual use of commercial online media at the level of single subpages. It comprises the media use of about 1.6 million people in Germany for more than 4.000 online media offerings (Brentel & Winters, 2021). The explorative study is oriented on the research question what patterns of online-media consumption can be identified: the extent of audience fragmentation vs. duplication and patterns of overlapping online media use meaning the composition of audiences grounded on the subpages-level. It offers insights on:

- the status of audience fragmentation vs. audience duplication in online media consumption in Germany;
- a description of patterns of online media consumption considering supply- and user-side, factors, i.e. the content genre and socio-demographic metrics, that are suspected determinants of audience fragmentation;
- further, in this study an alternative, innovative method to calculate audience duplication is suggested and applied continuing the methodological discussion of Webster, Taneja (2018) and Mukerjee with collaborators (2018b).

This study presents an overall mapping for online news consumption of commercial mass media online including online-born as well as legacy media to integrate case studies or to find new interesting online-media user groups for further research such as media repertoires.

## 2. Audience fragmentation and the internet

> *"One of the most widely observed consequences of the growth in digital media is audience fragmentation. As more offerings are delivered on broadband networks and more choices are available 'on-demand', patterns of consumption become more widely distributed."* (Webster & Ksiazek, 2012, p. 1)

This is one of the central concerns and a prominent hypothesis discussed in audience fragmentation literature (Stark, 2013, p. 199, 201; Schweiger, 2007, pp. 303f.). Considering the increasing importance of online media as source of information (see Hölig et al., 2021), a high audience fragmentation online challenges the idea of public sphere that "comprises in

essence the communicative institutions of a society, through which facts and opinions circulate and by means of which a common stock of knowledge is built up as the basis for collective political action" (McNair, 2003, pp. 20f.). With communicative institutions he meant mass media that are "the main source and focus of a society`s shared experience" (McNair, 2003, p. 21). Thus, an overlapping media use is needed to form a common ground of values and shared understandings of reality in societies (Stark, 2013, pp. 200f.; Jandura & Weiß, 2017, pp. 104). Especially, with the rise of internet a total fragmentation of public sphere often associated with filter bubbles or echo chambers is concerned. It is rooted in the differentiation of media offerings online, a fragmentation on the supply side (Kampes & Brentel, 2020, pp. 17ff.). With more offerings, media users have more options of selection and to fragment themselves among these different media offerings into smaller audiences (e.g. McQuail, 2010, pp. 444ff.; Stark, 2013, p. 199, 201; Webster & Ksiazek, 2012, pp. 40f.; Mahrt, 2019, pp. 46). Another cause origin from the possibility of personalization online, often associated with a "siloing effect on public conversations" (Nechushtai & Lewis, 2018, p. 306)[1]. Media supply and advertising industry can use personalization "guiding people's choice" (Webster, 2018, p. 99), e.g. tracing users and fostering homogeneous audiences. Also, users can personalize their media diet as precise media selection is easier online than in offline context: a user can choose a specific content without browsing through the whole outline of a media outlet like it is the case for newspapers or magazines. Further, media users have a very active role online (Bonfadelli, 2002, p. 72) and a high degree of self-selection (Mukerjee et al., 2018a, pp. 27f.; Bruns, 2019b): there is no program of media content that starts once a person is online like for tv or radio; user need to look for information, actively visit websites and scroll through or click on content (*cf.* Bonfadelli, 2002, p. 72). Following, media use online is very divers in possibilities and its nature – a high-choice medium (Mukerjee, 2021a, p. 3; Ormen, 2018, pp. 1f.; Zillien & Hargittai, 2009).

Another central assumption underlying the fear of total fragmentation and therewith dysfunctionality of public sphere online roots in the theory of cognitive dissonance and selective exposure. Accordingly, users will turn towards like-minded media and built like-minded communities. That is the fundament of echo chambers (Sunstein, 2007) in many cases combined with the approach of segmentation research. It describes a segmentation of society that is often reflected in fragmented media use, reinforced by media offerings that increasingly specify along lifestyles and interests of smaller target groups, thus generating further segmentation. Disintegration and reinforced (digital) divides in society are seen as consequences (McQuail, 2010, p. 446; Schweiger, 2007, pp. 303f.). As Webster & Ksiazek

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[1] Nechushtai & Lewis (2018) offer a systematic overview of the literature on filter bubbles and fragmentation.

(2012, pp. 49f.) summarize: "Writers have labelled these audience formations gated communities, sphericules, echo-chambers, cyberbalkans, redmedia-bluemedia, or, less judgmentally niches and microcultures (Anderson, 2006; Gitlin, 1998; Iyengar & Hahn, 2009; Sunstein, 2007; Turow, 1997, 2006; Van Alstyne & Brynjolfsson, 2005)". All studies have in common that "public attention is limited" (Webster & Ksiazek, 2012, p. 41) while digital media increase in numbers[2].

# 3. Three approaches to audience fragmentation

Audience duplication research has started in the 1960s with the diffusion and differentiation of tv-programs and has been used to analyse audience fragmentation. Most measures have been driven by media research improvement of tv-programs and advertising reasons (Mukerjee, 2018, pp. 28f.). At the same time, research on audience fragmentation increased. Webster and Wakshlag (1983) have developed a model to predict and explain tv-program choice including different determinants of program choice and audience fragmentation vs. duplication. They have involved determinants on the supply-side like availability of devices, programs, etc. as well as factors of individuals, the demand-side, like available time, needs, interests, etc.. McQuail (1997) evolved a model of audience formation describing four stages of audience fragmentation. Thereby, audience formation oscillates between two poles: concertation – a state of absolute audience duplication – and break-up of audiences, its disintegration due to absolute audience fragmentation – the absent of audience duplication (*cf.* Fletcher & Nielsen, 2017, p. 480; Stark, 2013). McQuail (1997, pp. 137f.; 2010, pp. 444f.) saw the differentiation of media as a central determinant of audience fragmentation since with increasing diversification of tv-channels the audience formation may develop from a unity model via pluralism and core-periphery models to a break-up model – reflecting a total fragmentation. Concluding, for audience fragmentation two main strings of factors can be identified: market factors such as the differentiation of media offerings online and user-sided factors which underlie the assumption of the need of selectivity in media use. Thus, audience fragmentation and duplication are formed by a duality of market and user factors. Consequently, different approaches to analyse audience patterns have aroused. Webster and Ksiazek (2012) have clustered audience fragmentation literature into two types: media-centric and user-centric studies while suggesting a third, the audience-centric perspective combining both.

## *3.1 Media-centric*

In literature it is the most prominent perspective. It takes a rather structural perspective where factors on the macro-level, those of the media market, determine audience formations – either

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[2] For the case of Germany this has been empirically validated by Kampes, 2020a, 2020b, *forthcoming*.

as audience fragmentation or audience duplication (Taneja et al., 2012, p. 952; Webster & Ksiazek, 2012, p. 42). It "tallies total attendance across outlets or products. This mode of analysis is typified by trend lines, long tails, and power law distributions" (Webster & Ksiazek, 2012, pp. 39f.). Media consumption is in media-centric studies often measured on an aggregated level (Taneja et al., 2018, p. 952), e.g. the reach of media outlets, viewpoint is the media not users (Fletcher & Nielsen, 2017, pp. 480). Online consumption usually is measured as page impressions or the number of unique users of a media offering. Further, metrics of media market concentration on different levels like companies or marketers based on the media reach like the Herfindahl-Hirschman Index (HHI) or Gini coefficient are used to analyse fragmentation on the supply-side (Webster & Ksiazek, 2012, p. 43; e.g. Kampes, 2020a, 2020b, *forthcoming*) as well as diversification of media outlets (e.g. Kampes & Brentel, 2020). Those studies show which media offerings are popular but are missing who is using what. They lack an adequately measure for audience fragmentation and cannot map combinations of media outlets used together – the extent of audience duplication remains unclear. Homogenisation effects in audience stay hidden, indications on segmentation and polarization of audiences cannot be analysed (Webster & Ksiazek, 2012, pp. 44f.).

## 3.2 User-centric

The individual combinations of different media offerings, often in a cross-media perspective, is the focus of studies with a user-centric perspective. They aim to find and describe "the media repertoires of individual consumers" (Webster & Ksiazek, 2012, p. 40). Usually cluster analysis is a preferred method to analyse audience fragmentation and media consumption on the micro level. Popular in such studies is a description of a typical user or user types by defining their media repertoires. Repertoires, thereby, "are subsets of available media that individuals use on a day-to-day basis" (Webster & Ksiazek, 2012, p. 45; see e.g. Bächler, 2017; Ng & Taneja, 2019). Early studies focussed on tv use and 'channel repertoires' (Webster & Ksiazek, 2012, p. 45), lately often cross-media use is considered for media repertoires. However, the individual media consumption usually is based on self-report in survey (Taneja et al., 2012, p. 956). Methodologically, the description of media repertoires is often limited to the number of outlets used not giving information about what is used exactly.[3] Further, the number of outlets to be reported is very limited either to the most important media sources or a fixed list that cannot represent today's high-choice media environment (Mukerjee et al., 2018, p. 27). Additionally, self-reported data has various pitfalls (Mukerjee et al., 2018, p. 27; Olsen, 2020, p. 9; Ormen, 2018, pp. 4f.) like social desirability or memorability. Furthermore, this form of data collection

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[3] Often in self-reported survey data the number of media outlets used on a typical day or week is asked (e.g. Hölig et al., 2021).

mismatches the way news is consumed in the digital age – such as incidental use (Boczkowski et al., 2018) or specific research needs using keywords to find a suitable medium assisted by platforms distributing users across different media outlets (Bruns, 2019b, pp. 2ff.). Opposed to rather habitual media use, e.g. known from consumption of newspapers where users (regularly) buy a preferred media outlet[4]. Therefore, reliability and validity of such measures for online media consumption are questioned (Mukerjee et al., 2018, pp. 27, 49; Olsen, 2020, p. 9; Ormen, 2018, p. 4).

Moreover, the aggregated level of (online) media measures are failing to cover the granularity of today's media selection possibilities. Especially considering that media repertoires are seen as "one of several 'coping strategies' people have for finding preferred content in an increasingly complex media environment" (Webster & Ksiazek, 2012, p. 45) and thus, a potential indicator of audience fragmentation. Theoretically this micro-level perspective often is based on the theory of selective exposure and the assumption that media consumption patterns become more and more specialized due to selection pressure evoked by (high) media choice (*cf*. Webster & Ksiazek, 2012, p. 45; Stark, 2013, pp. 214f.). Sometimes it is combined with the uses and gratification theory arguing that media use habits, and therewith media consumption patterns, are a product of different needs people have and want to satisfy by their media choice (gratification) (Mukerjee, 2021a, p. 11; Webster & Wakshlag, 1983; Taneja et al., 2012, pp. 952f.). Typically, the socio-demographic characteristics age, education and gender of users are used to describe differences in media use, such as media repertoires or across user types (Webster & Ksiazek, 2012, p. 45; Schweiger, 2007, pp. 270-278). Studies with a user-centric approach hardly include the perspective of audience overlaps nor abstract findings on media repertoires and user types for an understanding of public audiences (*cf.* Webster & Ksiazek, 2012, p. 45).

## *3.3 Audience-centric*

Due to the shortcomings of one-sided perspectives on audience fragmentation described above, Webster and Ksiazek (2012) suggested a combination of both: The audience-centric perspective focussing on "the extent to which public attention is dispersed across the media environment" (Webster & Ksiazek, 2012, p. 45), thus, lying on the macro-level. "It is user-centric in that it reflects the varied repertoires of audience members, which are aggregated into measures that summarize each audience" (Webster & Ksiazek, 2012, p. 45) and media-centric as it analyses (overlapping) audiences on the level of media outlets (ebd.). Hence, it accommodates the duality of media market (structure) and media users (agents) based on the

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[4] Of course, online versions of print outlets can be bought and their online offerings consumed in a more habitual way including the whole outlet. This may primarily be the case for subscribers – a special group of online users.

concept of Giddens' theory of structuration (1984). The agents act within a given structure, here the available online media offerings that can be selected by users for their individual consumption. The media market then follows the demand of users, formed by their individual preferences of media consumption. "As agents use media, they reproduce and alter the structural features of the environment" (Taneja et al., 2012, p. 953 on Giddens' theory). The supply side, the structure of the online media market, and demand side, composed of online media users as the agents, are interdependent.

Online media consumption is shaped by this self-reinforcing duality of supply and demand side. Therefore, an audience-centric approach is needed to analyse audience fragmentation vs. duplication incorporating both sides. Audiences here are characterized "by the other media they use" (Webster & Ksiazek, 2012, p. 45) and methods of audience duplication research are used to find out the extent of audience overlap across different media offerings used (*cf.* Webster & Ksiazek, 2012, p. 46). For a detailed literature review on audience duplication research see Fletcher and Nielsen (2017) and Mukerjee with collaborators (2018a). Most recent studies on online media consumption have concentrated on social network analysis as suggested by Webster and Ksiazek (2012, pp. 46ff.), especially when applying an audience-centric approach to analyse fragmentation. They either used the suggested measure for audience overlap Ksiazek developed in 2011 (e.g. Taneja et al., 2018; Taneja & Webster, 2016) or that of Mukerjee and colleagues proposed in 2018 as a better, alternative way to build networks of overlapping audiences (e.g. Olsen, 2020; Mukerjee, 2021a). This study will resort to the method of social network analysis to apply the audience-centric approach, but will use a third option to build networks of overlapping audiences considering the role a media offering has in the individual repertoire of a user.

# 4. Research Approach

This study wants to shade light on the online-media consumption patterns in Germany examining the status of audience fragmentation vs. duplication. In addition, the composition of overlapping audiences will be used to investigate supply- and demand-sided factors that link or separate those audiences as an indication for determinants of audience fragmentation in Germany. Following, the three leading research questions are:

*RQ1: What are the patterns of online-media consumption?*

*RQ2: How fragmented is the online audience?*

*RQ3: How are fragmented vs. overlapping audiences online composed?*

Supplementary the role of online-subpages offering general interest issues, the political "agora" (Neuberger & Lobigs, 2010, p. 132), in comparison to the general public is considered. As for democratic countries like Germany the news consumption of political information is crucial for the (political) integrative function of media and media-mediated political discourse

(McNair, 2003; Schweiger, 2007, pp. 302f.). Thus, audience fragmentation is seen more critical in relation to media offerings with political content.

## 4.1 Theoretical and methodological Approach

The audience-centric perspective is used to meet the duality of audience fragmentation vs. audience duplication considering supply- and demand-sided factors as well as the proposed network analysis to measure and analyse overlapping audiences online. Further the theoretical framework of news reading publics suggested by Mukerjee (2021a) is applied. A news reading public is "a group of individuals who share substantial overlap in their news consumption patterns" (Mukerjee, 2021a, p. 7). Also, it can be characterized "as a set of news (or more generally media) outlets that are consumed by certain groups of people who either seek specific gratifications, or automatically gravitate towards by virtue of shared societal experiences" (Mukerjee, 2021a, p. 7).

The framework of news reading publics for analysis on online media consumption has been developed as a theoretical concept related to theories of media use such as uses and gratification theory, cultural proximity, social identity and the idea of issue publics. These theoretical approaches make "assumptions about what the dimensions of audience fragmentation are" (Mukerjee, 2021a, p. 8). Analysis grounded on one of these theories often formulate hypothesis and group or aggregate data accordingly narrowing the potential of such analysis, e.g. pre-defining social groups or segments to identify their media-repertoires. "The news reading publics framework flips this idea on its head, by not imposing a preconceived model on the data, but instead, allowing the empirical evidence to inform and validate what such a model could be" (Mukerjee, 2021a, p. 8f.).

As the aim of this paper is to understand how fragmented vs. overlapping audiences online are composed to draw a conclusion which factors might shape audience fragmentation, this framework is promising. Similar to Mukerjee this study seeks "to see if the structure of audience behavior that emerges, is in line with what we would expect if these theoretical considerations were valid" (2021a, p. 18) instead of testing causal inferences of one or the other theory on media use.

Moreover, the theoretical approach of news reading publics is suitable for international comparative studies due to its characteristic of a "loosely organised collective" without a fixed theory that has to be applied. The framework of news reading publics can be flexibly adapted to national or regional circumstances by adding or removing theoretical concepts. So, this case study on German online media consumption is internationally connectable as the framework of news reading publics allows "us to identify the structural similarities and differences in the consumption landscapes between countries." (Mukerjee, 2021a, p. 9).

However, the term "news reading publics" is misleading, as it refers not only to political news, but to the consumption of content-related media in general[5]. Following the theoretical framework of news reading publics and an audience-centric perspective, different attributes of users as well as structural factors of the media market are considered in the analysis on online news consumption in Germany.

## 4.1.1 Supply-sided explanations for audience fragmentation

In research with a media-centric perspective it is assumed that market concentration forms audience fragmentation – offerings with a high reach produce audience duplication while those of the long tail, i.e. with a low media reach, are associated to be conceptualized to meet special interests of like-minded audiences. Not only interests but also demographic attributes of users are considered by the media market to allow "advertisers to profile individuals […] creating specialized audiences for different products, thereby 'segmenting' what was hitherto a 'whole' national audience (Anderson, 2008; Turow, 1998, 2011)" (Mukerjee, 2021a, p. 3). The case of Germany can deliver interesting insights here as the online media market has the structure of a long-tail (Kampes, 2020b): a fragmentation of offerings in the sense of a differentiation and thus an increase in online offerings (Kampes, 2020a), especially those that are entertainment-oriented; an opposite development of concentration, i.e. an increase in the concentration of reach on the offerings that already have a high reach (Kampes, 2020b); and a concentration of online providers and marketers (Kampes, *forthcoming*). This supports the assumption of differentiation into niche offerings, in which a 'segmenting' effect regarding the audience is assumed (Webster & Ksiazek, 2012, pp. 48ff.; McQuail, 2010, p. 446), in order to remain attractive and thus competitive for advertisers, especially with the low reach of the niche offerings of the "tail". Because with a segmented audience of a specific niche offer, advertisers can place (personalised) adds according to their target group (Taneja, 2020; Schweiger, 2007, p. 303).

## 4.1.2 Demand-sided explanations for audience fragmentation

In literature with a user-centric perspective the socio-demographic prepositions of users are analysed in conjunction with media consumption and audience fragmentation (Webster & Ksiazek, 2012, p. 45; Taneja et al., 2012; Schweiger, 2007, pp. 270-278). Mostly, age, gender and education are included and seen as factors of audience fragmentation with high potential. Sometimes income and socio-economic status are added to measure for financial resources a person has, e.g. to buy new technical devices, for a societal position of a user or a proxy for employment status that can reference on technical or media literacy skills as well as for time

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[5] media whose goal and business model are to generate and disseminate content, as opposed to e-commerce, for example (e.g. Kampes, 2020; see Wirtz, 2008 for more information on business models)

availability (Bonfadelli, 2002, pp. 72ff.; Zillien & Hargittai, 2009, *cf.* p.275). Further, audience segments in advertising are usually built upon these socio-demographic metrics of users and potential target groups (Bonfadelli, 2002, p. 71). With the internet and the possibility of personalisation, this is another explanation for audience fragmentation online (see Nechtushtai & Lewis, 2018; Pariser, 2011). The majority of studies that explain media use refer to the uses and gratification theory and/or selective exposure. In both cases, it is assumed that different predispositions, interests, partisanship and time availability (needs) lead to different media use to gain gratification. Individuals choose different media preferences according to their preferences and attitudes (selective exposure) (Webster & Wakshlag, 1983, pp. 437ff.; Mukerjee, 2021a, pp. 5f.). In the high-choice environment of online media, this leads to audience fragmentation (Ormen, 2018, pp. 1f.; Zillien & Hargittai, 2009). Explanation is given in different (media) habits, time availability, knowledge, media literacy and resulting gratification needs, especially in case of gender, age, education and socio-economic status (Peiser & Jandura, 2015; Schweiger, 2007, pp. 271-275). But also, affiliation to a social identity, social status, socialisation and the accompanying media use patterns and habits (Peiser & Jandura, 2015; Schweiger, 2007, pp. 271-275).

So, news reading publics differentiated by socio-demographic factors could on the one hand be a result of and explained by the supply-sided long-tail development found in Germany for 2014 to 2016 (Kampes, 2020b) with emerging differentiation in (entertainment-oriented) online offerings, that are mostly online-born (Kampes, 2020a, 2020b). Combined with the assumption of 'segmenting' effects in the audiences based on targeting specific user groups so that the niche offerings remain attractive for advertisers despite the rather small media reach (Schweiger, 2007, pp. 303f.; Taneja, 2020). On the other hand, such patterns of audience duplication reflected in news reading publics could arise from different social identities, habits and gratifications, e.g. from a generational effect where younger people may have different habits and gratification needs in media use than elder people as they grew up in different media environments (Peiser & Jandura, 2015; Schweiger, 2007, pp. 274f.); as well as different socialization, e.g. between women and men, still shaped by divergent gender roles (Schweiger, 2007, pp. 271f.).

## 4.2 Issue publics as explanation of audience fragmentation

Another promising theoretical explanation is that of *issue publics* meaning that audience formation fragments into thematically specialized audiences (Habermas, 2009, p. 157) that don't overlap at all or have at least a rather low audience duplication (Webster & Ksiazek, 2012, pp. 44.f). Thus, news reading publics online would form according to *content genres*, representing the interest needs of users. Using a media-centric perspective, it is rooted in an economically driven differentiation among content genres to fit assumed audience segments

and simplify personalized advertising on the supply side (Taneja, 2020; McQuail, 2010, pp. 432, 444; Schweiger, 2007, pp. 303f.). A user-centric perspective would see an audience divided along thematically different media as a result of a high-choice environment – meeting the media-centric argument of audience fragmentation as a consequence of thematic differentiation – leading to a high degree of self-selection driven by different interests (Fletcher & Nielsen, 2017, pp. 477ff., 491; Habermas, 2009, p. 157; Zillien & Hargittai, 2009) and needs of the users (Webster & Wakshlag, 1983, pp. 439f.).

## *4.3 The German online media market*

The case of Germany is interesting here as online offerings with different thematically focus are distinguished in their market structure: online-born offerings have a rather high reach and are rather entertainment-oriented while offerings with a political focus are provided by legacy media only (Kampes & Brentel, 2020). At the same time consolidation of providers and marketers in the online media market are observed for Germany, especially between 2014 and 2016 (Kampes, *forthcoming*). These market structures support the idea of a long-tail development with a rising differentiation of offerings and an increase in niche-offerings in Germany (Kampes, 2020b), that can endorse issue publics as well as 'segmenting' audiences in favour of personalization and advertisers. On an international level, Germany can be seen as a high-income democracy with a strong state intervention in the media system due to the public service media, which is well-funded. With public service media a media landscape with high audience duplication is associated. However, public service media in Germany is not strongly represented online (Fletcher & Nielsen, 2017, p. 483). In this analysis public service media online is not considered.

In addition, Germany is characterised by a decentralised media system due to federalism and accordingly a strong representation of regional media (Fletcher & Nielsen, 2017, p. 483), also online (Kampes, 2020a). This tends to support strong regional identities, both in terms of social identity and cultural proximity, which can foster audience fragmentation. This contradiction between centralisation through public service media and decentralisation through federal structures was also reflected in the results of the study by Nilsen and Fletscher (2017) on audience fragmentation vs. duplication in cross-media audiences: in an international comparison with France, Spain, Denmark, the UK and the USA, Germany could not be clearly classified. On the one hand, like Denmark and the UK, it had a low density, i.e. in the network of overlapping media use, only a comparatively small proportion of the possible connections representing shared media use could be found (ebd., p. 487). on the other hand, a low value was observed for diameter, which speaks for a lot of overlapping use (ebd., p. 488), as in the case of the USA, Spain and France. Furthermore, large differences in audience duplication structures were found between media types. Thus, overlapping use among offline media is

lower than among online media, which has the highest value of overlapping use in terms of density in an international comparison (ebd., pp. 488, 490). Therefore, the study in Germany is particularly interesting for the online sector with regard to audience duplication, especially because studies are lacking and so far, the focus has been on a cross-media view with strongly aggregated measurements of media use as well as case studies without online media.

# 5. Data: MA IntermediaPlus 2014-2016

As described already above, a sufficient data source is needed to analyse audience fragmentation, especially when considering the theoretically framework of news reading public. The "empirical data must be available at a sufficiently granular level" (Mukerjee, 2021, p. 9) and should rely on behavioural trace data on a large scale. Initial analysis on media consumption recommended a more detailed look with corresponding data (Webster & Ksiazek, 2012, p. 51) that were not available at the time. This study now can deliver a more granular analysis on online media consumption for the case of Germany based on new, highly detailed data source: The data of *IntermediaPlus 2014-2016* (Brentel et al., 2021) comprises about 4,000 online offerings per year and includes most of the German online offerings in the commercial sector. Here the most recent year, 2016, is considered.

For this analysis we are only interested in online media offerings following a content business model[6] as those are the ones potentially providing citizens with information. It allows a very detailed analysis of online media consumption patterns regarding commercial media offerings in Germany as a media offering is defined on the level of a single subpage. At the same time, the single subpage with a content-related business model can be assigned to a marketer, a provider, a media brand and its content-genre. The use of a medium is measured by tracking data and fusioned with survey data. Due to in-App and on-site surveys unique users are identified for different devices used to enter online media and socio-demographic parameters collected. The survey data is based on a representative sample for the German population older than 14 years and includes about 30,000 respondents. One year of the *IntermediaPlus* is based on two surveys, one during spring and one during autumn. Accordingly, online tracking data on a daily basis is matched from the three-month period of each survey data collection. With the behavioural data pitfalls of self-reported data on media consumption are overcome, too (Ormen, 2018, pp. 4f.).

## *5.1 Operationalisation*

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[6] The data source comprises information on the use of tv, radio and print media. However, an analysis of cross-media use would require aggregation of media measurements to account comparability of usage.

The analysis will use Social Network Analysis (SNA) as recommended for an audience-centric research on audience fragmentation vs. duplication, particularly when using large-scale data. Further a projection of a two-mode network will be executed as described later to create a one-mode network representing overlapping audiences between media offerings. The two-mode network is measured by nodes that either are respondents or online media offerings on the level of sub-pages that have a content business model and a commercial background being part of the *IntermediaPlus 2014-2016* data.

*Edges:* The edges, also called ties, represent a connection between two nodes in a network. Nodes here can be media offerings or people. A connection between a node symbolizing a medium and a node that embodies a user exists when a person uses a media offering, i.e. the individual media use. Media use is measured on a daily basis within a three-month period and comprises the actual use of a single media offering by a person.

*Thematic genre:* The *thematic genre* was gained from an inductive text analysis conducted for the names of the single subpages to define genre-categories (Kampes, 2020, pp. 32ff.). The result are 23 thematic genres: advice, car, career, culture, digital, economy, entertainment, family, finance, forum, games, health, knowledge, lifestyle, breaking news, news, newsletter, politics, regional, soccer, sports, style and travel as well as four additional categories: brand name, homepage, video and other including landing pages (Kampes, 2020; Brentel et al., 2021). Thus, thematic genre is measured with 27 categories. In this study the following thematic genre are seen relevant for *issues of general interest* as they are "relating to matters of information and culture that are of wide interest and concern in a society, without being addressed to any particular individual" (McQuail, 2010, p. 5): economy, knowledge, breaking news, news, politics, regional and homepage for media outlines coming from press media or having a breaking-news section on their homepage, like e-mail providers (e.g. t-online.de - Homepage).

The data of socio-demographic metrics is based on the answers given by the respondents in CATI surveys (Brentel et al., 2020, 2021). In total for 2016 the data comprises 339,423 respondents and 274,193 respondents are considered as online users.

*Gender:* Gender is a dichotomous variable comprising 'male' and 'female'.

*Age:* The age of a respondent is measured with twelve categories in four-year steps starting at 14 to 19 years and having '70 or older' as final cohort.

*Education:* The formal education is measured in four categories: 'elementary/primary/lower secondary school', 'secondary school', 'high school/matriculation standard' and 'university'. Here they are aggregated to three categories for low, mid and high educational level, whereby the category 'matriculation standard' and 'university' have been aggregated as a high education.

*Income:* The variable income is based on the income of a respondent and is measured in 500-Euro steps in eight categories. Beginning with 'no income' and 'less than 500 Euros' while ending with '3,000 Euros and more'.

# 6. Method

## *6.1 Analysis of news consumption patterns*

Analysis with behavioural trace data on a large scale is challenging due to the "noise" included in such data complicate to find meaningful results (Mukerjee, 2021, p. 9). Social Network Analysis (SNA) is a sufficient method for behavioural, large-scale data on the micro-level helping to reduce complexity and filter for noise. Further, it is appropriate to analyse audience fragmentation and detect overlapping audiences. To reduce complexity the two-mode-network is projected to a one-mode network comprising media offerings and representing overlapping audience structures. As in previous studies on audience duplication, the media-projection will be used (*i.a.* Webster & Ksiazek, 2012; Taneja et al., 2012; Mukerjee et al., 2018a; Olsen, 2020). Figure 1 exemplifies the principle of such a projection. It shows how projection can help to identify patterns (communities of overlapping audiences) drawn from behaviour (media use) of individuals (users). In a media-projection, media offerings are connected if they have been used by the same user and thus share their audience to some extent. The strength of the share in audience, the audience duplication, is determined by the shared ties (media use) of the two-mode network.

There are several options to measure the weight of such ties and consequently to calculate the strength of audience duplication between the media offerings. In literature a discussion about the best way to consider the weight of shared use in a media projection was held (see Mukerjee et al., 2018a, 2018b; Webster & Taneja, 2018) to measure audience duplication. Both approaches of projection follow the idea of filtering "deviation from-random duplication" (Ksiazek, 2011, p. 240). Randomness is defined as the expected overlap considering the media reach of two media outlets. The underlying assumption is, that only duplication above the "degrees of freedom" is significant duplication (Mukerjee et al., 2018a, p. 33). Thus, they want to filter the media-projected network only for audience overlap above the "degree of freedom". To do so the media reach of two media outlets is taken and "the degree to which the observed duplication between two outlets differs from the expected duplication between those outlets" (Ksiazek 2011, p. 240) calculated. Ksiazek (2011) assesses the chi² calculations using the percentage of media reach for each outlet. So far, the idea proposed by Ksiazek (2011) is dominating but is questioned by Mukerjee and colleagues in 2018 (2018a, 2018b). Their main criticism is "[t]he decision to use percentages instead of frequencies disregards, in other words, the substantive differences in reach. Hence, this approach treats as equivalent the least and

the most accessed outlets, thus offering a misleading interpretation of the strength of the overlap – a weakness that affects the rest of the analyses applied to the network" (Mukerjee et al., 2018a, p. 32). They propose to use the frequencies as it is done in a chi² test instead of using percentages for the media reach of outlets and resort to the calculation basis of phi correlation to find significant audience duplication. They call it the "phi correlation approach" (Mukerjee et al., 2018a, p. 35).

## 6.2 Alternative Measure of audience duplication

At first glance the approaches using chi² statistics or phi correlations seem comprehensible to find 'significant' overlap in media use and filter for the noise of big-data. It accounts the potentially large dispersion and thus 'irregular' appearing use that distinguishes the usage of the medium Internet from legacy medium. However, it does not measure the weighting of an outlet within the (online) repertoire of a user determined by the frequency of use and the number of outlets used. Thus, it fails to measure audience duplication from a user-centric perspective accounting for the role a media offering has in individual information seeking online considering the number of media offerings used and their frequency of use by an individual online. SNA-projection techniques would allow a more user-centric measure of audience duplication and respectively fragmentation.

Hence, distinct to Ksiazek (2011) and Mukerjee with colleagues (2018) this study proposes a new, innovative way to measure audience overlaps in media-projected networks accounting for the role of an online offering in the online repertoire based on the frequency of use and repertoire size. Since the role that a media offer plays in the individual media repertoire is of great importance in the evaluation of audience duplication and fragmentation. Especially, in context of (questioned existence of) media-mediated common ground in societies (Pariser, 2011; Sunstein, 2007). As the behaviour is measured as the frequency of use instead of used vs. not used. This granularity should be considered in the projection since it makes a difference if one uses a media offering once or several times and thus the relevance of an overlap with another user differs (see figure 1). For example, if two people use the same two media offerings online and this is the only media offerings they use, their overlap should count as relevant, regardless if the audience duplication of these two media is above the "degree of freedom" based on their media reach – see *user 4* and *5* in figure 1 forming *community 2*.

Consequently, the sparse matrix methods are used (Lietz, 2020a) here to differentiate between strong and weak ties, i.e. the audience duplication measured by overlapping use of two media offerings by two or more individuals: The weight of an overlap between two media is determined by the importance of these media in the individual (online) repertoires; Each user enters the calculation with "1", so that a normalisation and comparability is established. A user who uses many media (and that a lot) – like *user 1* in figure 1 – enters the calculation of the

overlap for the media-projection equally as a user who only uses two media, e.g. *user 4* in figure 1. So, an overlap between two media is strong if it is used by many users <u>and</u> depending on the importance both media play in the individual consumption patterns (see Lietz, 2020a, 2020b for further methodological details and matrix calculation). In the end, for a projected network, the entire network could be filtered for strong vs. weaker connections, but are not excluded in advance. Thus, the overlap of audiences always depends on the importance of a medium in the individual usage patterns.

*Figure 1: exemplification of media-projection to identify media consumption patterns*
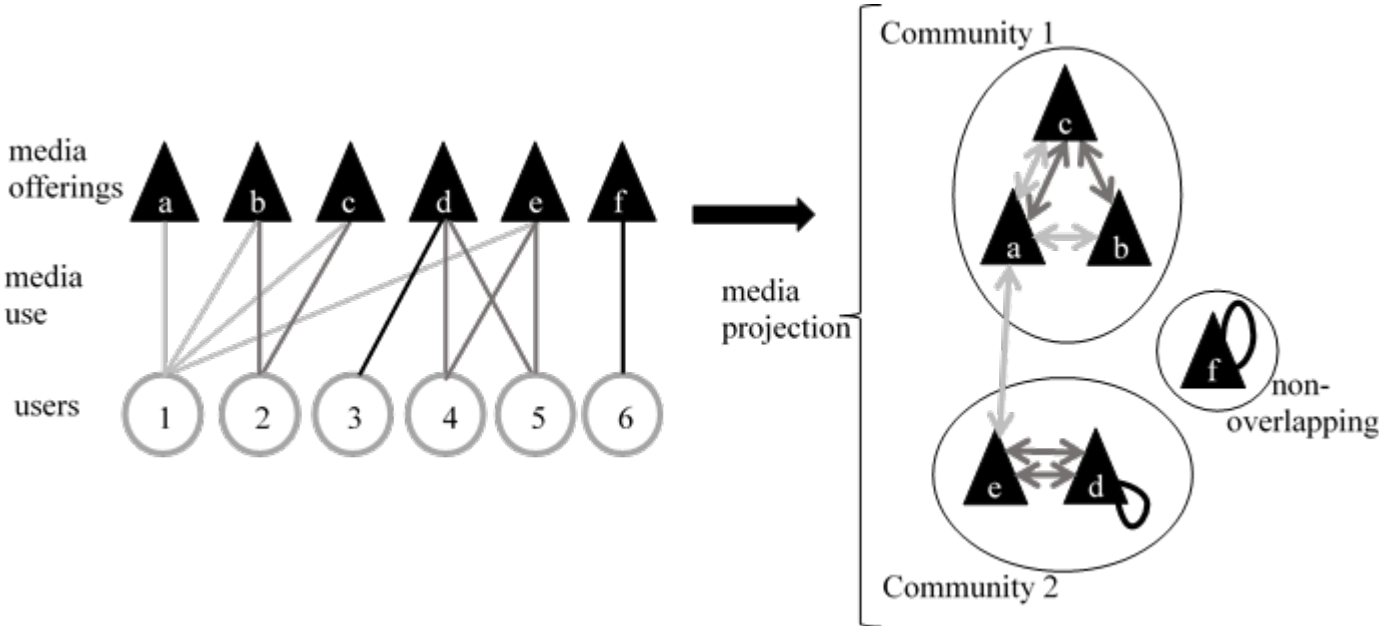


Finally, a community detection in SNA is executed for the media-projected network, common in audience duplication research to identify overlapping audiences (Mukerjee, 2021b, p. 1). The community detection is based on similar statistical mechanisms like cluster analysis: based on the ties between two media offerings, that represent overlapping use of at least two people, similarity of these pairs is calculated and assigned to a community accordingly. "Communities, if identified in the network, would imply the presence of certain outlets sharing significantly higher audience overlap than two outlets selected at random" (Mukerjee, 2021a, p. 21). As exemplified in figure 1 for the media offerings *a* and *e*, due to the granularity of measure for overlap in the media-projection, two media offerings that are used jointly (with a low frequency of use) by only one person (*user 1*) with a fairly large online repertoire can be assigned to different communities if they have a stronger share with other media offerings – for *e* it is *d* and in case of *a* it is *c* with *b* in figure 1. The algorithm of Louvain is used for the community detection, considered to best fit large-scale networks (Barabasi, 2016) and "work remarkably well even in the presence of substantial noise, when many of the others fail to identify any community" (Mukerjee, 2021b, p. 9). A detected community can be interpreted as

a news reading public as "the presence of news reading publics is reflected in these clustered communities" (Mukerjee, 2021a, p. 21), but is not equivalent. However, "news outlets corresponding to a single news reading public [are expected] to be more tightly connected to each other, than to outlets corresponding to other news reading publics" (Mukerjee, 2021a, p. 21).

# 7. Results

## 7.1 RQ 1: Patterns of online news consumption – community detection for overlapping audiences

Two communities of overlapping audiences could be identified in the media-projection (see figure 2) indicating two news reading publics online in Germany for 2016. Already 1,025 media offerings (53.7 %) were excluded due to the media-projection as they were not or not jointly used with other media. Thus, the base for community detection were 883 media offerings (46.3 %) which are used with others; 88.5 percent of them (n=781) are part of the first community, the blue one in figure 2, and 11.6 percent (n=102) are assigned to the second community, the yellow one. Consequently, the blue community is by far the largest when it comes to the number of media offerings comprised. As the visualization of figure 2 implicates the

*Figure 2: media-projected network for overlapping online use in Germany in 2016*
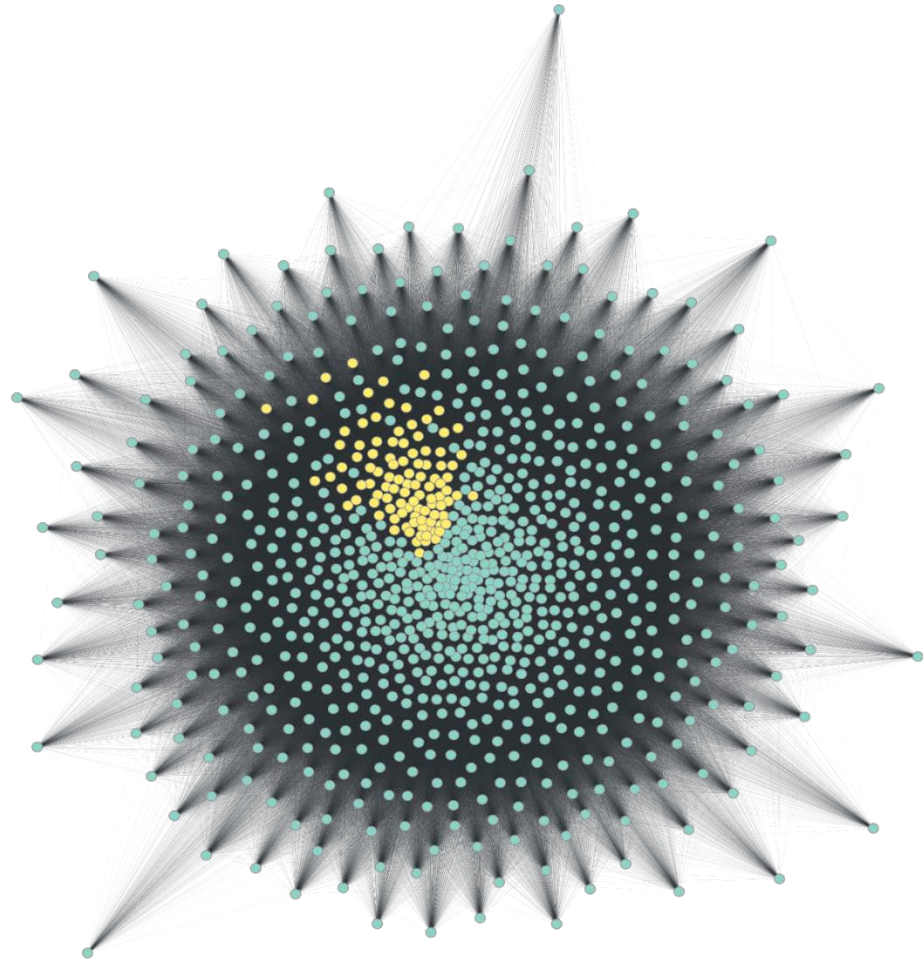
communities of overlapping audiences are not completely separated from each other but connected. Following, the two news reading publics identified have a strong audience duplication within their community, but also have overlapping audiences with each other based on weaker ties. Like *community 1* and *2* in figure 1 share the *user 1* as part of their audience, but hold stronger connections, i.e. a higher proportion of shared audience, with the other media of their community.

## *7.2 RQ 2: Fragmented or overlapping patterns – An analysis of distribution of users across the communities*

Thus, a total fragmentation in the online audiences among the yellow and blue community does not exists. Instead, they share parts of their audiences: when analysing the demand-side of the media-projection three user groups can be identified – those using exclusively media offerings of the blue community (6.3 %; n = 11,509) or those of the yellow community (50.8 %; n = 92,877), plus, users that have a share in both communities (42.9 %; n = 78,433).[7] However,

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[7] There are also people without overlaps in their use / not using subpages which is 33.3 percent of the two-mode data; they are excluded from the calculations of the numbers for the shares in overlaps.

there is a certain degree of audience fragmentation between the exclusive users of the respective community. Concluding, it is evident that a separation of audiences cannot be identified due to the audience duplication found forming the two communities and even across them. It should be mentioned that around 33.3 percent of people do not use the tracked online subpages and therefore do not overlap with the audiences of the communities.

## 7.3 RQ3: Composition of communities: issue publics – thematically driven news reading publics
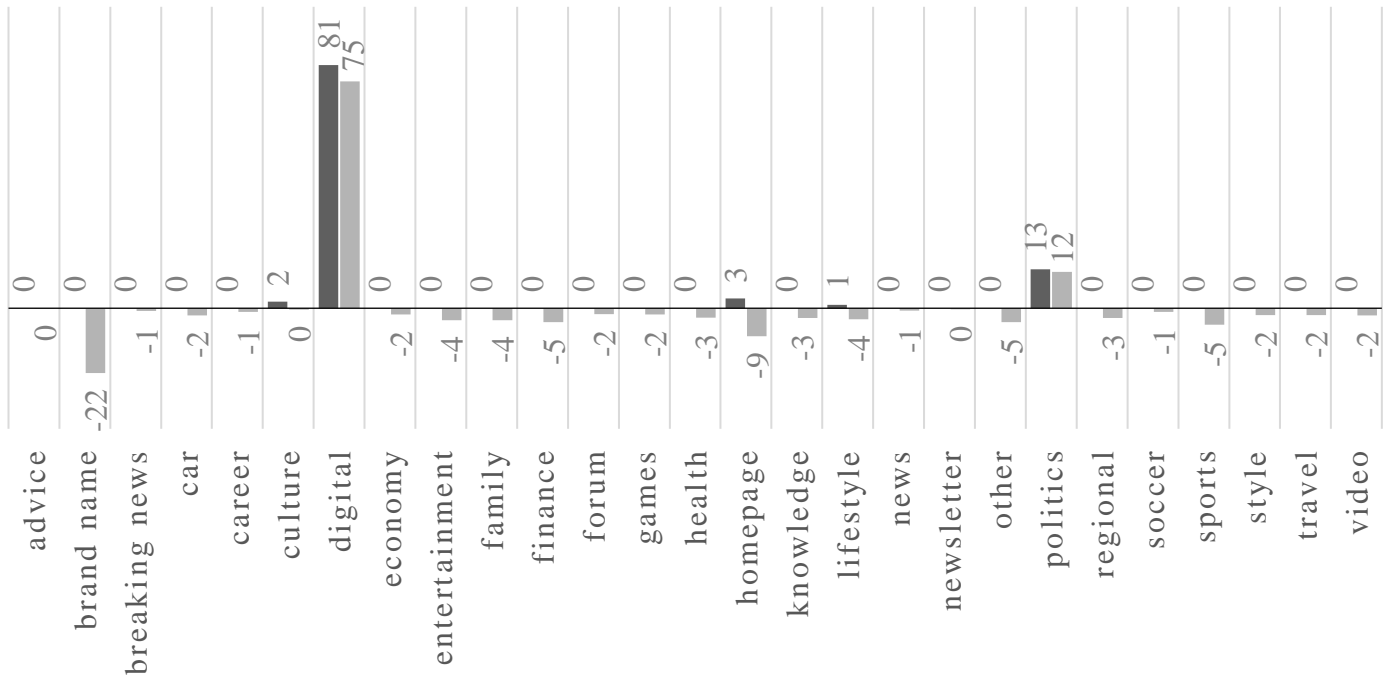
### 7.3.1 Thematic genre

After examining the distribution of supply and demand characteristics in the communities, it becomes clear that issue publics, i.e. thematically driven news reading publics, can most distinctly explain the clustering of audience duplication. Only five of the 27 content-genre categories occur in the yellow community: digital, politics, homepage, culture and lifestyle (see figure 3). Almost all online offerings assigned to the digital and politics genre – further called digital- and politics-offerings – are part of the yellow network community meaning they have an extremely high audience duplication. People using politics-offerings, over-proportionally seem to use digital-offerings too but not so much offerings with different thematical focus. In contrast, especially digital-offerings are almost absent in the blue community, only one offering is assigned to the blue network (see figure 4). Also politics-offerings are rare having a share of 0.5 percent in the blue community.

The high audience duplication of digital- and politics-offerings indicated by the yellow network community is surprising as from a market-centric perspective those are the genres that are most different and can be seen typically for online-born (digital genre) on the one side of the market and offline-originated (politics genre) on the other side (Kampes & Brentel, 2020). Thus, the clustering of digital- and politics-offerings into one network community seems best to be explained by interest – consequently the explanation of issue publics may differentiate the online public in Germany at least in case of audiences of digital- and politics-offerings, that are strongly overlapping. It could result from interest lead selection (selective exposure) or out of the need of information seeking (gratification).

*Figure 3: Distribution of content-genre in the yellow community of the media-projection showing the deviation (delta) to an expected distribution based on the overall distribution in the data*

**CONTENT-GENRE OF YELLOW COMMUNITY**

■ Proportion in yellow community (in %)　　■ Delta to expected distribution (%-points)

| | advice | brand name | breaking news | car | career | culture | digital | economy | entertainment | family | finance | forum | games | health | homepage | knowledge | lifestyle | news | newsletter | other | politics | regional | soccer | sports | style | travel | video |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Proportion | 0 | 0 | 0 | 0 | 0 | 2 | 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| Delta | 0 | -22 | -1 | -2 | -1 | 0 | 75 | -2 | -4 | -4 | -5 | -2 | -2 | -3 | -9 | -3 | -4 | -1 | 0 | -5 | 12 | -3 | -1 | -5 | -2 | -2 | -2 |

The news reading public indicated by the blue network community seems to be united by the use of online offerings assigned to the genre homepage (homepage-offerings) that make about 19 percent of the community's offerings lying five percentage points above the expected share assuming an equal distribution across all online offerings in the data (n = 1908). Further, offerings assigned to entertainment (+ 3 %-points), car, economy, lifestyle and knowledge (+ 2 %-points) are above the expected share; while offerings assigned to family, other, sports and entertainment also seem to be comparatively popular among users in this group of overlapping audience with a share between five and six percent meeting or being above the expected share (see figure 4). However, characteristic for the news reading public reflected by the blue community in the media-projection seem to be a thematically rather unspecific use of online media offerings oriented towards superficial, fairly broad information seeking indicated by the use of homepage-offerings and entertainment-offerings (see figure 4).

*Figure 4: Distribution of content-genre in the blue community of the media-projection showing the deviation (delta) to an expected distribution based on the overall distribution in the data*
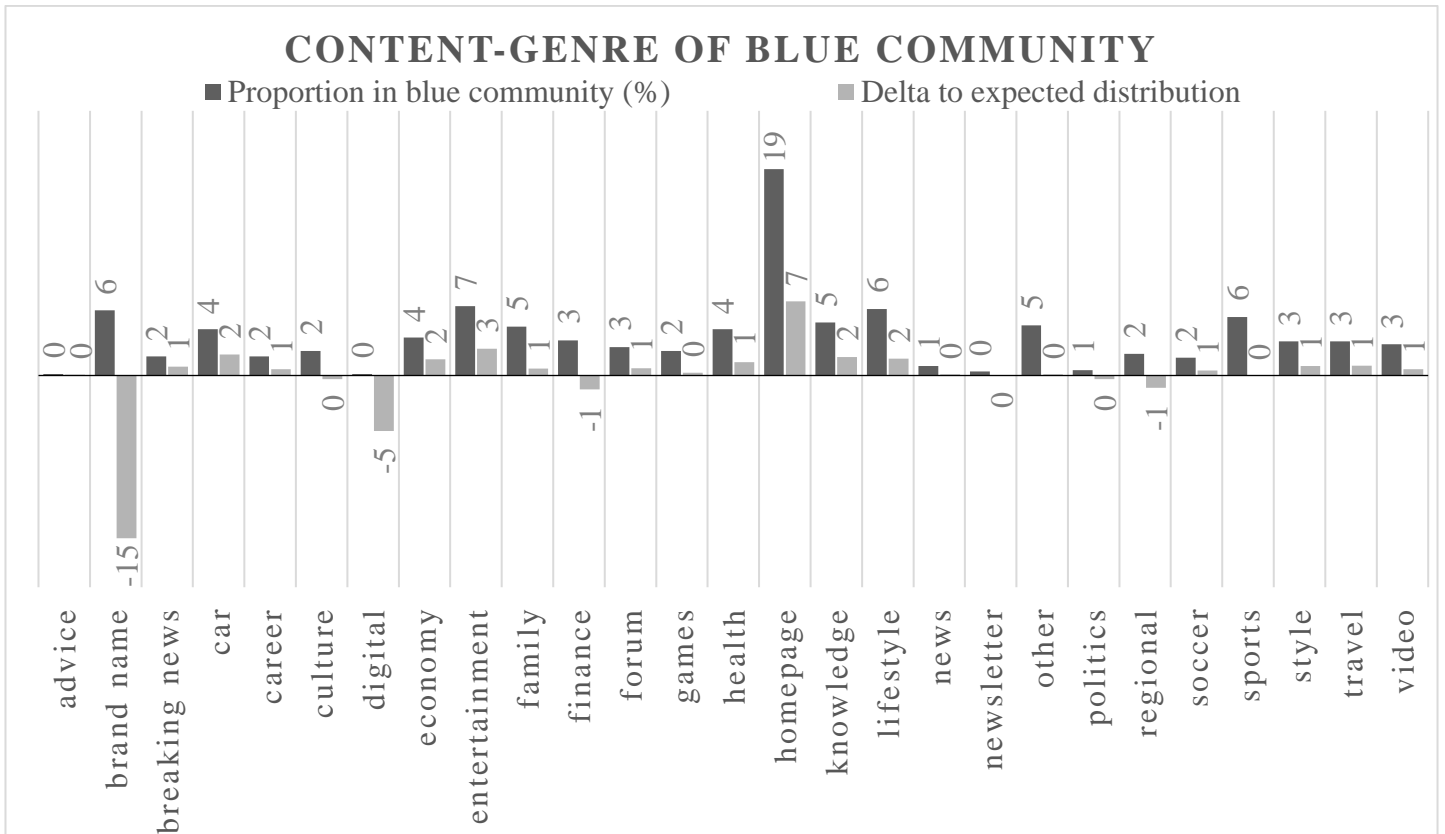
**CONTENT-GENRE OF BLUE COMMUNITY**

■ Proportion in blue community (%)     ■ Delta to expected distribution

Categories (left to right): advice, brand name, breaking news, car, career, culture, digital, economy, entertainment, family, finance, forum, games, health, homepage, knowledge, lifestyle, news, newsletter, other, politics, regional, soccer, sports, style, travel, video

This is in favour of an explanation based on the long-tail theory: It indicates a high overlapping use among niche offerings that are said to be rather among entertainment-oriented offerings (Kampes, 2020b) instead of an assumed fragmenting effect. Further it could be interpreted as an interest driven news consumption pattern where individuals unite various gratification needs that result in the use of different special-interest offerings. Or to say it with the words of Alexander Bruns (2019a, 49): "As a long history of media and cultural studies inquiry has made abundantly clear, we each have multiple identities, which we perform according to the social contexts we find ourselves in – and, especially in online and social media environments, those contexts are more and more often collapsing onto one another."

### 7.3.1 Socio-demographic metrics

Considering socio-demographic metrics of users, further, the gender seems to determine if users belong exclusively to the blue community (women are + 49 %-points above the expected share) or to the yellow community (men are +16%-points above the expected share). As displayed in figure 5, for users belonging to audiences of both network communities it is pretty balanced (+ 8%-points towards women).

*Figure 5: Distribution of gender among user groups showing the deviation (delta Δ) to an expected distribution based on the overall distribution in the data*

## GENDER

**■ male  ■ female**

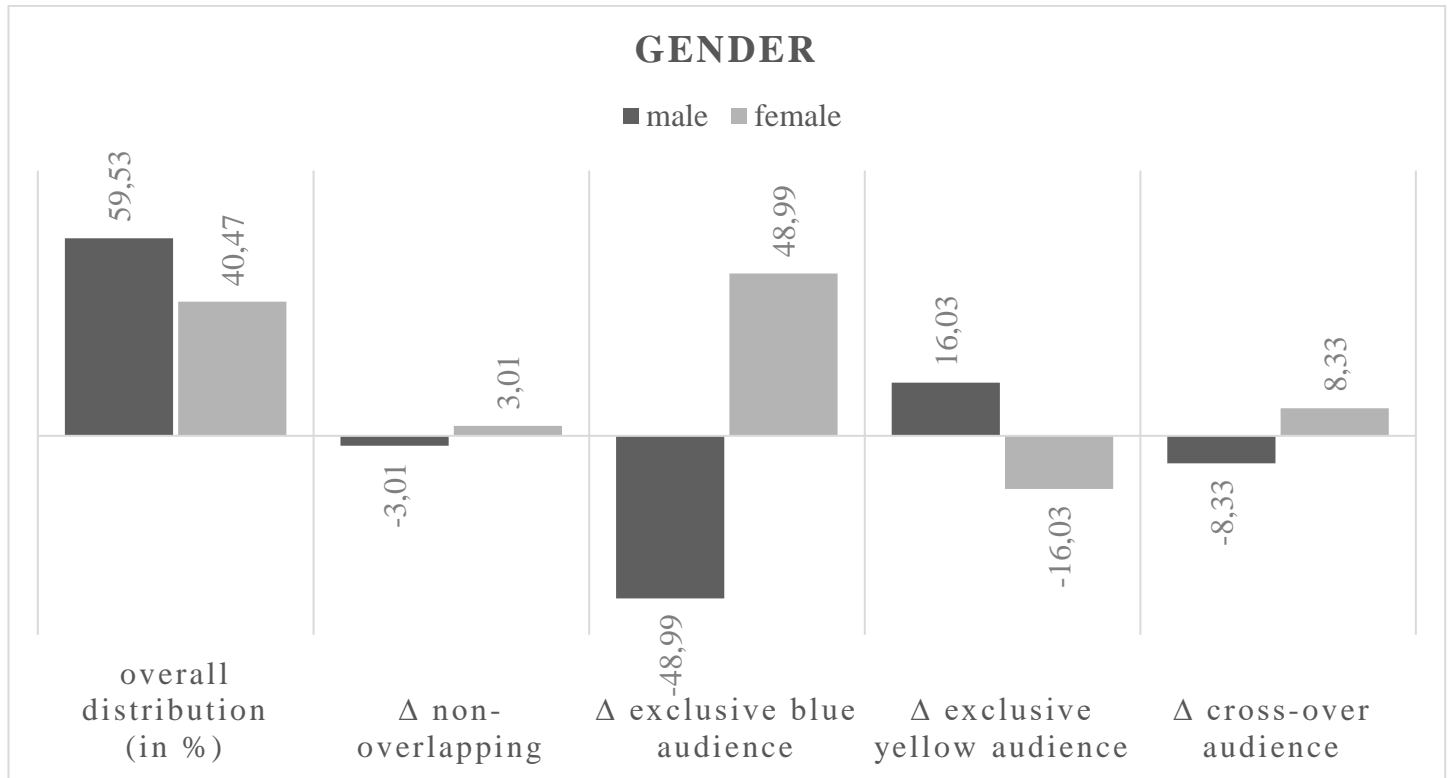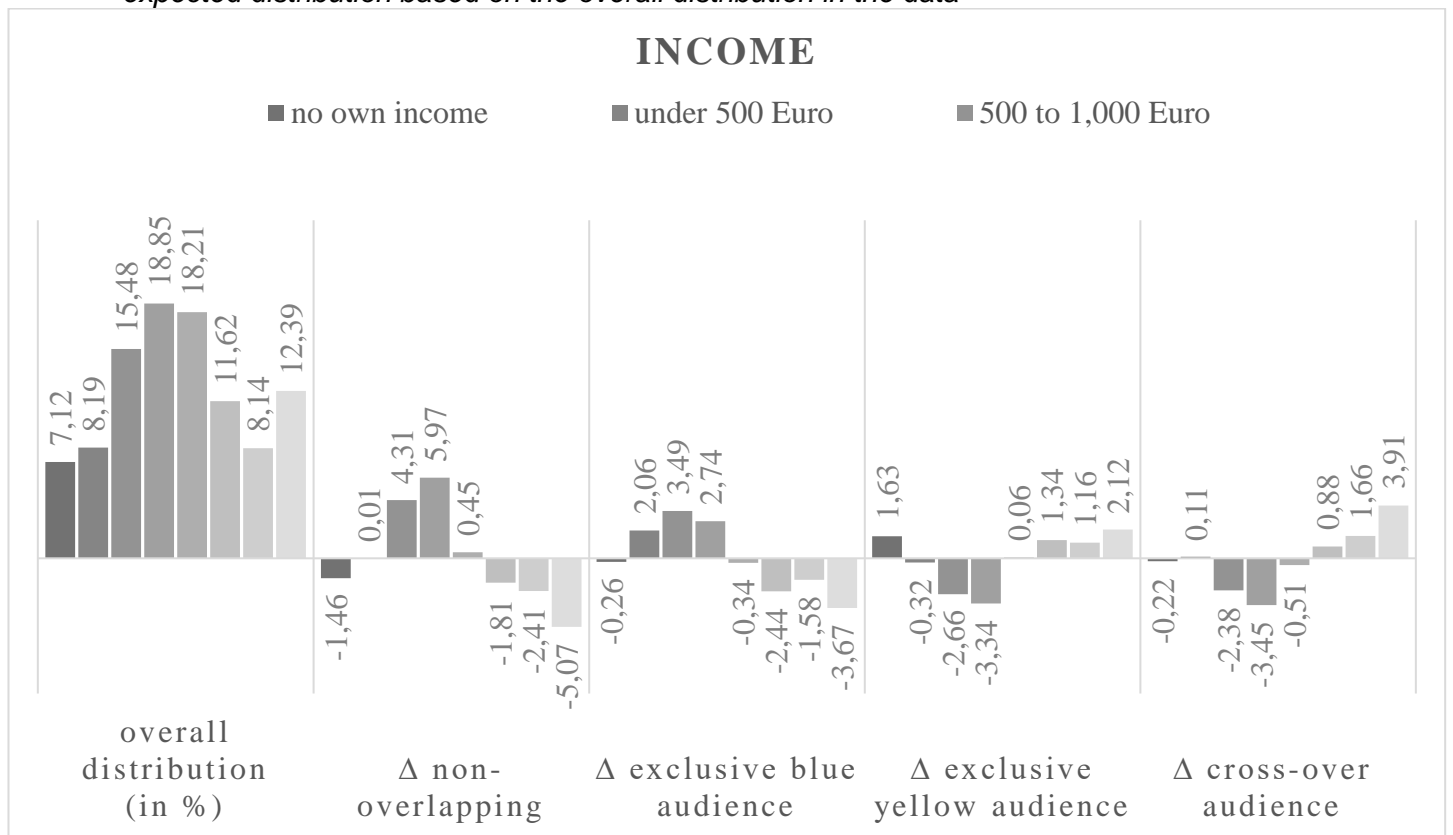| | male | female |
|---|---|---|
| overall distribution (in %) | 59,53 | 40,47 |
| Δ non-overlapping | -3,01 | 3,01 |
| Δ exclusive blue audience | -48,99 | 48,99 |
| Δ exclusive yellow audience | 16,03 | -16,03 |
| Δ cross-over audience | -8,33 | 8,33 |

Figure 6: Distribution of income among user groups showing the deviation (delta Δ) to an expected distribution based on the overall distribution in the data [8]

## INCOME

**■ no own income  ■ under 500 Euro  ■ 500 to 1,000 Euro**

| | no own income | under 500 Euro | 500 to 1,000 Euro |
|---|---|---|---|
| overall distribution (in %) | 7,12 / 8,19 / 15,48 | 18,85 / 18,21 / 11,62 | 8,14 / 12,39 |
| Δ non-overlapping | -1,46 / 0,01 / 4,31 | 5,97 / 0,45 / -1,81 | -2,41 / -5,07 |
| Δ exclusive blue audience | -0,26 / 2,06 / 3,49 | 2,74 / -0,34 / -2,44 | -1,58 / -3,67 |
| Δ exclusive yellow audience | 1,63 / -0,32 / -2,66 | -3,34 / 0,06 / 1,34 | 1,16 / 2,12 |
| Δ cross-over audience | -0,22 / 0,11 / -2,38 | -3,45 / -0,51 / 0,88 | 1,66 / 3,91 |

[8] Note that 6.9 percent didn't answer the question on their income and are not displayed in the graph.
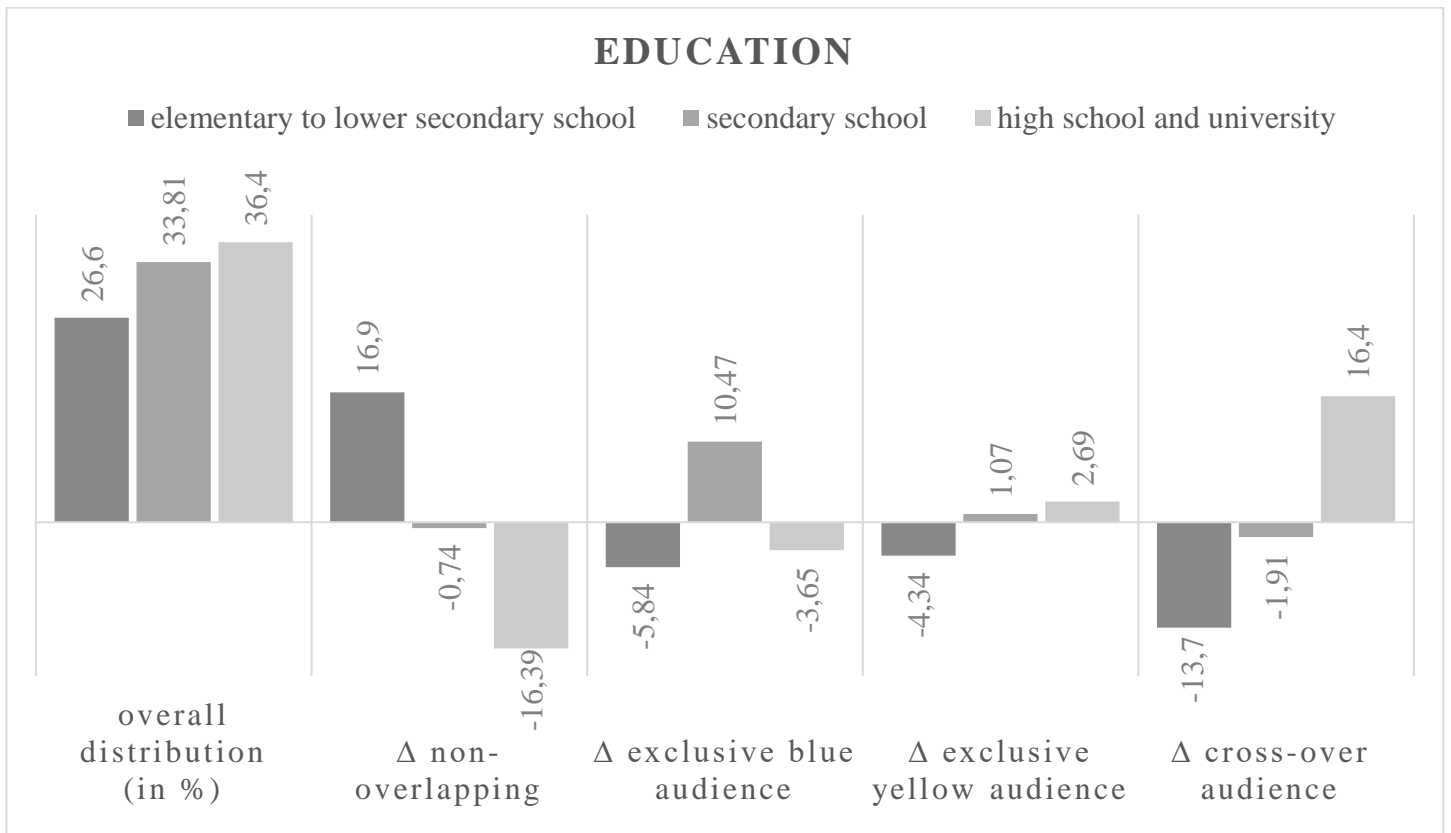
The age and educational level as well as in parts income (see figure 6) appear to impact the media use patterns and thus overlapping audience structures, too, particularly when it comes to whether media are used (with others) at all: elder people (55+) often are non-(overlapping) users, especially when they are older than 70 years (deviation of + 17 %-points) like figure 7 shows. Same applies to people with a low educational level (deviation of + 17 %-points), see figure 8.

*Figure 7: Distribution of age among user groups showing the deviation (delta Δ) to an expected distribution based on the overall distribution in the data*
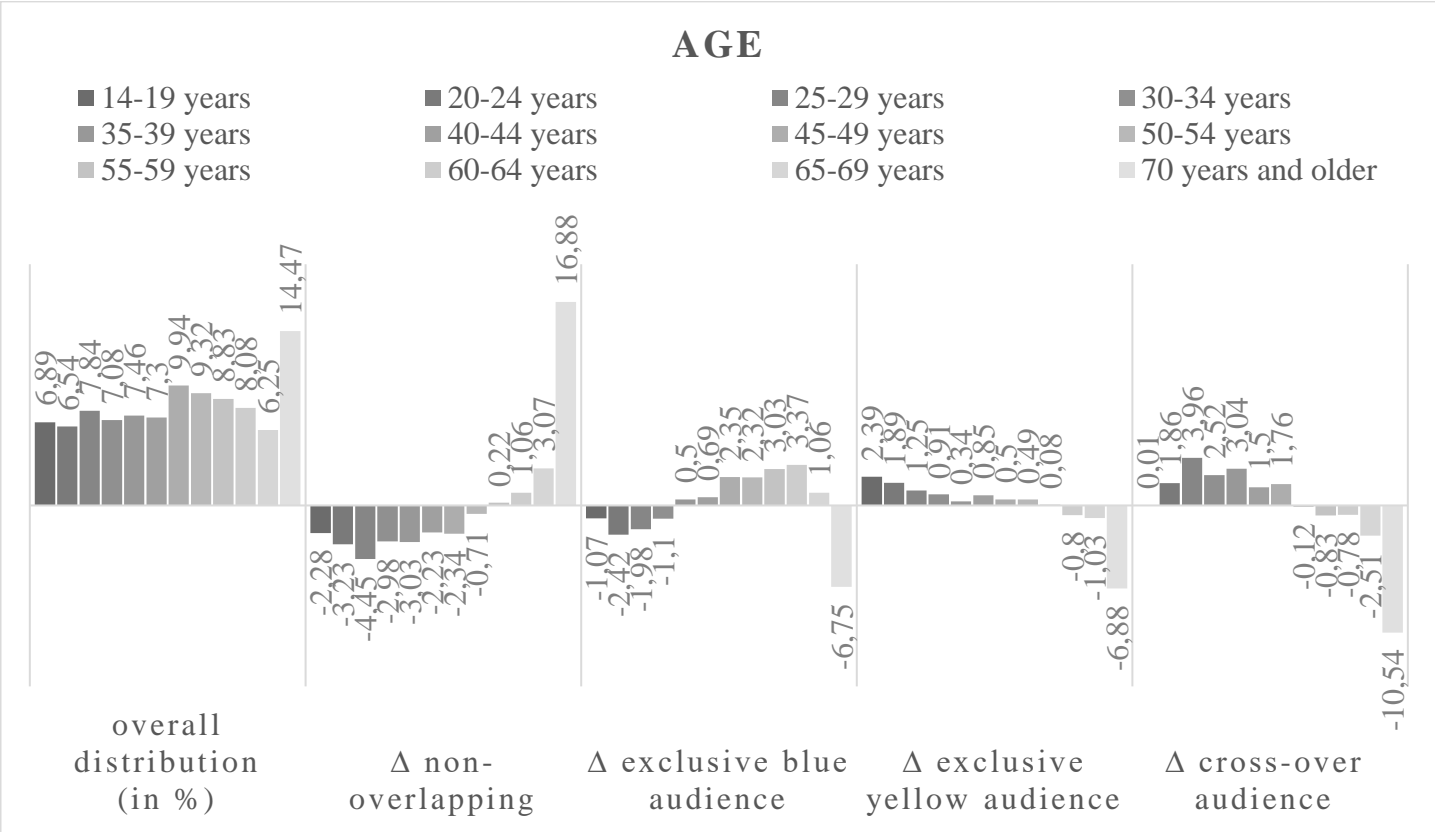


For the distribution of the exclusive communities, the picture is rather mixed, with a tendency for younger people towards the yellow community (14 to 54 years with a total deviation of + 9 %-points, that is decreasing with rising age) than towards the blue community where the 35-year olds to 69-year olds are represented above the expected shares (with a total deviation of + 13 %-points). Further, a tendency for the medium educated towards the blue community (with a deviation of + 11 %-points) can be observed. Users who belong to both communities (cross-over users) and correspondingly have overlaps with both distinct audience groupings, are mainly high educated people. However, the cross-over users do not contribute to a fragmented pattern, but rather increase the degree of audience duplication as they are audience to the online offerings of both identified communities.

*Figure 8: Distribution of education among user groups showing the deviation (delta Δ) to an expected distribution based on the overall distribution in the data*

**EDUCATION**

- elementary to lower secondary school
- secondary school
- high school and university

| | overall distribution (in %) | Δ non-overlapping | Δ exclusive blue audience | Δ exclusive yellow audience | Δ cross-over audience |
|---|---|---|---|---|---|
| elementary to lower secondary school | 26,6 | 16,9 | -5,84 | -4,34 | -13,7 |
| secondary school | 33,81 | -0,74 | 10,47 | 1,07 | -1,91 |
| high school and university | 36,4 | -16,39 | -3,65 | 2,69 | 16,4 |

The high divergence of men and women in exclusively using online offerings of one network community and thus detached news reading publics when ignoring cross-over users could be explained by different socialisation or to put it differently: a result of shared societal experiences forming different media consumption habits (see Peiser & Jandura, 2015) as well as different interest, e.g. men are said to use more political information and digital content than women (Witting, 2018, p. 469; Marth, 2019, p. 125) as they are supposed to have on average a higher political interest (Peiser & Jandura, 2015). The same applies to the differences in media use patterns, which find expression in the audience duplication structures of the network communities, among younger vs. older people. One possible explanation is that younger people have already grown up with the internet and thus may have acquired different media use habits than older people who were socialised without the internet; this is a promising explanation, especially when it comes to understanding the large proportion of non-users among the 70+ age group. Growing up in different media environments may also have led to different cultural proximities or social identities, which is a further explanation for the age gap in the communities of overlapping media use, the news reading publics of digital- and political-online offerings vs. those with a fairly unspecified and more entertainment-oriented focus. Nevertheless, the audience behaviour that emerges in the clustered communities and can be

interpreted as the two news reading publics observed in the German online sphere for 2016, seems rather to be explained by the theoretical considerations of issue publics; because the two identified communities are mainly marked by the different thematic orientation, which in particular seems to be shaped by the overlapping usage patterns of the audience of the yellow community. Even if differences in the socio-demographics of the respective users are recognisable, more complex connections, such as intersectionality, seem to be present here for the formation of overlapping usage patterns. Only in the case of the difference between users vs. non-users are there clear indications of a plausible explanation based on age.

## 8. Fragmented or overlapping patterns of online news consumption in Germany? – A summary

With the spread of internet and its technical possibilities of personalization as well as increasing differentiation of online offerings, the discussion about audience fragmentation rekindled. Due to the high number of available media offerings online with low entry barriers, audience fragmentation is seen as a logical consequence resulting from media consumption patterns that "become more widely distributed" (Webster & Ksiazek, 2012, p. 1). Resulting informational silos are feared by scholars (e.g. Sunstein, 2007), undermining a media-mediated common ground of shared knowledge, believes and values sufficient for democracy (Stark, 2013; Habermas, 1989; Williams & Delli Carpini, 2011). However, this study, too, cannot find empirical evidence for these fears, as was the case with previous studies. Although this study had a much greater level of granularity in the data due to behavioural trace-data and thus analysis to better measure and identify audience fragmentation (Ormen, 2018, p. 5), which according to the fragmentation thesis is occurring along the increasingly thematically differentiated online media (Stark, 2013, pp. 199f.), a large overlap in the audiences was again identified. Instead of "the information cocoon fragmenting our society and democracy that Sunstein, Pariser, and even Obama warned of (…) communities of interest that accumulate around shared topics and identities, but do not detach altogether from the world beyond" (Bruns, 2019a, p. 49) have been identified for the patterns of media consumption among German, commercially-driven online offerings for the year of 2016.

Using social network analysis, audience duplication between media offerings was made visible on the basis of individual usage patterns and groupings of overlapping media usage were identified by community detection. Given the duality of audience fragmentation of supply- and demand-side an audience-centric perspective was applied to investigate the composition of the identified network communities. The framework of news reading publics has proven useful, especially the explanatory approach of issue publics, where overlapping use is characterised by interest-driven use and is formed along certain thematic areas. hence two news reading publics were identified: One is characterised by a strong audience duplication of digital- and

politics-offerings. while the other comprises rather entertainment-oriented media and more superficial information offerings, like homepage-subpages, and is thematically less specific characterized.

The granularity of the data and the new methodological approach to assess media projection networks for overlapping usage allows for a more accurate description of the identified network communities than before; investigating audience duplication and fragmentation more detailed. Now it is easier to identify the user groups that form these audience duplication communities. For example, it became apparent that about six percent of the users exclusively use the media offerings of the blue network, although this comprises significantly (over eight times more) more online offerings than the yellow network community which is used by almost 51 percent. One could say, these two user groups detached in their media consumption. However, 43 percent of users, the cross-over user group, are consuming offerings from both network communities. This massively increases audience duplication and makes a total fragmentation of the blue and yellow network communities representing the two identified news reading publics unlikely. Nevertheless, within the blue network community, there is a greater potential for further fragmentation, as many online offerings are included, but a much smaller proportion of users are using them (the cross-over users also have a higher proportion in the yellow cluster). The users of the yellow cluster, on the other hand, have more potential to split off from other audience groups, as they have a much narrower scope of topics that they use online. However, as these are general interest media, policy-specific information, this is less of a concern. In total, it seems as if the concentration of overlapping audiences for media offerings of the yellow network is highest, concluding it can be interpreted as the core of the online public sphere regarding to McQuails' model of audience formation (1997, p. 138; 2010, pp. 444f.). Due to the high number of media offerings in the blue network community, characterized as thematically fairly disperse and less users, especially in relation to that of yellow media offerings, it can be argued to be the periphery of the online sphere.

Nevertheless, this is a first explanatory study on online news consumption patterns in Germany with this granularity and more research is needed to draw sound conclusions about audience fragmentation online in Germany. Particularly, because a new methodological approach was used to measure overlaps in media use as well as an innovative theoretical framework just recently suggested by Mukerjee (2021a). Further limitation lies in the data that misses information on public service media and social media, thus it offers a clear delimited section of digital media available. Moreover, audience fragmentation is subject to processuality, here a snapshot of 2016 is given and further analysis on more recent years needed. As well as more detailed analysis of news consumption patterns using the option of filtering for strong vs. weak ties in the network and conduct more community detection or other methods to examine the user groups more, e.g. zooming on the level of their individual media repertoires, considering

intersectionality to research segmenting effects or cross media consumption. Continuing studies considering other levels of fragmentation, like the reception of consumed content, are inevitable, because "[i]n a hyperconnected yet deeply polarised world, the most important filter remains in our heads, not in our networks: it is the cognitive filter that makes us reject some ideas out of hand" (Bruns, 2019a, p. 61). This means people can consume the same media offerings, but interpret and use it differently; mainstream media can also be used to monitor them and "attach new disinformation" towards them (Bruns, 2019a, p. 49).

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