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Exposure diversity as a design principle for recommender systems

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ABSTRACT

Personalized recommendations in search engines, social media and also in more traditional media increasingly raise concerns over potentially negative consequences for diversity and the quality of public discourse. The algorithmic filtering and adaption of online content to personal preferences and interests is often associated with a decrease in the diversity of information to which users are exposed. Notwithstanding the question of whether these claims are correct or not, this article discusses whether and how recommendations can also be designed to stimulate more diverse exposure to information and to break potential 'filter bubbles' rather than create them. Combining insights from democratic theory, computer science and law, the article makes suggestions for design principles and explores the potential and possible limits of 'diversity sensitive design'.

Introduction

Recommendation systems increasingly influence our information choices: the information that is ultimately being presented to us has been filtered through the lens of our personal preferences, our previous choices and the preferences of our friends. There are also commercial and strategic decisions behind the algorithms that determine which information we will see, which information is prioritized and which information is excluded (Bozdag, 2013; Foster, 2012; Schulz, Dreyer, & Hagemeier, 2012; Webster, 2010). Search engines and social networks, in particular, increasingly rely on recommender systems, which are a class of information filtering systems that study patterns of user behaviour to determine what someone will prefer from among a collection of 'information'. By doing so, recommender systems essentially personalize the list of content that is offered to a user. With the emerging trends of higher interactivity and user orientation, the use of recommender systems is not limited to search engines and social networks, as media organizations are also increasingly incorporating recommenders into their own services.

The impact of personalized recommendations on the realization of media and information diversity is currently a central question in both academic and public policy debates.

As one of the central communication policy goals, diversity refers to the idea that in a democratic society informed citizens collect information about the world from a diverse mix of sources with different viewpoints so that they can make balanced and well-considered decisions.

The potential negative effects have been noted, for example, by the EU High Level Group on Media Freedom and Pluralism (2013, p. 27): 'Increasing filtering mechanisms makes it more likely for people to only get news on subjects they are interested in, and with the perspective they identify with. Such developments undoubtedly have a potentially negative impact on democracy'. This warning mirrors the debates on 'filter bubbles' (Pariser, 2011), 'echo chambers', 'information cocoons' (Sunstein, 2007) and other concerns in the academic and public debates over the fragmentation of public discourse. Others, however, have argued that these fears are often not backed by evidence, and that recommendation functions can actually have a positive effect on users' information exposure (e.g., Helberger, 2015; Nguyen, Hui, Harper, Terveen, & Konstan, 2014): they help users to navigate the digital information maze, separate the wheat from the chaff and find the truly relevant information (Foster, 2012; McNee, 2006; Neuberger & Lobgis, 2010; Stark, 2009; Webster, 2010).

Regardless of whether these assumptions are correct, filtering and recommender systems are not all the same and their impact is not inevitable or beyond human control. In fact, recommendation and algorithmic profiling can, at least in principle, also be designed to complement a personal media diet, or expose viewers to opposing viewpoints, and thus not only give users the information that they have been looking for, consider relevant to them or are most likely to read (Nguyen et al., 2014; Stark, 2009). In addition to offering media users more value and richer choice, 'diversity-sensitive design' might, consequently, also provide an interesting public policy means to overcome concerns about filter bubbles and information cocoons (Helberger, 2011; Munson, Zhou, & Resnick, 2009). With many media regulators currently considering how to deal with the potential negative effects of information filtering on the realization of public information policy objectives (Dutch Ministry of Economic Affairs, 2014; European Commission, 2013; Ofcom, 2012), it is tempting to see diversity-sensitive design as part of a possible solution.

Initiatives to design for more diverse exposure, however, face a number of unresolved questions. Firstly, what actually constitutes 'diverse exposure', and how can such an abstract value be captured in concrete design principles that are instructive for programmers of recommendation systems? As we discuss below, there is no commonly accepted definition of exposure diversity or the possible policy objectives behind it, even in academic literature. Secondly, there are ethical questions involved, most prominently regarding the compatibility of personalized diversity nudges with the autonomy of users. Finally, there are also more practical considerations, such as the question of the incentives for information services to recognize the value of content that is in the first place diverse and, ideally, conducive to democratic values and goals, rather than merely giving users the information they apparently want.

In this article, we first show how different conceptions of the role of media and information in democracy lead to different criteria for assessing exposure diversity, which in turn implies different design principles for recommendation systems. Based on these principles, we will then analyse the design of existing recommender systems, and the question to what extent normative conceptions of diversity are already playing direct or indirect

(as a side product) roles in recommender design. We will also investigate the potential role of regulation in developing incentives to create diverse recommendation services. Finally, the article will offer some reflections on the ethical questions involved, and, in particular, on where to draw the dividing line between nudging users to consume more diverse information and unethical manipulation.

What is exposure diversity?

Any initiative to promote more diverse exposure to information will first have to deal with the question of what 'diverse exposure' actually is. In debates on media diversity, exposure diversity is used to refer to the content that the audience actually selects, as opposed to all the content that is available (McQuail, 1992). In addition to this descriptive definition, however, there are more normative questions regarding what choices users would need to make in order to choose 'diverse' content and what conditions influence these choices.

From the normative and policy perspectives, discussions around media diversity have tended to focus primarily on the supply side (the aspects of source and content diversity) and questions of what would characterize a diverse market structure or diverse content offers (Helberger, 2012; Napoli, 1999; Valcke, 2011). Despite decades of debate on diversity as a policy objective, however, there is no consensus on a generally accepted, consistent definition of what constitutes 'diversity' or 'pluralism', even at the level of supply (Karppinen, 2013; Napoli, 1999; Neuberger & Lobgis, 2010; Valcke, 2004). Furthermore, the matter of media consumption has often not been considered in these debates.

In recent years, however, scholars and some policy-makers have started to acknowledge the importance of the user dimension of media diversity. A study on indicators to identify risks to media pluralism, funded by the European Commission, for example, defined media diversity not only in terms of the diversity of supply and distribution but also of use – although without specifying what the diverse use of information actually entails or how diverse such use would need to be in order to be considered sufficiently diverse (ICRI et al., 2009). Similarly, the British Ofcom's (2012) report on measuring media plurality noted than an ideal plural outcome entails that 'consumers actively multisource – such that the large majority of individuals consume a range of different news sources'. However, these definitions provide little guidance on the actual criteria or principles on which to base the design of diversity-sensitive recommendation services.

In this article, we argue that generating more concrete benchmarks to identify (or measure) desirable levels and forms of diverse exposure is ultimately a normative question. Assuming that diversity is not a goal in itself but a means to an end (Karppinen, 2013; Ofcom, 2012), the development of design principles would have to begin with the actual functions or objectives that diverse exposure is supposed to serve (Helberger, 2011).

The value of exposure to diverse content can be defended from a variety of perspectives, ranging from economic innovation, personal fulfilment and the development of cultural tastes to the promotion of tolerance and intercultural understanding. Most commonly, however, concerns about filter bubbles, echo chambers and the narrowing patterns of media use are at least implicitly linked to concerns about democracy and the quality of public discourse. Different conceptions of democracy, however, imply different criteria for assessing exposure diversity (see Karppinen, 2013). Given the variety of these

understandings, there is, consequently, more than one way in which software design can attempt to promote 'diverse exposure', depending on different benchmarks and criteria.

For the purposes of assessing the democratic goals that diverse exposure should serve, we roughly outline three different frameworks of thinking about exposure diversity as a societal goal. These frameworks are not mutually exclusive, nor do they provide a comprehensive overview of all possible normative positions. Instead, they serve to highlight the range of possibilities, benchmarks and criteria that different experiments and attempts to promote diverse exposure by means of software design can choose between.

Individual autonomy perspective

Firstly, exposure diversity can be defended from the perspective of the traditional liberal ideals of individual autonomy and consumer choice. From the liberal-individualist perspective, diverse exposure can be valued simply because it extends individual choice and affords individuals more opportunities to realize their interests. The democratic subject in this framework is thus understood to be a self-seeking, utility maximizing individual who ultimately knows his/her interests (Dahlberg, 2011, p. 858). In many ways, the liberal-individualist framework is the current dominant perspective on information use. The idea of providing more choice and making services more responsive to users' wishes is not a contested idea, and it is also what many recommendation systems already do. Nevertheless, the interests of service providers and users are not always the same – algorithmic filtering is influenced by many other interests, including advertisers', so providers do not always register the 'real interests' or choices of consumers (e.g., Bucher, 2016).

From the liberal-individualist perspective, 'filter bubbles' and other mechanisms that narrow consumers' exposure to diverse views can be regarded as a form of market failure that constricts individual autonomy and prevents people from accessing what they actually want. Consequently, designing for diverse exposure should aim to correct such market failures, promote consumer awareness of different options and thus extend choice. The level of attraction to different ideas depends on the personal taste and psychological attributes of each consumer (e.g., Garrett & Stround, 2014). The preferred level of exposure diversity is therefore likely to vary between people. Even if algorithmic power is at least partly the result of people's own autonomous choices, there are likely to be consumers who would actually prefer a more diverse fare than what current algorithms recommend.

The possible benchmarks and criteria used to identify the desirable level and form of exposure diversity would thus include aspects such as user satisfaction and awareness of options and choices. These can be achieved, for example, by modifying the way in which recommendations are presented to the user, by clearly stating additional options which may produce a different recommendation list or by giving users the opportunity to interactively navigate through connected lists of recommendations or change the settings in recommender systems. Possible metrics for these would include, for example, measuring the session length, the navigation behaviour on the website (what links are clicked and how often), the number of 'likes' or 'sharing' of the webpages visited on social media, but also the extent to which users make use of the opportunity to adapt recommendations to their own personal preferences.

The deliberative perspective

Secondly, exposure to diverse information is commonly justified from the perspective of inclusive public debate. While liberal-individualist ideas seem widely shared in the practical world, for many researchers, mere consumer choice is not sufficient, or not the only goal that diverse exposure should serve (Karppinen, 2013). Instead, much of the academic discussion on media diversity has been grounded in various versions of deliberative democracy, which usually draw on Habermas's (2006) notion of the public sphere. From the deliberative perspective, the role of diverse exposure is not only to satisfy individual consumers but to promote rational public debate and the formation of a reasoned public opinion. In other words, exposure to diverse viewpoints is seen to facilitate a more reciprocal and inclusive exchange of ideas and dialogue between different viewpoints and arguments in public debates. This can take place, for example, by making the range of opinions on a given topic visible or by bringing different viewpoints into contact with each other through system design.

From the deliberative perspective, exposure to diverse viewpoints is considered valuable because it helps citizens develop more informed opinions and less polarized, more tolerant attitudes towards those with whom they disagree (Garrett & Stroud, 2014). This, in turn, is seen as a precondition for allowing people from different political orientations to build mutual understanding and make compromises. Possible benchmarks and criteria to assess exposure diversity from the deliberative perspective include the reciprocity and inclusiveness of public discourse – meaning that debates should be open to all and participants should be willing to exchange ideas and viewpoints, and even change their opinion when faced with new arguments or evidence. While these ideals are more difficult to measure than mere consumer satisfaction, it is conceivable to design metrics that would focus, for example, on user engagement with opposing political views, cross-ideological references in public debates or social media connections between people who represent different ideological positions.

The adversarial perspective

Thirdly, exposure diversity can also be justified from the perspective of more radical agonistic or adversarial conceptions of democracy. The deliberative model of democracy has been criticized over the years by many political theorists for over-emphasizing social unity and rational consensus. In contrast, radical-pluralist or agonistic theories of democracy tend to emphasize the value of dissent and contestation for democracy (e.g., Mouffe, 2013; Wenman, 2013). From the perspective of radical democracy, exposure to diverse viewpoints is thus not seen as a way to facilitate consensus but, on the contrary, as a way to introduce new forms of critique, dissent and contestation into public debates (Karppinen, 2013).

Exposure diversity can be seen as a corrective to the tendency of public debates to be dominated by existing elites and powerful interests. This is achieved particularly by contesting the boundaries of mainstream public debate and promoting exposure to critical voices and disadvantaged views that otherwise might be silenced in the public debate (see e.g., Young, 2000). The underlying goal behind exposure diversity from this perspective would therefore be to challenge existing beliefs and truths and provide space for ideas

that challenge users' horizons. From the perspective of software design, this third conception would require foregoing the ideal of neutrality and balance. As DiSalvo (2012) argues, 'adversarial design' must thus be political, and even purposefully biased, to provoke, expose and challenge the current hegemony. The potential benchmarks to assess exposure diversity from the agonistic perspective would thus include the visibility of minority voices and controversial viewpoints, and ultimately also political change and increased political participation.

Exposure diversity through software design

On the basis of these normative approaches to exposure diversity, we now turn to a discussion of how information and software design might reflect these perspectives in practice. This section analyses how diversity has been incorporated into recommender systems and to what extent the design and implementation of current recommender systems reflect the normative aspects discussed above. This section also investigates the circumstances in which a diversity-sensitive design might be desirable – and perhaps even profitable – to media companies.

Traditionally, recommender system design has favoured the approach of presenting content that is expected to match the themes and objects of interest to each user. However, more recent studies (Zhang & Hurley, 2008; Zhou et al., 2010) have observed that this type of approach might lead to a situation where the recommendations offered are 'monothematic' and repetitive and therefore end up being boring to the user. As a way to mitigate this effect and enhance user satisfaction, recent approaches to recommender systems have started investigating and incorporating diversity into their design (Lathia, Hailes, Capra, & Amatriain, 2010; Ozturk & Han, 2014; Vargas & Castells, 2011).

Thus, catering for diversity in the software design of recommenders is often based on reasons and needs that differ from those behind the abstract normative designs proposed in the previous section. Companies would typically want to incorporate diversity into recommendations simply to engage the user and to improve their profits, rather than to promote democratic debate. Recommender systems may also have unintended consequences from the perspective of broader societal objectives. Without claiming that we can tap into the minds of designers and reconstruct their intentions, the normative frameworks discussed here provide a critical lens for not only assessing existing systems, but also imagining services which do not yet exist, and which might have public interest value, even if commercial companies have no incentive to design them.

Based on the above observations, it is not surprising that the support of personal autonomy and choice is perhaps the most common feature of current recommender systems. In fact, as many studies have observed (Ekstrand, Kluver, Harper, & Konstan, 2015; Harper et al., 2015; Komiak, Wang, & Benbasat, 2005), users wish to be in control of the content that they consume and might therefore prefer systems/services that clearly offer them this freedom over those that do not. In real-world recommender systems, personal autonomy is generally achieved by combining different types of recommender algorithms. This design, known as the 'hybrid recommender', is the de facto standard in recommender systems and is used by both Facebook and Google, among others (Facebook, 2016; Liu, Dolan, & Rønby Pedersen, 2010).

As an example, let us consider a hybrid recommender that implements the following three popular algorithms: (1) one that recommends content similar to the content the user has consumed in the past (this algorithm is often known as a 'content based recommender'), (2) one that recommends content that users who are similar to the target user have consumed (known in the literature as 'collaborative filtering') and (3) one that recommends the latest content. When a user visits a certain page that contains recommendations, a list with items selected from each of these algorithms is presented to them. Taking into account the item that the user chooses to consume next, a new list containing a different combination of items calculated by the three algorithms mentioned above is subsequently presented to the user. Thus, consuming a particular recommendation often gives recommender systems a good idea of 'which direction a user wants to go next' in their quest for content. A recent study on a movie recommender has shown that users who consume recommendations are more likely to be offered more diverse content in the future than users who have not consumed recommendations (Nguyen et al., 2014).

The above-mentioned techniques enable a certain level of diversity in the recommendations offered to the users, although the algorithms are not necessarily designed to specifically enhance diversity. Recently, there have been proposals in the research community for recommender systems that more explicitly address diversity (Christoffel, Paudel, Newell, & Bernstein, 2015; Vargas & Castells, 2011; Zhou et al., 2010). These include software designs that allow users to 'tune' the level of personalization of the recommender system they are using to further boost personal autonomy (Harper et al., 2015; Kamba, Bharat, & Albers, 1995). According to these studies, users generally prefer to be able to tune the recommendations they receive (Harper et al., 2015). It can be argued to some extent that offering consumers more choice and increased awareness of options is already built into many existing recommendation systems. However, the more sophisticated software designs that specifically aim to give users more control are primarily discussed in the research literature rather than being found in existing recommender systems.

Compared to individual autonomy and choice, the aspect of purposefully catering for different viewpoints in recommender system design has thus far received less attention in practice. However, the themes of balancing different viewpoints and advancing dialogue are not completely absent from research efforts. Kamishima, Akaho, and Asoh (2012), for example, propose a software design for a recommender system that produces recommendations that are 'neutral' towards a specific viewpoint specified by the user. For example, if a user wants to obtain recommendations on articles talking about 'Obama' and has specified neutrality towards 'political affiliation', they might receive news from both Democrat and Republican sources.

Sheth, Bell, Arora, and Kaiser (2011) also addressed social diversity, suggesting that the list of recommendations could include content that is popular among specific social groups identified by socio-demographic parameters (e.g., people within an age range or living in a certain place). By doing so, users would be exposed to different viewpoints than they would normally be, based on their own social group. Finally, it is worth noting the Balance project (www.balancestudy.org), in which researchers have explicitly investigated the issue of a balanced diet of political viewpoints for news readers. This project primarily focuses on the user interface to encourage users to consume more diverse content, which includes the use of a widget that monitors and reports to users how 'politically balanced' their news reading is.

However, beyond experimental or research purposes, we are not aware of real-world implementations of recommender systems that explicitly follow the above design. Furthermore, it is not clear what the incentives would be for designing such recommenders, and how they would be able, for example, to retain user interest for the website (Sheth et al., 2011). Therefore, more research seems to be needed to assess the viability of this design principle in practice.

While there are some experiments that seem to reflect the deliberative conception of exposure diversity, examples of the 'agonistic' ideal of promoting the visibility of minority and controversial viewpoints in recommender system design are even more difficult to find. One way in which this design principle might be implemented in a recommender is by means of algorithms that attempt to unlock the long tail, that is, suggest content that is globally less popular among users. Adomavicius and Kwon (2009), for example, have shown that it is possible to recommend content from the long tail while still maintaining a good user experience. We note that this strategy, which was originally proposed with the goal of selling less popular content, also lends itself to implementing the principle of promoting the visibility of minority and controversial viewpoints, under the assumption that these are indeed located in the long tail of content popularity. Adomavicius and Kwon (2009) mention Netflix as a possible example, but the argument can be made for all media services that manage a large library of content, including the websites of news media and the archives of the public service media.

Thus, although this design principle is implicitly followed in commercial recommenders, it is not yet fully understood how well unlocking the long tail will work in practice in the case of news recommendations. All in all, for the time being, most designers of recommender systems seem to assume that giving users more or less exactly what they want is the more preferable and economically viable option, and although diversity-sensitive design has attracted the interest of some designers of recommendation systems more recently, it has been primarily informed by considerations of individual user satisfaction, rather than societal ideals. Beyond experiments within the research community, more normative conceptions of diverse exposure are still difficult to find in practice.

Regarding the question of whether the normative conceptions of exposure diversity can and should find their way more prominently into the practical design of recommender systems, much depends on the concrete purpose of the service. In the case of search engines such as Google, which users employ to actively search for answers, there may be a trade-off between accuracy and diversity (Adomavicius & Kwon, 2011). Having said this, more diverse recommendations do not always have to result in a loss of accuracy (see Adomavicius & Kwon, 2011; Zhang & Hurley, 2008). In part, consumer satisfaction with more diverse recommendations also depends on the way diverse information is presented (Ge, Gedikli, & Jannach, 2011).

An openness to more normative conceptions of diversity could be greater in services that are used for discovering content ('discovery services'), such as news websites, but also social networks. In this context, users less often approach the service with clearly predefined ideas of what types of content they are interested in and are more open to diverse discoveries. In a recent representative study in the Netherlands,[1] for example, it was demonstrated that although a part of the population could see the merits of more personalization in the news media, the majority also attached value to being more broadly informed. Interestingly, users extended this expectation to both public service media

and online news media, and less so to commercial broadcasting media and social media. In other words, in discovery services, such as news media and social media, providing diverse choices (instead of merely personalized ones) could be considered an element of quality; a route to intensified engagement with the user and even a selling point. In a similar sense, Zhang and Hurley (2008) and Lathia et al. (2010) have argued that the lack of variation can also have a frustrating effect on users, while Schönbach (2007) argued that people actually buy news media because they are interested in what he calls 'reliable surprises'.

Of course, much will also depend on the question of which conceptualization of diversity we are talking about. As discussed above, some conceptualizations of diversity are more likely than others to be found in recommender design, and even then, diverse design will typically be driven by motives other than complying with public policy objectives or normative ideals.

In summary, the liberal conceptualization of exposure diversity, with its emphasis on individual users' preferences, may actually help explain (also with respect to commercially operating parties) why users may be more satisfied with services that offer them some diversity of choice. The deliberative conception of media diversity, in contrast, is closely linked to the democratic role of the media and their mission to inform. As explained above, users seem to actually expect a certain degree of deliberative diversity, especially from the news media. However, the prospect of a market-driven realization of the more adversarial conceptualization of media diversity is less likely, not only because of its critical nature but also because of the trade-off between accuracy and diversity, and its deviation from users' primary preferences. The democratic rationale behind the radical conception of exposure diversity is to make users aware of other, usually less popular, marginalized voices, and to challenge establish beliefs and broadly accepted ideas. In some ways, this is reflected in the mission of the public service media (Grummell, 2009) and other non-profit, alternative or community media. The Council of Europe, for example, explicitly calls for public service media to 'play an active role in promoting social cohesion and integrating all communities, social groups and generations, including minority groups, young people, the elderly, underprivileged and disadvantaged social categories, disabled persons, etc., while respecting their different identities and needs' (Council of Europe, 2007, para. 32). The task of the public service media in realizing the more ambitious aspects of exposure diversity thus leads us to the possible role of public policy and regulation in stimulating the diversity-sensitive design of recommender systems.

Diversity through design and regulation

According to the European Court of Human Rights, the '[g]enuine effective exercise of freedom of expression does not depend merely on the state's duty not to interfere, but may require positive measures of protection … even in the sphere of relations between individuals' (European Court of Human Rights, 2000). Arguably, under conditions of information abundance and attention scarcity, the modern challenges to the realization of media diversity as a policy goal lie less and less in guaranteeing a diversity of supply, and more in the quest to create the conditions under which users can actually find and choose between diverse content (Burri, 2016; Helberger, 2012; Korthals, 2013, p. 35). Clearly, any such initiatives would need to be careful to not interfere with users' privacy and personal autonomy (Council of Europe, 2007; Napoli, 1999; Valcke, 2004). In

addition, autonomy in the context of media diversity is not only about being able to make choices, but also about the effects of those choices on other speakers and listeners (Napoli & Sybblis, 2007).

However, regulation to promote diversity by design is not entirely unprecedented in Europe. One relevant example is the regulation of the 'Electronic Programme Guide' (EPG), essentially a recommender for the broadcasting sector. According to the European Access Directive, Member States can impose 'obligations in relation to the presentational aspects of electronic programme guides and similar listing and navigation facilities'. Media pluralism and giving due prominence to programmes that are especially devoted to the promotion of media pluralism, such as the public service media, is an important consideration behind this provision (see Recital 10 of the Access Directive; for a comparative overview see van der Sloot, 2012). In the course of the consultations for the European Commission's Green Paper on convergence, one of the questions was to what extent the scope of the EPG regulation should be expanded to cover not only audiovisual services but, more generally, recommenders in information services, such as search engines or social networks (European Commission, 2013). The background to this was the impact of such services on the way people search and access diverse information, or what Napoli referred to as 'algorithmic governance in the public interest' (Napoli, 2014). In a similar direction, the Council of Europe (2011) pointed out that there might be a need for a differentiated policy response where intermediaries 'have a bearing on pluralism'.

However, these recent discussions again lack a clear normative conception of exposure diversity. Accordingly, acknowledging the need for such a normative discussion to inform not only law and policy-makers but also designers could be the first step. As Bernhard Rieder (2009, p. 134) remarks, 'without a clear normative standpoint it is difficult to formulate suggestions about how search ought to work'. Without such a conceptualization, it is difficult to decide under which conditions filter bubbles and personalized communication threaten media diversity, or how the conditions for diverse exposure could be improved.

Although we have made a number of concrete suggestions about how to conceptualize exposure diversity, we do not argue or have a clear preference for one over the others. Instead, we suggest here that the question of which conceptualization is preferable should be approached in a more differentiated way. Each of the three conceptualizations of exposure diversity highlight some aspects of the role of media diversity in a democratic society, so it can be argued that there is a need to differentiate according to the context and the medium in question. The liberal-individualist and, to some extent, even deliberative conceptualizations of exposure diversity are more likely to be reflected in market-driven recommender systems, whether in search engines, social media or the news media. In contrast, it could be a matter for the public service media and other non-profit or alternative media to serve a more adversarial concept of diversity, and thereby give prominence to voices that may be less easily encountered elsewhere on the Internet.

The ethical implications of diversity-sensitive design

Thus far, we have suggested that diversity-sensitive recommender systems could provide a tool to actively promote the diversity of exposure, counter filter bubbles and even to 'nudge' people towards diversity in their information exposure. Diversity-sensitive design, however, also raises a number of ethical issues. As the responses to a recent Facebook

experiment have shown (Kramer, Guillory, & Hancock, 2014), influencing people's choices, even for good and legitimate reasons, can sit at odds with users' conceptions of personal autonomy, freedom from manipulation and privacy. This is even more so if diversity-sensitive design is used to realize more normative, societal objectives, such as serving democratic discourse rather than the interests of individual users (Council of Europe, 2007; Napoli, 1997; Valcke, 2004).

The recent debate in the UK Parliament about including aspects of media consumption and exposure diversity in media policy are symptomatic. As a report of the UK House of Lords (2013, para. 53) noted: 'For some, the inclusion of the word "consumed" was conspicuous and raised a question about whether Ofcom's intention had been to suggest that media plurality policy should actively seek to stimulate the demand for and consumption of diverse viewpoints'. In response to these concerns, the House of Lords concluded that even though policy should also take into account the consumption of content, interventions to stimulate diversity will have to be limited to the supply side (UK House of Lords, 2013, para. 56). This debate already demonstrates how much sensitivity there can be in diversity-sensitive design, particularly when it concerns public media policy. In the following, however, we argue that diversity-sensitive design does not need to be at odds with autonomous choices and can even serve users' autonomy and freedom of choice.

The most prominent ethical concerns regarding diversity-sensitive design relate to its potential conflict with the user's autonomy, as one of the 'cornerstones of our society' (Roessler, 2010). Developing tools with the intention to stimulate users to choose more diversely could affect 'one's capacity to govern oneself' in one way or other (Feinberg, 1983). Now, it could be argued that this is precisely what users expect from a search or recommendation tool. However, what may matter is whether these tools point users towards items that clearly align with their personal preferences, seek to induce them to critically reconsider their choices or trigger them to make choices they would not readily have made otherwise (see Bovens, 2008). These questions become even more crucial when the information we consume and the media choices we make have an influence on how we think and who we want to be.

Autonomy can be understood either in the sense of negative liberty or 'freedom from interference', or in the sense of 'positive liberty', as the freedom 'to do' something and to self-determine one's life (Berlin, 1990). According to a 'negative' definition of liberty, it could be argued that a news recommender or search engine should not modify a user's information diet by introducing diverse items against their wish, as it would interfere with the user's liberty and autonomy – even if they were principally diversity-seeking and interested in ways to diversify their diet. However, as Dworkin (1988) argued, autonomy cannot be equated with negative liberty alone. In order to be free and autonomous, we also need 'good' or desirable options to choose from in order to make use of our liberty (Roessler, 2010, p. 7). Following a more positive understanding of liberty, influencing individual information choices could, under certain circumstances, also be conceived of as potentially autonomy-enhancing. For example, it might help those who are interested in a diverse range of information to sort through the abundance of content offered online, be presented with a real choice and have the ability to make more diverse choices. The ultimate answer to the question of whether recommendation services that stimulate users to consume more diversely are autonomy-enhancing or not also depends of course on the underlying normative conception of diversity.

Obviously, a liberal-individual perspective aligns far more easily with personal preferences and an individual's own choices than an agonistic-adversarial perspective, which is essentially political and tightly linked to the role of the media and media diversity as a value in a democratic society. Finally, there is the matter of the conditions under which users are nudged to view more diverse content, and whether this amounts to manipulating the users' choices or not.

Clearly, not all ways of 'nudging' people to make more diverse choices will encroach upon personal autonomy in the same way. Many ways of designing diverse recommendations will not even intend to alter individual choices, at least not directly. In addition, arguably, existing media services already 'nudge' users to read particular news items or advertisements. Under which conditions, then, can we speak of manipulation, or the danger of this, in the context of diversity-sensitive design?

Hansen and Jespersen (2013) have developed a useful categorization of nudges that is also instructive for our analysis. Hansen and Jespersen specifically discuss the main criticism of nudging, namely that it works by manipulating citizen's choices. Based on Kahnemann's dual process theory, Hansen and Jespersen observed that not all forms of nudging influence choices that are the result of reflective thinking, some also affect automatic modes of thinking, in the sense of reflexes, instincts and routine actions which we perform without really making a conscious decision (accordingly, they distinguish between Type 1 and Type 2 nudges). They also reflected on the role of transparency as a constituent element that distinguishes instances of manipulation from other, non-manipulative forms of nudging (Hansen & Jespersen, 2013, p. 19). Based on these main considerations, they developed the following categorization (Table 1).

As becomes clear from their categorization, not all nudges aim to affect choices (some aim to prompt reflective behaviour), and only the non-transparent nudges can be said to engage in psychological manipulation of either choice or behaviour. Many, if not most, forms of recommendation will fall into the top-left category: 'prompting of reflected choices', notably to the extent that they focus on making users aware of either their reading habits and possible biases, the existence of filters or the diversity of comments and opinions that exist online.

Some recommenders may go beyond pure awareness-raising and seek to stimulate reflection and engagement with diverse opinions/other users or help people 'design' their bubble (particularly to the extent that these recommenders follow more radical conceptions of exposure diversity). Even these do not actively change preferences (as defaults do), nor do they create incentives to follow predefined preferences or label individual preferences as good or bad. If at all, they are tools that allow users to reflect on, and possibly reconsider, their own preferences. Hansen and Jespersen (2013, p. 24) describe these as 'empowerment nudges, which promote decision-making in the interests of citizens, as

Table 1. Categorization of different types of nudges (Hansen & Jespersen, 2013, p. 23).

	Transparent	Non-transparent
System 2 Thinking	Transparent facilitation of consistent choice/prompting of reflected choices	Manipulation of choice
System 1 Thinking	Transparent influence (technical manipulation of behaviour)	Non-transparent manipulation of behaviour

judged by themselves, without introducing further regulation or incentives' or using any manipulative measures.

This is not to say that forms of diversity-sensitive design could not amount to manipulation. For example, tools that would prioritize certain content (in the sense of a more adversarial design) would probably fit in the bottom-left category (transparent nudges that stimulate System 1 Thinking), as they internalize the fact that people far more often tend to choose the results that are presented first, last or more prominently (Keane, O'Brien, & Smith, 2008). Nonetheless, such a design would not amount to manipulation, at least not in the psychological sense, as long as it is transparent to users.

Regarding the category of non-transparent manipulations of choice, Hansen and Jespersen suggest that in most situations they should be considered unacceptable. This is because these kinds of nudges not only manipulate choices in a manner that users cannot see, but also because they ascribe the responsibility for those choices to users (Hansen & Jespersen, 2013, p. 27; see also Berdichevsky & Neuenschwander, 1999; Spahn, 2012). In this way, users would be held responsible for a decision they would not have taken otherwise.

These considerations could also provide useful guidance for developers, as well as legislators, when promoting diversity-sensitive design. Based on the above discussion, it becomes clear that transparency about the way in which ranking, filtering and personalization, as well as diversity-by-design measures, are applied is an important precondition for the ethical acceptability of diverse recommenders. For the same reason, recommenders that trigger automatic responses and choices (e.g., through the use of defaults) are probably more problematic than recommenders that seek to engage users in reflective thinking. If measures not so much affect choices as automatic behaviour – even if this is done transparently – users will have less ability to exercise conscious control, precisely because the measures will produce automatic, spontaneous response.

An example of such a measure might be to visibly change the default in a personalized recommender system to include more categories than had been originally chosen by the user. In such a case, additional options might be necessary to safeguard personal autonomy, such as being able to reset the default, choose between different recommendation logics, make a complaint about the tool, provide feedback or trigger people to reset their personal choices at regular (but not very frequent) intervals. Finally, the non-transparent manipulation of choices is essentially unethical and should therefore be a no-go area, even if the principal objective (stimulating diversity) is a noble one.

Conclusion

This article has developed design principles for three different normative conceptions of exposure diversity and has discussed those design principles in the light of existing and possible future recommender systems. We suggested that it may sometimes actually be in the interests of online intermediaries and media companies to embrace one or more of the conceptions of 'diversity by design' developed here. However, some of these conceptions are more closely aligned than others with the incentive structures of search engines, social media and the news media. As a consequence, we have discussed whether there is a role for policy-makers and regulators with respect to, firstly, providing guidance on normative conceptions of exposure diversity to designers, and/or secondly, ensuring

that all forms of exposure diversity (liberal, deliberative and radical) are represented in the broader media ecosystem. As each of these forms serves different purposes in a democratic society, this can also imply that the public service media, in particular, should realize forms of exposure diversity in recommendations that are not found elsewhere in the market.

In summary, diversity-sensitive design could be an option of interest to governments that wish to give more effect to their commitment to the promotion of media diversity. A precedent already exists in the way EPGs are regulated to give due prominence to particular programmes, such as public service media. That said, any involvement of the regulator must maintain the precarious balance between promoting positive liberties and refraining from curtailing people's negative liberty. To this end, the article has highlighted a number of principles, including transparency and a ban on manipulative practices, which should be taken into account by designers of recommender systems as well as media regulators.

Note

1. The survey was conducted among a representative sample of the Dutch population (*n* = 1400) and was part of the Personalised Communication Project (http://personalised-communication.net).

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