

RESEARCH ARTICLE

The Algorithmic Public Sphere

How Recommendation Systems Reshape Selective Exposure Theory

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ABSTRACT

Recommendation systems now curate much of the political information that citizens encounter online, yet selective exposure theory was developed before algorithmic curation existed. This paper conducts a systematic review of ten empirical, quantitative studies that test how recommendation systems and personalised algorithms shape exposure to political and news content. Guided by selective exposure theory and Habermas's theory of the public sphere, the review compares studies published between 2014 and 2020 in major communication, information-systems, and interdisciplinary journals. The reviewed studies use behavioural trace data, controlled experiments, platform audits, and cross-national surveys, which allows their outcomes to be compared directly. The synthesis shows that recommendation systems do not produce one uniform effect. Individual choice narrows exposure at least as much as algorithmic ranking does; recommender design, rather than personalisation itself, determines whether diversity rises or falls; and platform-level curation tends towards homogenisation around a small number of legacy outlets rather than towards fragmentation into isolated bubbles. This paper argues that these findings require selective exposure theory to be extended rather than replaced. It proposes the concept of algorithmic co-selection: recommendation systems act as a second, non-human selector that interacts with individual predispositions in platform-specific ways. The algorithmic public sphere that results is neither uniformly fragmented nor uniformly integrated, but differentiated by platform architecture and design choice.

Keywords: algorithmic public sphere; selective exposure theory; recommendation systems; filter bubbles; echo chambers; content diversity; systematic review

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Introduction

Digital platforms have replaced the front page with a feed. Facebook, YouTube, Google News, and dozens of similar services now decide, article by article, what a person sees first, what they see at all, and what never reaches them. This decision is made by a recommendation system: software that ranks content according to a model of the user's inferred interests. Recommendation systems were built to solve a problem of abundance. They have become, almost as a side effect, a mechanism of political information control.

Selective exposure theory offers the classical account of how people manage information abundance. Developed across decades of media-effects research and revisited for the platform era by Sunstein (2017) and Pariser (2011), the theory holds that individuals prefer information that confirms their existing beliefs and avoid information that challenges them. The theory was built to explain individual choice among newspapers, television channels, and, later, websites. It assumes that the person is the primary selector. Recommendation systems complicate this assumption. A recommender does not simply present a menu from which a person chooses; it pre-selects the menu itself, often invisibly, before individual choice can operate at all (Napoli, 2019).

This creates a theoretical problem. If an algorithm pre-selects content before a person exercises any preference, exposure is no longer solely a function of individual psychology. It becomes a joint outcome of human preference and machine curation. Popular commentary has resolved this problem too quickly, in one of two opposing directions. One camp, associated with Pariser's (2011) filter bubble thesis and Sunstein's (2017) account of political polarisation through personalisation, argues that algorithmic curation isolates people inside self-reinforcing information environments, and thereby corrodes the shared basis for democratic deliberation that Habermas (1989) called the public sphere. A second camp, associated with Bruns's (2019) empirical critique of the filter bubble concept, argues that the isolation thesis has outrun the evidence, and that most people continue to encounter a broad range of content regardless of the algorithms that rank it.

This paper does not adjudicate between these two camps in the abstract. It examines what the empirical record actually shows. It conducts a systematic review of ten quantitative studies, each of which measures, directly, how a recommendation system or personalisation feature affects exposure to political or news content. Restricting the review to quantitative, comparable studies allows this paper to move past qualitative disagreement between optimists and pessimists and towards a synthesis of measured effects.

The paper is guided by one central research question: does empirical evidence support the claim that recommendation systems narrow political exposure, in the manner selective exposure theory would predict once an algorithmic selector is added to the human one? A second, related question asks what pattern, if any, unites the studies that test this claim across different platforms, countries, and methods.

Answering these questions matters for two reasons. First, selective exposure theory needs updating. The theory was built for an environment of moderate information supply and unmediated individual choice, not for an environment in which a machine-learned model performs a first pass over the available information before a human ever sees it. Second, the answer bears directly on the health of the public sphere. Habermas (1989) argued that the public sphere depends on citizens encountering a common set of issues and a range of arguments about them. If recommendation systems narrow that common set, the public sphere fragments. If they do not, the concern is overstated, or misdirected towards a different mechanism, such as the concentration of attention on a small number of dominant outlets.

This paper argues that the empirical record supports neither the strong fragmentation thesis nor its outright dismissal. Recommendation systems interact with individual selective exposure in ways that depend heavily on platform architecture and design choice. This paper terms this interaction algorithmic co-selection, and argues that the algorithmic public sphere it produces is differentiated rather than uniformly closed or open. The next section sets out the theoretical framework. The following sections describe the systematic review method, present the findings of the ten reviewed studies organised into three thematic clusters, discuss what these findings mean for theory, and conclude.

Theoretical Framework

Selective exposure theory: from psychology to platforms

Selective exposure theory begins from a simple psychological premise: people prefer information consistent with their existing attitudes because inconsistent information is uncomfortable to process. Sunstein (2017) traces this premise through decades of communication research and applies it directly to internet-era media choice. Pariser (2011) makes a parallel argument from the perspective of technology criticism, describing the tendency of a personalised information environment to reinforce, rather than challenge, a person's existing outlook.

Both accounts share an assumption that deserves scrutiny: that the person remains the primary selector. Classical selective exposure research examined choices among a fixed menu, which newspaper, which channel, which website, that a person actively browsed. Recommendation systems intervene earlier, before the moment of choice. A ranked social media feed, a recommended list, and a personalised search results page all reorder the menu before the person sees it. This paper follows Napoli (2019) in treating this reordering as a second, non-human act of selection, layered on top of, and interacting with, the individual's own psychological preference for confirming information.

Habermas and the public sphere in an algorithmic age

Habermas's (1989) account of the public sphere describes a space, historically constituted by newspapers, coffee houses, and later broadcast media, in which private citizens come together to debate matters of common concern on the basis of shared information. The theory's central requirement is not agreement but access to a common set of issues and arguments. A fragmented public, each faction reading only what confirms its existing view, cannot deliberate in the sense Habermas intended, because there is no common ground from which deliberation can proceed.

Habermas developed this theory for an era of mass broadcasting, when editorial gatekeeping was human and centralised. Napoli (2019) extends the theory to an era in which coders and engineers perform much of the gatekeeping that editors once performed, and argues that this produces a distinct market failure in what he terms the algorithmic marketplace of ideas. Bruns (2019) is more cautious. Reviewing the same body of technology, he argues that the public sphere has always been more fragmented and more porous than Habermas's classical model implies, and that recommendation systems have not created a new problem so much as made a long-standing one newly visible.

Towards an algorithmic public sphere framework

This paper synthesises these positions into what it terms the algorithmic public sphere: a public sphere in which access to shared information is jointly determined by individual selective exposure and algorithmic curation, and in which the balance between the two varies by platform and design choice. This framework makes two claims explicit that the filter bubble debate often leaves implicit. First, algorithmic curation is not a single, uniform mechanism; a collaborative-filtering recommender, a popularity-based ranking, and a user-customisation feature are different mechanisms with different effects, and a theory of the algorithmic public sphere must distinguish between them. Second, algorithmic effects on exposure are empirical questions, not assumptions. Whether a given recommendation system narrows, broadens, or concentrates exposure is a matter that can and should be measured, not inferred from the mere fact that an algorithm is present. The systematic review that follows tests this framework against the empirical record.

Methodology

Search strategy and eligibility criteria

This paper is a secondary systematic review. It does not collect new data; it identifies, screens, and synthesises existing empirical studies. The review followed a structured search strategy across Scopus, Web of Science, and Communication & Mass Media Complete, combining two groups of search terms: recommendation system, recommender system, algorithmic curation, or personalisation; and selective exposure, filter bubble, echo chamber, or content diversity. The search was restricted to English-language, peer-reviewed journal articles published between 2014, the year preceding the first large-scale platform audits of algorithmic personalisation, and 2020.

Four eligibility criteria determined which studies were retained. First, a study had to report original empirical data; conceptual and purely qualitative studies were excluded because the aim is to compare quantitative effect patterns across studies. Second, a study had to use a quantitative method, behavioural trace or browsing data, a controlled experiment, a computational audit, or a survey with quantitative analysis, so that its outcome could be expressed as a measurable direction of effect. Third, a study had to examine a recommendation system, personalisation feature, or algorithmic curation mechanism as an explicit object of analysis, rather than treating algorithms only in passing. Fourth, a study had to report an outcome relevant to selective exposure, such as ideological or partisan diversity, cross-cutting exposure, or source concentration, so that its findings could be compared against the others on a common conceptual axis.

Studies were excluded if they addressed recommendation systems only in non-political, non-news domains, such as e-commerce or entertainment recommendation, unless they also reported political or news-exposure outcomes. Working papers, conference proceedings without peer review, and preprints were excluded unless a peer-reviewed version could be located.

Screening and analytic approach

Titles and abstracts identified by the search were screened for topical relevance, and the full text of each candidate study was then assessed against the four eligibility criteria above. This process yielded ten studies that met every criterion. Table 1 summarises their bibliographic details, methods, and samples.

Given the heterogeneity of outcome measures across the ten studies, ranging from ideological distance scores to source-concentration percentages to experimentally manipulated selective-exposure indices, a formal meta-analysis was not appropriate. This paper instead uses narrative synthesis, a recognised method for systematic reviews in which studies that cannot be statistically pooled are compared on the direction, consistency, and boundary conditions of their findings. The ten studies are grouped into three thematic clusters, reflecting the level at which each study examines algorithmic curation: individual-level network and ranking effects, recommender design and user agency, and platform-level gatekeeping and audit studies. Each cluster is presented in the Findings section with a comparative table of the claim or objective and the key finding of each included study, followed by an interpretive discussion of what the cluster shows.

Table 1*Overview of the ten reviewed studies*

Author(s) & Year	Journal	Method & Sample
Bakshy, Messing & Adamic (2015)	Science	Network analysis of 10.1 million Facebook users' friendship ties and news-feed exposure
Flaxman, Goel & Rao (2016)	Public Opinion Quarterly	Browsing-history panel data for approximately 50,000 US internet users
Möller, Trilling, Helberger & van Es (2018)	Information, Communication & Society	Computational simulation comparing four recommender logics across roughly 22,000 news articles
Kitchens, Johnson & Gray (2020)	MIS Quarterly	Longitudinal browsing-panel data for approximately 200,000 US adults over four years
Fletcher & Nielsen (2018)	New Media & Society	Cross-national online survey across four countries
Cardenal, Aguilar-Paredes, Cristancho & Majó-Vázquez (2019)	European Journal of Communication	Combined survey and web-tracking navigation data in Spain
Dylko et al. (2017)	Computers in Human Behavior	Online experiment manipulating customisability features on a mock news site
Beam (2014)	Communication Research	Online mock-election experiment with adult internet users
Haim, Graefe & Brosius (2018)	Digital Journalism	Two field audits of personalised and non-personalised Google News results
Nechushtai & Lewis (2019)	Computers in Human Behavior	Field study with 168 participants searching Google News on personal accounts

Findings

The ten reviewed studies are presented below in three thematic clusters. The first examines how algorithmic ranking interacts with individual choice at the level of large user networks. The second examines how the specific design of a recommender system, rather than personalisation as such, shapes exposure. The third examines platform-level audits of gatekeeping, concentration, and incidental exposure. Each cluster begins with a comparative table of the studies' claims and findings, followed by this paper's interpretation.

Cluster 1: Algorithmic ranking versus individual choice

Table 2*Algorithmic ranking and individual choice in shaping cross-cutting exposure*

Author & Year	Claim / Objective	Key Finding
Bakshy, Messing & Adamic (2015)	Tests whether Facebook's news-feed algorithm reduces exposure to politically cross-cutting content, relative to individual clicking behaviour	Algorithmic ranking modestly reduced exposure to cross-cutting content, but individual clicking choices reduced such exposure by a larger margin than the algorithm did
Flaxman, Goel & Rao (2016)	Tests whether social media and search-engine use increase or decrease ideological segregation, relative to direct browsing	Social media and search use were linked to a small rise in mean ideological segregation and to greater exposure to opposing views than direct browsing; most consumption stayed concentrated on a few mainstream outlets
Kitchens, Johnson & Gray (2020)	Tests whether social media use produces uniform echo-chamber or filter-bubble effects on source diversity and partisanship	Facebook use was linked to more diverse but more partisan sources; Reddit use was linked to more diverse and less partisan sources; Twitter use showed little change

These three studies converge on a finding that complicates the popular filter-bubble narrative: individual choice, not the algorithm, does most of the narrowing. Bakshy et al. (2015) show this most directly, because their design separates algorithmic and individual effects within the same population. Flaxman et al. (2016) reach a related, more paradoxical conclusion: social platforms slightly increase average ideological distance between users while simultaneously increasing exposure to opposing views for the individuals who use them, because these platforms draw people towards political content, including cross-cutting content, that they would not otherwise have sought out.

Kitchens et al. (2020) add a further complication: there is no single social media effect. Facebook, Reddit, and Twitter produced three different outcomes in the same study, using the same population and the same four-year panel. This finding is difficult to reconcile with a theory of selective exposure that treats algorithmic personalisation as one undifferentiated cause. It instead supports treating each platform's ranking logic as a distinct variable with its own, empirically distinguishable effect. Read together, this cluster suggests that classical selective exposure theory understates the role of individual agency in an algorithmically mediated environment, while popular accounts of algorithmic curation overstate the algorithm's independent contribution to ideological narrowing. The mechanism selective exposure theory must now model is not algorithm versus person, but the joint, platform-specific output of both.

Cluster 2: Recommender design and user agency

Table 3

Recommender design, personalisation mode, and user agency

Author & Year	Claim / Objective	Key Finding
Möller, Trilling, Helberger & van Es (2018)	Tests whether four recommender logics reduce topic diversity relative to human editorial selection	All four recommender logics produced diversity comparable to or greater than human editorial selection; recommendations based on a user's full reading history increased topic diversity the most
Dylko et al. (2017)	Tests, experimentally, whether customisability technology increases political selective exposure, and whether system-driven or user-driven customisation has the larger effect	All forms of customisability increased selective exposure; system-driven, automatic customisation produced the strongest effect, especially among ideologically moderate participants
Beam (2014)	Tests how personalised-recommender designs affect selective exposure, elaboration, and political knowledge in a mock-election setting	Personalised recommender use generally increased selective exposure and reduced political knowledge, but explicit user customisation produced higher counter-attitudinal exposure than computer-generated recommendations
Cardenal, Aguilar-Paredes, Cristancho & Majó-Vázquez (2019)	Tests the echo-chamber hypothesis using self-reported and behavioural navigation data in Spain	Users spent more time with politically aligned outlets yet still showed considerable cross-partisan exposure; the echo-chamber effect strengthened with overall news consumption

This cluster shows that the direction of an algorithmic effect depends on the specific design of the recommender, not on the presence of personalisation as a general feature. Möller et al.'s (2018) finding that history-based recommendations increased diversity beyond the level achieved by human editors is the clearest evidence against a simple algorithms-narrow, humans-diversify account. At the same time, Dylko et al. (2017) show that automatic, system-driven customisation, precisely the recommender logic that requires no active choice from the user, produced the strongest selective-exposure effect of any condition tested, and that this effect was strongest among the moderates whom deliberative theory most wants to reach with a range of views.

Beam's (2014) finding adds a further distinction. Explicit user customisation, in which a person actively tells the system what to prioritise, produced higher counter-attitudinal exposure than computer-generated recommendation, the reverse of what a simple filter-bubble account would predict. Cardinal et al. (2019) locate a boundary condition for these effects in real-world audiences: partisan selectivity was real but conditional, growing stronger as a person's overall news consumption grew, rather than acting as a fixed trait of the platform. Together, these four studies indicate that recommender design choices are a more powerful predictor of exposure diversity than the binary presence or absence of an algorithm. Selective exposure theory, extended to this environment, needs a design-sensitive account of algorithmic curation, not a single algorithmic variable.

Cluster 3: Platform gatekeeping, incidental exposure, and homogenisation

Table 4

Platform-level audits of gatekeeping and exposure diversity

Author & Year	Claim / Objective	Key Finding
Fletcher & Nielsen (2018)	Tests whether incidental exposure to news through social media broadens or narrows the range of online news sources used, across four countries	Incidentally exposed users used significantly more online news sources than non-users; the effect was strongest among younger people and those with low interest in news
Haim, Graefe & Brosius (2018)	Tests whether implicit and explicit personalisation reduce the content and source diversity of Google News results	Personalisation produced only small effects on content diversity and no clear evidence of a filter-bubble effect on source diversity
Nechushtai & Lewis (2019)	Tests whether Google News's algorithm fragments audiences along political lines or concentrates attention on a small number of outlets	Users with different political leanings and locations received very similar news recommendations; a handful of legacy news organisations accounted for a large share of all recommendations collected

This cluster shifts the empirical picture away from fragmentation and towards concentration. Nechushtai and Lewis (2019) found almost no evidence of political fragmentation in the recommendations different users received; their concern instead is that a very small number of legacy outlets dominate what any user receives, regardless of political leaning. Haim et al. (2018) reach a compatible conclusion using an independent method: personalisation, whether implicit or explicit, made little measurable difference to the diversity of Google News results. Fletcher and Nielsen (2018) go a step further and find a positive effect: incidental exposure through social media broadened, rather than narrowed, the range of news sources used by people who were not actively seeking news, particularly younger and lower-interest users, precisely the audience segment most vulnerable to the narrowing effects that filter-bubble theory predicts.

Taken together, these three platform-level audits do not support the strong version of the filter-bubble thesis that first motivated Pariser's (2011) argument. The risk they document is gatekeeping concentration: a small number of established outlets capturing a disproportionate share of algorithmic recommendation, which raises different normative concerns from those raised by Habermas's (1989) account of a fragmenting public sphere. A concentrated public sphere, in which everyone sees the same handful of sources, is not fragmented in Habermas's sense, but it is not diverse either; it risks a different failure mode, a narrowing of the range of institutions that set the public agenda, even where individual citizens' exposure looks similar across political lines.

Discussion

The ten studies reviewed here were selected because each provides a quantitative, comparable test of how recommendation systems interact with selective exposure. Read individually, they might seem contradictory: some report narrowing effects, others report no effect or a broadening effect, and one

reports an effect that runs opposite to the platform's popular reputation. Read together, they support a single, coherent claim.

This paper's claim is that recommendation systems do not add a second, independent narrowing force on top of individual selective exposure. Instead, they interact with individual preference in ways that depend on three factors identified across the reviewed studies: the platform's ranking logic (Cluster 1); the specific design of the recommender, implicit or explicit, history-based or single-preference (Cluster 2); and the level of analysis at which curation is examined, individual exposure or aggregate market structure (Cluster 3). This paper terms this interaction algorithmic co-selection: the joint, platform-specific determination of exposure by human predisposition and machine ranking, in which neither factor operates independently of the other, and in which the resulting direction of effect, narrowing, broadening, or homogenising, cannot be predicted from the mere presence of an algorithm.

Algorithmic co-selection has two implications for selective exposure theory. First, the theory's central mechanism, an individual's preference for confirming information, remains intact; none of the reviewed studies eliminates evidence for it. What has changed is the environment in which that preference operates. An algorithm now performs a first pass over the available content before individual preference is exercised, and the reviewed studies show that this first pass can amplify individual preference (Dylko et al., 2017), counteract it (Beam, 2014; Möller et al., 2018), or leave it largely unaffected (Haim et al., 2018). Second, the theory needs a vocabulary for platform-level effects that operate above the level of the individual, such as the source-concentration effect documented by Nechushtai and Lewis (2019). This effect does not reduce to any individual's selective exposure; it is a property of how the recommendation algorithm allocates attention across the whole population of possible sources.

For public sphere theory, the implication follows a similar logic. Habermas (1989) worried about the loss of a common set of issues and arguments. The reviewed evidence suggests that this loss, where it occurs, more often takes the form of source concentration than audience fragmentation: citizens across the political spectrum increasingly encounter the same small set of outlets, rather than entirely separate ones. Napoli's (2019) concept of an algorithmic marketplace of ideas anticipates this outcome directly, describing a market failure in which algorithmic curation favours already-dominant suppliers of content. Bruns's (2019) scepticism about the filter-bubble metaphor is, on this evidence, largely vindicated at the level of individual fragmentation, while Sunstein's (2017) concern about polarisation finds more specific support in the experimental studies (Dylko et al., 2017; Beam, 2014), where design choices that remove user agency produce the clearest selective-exposure effects.

This synthesis is subject to clear limits. The ten studies concentrate heavily on the United States and Western Europe; only Cardenal et al. (2019) examines a Southern European market, and none examines Africa, South Asia, or Latin America, where platform use, media systems, and political context differ substantially from the settings in which most filter-bubble research originated. The studies also span a six-year window, 2014 to 2020, during which the underlying recommendation algorithms changed considerably; a platform audited in 2015 is unlikely to use the same ranking logic today. Finally, the reviewed studies use different outcome measures, which limits the precision of cross-study comparison even where a narrative synthesis, as used here, can still identify a consistent direction of effect.

These limits point directly to a research agenda. Future studies should extend algorithmic audits to platforms and political contexts outside the United States and Western Europe, track how a single platform's effect on selective exposure changes as its algorithm is updated, and develop standardised outcome measures that would allow a formal meta-analysis of algorithmic curation effects, something the current, heterogeneous literature does not yet support.

Conclusion

This paper tested whether recommendation systems narrow political exposure in the manner that adding an algorithmic selector to selective exposure theory would predict. The systematic review of ten empirical, quantitative studies does not support a single answer to that question, and this paper argues that the absence of a single answer is itself the central finding. Recommendation systems interact with individual selective exposure through algorithmic co-selection, a joint mechanism whose direction- narrowing, broadening, or homogenising- depends on platform ranking logic and recommender design rather than on the presence of personalisation as such.

Three conclusions follow. First, selective exposure theory should be extended, not replaced, to include the algorithm as an interacting variable rather than a background condition. Second, the public sphere that results from algorithmic curation is more accurately described as differentiated than as either fragmented or integrated; the evidence reviewed here points more often towards source concentration than towards audience fragmentation. Third, normative and policy responses to algorithmic curation should target specific design choices, such as system-driven automatic customisation and single-source recommendation logics, rather than personalisation in general, because the reviewed evidence shows that these specific choices, not personalisation as a category, produce the clearest selective-exposure effects.

This paper offers this claim as a corrective to a debate that has often proceeded at the level of metaphor, the filter bubble, the echo chamber, rather than at the level of measured effect. A systematic, comparative reading of the quantitative record shows a more differentiated, and in some respects more reassuring, picture than either popular alarm or blanket scepticism suggests. It also shows where genuine concern remains justified: not primarily in the isolation of citizens from opposing views, but in the concentration of algorithmic attention on an increasingly narrow set of dominant news organisations. Addressing that concentration, rather than personalisation in general, is where future research, and future regulation, should focus.

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