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The public sphere as a dynamic network

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Abstract

This article proposes to conceptualize the public sphere as a dynamic network of actors and contents that are linked with each other by communicative actions. This perspective allows us to theoretically derive and empirically describe the entire range of small to large network structures and their evolution over time. First, we will define the elements of these networks, which include the actors, content, communicative actions, and content relations. Based on these entities, four communicative roles (producer, recipient, curator, isolate) will be distinguished. Second, we will summarize how these actors perceive the communicative situation and how they select from behavioral options. Third, we will show how this combines with the network dynamics and outcomes that are discussed in the different lines of research. This provides not only the basis for understanding the link between the communicative actions on the micro-level and macro-level structures, but also new avenues for normative discussions.

Keywords: public sphere, dynamic network, communicative actions, communicative roles, behavioral preferences, social network analysis, echo chamber

Traditionally, the public sphere is described with metaphors such as "sphere," "forum," or "arena" (Donges & Jarren, 2017, pp. 75–76). This is associated with the idea of a shared, open space in which a multitude of participants can mutually observe and influence each other, as they are in the same place at the same time. The public sphere is conceptualized as a spatiotemporal unity in a face-to-face-situation. This idea was transferred to the societal macro-level. Here, the metaphors refer to the public sphere mediated by mass media (Habermas, 1992, 2008). Various functions, such as social self-observation and temporal synchronization, are assigned to this sphere (Luhmann, 1996). However, this notion of the public sphere as a shared space of observation and influence has been challenged by the digitalization of public communication for three reasons: First, there has been intense debate and research on whether the public sphere is breaking down into echo chambers, relegating individuals to their own filter bubbles. While there is considerable empirical doubt that such decay is occurring (Bruns, 2019), the selectivity of reception in a high-choice media environment (Van Aelst et al., 2017) nevertheless reduces the proportion of the reception of the same content. Second, publics often no longer emerge only synchronously (as in television and radio) or in a very narrow temporal frame (as in newspaper and magazine) through the reception of linear or periodically distributed mass media, but also in a time-delayed manner as a viral effect through the diffusion of content. This diffusion may be very rapid or delayed by retrieval from online archives (additive public instead of co-present public). Furthermore, it is not limited to pure replication, but also includes translation and transformation (Boullier, 2023). Third, the spatial metaphor is called into question because the boundaries between contexts become blurred, including the different arenas and levels of the public sphere (Davis & Jurgenson, 2014). In sum, digitalization has increased the variability and dynamics of public communication, which is why the models of static, one-way

linear, and one-to-many communication and the public sphere as the delimited, homogeneous, and shared space that these models created appear to be outdated. New models of the public sphere need to build on a flexible, relational, and dynamic understanding of public communication (Keinert et al., 2021). Therefore, instead of a top-down view, we propose the opposite starting point of a bottom-up view. We locate the term "public" as an adjective on the micro-level of communicative actions and frame this attribute in terms of action theory: content is "public" as an option for action if it is objectively accessible to all (Friemel & Neuberger, 2021).

The metaphor of the public sphere as a network has been proposed previously (Habermas, 1992, p. 436, 2008, pp. 158–159). We followed this metaphor but specified it conceptually by building on the literature of social network analysis for two reasons: First, using Habermas (1963, 1991) as a starting point, the normative perspective has dominated public sphere theory. Consequently, the normative ideal of a unified public sphere has determined theoretical reasoning and empirical investigation on the macro-level. While this approach has resulted in a rich and differentiated scholarly debate, it has remained reduced to the question of whether the Habermasian ideal has been fulfilled or not. This limited the development of alternative analytical approaches. Therefore, our approach has aimed to complement the literature by starting at the other end. We intend to fill the analytical gap before we try to evaluate the quality of public communication and its outcomes as measured by deliberative criteria. Second, conceptualizing the public sphere as a dynamic network of actors and contents that are linked to each other by communicative actions has allowed us to link the micro-level of individual actors with the macro-structures within society. Hereby, the reasoning may go in both directions: (1) The knowledge regarding the behavioral preferences and decisions of individual actors may help to predict emergent phenomena; and (2) The patterns on the macro-level may help to identify the

prevalence of behavioral preferences. This article makes use of both directions of reasoning.

Network analysis and its aim for empirical investigation requires a radical formalization and reduction of complexity. Therefore, we elaborate a language for the description of networks and to detect the mechanisms for the explanation of network development. First, we will define the elements of these networks, which include the actors, contents, communicative actions, and content relations. Based on these entities, four communicative roles (producer, recipient, curator, isolate) are distinguished. Second, we will summarize how these actors perceive the communicative situation and how they select from the options for action. Third, we will discuss what is known about the selection of the communicative options by the different roles. Finally, we will discuss how these micro-level decisions shape the macro-level structure and dynamics of the public sphere. In combination, this approach follows the reasoning of the methodological individualism: We describe and explain the decisions of the actors to connect (or not) through communicative actions with other actors. At the same time, every communicative action changes the situation for other actors and their follow-up decisions. As a result, this network evolves step-by-step and the dynamic macro-effects result from the interlinking of many communicative actions.

In order to demonstrate the applicability and heuristic potential of our analytical tools for public sphere theory, we use as an example the much-debated and studied concept of the "echo chamber." Echo chambers are defined as homogeneous, densely connected, and isolated clusters of actors who share the same political opinions (Bruns, 2019, p. 29). We will provide arguments for the plausibility of such effects under certain conditions and the reasons for the limited empirical evidence of it (Bruns, 2019). Our considerations may help to resolve these inconclusive findings and open new avenues for normative discussions of the public sphere.

A network perspective on public sphere

The technical infrastructure of the internet and the emergence of online networking platforms have triggered a multitude of theories and models regarding the networked public sphere (e.g., Benkler, 2006, pp. 212–272; Friedland et al., 2006; Kaiser et al., 2017; Meraz & Papacharissi, 2013; Neuberger, 2014, 2022; Simone, 2010). These share the idea that the public sphere consists of a multitude of actors that engage with each other. Following the literature on social network analysis, the public sphere can be defined by a set of nodes and ties (Wasserman & Faust, 1994). The relevant nodes of the public sphere are the actors and contents. The relevant ties are their communicative actions (production, reception, and curation) and the references between the content elements.

Figure 1 illustrates the minimal constellation of communicative actions in the public sphere, including two actors (i, j), a content (k), and the two basal types of communicative actions (production as solid line and reception as dashed line). This communication is "public" if the content is potentially subject to the communicative actions of other actors (m). In contrast to private communication, the receptive access is not limited to certain (predefined) actors. Due to these communicative actions of further actors and the substantial ties to other content (n), a complex network can emerge (dotted lines) (van Dijk, 2012, p. 27). Furthermore, we will argue that "curation" can be defined by the further processing of the

received content (n) by an actor (m) through the curative actions, such as selection, arrangement, aggregation, and redistribution of existing content (i.e., combining reception and production).

To conceptualize the public sphere not only as a network but as a dynamic network it is necessary to consider the temporal dimension. Therefore, the public sphere may be defined by the nodes, ties, and time frame that are relevant. This can be done in a deductive manner by selecting the nodes and ties based on specific characteristics (e.g., citizens as relevant actors, political issues as relevant content, and communicative actions on a specific social media platform as relevant ties) and by choosing a specific timeframe (e.g., election campaign). In combination, this would allow the conceptualization of the part of the public sphere that is delineated with respect to an election. Alternatively, a network can be defined in an inductive manner by starting with a set of seed nodes from which the relevant communicative actions (e.g., use of specific modes of communication) and related nodes are identified. Depending on the number and types of communicative actions taken, a public sphere may result that may include a multitude of topics that link actors that would otherwise be assumed to be disconnected. In principle, both approaches may be used to specify small and narrowly defined networks or an all-encompassing global network without any constraints to nodes, ties, and time.

From a normative perspective, the academic discourse on the structure of the public sphere often alludes to the macrolevel structure at a given timepoint (e.g., polarized) or the changes of this structure over time (e.g., polarization). This is often done in a decontextualized manner from the perspective of the producers, contents, or recipients. Regarding producers, the number of actors and their characteristics that contribute to the public sphere may be assessed. Hereby, it is repeatedly criticized from a normative perspective that the number of news publishers has decreased over the past decades (Reese, 2021). While this market concentration may be criticized, it can also be argued that it is the plurality of the content that is crucial for the quality of a deliberative discourse (Rössler, 2007, pp. 503–504; Van Aelst et al., 2017, p. 11). A third perspective takes the recipients into account. The rationale is that it is not the plurality of the content provided that is decisive, if the recipients do not make use of it. While these are relevant aspects of the overall picture, the focus on one aspect distracts from the others. The proposed network perspective on the public sphere not only suggests considering all elements (actors in different roles, contents, and communicative actions) and therefore integrating the previously separate fields of research in communication research, but also that this should be performed from a dynamic perspective. The subsequent sections will provide a more detailed description of these defining elements of a public sphere as a dynamic network (actors and content as nodes, communicative actions as ties) before we define the most important communicative roles, the context they are embedded in, and their behavioral preferences.

Actors and content as nodes

A network may include different types of nodes; our network model of the public sphere includes actors and contents as two distinct node types (defining a two-mode network) (Wasserman & Faust, 1994). Both types may be further differentiated by various attributes. For actors, it may be
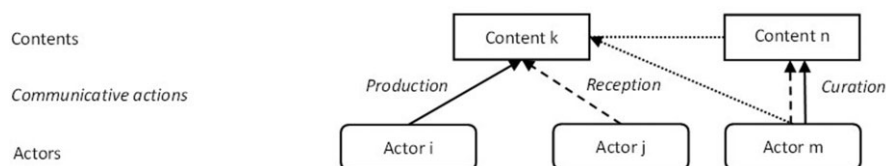
Figure 1. Network model of communicative actions in the public sphere.

relevant to distinguish between individual actors (e.g., politicians, journalists, citizens), collective actors (e.g., parties, news organizations), and artificial actors (e.g., algorithms, bots). Also, more specific characteristics, such as the sociodemographic variables of individual actors or the economic resources of collective actors, may be considered. With respect to content, the relevant attributes include the subject (ranging from broadly defined topics to very specific dimensions used in content analysis) and its modality (e.g., text, picture, sound). However, for the network structures and dynamics discussed in this article, most of these differences are negligible and it is more important to take their persistency into account (e.g., stable vs. ephemeral).

The number of nodes included in a network defines its size and the question regarding the inclusion or exclusion of nodes is a crucial decision for any theoretical or empirical model of the public sphere. As mentioned above, this may be done using two different approaches. The deductive approach requires certain knowledge regarding the universe of nodes that can be considered as being part of the public sphere. The spatial models mentioned in the introduction follow this top-down approach and include, for example, media organizations, depending on their distribution technology (e.g., press, radio, television, internet), or geographical and cultural attributes (e.g., country, language). However, in past decades these criteria have increasingly blurred and new actors have emerged, which complicates the delineation of a network of the public sphere.

Hence, an inductive approach may be more suitable to identify the relevant nodes. Hereby, a set of seed nodes (i.e., actors or contents) may be used as the starting point to identify all the (directly or indirectly) connected nodes that are relevant for the discourse on a specific topic or to understand in what context the actors are embedded. This approach allows the identification of the nodes that otherwise might have been excluded because they do not fulfill the deductive selection criteria. At the same time, this approach does not consider the nodes that are not tied to other nodes. Hence, a deductive approach needs to be inclusive in order not to miss the relevant nodes or should be combined with an inductive approach.

From a temporal perspective, the emergence of new nodes and the disappearance of existing nodes are two crucial network dynamics. These dynamics not only affect the size of a network but can have a crucial impact on the role of other actors, the relative importance of content (e.g., visibility), and the overall network structure. The same holds true for nodes that disappear. Furthermore, it needs to be considered that, with the exclusion of a node, the related ties disappear. At the same time, it can be argued that, in the public sphere, the legacy of vanished nodes may remain relevant. For example, actors may remember that there was another actor whose opinion was censored. Hence, a dynamic network model of the public sphere needs to consider that the role of an actor

and the relevancy of a content is neither an attribute of the node itself nor is it stable over time.

Communicative actions and content relations as ties

In a network model of the public sphere, two sets of ties need to be distinguished: (1) the ties between actors and content; and (2) the ties among the content itself. The ties between actors and content are formed by the communicative actions of the actors with respect to content. Hereby, we distinguish three types of communicative actions: production, reception, and curation. Production is understood as any form of content creation. This may be an article in a newspaper, a movie on a video platform, a podcast, or any other form of public content. The complementary action is the reception of content. Hence, it is not the content that reaches passive recipients, but the recipient who performs the communicative action of reception. This also emphasizes that the reception of content may only be enabled by production but not enforced. Curation as a third communicative action depends on the prior reception of a content and describes its further processing by selecting, arranging, aggregating, and redistributing without changes to the content. This is a narrower understanding of curation compared to the definitions in the literature (e.g., Bhaskar, 2016). The reason for this is the need for a clear distinction between curation and production.

Production, reception, and curation as types of communicative action encompass the relations between actors and content. To clarify these references, the speech act theory can be used. A single speech act consists of two parts: the illocutionary act as a communicative action of producers (such as regulatives and constatives) and the propositional act as the content (topic) (Searle, 1969, pp. 23–24, 2010, p. 69). Therefore, references are two-dimensional: they refer to a type of communicative action and a specific content. Based on a simplified form of speech act theory (Searle, 1969), we distinguish two types of content production: evaluations and assertions. At this point, we follow Habermas's revision of Searle's speech act typology, who labeled them "regulatives" and "constatives" (Habermas, 1984, pp. 8–42). Their claim of validity is related to the "normative rightness" (regulatives) and "truth" (constatives) of speech acts. This is a common distinction, for example, in journalism, where a professional norm requires the separation of news and opinion. Evaluations (regulatives) can be positive or negative, while assertions (constatives) can be indicated as "true" or "false." A subsequent speech act (of a former recipient who switches in the next act into the role of a producer) can confirm ("Yes, it is true!") or deny ("No, it is wrong!") the validity claim of a preceding speech act. Thus, with the help of speech act theory, the concatenation of communicative action can be observed. Besides production, reception, and curation, we acknowledge the absence of a subsequent tie, the interruption of communication after reception, as a fourth action, but will not elaborate in more detail on this.

The second set of ties in a network model of the public sphere includes the relations between the content elements (without consideration of the actors). On the one hand, these ties can be formal (explicit) references such as citations or links as a form of meta-communication (Kleinberg, 1999). On the other hand, it is important to include the implicit ties between contents. This may be the case if they are not formally linked but address the same topic. In fact, the observation of no explicit tie may be as relevant for the understanding of the public sphere as the existence of other ties (e.g., if actors attempt to exclude certain information or arguments from the discourse).

Communicative roles

Roles are "patterns of mutually adjusted expectations and orientations." They are "the central instance of mediation between the totality of 'society' and the concrete actions of 'individuals'" (Esser, 2000, pp. 141–142; translated by the authors). Roles can open or close institutionally determined options for action. Complementary roles, such as that of producer and recipient, depend on each other in order to result in a successful process of communication. In a network model, these expectations and orientations, as well as the actions, can be conceptualized as node attributes and ties. A relevant node attribute can be an exogenous (e.g., institutionally given) role, such as professional journalist. Alternatively, a role can endogenously arise from the interactions (ties) in the network itself. While most models of the public sphere rely on an exogenous attribution of the actors, the conceptualization of the public sphere as a network allows for an endogenous approach. This means that, in a network model of the public sphere, roles do not have to be determined a priori, but can emerge from the communicative actions of the actors involved and the repetition of certain types of action (Friemel, 2008). This approach has the advantage that even unusual actions and relationship repertoires can be captured in the analysis. This is particularly appropriate in the case of online media, where traditional institutional roles such as "journalist" are supplemented by new roles such as "influencer," or that of private persons who may reach even more recipients than an established media company.

Communication theories provide a wide spectrum of possibilities to define the roles in a network. This starts with such classic ideas as that of the "opinion leaders": those persons who influence at least one other person (Lazarsfeld et al., 1944) or those who are nominated by at least four persons as being relevant informants (Merton, 1949). By considering several types of communicative actions at the same time, an infinite number of further roles can be defined, such as those of the "transmitters" and "carriers" proposed by Harary et al. (1965) or the "sycophants" and "brokers" described by Marsden (1992). A further group of possible definitions is suggested by the literature on social network analysis (Friemel, 2008, 2015). Going beyond the dyadic and triadic perspective, these concepts often take the broader structure into account. This may be done using centrality measures (Borgatti, 2005), structural and regular equivalence (White et al., 1976), or symmetric-acyclic decomposition (Doreian et al., 2000; Harary et al., 1965). Finally, it can be argued that communication roles are not discrete categories that allow an exclusive classification but should rather be considered as a value on a continuous scale (Lin, 1973).

Given that there is no superior theoretical deductive or inductive empirical definition of the roles in a communication network, we propose to begin with a simple dyadic constellation of the communicative actions of an actor in relation to a content that includes four types of ties (production, reception, curation, and no action). Hence, four prototypical roles can be distinguished: producers, recipients, curators, and isolates. In a single dyad of an actor and a content, this definition is unambiguous. However, with respect to a multitude of actors and contents, this may become more blurred, because every node is necessarily involved in many dyads. In fact, it is unlikely to encounter exclusive roles of actors that are only producing, receiving, curating, or not participating in any communicative actions. For example, even a professional news organization is not limited to production, since they are dependent on perceiving the content to communicate about and monitoring the content of other actors to adjust their production. Nevertheless, in many cases, a distinction will be possible based on the role an actor most frequently takes. This endogenous identification of communicative roles may confirm the exogenous definitions such as those of the journalist and audience. However, they also provide leeway for changing roles or actors that play the functionally equivalent roles without a formal designation. Roles can be defined by not only one type of communicative action, but also by a mixture of different types.

The four prototypical roles of producers, recipients, curators, and isolate can be described as follows:

Producers are actors that (mainly) create content; the literature on the public sphere refers to these actors as the sources of journalism or the spokespersons pursuing their interests in the public. We suggest extending this understanding to include all the actors that produce content in a form that may subsequently be perceived or curated by other actors. These can be journalists who write an article or produce a TV segment, as well as any other actor producing publicly available content (e.g., on social media). Producers may be categorized according to their productivity (i.e., number of producing communicative actions, the amount of content they produce) or the success of their content among the recipients (i.e., number of receiving communicative actions by recipients). Newspapers of record or influencers on social media are examples of successful producers with respect to their reach. In addition to these dyadic (i.e., producer–content) and triadic perspectives (i.e., producer–content–recipient), the network perspective also allows the identification of actors that are crucial for the overall structure without being very active. For example, a whistleblower may only communicate once but the respective content is the starting point of many subsequent communicative actions by curators sharing it or by other producers that include it as an important piece of information in their own content production (e.g., when commenting on this).

Recipients are actors that (mainly) turn to the content provided by others. Theories on the public sphere typically refer to this role as the "audience" and emphasize that the number and identities of the recipients may not be restricted or controlled. If content may potentially be received by an undefined set of actors, the communication meets the criteria of public communication. The research on media use distinguishes among the different types of recipients according to the amount of content they perceive (e.g., heavy users), the overall pattern of content they use (e.g., media repertoire) (Hasebrink

& Domeyer, 2012), or the share of the news within their media menu (e.g., news deprived) (Eisenegger et al., 2020).

Curators are actors that receive, select, arrange, aggregate, and redistribute the existing content produced by other actors. Compared to other definitions (Bhaskar, 2016; Thorson & Wells, 2016), this understanding is more focused on how existing content is handled. In its pure form, this does not include the communicative actions, such as interpreting, commenting, and moderating, that are key for other definitions (Neuberger, 2020, pp. 137–141). In our network model, these would be the actions of production, with the specificity that the produced content is explicitly linked to another content (e.g., a commentary by an editor regarding the front-page articles or a comment accompanying a social media post). Nevertheless, even without producing content, curation can add value by filtering content and by arranging it in a specific way. In doing so, curators provide a service as intermediaries between producers and recipients. Not only journalistic media organizations (and foremost their editors), but also social media platforms such as Twitter, Facebook, Instagram, YouTube, and TikTok, are examples of institutional curators that (mostly algorithmically) influence the context and visibility of third-party content (Gillespie, 2018). On the individual level, actors can curate sporadically as ordinary users (for example, when they recommend a content in their network as opinion leaders).

Isolates are actors that do not participate in communicative actions. In the context of an information society, this is unlikely to be found in its pure form. However, it may be the case for specific topics (e.g., a specific political issue) or a broader set of topics (e.g., politics). Furthermore, some people may be in this role against their will as a result of lack of access (e.g., digital inequality) (Friemel et al., 2021).

Objective conditions and subjective perception of the situation

Having characterized nodes and ties as basic elements of a network, we now turn to the question of how they combine to a network of the public sphere. We followed the basic model of sociological explanation by Hartmut Esser (1996, pp. 91–102). According to this model, actors perceive various options for action (logic of the situation) in a situation and choose from these options (logic of selection); the concatenation of actions results in aggregative effects (logic of aggregation).

The logic of the situation is determined by the objectively offered options and their subjective perception (Esser, 1999, p. 36). The objective conditions for communicative options are first determined by the public context, which is an open, society-wide sphere of mutual observation and influence. The conditions also depend to a high degree on the respective media and their affordances that are technically and institutionally defined (Evans et al., 2016). However, other factors beyond the specific media must be considered. For example, for journalists as institutionally embedded producers, five levels of influence can be distinguished: the individual level of journalists, the level of routines and practices in the newsroom, the organizational level (publishing house), the level of social institutions (professional norms, practices, roles), and the social system level (Shoemaker & Vos, 2009). At the system level, the political, legal, economic, and cultural conditions of a media system must be taken into account (Hallin &

Mancini, 2004). Media reception is similarly socially influenced, such as in the gratifications sought by recipients (Blumler, 1979). The objective conditions are also an expression of the distribution of power in a society. Therefore, the results of the public discourse depend not only on the quality of arguments, but also on power (Foucault, 1980, pp. 131–133). Besides the objectively proffered options of a situation, their subjective perception must be considered. Among others, this includes the perceived opportunities (e.g., when gaining attention and approval by other actors) and risks (e.g., when other actors disagree). These exogenous factors of the situation (whether objectively proffered or subjectively perceived) must be supplemented by the course of communication as an endogenous factor. Communicative actions are interrelated and the sequences of such actions build a path-dependency for following actions (Burkart, 2019, pp. 29–33; Luhmann, 1996, p. 14). This aspect becomes especially important for the understanding of dynamic processes.

Digital transformation expands the spectrum of possibilities for communicative actions because more actors have the possibility to produce public content that is available for reception or curation. This results in a public sphere that is often referred to as a "high-choice media environment" (Van Aelst et al., 2017). This implies that more variants of the producing, receiving, and curating actions are possible than before (Costera Meijer & Kormelink, 2015). From the perspective of the individual actor, there are more possibilities for communicative actions in the public sphere, and from the macro-perspective, more complex networks result. Furthermore, digital media facilitate explicit relations among content, which has become a characteristic feature of most online media (e.g., hyperlink between websites or tags). In sum, this leads to the paradoxical situation in which content is accessible for more potential recipients over a longer period than ever before, but its visibility vanishes due to the increase in the amount of content ("information overload").

Because the complexity of the situation increases, it is not plausible to assume that actors make their decisions based on the full information of the entire ("global") network and all previous and potential future constellations. It is more likely that the perception of the situation is dominated by "local" factors such as the adjacent actors, related contents, and previous actions within a limited timeframe. In a digital high-choice media environment (Van Aelst et al., 2017), the objective increase in options leads to an overload because actors only possess a limited capacity for processing. The options of reception are no longer compared, but only scanned (Panek, 2016). The information on the global network and its previous and potential future structure must be generated actively (e.g., by researchers) and may provide only a rough and generic description, such as with the notion of echo chambers (Bruns, 2019).

Selecting from the options for communicative action

In the previous sections, we have argued that communicative actions are always embedded in the context of actors, contents, preceding communicative actions, and other factors that structure the set of possibilities in a given situation. In this section, we will turn to the logic of selecting a particular action from the available options.

Our model of the public sphere builds on the following assumptions for this selection of a distinct action: First, this selection is not at random, but follows specific preferences and models of decision-making that may differ among actors and over time. Schimank (2016, pp. 44–185) distinguished among the rationally calculating, egoistic utility maximizer ("homo economicus"), the norm-guided "homo sociologicus," the "emotional man" following his emotions, and the "identity assertor" who seeks to live up to his evaluative self-image. These preferences should not be considered as being deterministic but, rather, as a question of probability. In order to reduce the complexity of a decision-making situation, actors define situations with the aid of mental models that help to typify situations (frames) and to select a distinct action (script). According to the dual-process model, the degree of rationality and depth of processing varies (Esser & Kroneberg, 2015). These considerations have been applied to curating in journalism (situation model for the explanation of news selection) (Engelmann, 2012, pp. 125–150) and reception (extended elaboration likelihood model; Ott et al., 2020).

Second, the relevant set of possibilities to choose from does not include the entire public sphere but rather a set of "local" options that are within the observational scope of an actor. We elaborated on this in the previous section (logic of situation).

Third, communicative actions depend on previous actions. This means that the production or reception of a specific content can be assumed to be dependent on other content that was already perceived or produced by that actor. In the simplest case, this results in a triadic setting including two contents and an actor. In this triad, one content is given and the actor must decide regarding the communicative action (producing, receiving, curating vs. no action) toward the second content. Equivalent to the second assumption, that only a "local" set of options is relevant, it can be assumed that this limitation also applies to the temporal dimension. More recent actions are likely to be more relevant for behavioral preferences than older actions. Therefore, communicative actions must be considered as part of a sequence of the preceding actions that refer to each other.

Table 1 summarizes the key concepts that we introduced and defined above. In sum, they represent the relevant building blocks to describe the public sphere and its dynamics from a network perspective.

Echoes of communicative actions

The following paragraphs summarize what is known about and can plausibly be assumed to guide the selection of the communicative actions of producers, receivers, curators, and isolates. Mostly, these theories refer to these roles in the context of mass media and must be transferred to the context of the digital public sphere, in which the options for action largely overlap between the roles (Arendt et al., 2016).

There is a variety of producers, including stakeholders from politics and business (public relations, advertising) and, as a result of platformization, ordinary participants who use social media for communication. Other content producers, such as authors and film producers, are financially dependent on the number of recipients and are in constant competition with other producers. In contrast to companies or political parties, they may not follow a substantial goal but simply focus on the number of receptive actions towards their content. Hence, they attempt to anticipate the selective actions of the recipients. Providing more of the content that was successful in the past appears to be a less costly and risky strategy.

The same holds true for curators. News values can be considered to be the most prominent and sophisticated line of research that addresses the respective selective process of journalistic curators. According to this, various news factors are assessed to anticipate the value of a content for the recipients and thereby maximize the likelihood of a respective communicative action (reception) (Galtung & Ruge, 1965). However, the assessment of this news value requires substantial efforts and comes with uncertainties. Today, the most prominent institutional curators are the various social media platforms. In contrast to journalism, most platforms avoid taking responsibility for the content. In fact, they are radically indifferent to the quality of content (Zuboff, 2019) to increase the number of recipients for a content and to increase the amount of content perceived by a recipient.

Similar to the producers and curators, a recipient may prefer content that is similar to content that was perceived before. The relevant theories and research traditions hereby are balance theory (Newcomb, 1953) and selective exposure

Table 1. Concepts for the analysis of the public sphere as dynamic network

Network entities	Actors	Actors (individual, collective, artificial) are nodes in a network that produce, receive, and curate content as communicative actions or abstain from it. They can enter and leave a network.
	Content	Content is a second set of nodes in a network that is produced, received, and curated by actors. They can enter and leave a network.
	Communicative actions	The communicative actions of production, reception, and curation are the ties in a network and are conducted by actors. They can be differentiated by types of illocutionary acts (like regulatives and constatives).
	Content relations (references)	Content relations are ties in a network that link content topic-related to each other (propositional content).
Communicative roles	Producers	Producers create and distribute content by communicative actions.
	Recipients	Recipients perceive content by communicative actions.
	Curators	Curators as intermediaries that receive, select, arrange, aggregate, and redistribute existing content produced by other actors.
	Isolates	Isolates abstain from communicative actions.
Logic of situation		Actors are embedded in an objective and global situation but decide based on the subjective perception of their local situation.
Logic of selection		Actors select specific content for their communicative action. Speech acts can be "positive" and "negative" evaluations (regulatives) and as "true" or "false" labeled assertions (constatives).

(Stroud, 2010); they suggest the dominance of communicative actions that confirm previously perceived content. Furthermore, theoretical arguments and empirical findings suggest a co-orientation of media use among the members of a social setting (Atkin, 1972; Friemel, 2021).

In sum, there are many arguments to assume that producers, curators, and recipients follow stable preferences over time to reduce the complexity of communicative actions. Hence, the communicative actions produce an echo that continues to resonate. Due to the different regulative and constative speech acts transferring opinion and knowledge, this dynamic is likely to be separated into multiple echo chambers. However, as with every echo, the repercussion decreases and is unlikely to persist over time. Furthermore, at some points, recipients actively challenge their balanced set of cognitions in order to cope with changing context. In addition, the novelty of a piece of information and its inconsistency with previous information may be a strong driver of reception and curation (Vosoughi et al., 2018). Hence, echo chambers are not stable but may only buffer the dynamics within the networks of the public sphere.

Finally, isolates do not select any option from the other possible communicative actions. A classic explanation for choosing not to participate in communicative actions is in the avoidance of cognitive dissonance (Festinger, 1957). This can result in the general avoidance of content regarding a specific domain (e.g., political news) or a more specific selection by avoiding content regarding a specific topic (e.g., climate change) or a specific position toward an issue (e.g., reducing CO^2 emissions). With respect to the digitalization of the public sphere and the chronic overload of available content and other negative side-effects, even more fundamental behavioral preferences, such as "digital detox" (Radtke et al., 2022), "unfriending" on social media as a form of active isolating (Neubaum et al., 2021), and even the request for a "right to disconnect" (Karppi et al., 2020) have emerged in recent years. The fear of hate-speech or other negatively perceived actions may cause participants to withdraw and remain silent (a reaction called the "chilling effect" or "self-censorship") (Penney, 2022), even in journalism (Springer & Troger, 2021), leaving only a loud, unanimous minority (Hölig, 2018). This has raised the question of whether such intimidation and forced isolation restricts freedom of speech (Wu, 2018).

Network dynamics and implications for the public sphere

In the previous sections we have focused on communicative roles and how an actor selects from the options for communicative actions, given the objective conditions and his/her subjective perceptions. Up to this point, we have only considered single communicative actions of the actors. However, for a discussion of communicative dynamics in the public sphere, we must consider multiple actors and their simultaneous, as well as subsequent actions. We argue that, among the theoretically infinite number of sequences and outcomes, some are more likely to emerge. This represents the uneven distribution of communicative actions, the structures along content characteristics, and the logic of aggregation. All three are inherently linked but are discussed in the literature using different terms and with different arguments. The proposed perspective

of the public sphere as a dynamic network helps to clarify their similarities and differences.

Uneven distribution of communicative actions

The uneven distribution of (follow-up) communicative actions is well documented by the long tail distribution of attention that publicly available content and the providing actors receive (i.e., few contents receive the most attention, while the other content receives very little attention). This dynamic and structural outcome can be explained by the co-orientation process among actors (Friemel, 2021) and the thereby informed algorithmic selection by social media platforms. Although, this so-called "Matthew effect" is not new to the digital age (Merton, 1968; Salganik et al., 2006), the digitalization of communication seems to have aggravated this tendency instead of providing equal opportunities to gain attention (i.e., reception as communicative action)—a central normative criterion for the public discourse (Habermas, 2006).

Structures along content characteristics

In addition to this uneven distribution of communicative actions, the public sphere is likely to be structured along content characteristics. Producers, curators, and recipients tend to prefer confirming (i.e., positive evaluation) over contradicting content in most communicative actions. Nevertheless, in the conflict mode of interaction, producers and curators may deviate from this and favor contradicting over confirming content. In combination, the two tendencies support the clustering effects of specific actors and contents. Confirming relations are bounded within the clusters, while contradicting relations exist between the clusters. The often-cited polarization of the U.S.–Twittersphere along Republican and Democrat partisanship lines (Colleoni, 2014) can be seen as a prototypical example of what can be assumed to exist on other topics and in other settings of the public sphere. However, this dynamic is not limited to two poles but may lead to a fragmentation across multiple topics and social settings (see the notion of echo chambers discussed above). This network structure is often discussed as being problematic and against normative criteria. However, the increased opportunities for cooperation within the clusters should not be neglected.

Logic of aggregation

It is important to note that the described selection mechanisms may accumulate to significantly different network structures even if there are minor tendencies for the single decision (logic of aggregation). This is because every communicative action changes the situational condition for further communicative actions (Friemel & Bixler, 2018; Luhmann, 1996, p. 14). Therefore, the public sphere is not only the result of all actors, communicative actions, and content, but, at the same time, the situational condition for any further communicative action. Therefore, theoretical reasoning and empirical investigation need to be very sensitive to these decisive differences in behavioral preferences as a starting point of larger effects (Slater, 2007). At the same time, it is likely that the dynamics do not perpetuate infinitely, but that there are points where decisive changes occur. This may be endogenous by means of a saturation effect or exogenous by means of regulation by an authority.

Conclusion

The academic discourse on the public sphere often begins at the macro-level of the public sphere and focuses on the performance of central actors (e.g., public service media, media companies, and regulators) to reach normative goals. In contrast to this top-down approach, this article began from the bottom up with a description of what can plausibly be assumed for individual actors in order to link these micro-behaviors to aggregated dynamics and structures. Given the multitude of possible communicative roles and situations, we focused on the most basic roles and behavioral preferences. This reasoning suggests the emergence of a public sphere that is characterized by specific network structures and the dominance by a limited number of actors and contents. In fact, this assumption is backed by empirical findings regarding the longtail distribution of content and network structures of the public discourse. Hence, the proposed conceptualization of the public sphere as a dynamic network (in which actors perform communicative actions) seems to provide a valid starting point to link the micro-level of individual actors to the macro-level of the public sphere.

Of course, more detailed theoretical discussions and empirical investigations of all aspects are necessary. With respect to the theoretical discussion, this includes the concept of "actor constellation" and the related modes of interaction. An actor constellation exists when at least two actors interact with each other (Schimank, 2016, p. 202) and are, therefore, in a "reciprocal relationship" (Simmel, 1909, p. 296). There are several ideal-typical patterns of interaction (Neuberger, 2014, 2022), such as cooperation and conflict. Cooperation is experienced if the communicative action serves a shared interest or the individual interest of the respective other (Lewis, 2006, pp. 201–204). In a conflict, opponents with differing interests or values interact directly and try to convince each other or the recipients. The distinction of interaction modes can provide new avenues for normative discussions. They can be assessed for their quality (Neuberger, 2022, p. 77), for example, in the case of conflicts involving criteria of deliberative quality (Habermas, 1991, 2008).

With respect to empirical research, the proposed concept allows three different research designs: First, future studies can advance our knowledge about the behavioral preferences and decisions of individual actors with respect to the four communicative actions and thereby inform agent-based modeling approaches (Waldherr, 2014). Second, the analysis of structures on the macro-level may help to infer regarding the prevalence of the behavioral preferences of the actors. Third, longitudinal network data on communicative actions allow to merge the two perspectives and to test theoretically informed stochastic models regarding their ability to explain the observed dynamics (Friemel, 2021; Snijders et al., 2010; Stadtfeld et al., 2017).

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