New Methods of Measuring Opinion Leadership: A Systematic, Interdisciplinary Literature Analysis

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Opinion leadership research has changed with the development of new online communication environments. Consequently, the already diverse methods of measuring opinion leadership have expanded further. With the help of a systematic literature analysis of 410 articles published in the past 20 years, I collected, organized, and compared traditional and new methods. The analysis identifies three major methods: traditional methods of self-assessment, assessment by others, and the new method of algorithmic assessment. Algorithmic assessment is already used by 37% of all analyzed studies and 74% of the studies researching opinion leadership online. It comprises four main criteria serving as indicators for opinion leadership: contacts, activity, feedback, and citation/imitation. A comparison with traditional methods shows that different types of opinion leaders are identified with the new algorithmic assessment and the construct has split into multiple dimensions.

Keywords: multistep flow of communication, opinion leaders, social media, literature analysis

Increasingly, different actors (e.g., mass media, organizations, companies, and individuals) inhabit the Internet public sphere, publish content, report, and discuss things they are interested in or seek to influence others' opinions. Mass media are no longer the only gatekeepers providing information about various topics ranging from current societal affairs to special interests. However, the notion that mass media are not the only entities playing a crucial role in informing the public and shaping its opinions already had gained popularity long before the development of online communication. More than 70 years ago, Lazarsfeld, Berelson, and Gaudet (1944) discovered that certain individuals—so-called opinion leaders—might be important in spreading messages, too. Opinion leaders are communicative, well informed, and well connected. These characteristics enable them to transmit information they learned from the mass media or elsewhere to their peers and to give advice when needed. Now, the Internet and especially the social web offer opinion leaders (and anyone else with access and a widely available set of

skills) the opportunity to publish content for a potentially large audience without much effort. They distribute opinions and information not only through interpersonal communication channels, but also through their accounts on several social media platforms.

Since the 1940s, the identification and the potential impact of opinion leaders on public opinion and behavior have been of interest in various disciplines. In organizational communication, the goal is to identify and reach individuals who effectively distribute word-of-mouth recommendations and thereby influence other consumers' buying behavior (e.g., Bertrandias & Goldsmith, 2006; Goldsmith, Flynn, & Clark, 2012). In health care, researchers focus on the diffusion of healthy behaviors through opinion leaders (e.g., Thompson, Estabrooks, & Degner, 2006; Valente & Pumpuang, 2007). In politics, strategists want to know how voting decisions or civic engagement can be affected by influential individuals in grassroots movements (e.g., Nisbet, 2006; Shah & Scheufele, 2006). In the past 15 years, researchers have examined opinion leadership in online environments as well (e.g., Aral & Walker, 2012; Lyons & Henderson, 2005). In addition to traditional concepts and measurements, new methods of finding influential users in online communities by using different ranking algorithms have already emerged. However, these new methods are highly diverse, and their relationship with traditional methods is still unclear.

With the help of a systematic, interdisciplinary literature analysis, I collected new methods of researching opinion leadership and organized them. In this article, I discuss their validity in measuring the concept. The goal is to provide a comprehensive overview of the state of research and identify new directions.

Opinion Leadership

The idea to have a closer look at how individuals influence their peers mainly stems from social psychology. Communication scholars first embraced it during the 1940s. As part of the People's Choice study, Lazarsfeld and colleagues (1944) examined factors influencing voting decisions during the American presidential election in 1940 by surveying 3,000 voters in a panel design study. They found that voters who were less interested in politics and voters who changed their minds or made their decision rather late during the campaign had informed themselves about the election mainly through interpersonal communication channels. The researchers were surprised that mass media were less influential than expected. Instead, peers played a major role in influencing people's voting decisions. In fact, about one fifth of the surveyed voters stated that they either had recently tried to convince people of their political ideas or had been asked for advice on a political question. Thus, they were identified as opinion leaders (Lazarsfeld et al., 1944, p. 50). These opinion leaders could be found in all social strata and used mass media more often. This led the researchers to believe that there existed a two-step flow of communication, in which "ideas often flow from radio and print to opinion leaders and from them to the less active sections of the population" (Lazarsfeld et al., 1944, p. 151).

In the following years, studies extended these findings by indicating that opinion leaders transmit information, provoke social pressure in a group, and thus influence others (Katz, 1957, p. 77). Furthermore, they are themselves influenced by other opinion leaders, which supports the notion of a

multistep flow of communication (Menzel & Katz, 1955, p. 352) instead of only a two-step process. Rogers (1962/2003) stressed the importance of opinion leaders in the diffusion of innovations, as they help spread information about innovations and influence others to adopt them. Subsequently, researchers have studied the opinion leaders' impact in the context of product diffusion, health care, agriculture, and other areas (Weimann, 1994), giving them many different labels (e.g., opinion leaders, influentials, influencers, or mavens). According to Katz (1957, p. 73), opinion leaders can be described by their personality ("who one is"), their competence and knowledge ("what one knows"), and their position in a social network ("whom one knows"). Weimann, Tustin, van Vuuren, and Joubert (2007, p. 176) suggest that opinion leaders can be found at every social level, in both sexes, and in all professions and age groups. They have common characteristics, such as being communicative and having a strong personality and many social contacts. In addition, they are considered experts in their field and usually exert their influence only in that specific field (monomorphous), although sometimes they can be influential in different areas of expertise as well (polymorphous; Katz & Lazarsfeld, 1955/2006). Yet, the numerous methods of identifying opinion leaders and the different topic areas in which they are influential sometimes lead to different characterizations.

One central weakness of the opinion leadership concept has always been its somewhat blurry definition. Lazarsfeld and colleagues (1944) defined opinion leaders as those "who are most concerned about [an] issue as well as most articulate about it" (p. 49), emphasizing personal attributes such as involvement and communicative behavior. Others have paid more attention to the effects opinion leadership might have in the diffusion of information and opinions, defining it as "the degree to which an individual is able to influence other individuals' attitudes or overt behavior in a desired way with relative frequency" (Rogers, 1962/2003, p. 27). Weimann (1994, p. 71) criticized the term *opinion leader* because it suggests that the person has to have special leadership qualities often associated with a formal leadership position. He favored the label *influential* instead. Katz and Lazarsfeld (1955/2006, p. 108) also stated that they were less interested in leaders but understood opinion leadership to be a communication role comprising several subroles, such as being the originator of a new idea, its transmitter by forwarding it to other people, or the influential who evaluates the idea. In addition, an important characteristic of opinion leaders is that they exert their influence informally (Katz & Lazarsfeld, 1955/2006, p. 368). From these definitions, we can derive three core elements of opinion leadership: (1) Opinion leaders have a special influence on others' awareness of an issue, as well as their opinions and behaviors. (2) Opinion leaders are individuals who influence others through mediated or nonmediated interpersonal communication. (3) Opinion leaders are not professional communicators (e.g., journalists or PR professionals). Instead, they influence others informally. Because they do not act as representatives of special organizations and institutions with corporate interests, people might think they are more trustworthy (Lazarsfeld et al., 1944, p. 152). Most past research has focused on these nonprofessional, individual opinion leaders, although researchers have sometimes expanded the scope of the concept by studying media organizations (e.g., Noelle-Neumann & Mathes, 1987) or celebrities (Stehr, Rössler, Leißner, & Schönhardt, 2015) as opinion leaders as well.

Furthermore, it is important to note that especially diffusion theory (Rogers, 1962/2003) names some constructs that are similar to opinion leadership but not synonymous: (1) early adopters and champions that are distinct from opinion leaders because the latter do not always favor innovations, (2)

change agents who act as representatives of organizations and are therefore not independent, and (3) lead users who develop innovations themselves.

Traditional Methods of Measuring Opinion Leadership

The methods used to measure opinion leadership have always been diverse. In the People's Choice study, Lazarsfeld and colleagues (1944) used two self-designating questions. Those who tried to influence others and had been asked for advice were dubbed opinion leaders. Subsequent research often criticized that these questions were not sufficient to measure the concept (e.g., Katz, 1957). Therefore, more complex scales evolved, and completely different methods emerged as well. From a social science perspective, Weimann and colleagues (2007) distinguish six traditional methods of measuring opinion leadership: (1) according to a person's formal position or (2) their reputation, (3) by observing the communication patterns in a community, (4) through self-designation by responding to items in an opinion leadership scale, (5) sociometric by analyzing the social network structure of a group, and (6) by asking key informants. Few studies have used the first method given that opinion leadership by definition should not depend on the formal position of a person. Opinion leaders are first and foremost ordinary people, influencing others in their immediate social circle. Furthermore, it has been difficult to observe opinion leaders, especially in large communities (Weimann et al., 2007). Outside the social sciences, researchers have used these methods as well. Valente and Pumpuang (2007), for example, identified similar methods of measuring opinion leadership by analyzing 191 studies from a clinical or health-related context. Both classifications highlight the diversity of methods, but the categories are not always distinct.

Therefore, the following review is structured based on the people who actually identify opinion leaders. In a first step, I distinguish between *self-assessment* and *assessment by others*. The others can be opinion receivers, which are the people in the community being influenced by opinion leaders (Robinson, 1976) and who therefore can tell which peers are influencing them. Furthermore, they can be external observers who do not directly belong to the community but know that community well (e.g., change agents or nongovernmental organizations and the researchers themselves as special types of external observers). In addition, new methods of measuring opinion leadership by using *algorithmic assessment* are included and are examined in detail in this article. Using such key figures (e.g., number of followers or retweets on Twitter) can also be seen as a type of observation. That is why Nejad, Sherrell, and Babakus (2014, p. 196) call these new methods "observation-based methods" in contrast to "communication-based methods," which include self-assessment and assessment by others.

Self-Assessment

From a practical point of view, self-assessment is the easiest way to measure opinion leadership because it can simply be integrated into a survey. However, researchers have to rely on self-perception, without knowing whether that person only thinks he or she is able to influence others. Usually, researchers choose from a number of well-established scales to measure self-assessed opinion leadership. Some of these scales measure monomorphic opinion leadership, which depends on one specific topic. Others measure polymorphic opinion leadership as a personality trait, identifying people who are

influential across different areas of expertise. In addition, there are maven scales that are topic-dependent because they deal with a general topic area (e.g., health, consumer products) but do not focus on a specific issue.

Monomorphic Scales

At first, a commonly used scale was the one invented by Childers (1986). Childers developed the scale for the topic "cable TV," but the items are applicable to any other topic as well. This scale focuses especially on the ability of opinion leaders to transmit information but does not integrate their influence potential. By contrast, the opinion leadership scale by Flynn, Goldsmith, and Eastman (1996) consists of items describing the ability to influence others' attitudes and behaviors. Reynolds and Darden (1971) developed a scale that includes both dimensions: information giving and influence. In addition, Hirschman and Adcock (1978) proposed a scale that researchers mainly used to measure fashion opinion leadership. It consists of two dimensions: opinion leadership and innovativeness. The three items measuring opinion leadership focus on giving advice and influencing others' purchase intention.

Maven Scales

Mavens are opinion leaders who are influential in a certain area such as consumer products or health care but are not specialized on specific product categories or diseases. Feick and Price (1987), for instance, define market mavens as

> individuals who have information about many kinds of products, places to shop, and other facets of markets, and initiate discussions with consumers and respond to requests from consumers for market information. (p. 85)

Accordingly, health mavens are people

> who would have knowledge of a broad range of health behavior and health topics, would enjoy volunteering health information to others, and would be recognized as health experts by others. A health maven would be asked health-related questions often and would serve as an information resource for others. (Boster, Kotowski, Andrews, & Serota, 2011, p. 182)

The two scales developed by Feick and Price (1987) for market mavens and Boster et al. (2011) for health mavens both measure information and advice giving in market- or health-related topics.

Polymorphic Scales

Polymorphic scales are not focused on any area of expertise and therefore are quite different from monomorphic and maven scales. An example is the personality strength scale by Noelle-Neumann (1983). In addition to advice giving and the joy of persuading others, it mainly measures personality

characteristics such as self-efficacy, self-consciousness, leadership qualities, responsibility, and assertiveness. Gnambs and Batinic (2011) also emphasized the existence of a more stable opinion leadership trait and developed a generalized opinion leadership scale. Together with domain-specific expertise, this scale was the strongest predictor for domain-specific opinion leadership as measured by the Flynn scale (Flynn et al., 1996; Gnambs & Batinic, 2012).

Assessment by Others

The assessment of opinion leadership by others is often seen as more precise than self-assessment, but also as more expensive and laborious (Weimann et al., 2007, p. 178). Nevertheless, researchers use this method, especially when identifying opinion leaders in health-related contexts (Valente & Pumpuang, 2007). As explained before, there are different identifiers, namely, opinion receivers, researchers, and other external observers. In general, no standardized scale is used when measuring opinion leadership through assessment by others. One exception is the Hiss instrument (Hiss & MacDonald, 1978), which measures expert opinion leadership in communities of health professionals (doctors, nurses, etc.). It requires opinion receivers to name up to three colleagues for each of the following three criteria: (1) persons who convey information, (2) individuals who like to teach and have a high level of clinical knowledge and expertise, and (3) caring physicians with a high level of humanistic concern.

New Methods of Measuring Opinion Leadership

With the development of the social web, interpersonal communication can now take place on online platforms where it is possible to share information and thoughts with other people without spatial or temporal boundaries. These platforms offer a vast amount of data for tracing communication and information paths. People befriend others in online social networks, enabling researchers to identify connections between profiles, while links and shares illustrate information flows. In the last years, computer scientists have seized the opportunity to crawl and save public interactions in the social web and test new approaches of measuring opinion leadership online. The survey method, which was prevalent for both traditional self-assessment and assessment by others, has been replaced by the automated analysis of public digital communication trace data with key figures and algorithms.

Measuring opinion leadership through algorithms can be described as a special type of assessment by researchers. They define key figures, weigh them, and use them to calculate a score indicating the degree of opinion leadership in an online network. In the end, they usually create a ranking of all network actors (e.g., Kwak, Lee, Park, & Moon, 2010). The formulas used to calculate opinion leadership are not always complex algorithms. Sometimes, single key figures (e.g., the number of followers on Twitter) serve as the only indicators for opinion leadership.

One of the key concepts these studies rely on is social network analysis, which analyzes the relationships between members of a social system, and has its roots in the 1930s when Jacob Moreno modeled these relationships as a graphic network. The nodes in such networks represent its members (i.e., persons or institutions). The lines between the nodes are the edges indicating that a relationship

between nodes exists (Scott, 2013, p. 11ff.). Traditionally, information about the relationships of different network members was obtained by surveys or the observation of network members. Online, however, researchers model digital trace data indicating all kinds of links between accounts or websites as social networks. They analyze the diffusion of everything that might flow from one person to another via these networks (e.g., information, opinions, or behavior; Christakis & Fowler, 2011). From this perspective, the influential nodes in a network are those with the best strategic network position. This is essential because opinion leaders cannot exert any influence if they are not connected to other network members.

Accordingly, in their literature analysis of 16 studies dealing with the identification of opinion leaders on social networks sites (SNSs), Probst, Grosswiele, and Pfleger (2013) identified two main approaches: (1) studies focusing on the strategic location of users on SNSs and (2) studies focusing on the solution of the influence maximization problem. Studies choosing the first approach examine social networks based on different types of relationships (e.g., friendship, interactions, and transactions). They often use centrality measures to identify influential users, for example, degree centrality (number of direct contacts of a network member), closeness centrality (proximity of a user to all other network members), or betweenness centrality (frequency of being on the shortest path between any two members of the network). Studies solving the influence maximization problem use diffusion models to identify network members that need to be activated to improve the diffusion of information or behavior in the network. Similarly, Singh, Mishra, and Sharma (2013) collected nine techniques for identifying influential users on SNSs including the aforementioned two. However, those techniques rather define the basic algorithms that are used to define influential users, but do not clearly point out the criteria that are actually used to measure opinion leadership.

Method

To examine recent developments in interdisciplinary opinion leadership research and to identify new methods of measuring opinion leadership, I conducted a systematic literature analysis. The goal was to provide a complete, thorough, and transparent analysis of the topics, methods, and results of current studies. Therefore, publications published between 1995 and 2014 that dealt with the identification, characterization, and effectiveness of opinion leaders were collected and analyzed. I used 1995 as a starting point because one year before, Weimann (1994) had published his extensive literature review dealing with early opinion leadership studies. Based on his work, I aimed to identify new developments in opinion leadership research that have since emerged. For this research article, I mainly focus on the methods used to measure opinion leadership, sidelining other findings concerning the characteristics and influence of opinion leaders (see Jungnickel, 2017).

There are two possibilities to collect the studies necessary for a systematic literature analysis: First, one can define important scientific journals and search for relevant articles there (e.g., Zhang & Leung, 2014). Second, a search in scientific databases can be conducted with the help of predefined keywords (e.g., Probst et al., 2013; Thompson et al., 2006; Valente & Pumpuang, 2007). For this analysis, the second option was more suitable because opinion leadership is researched in many

disciplines, making it difficult to focus only on specific journals. Therefore, I used several databases[2] that collect articles from the disciplines Weimann (1994) identified as those dealing with opinion leadership: social sciences (including psychology, sociology, communication, and political sciences), economics, medicine, and health care. In addition, computer sciences were included given that they recently have started to identify opinion leaders on SNSs as well.

In these databases, I searched for journal articles and conference proceedings written in English or German[3] that were published between 1995 and 2014. At least one of the following keywords usually associated with opinion leadership had to be included in their titles or abstracts: *opinion leader/s*, *opinion leadership*, *personality strength*, *maven/s*, *mavenism*, *influential*, *influential users/people/members/ bloggers/individuals*, *influencer/s*, and *online leaders*. I identified 2,708 articles. Afterward, I manually evaluated the abstracts of the articles to determine whether they did in fact research the identification, characterization, and effectiveness of opinion leaders as defined above. Occasionally, the studies did not deal exclusively with individual opinion leadership of nonprofessional communicators, but they had to at least include these opinion leaders to be considered as relevant. Finally, the whole articles were analyzed, and again those that did not deal with opinion leadership were excluded. In the end, 443 relevant articles remained. The relevant sample base for this article, however, is 410 articles in which researchers presented one or several methods they used to measure opinion leadership.

For an in-depth analysis of the articles, I chose a mixed-methods approach combining qualitative and quantitative content analysis. Usually, systematic literature analyses are conducted as either meta-analyses or narrative syntheses (Petticrew & Roberts, 2006, p. 164). In this case, a meta-analysis, which statistically compares the results of different studies, was not possible. The research focus was too broad and the methodological approaches of the studies were too diverse to be comparable. A narrative synthesis, however, seemed to be too interpretative and less systematic. Therefore, I chose a mixture of these two approaches by conducting a qualitative and quantitative content analysis of the articles with the help of a codebook. It contained categories concerning the theoretical foundations, the study design, the research units, the measurement of opinion leadership, and the study results. Some categories were already predefined; others were created inductively during the coding process. Specifically, to identify the methods that were used to measure opinion leadership, I followed a two-step process. First, I extracted the passages in the articles describing the operationalization of opinion leadership. In a second step, I qualitatively analyzed these text extracts and inductively built categories identifying the methods that were used.[4] Afterward, I evaluated the category building as well as all other codings and the above-mentioned article selection with an intracoder reliability test.[5]

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[2] Web of Knowledge, Communication & Mass Media Complete, Business Source Premier, IEEE Xplore, ACM Digital Library.

[3] Only five articles were written in German.

[4] A PDF containing the references for all analyzed studies and an Excel file with all the codings for categories relevant to the results presented here are provided as supplemental material: www.dropbox.com/sh/k7zlebqqij5xuni/AADV5jd1wUjSMT30gISlDYPja?dl=0

[5] For the intracoder reliability test, I first chose 50 random abstracts from the total of 2,708 abstracts and again evaluated whether they fit the selection criteria. The Holsti intracoder reliability coefficient was .94.

Of the 410 articles, 184 focused specifically on online opinion leadership. Although the first article was published in 2002, not much research dealt with online opinion leaders in the early 2000s. However, in 2010, the body of research started to grow, and since then, 153 articles have been published. Articles about online opinion leadership were mainly published in journals or conference proceedings dealing with computer sciences (50%), followed by economics (25%), interdisciplinary research (15%), social sciences (8%), and health sciences (2%). In comparison, the studies focusing on offline opinion leadership were published primarily in journals about economics (39%) and health sciences (23%). All studies primarily used the terms *opinion leader/ship* (61%) and *influentials* (22%), and other such labels as *influencers* (6%) and *mavens* (11%) were used less.[6] Table 1 shows the platforms that studies examined when researching online opinion leadership. Obviously, microblogs such as Twitter have been much more in the focus of research than SNSs, despite having fewer users. This might be due to the difficulty for researchers to obtain data from SNSs such as Facebook, either because of restrictions made by the platform owners or because of privacy settings set by the users themselves.

Table 1. Online Platforms Where Opinion Leadership Had Been Researched.

Platform	%
Microblogs (e.g., Twitter, Sina Weibo)	23.9
Blogs	12.5
Groups and discussion forums	10.3
Social network sites (e.g., Facebook)	8.2
Consumer review sites	6.0
Recommender systems	3.8
Social sharing sites	2.7
Others	7.6
Several	7.6
No specific platform	17.4

Note. Base comprised all 184 articles about online opinion leadership.

Results

When researching opinion leadership, the different disciplines also prefer different methods to measure the concept. In the social sciences and economics, self-assessment is prevalent, whereas in health and medicine, researchers rely more on assessment by others. Naturally, computer scientists mainly use algorithmic assessment to identify opinion leaders (see Table 2).

Second, I chose 30 of the 443 articles and analyzed them again. The Holsti coefficient was above .85 for 61 of 66 numerical categories. I redefined the categories with low reliability coefficients and coded them again for all articles to make sure their assessment was accurate.

[6] Despite the labeling differences, I use the term *opinion leader/ship* hereafter, although the possible differences between the labels are discussed later.

Table 2. Methods of Measuring Opinion Leadership
in Different Disciplines, in Percentages.

Method	Social sciences (*n* = 40)	Economics (*n* = 132)	Computer sciences (*n* = 108)	Health & medicine (*n* = 54)	Interdisciplinary research (*n* = 54)	Others (*n* = 22)
Self-assessment	60.0	76.5	5.6	18.5	42.6	27.3
Assessment by others	30.0	15.9	11.1	83.3	24.1	36.4
Algorithmic assessment	17.5	15.2	88.9	1.9	38.9	36.4

Note. Base comprised 410 studies operationalizing opinion leadership.

Similarly, when looking at online opinion leadership, algorithmic assessment is primarily used to identify opinion leaders (see Table 3).

Table 3. Methods of Measuring Opinion Leadership
Online and Offline, in Percentages.

Method	Opinion leadership studies offline (*n* = 226)	Opinion leadership studies online (*n* = 184)	All studies (*N* = 410)
Self-assessment	56.6	22.8	41.5
Assessment by others	38.5	13.0	27.1
Algorithmic assessment	7.5	73.9	37.3

Note. Base comprised 410 studies operationalizing opinion leadership.

Through inductive category building, I identified the main criteria for opinion leadership within each of the three methods.

Self-Assessment

Overall, I identified seven main criteria for measuring opinion leadership through self-assessment (see Table 4) in the 170 studies that used this method.

Table 4. Criteria for Measuring Opinion Leadership
Through Self-Assessment, in Percentages.

Criterion	Example scale item	Indicator for opinion leadership		
		Offline (*n* = 128)	Online (*n* = 42)	All studies (*N* = 170)
Giving advice	"Other people come to me for advice about choosing…" (Flynn et al., 1996)	82.0	83.3	82.4
Giving information	"My friends come to me more often than I go to them for information about…" (Reynolds & Darden, 1971)	48.4	57.1	50.6
Influence on opinion	"I often influence people's opinion about…" (Flynn et al., 1996)	38.3	42.9	39.4
Influence on behavior	"People in my social circle often act upon my advice" (Gnambs & Batinic, 2011)	36.7	35.7	36.5
Interpersonal communication	"In general do you talk to your friends and neighbors about… ?" (Childers, 1986)	19.5	19.0	19.4
Leadership personality	"I like to take the lead when a group does things together" (Noelle-Neumann, 1983)	11.7	14.3	12.4
Agenda setting	"My friends and acquaintances often discuss subjects that I brought up" (Gnambs & Batinic, 2011)	3.9	4.8	4.1

Note. Base comprised 170 studies operationalizing opinion leadership through self-assessment.

On average, 2.5 criteria were used per study to identify opinion leaders. The most commonly used criterion was giving advice, either by offering advice or being asked for advice by others. Most self-assessment scales focused either on information and advice giving (Boster et al., 2011; Childers, 1986; Feick & Pryce, 1987) or on advice giving and influence on opinions/behavior (Flynn et al., 1996; Gnambs & Batinic, 2011; Hirschman & Adcock, 1978; Noelle-Neumann, 1983). This shows that different scales measure different types of opinion leaders and support the notion of (at least) two different dimensions or functions of opinion leadership: transmitting information and persuading others. When comparing studies on offline and online opinion leadership, I could detect no major differences concerning the measurement criteria.

An interesting question that often arises when measuring opinion leadership through self-assessment is whether opinion leadership should be conceptualized as a continuous trait, or whether there are clear boundaries between opinion leaders and nonleaders. Whereas 57% of the studies measured opinion leadership as a continuous trait, 43% created different opinion leader groups. However, the criteria for splitting the sample were often rather arbitrary (e.g., 1 standard deviation above the mean on an opinion leadership scale, or the top 10–33% with the highest values on the scale, or a median split). These different techniques have the disadvantage of making the results less comparable. For example, the probability of finding differences between opinion leaders and others might decrease with the percentage of people in the sample being identified as opinion leaders. Furthermore, Gnambs (2017) found that the latent trait distribution on the generalized opinion leadership scale cannot be represented by discrete trait levels reflecting different opinion leadership types. Rather, opinion leadership was best conceptualized as a continuous trait.

Assessment by Others

When others identify opinion leaders, they are often asked to use criteria similar to the ones used for self-assessment (see Table 5). Two additional criteria emerged: (1) knowledge and expertise and (2) social competence and popularity. They are especially important in health communication, in which either popular individuals are trained in community popular opinion leader programs to prevent such diseases as AIDS or knowledgeable physicians act as opinion leaders for their colleagues.

Table 5. Criteria for Measuring Opinion Leadership
Through Assessment by Others, in Percentages.

Criterion	Example	Indicator for opinion leadership		
		Offline (*n* = 87)	*Online* (*n* = 24)	*All studies* (*N* = 111)
Social competence /popularity	Popular, likeable, trusted, and respected people	26.4	0.0	20.7
Interpersonal communication/ contact frequency	People they can discuss certain topics with, frequency of chatting	23.0	12.5	20.7
Giving advice	People they ask for advice	21.8	16.7	20.7
Knowledge/ expertise	People who are knowledgeable and experts in their fields	23.0	8.3	19.8
Giving information	People who convey information	19.5	16.7	18.9
Leadership personality	People who are good leaders and to whom they look up	13.8	0.0	10.8
Influence on opinion	People with perceived influence on them and others	8.0	16.7	9.9
Influence on behavior	People who influenced the choice to adopt a new product	5.7	4.2	5.4
Formal position	Religious leaders, prominent community figures	6.9	0.0	5.4

Note. Base comprised 111 studies operationalizing opinion leadership through assessment by others

There was no real dominant criterion, and in approximately 20% of the 111 studies, no specific criteria were given to peers or external observers. Instead, they were asked to just name opinion leaders or influentials. It was also less common to use more than one criterion to identify opinion leaders given that an average of only 1.3 criteria was used per study.

Algorithmic Assessment

The criteria for measuring opinion leadership with the traditional methods of self-assessment and assessment by others were rather similar. However, when examining the key figures and algorithms used to measure opinion leadership (mainly) online, I came across very different indicators, which can be divided into four main criteria: citation/imitation, contacts, feedback, and activity (see Table 6).

Table 6. Criteria for Measuring Opinion Leadership Through Algorithmic Assessment.

Criterion	Key figures for quantity	Key figures for quality	%
Citation/imitation	Number of links, retweets, shares	Text similarity in posts Increasing conformity of opinion and behavior	43.8
Contacts	Number of contacts (friends, followers, subscribers) Network position (centrality measures)	Tie strength Frequency of interactions Influence of contacts	39.2
Feedback	Number of views Number of likes and evaluations Number of comments and mentions Number of received questions	Comment tonality	38.6
Activity	Time spent on platforms Frequency or number of posts, tweets, reviews, answers	Content quality (novelty, length, persuasion attempts)	34.0

Note. Base comprised 153 studies measuring opinion leadership with algorithmic assessment.

Each criterion had a quantitative aspect, which covered only the number of certain digital trace data and a qualitative aspect exploring the data in more detail. On average, 1.6 of the four criteria were used to measure opinion leadership. However, 52% of all studies used only one criterion for measurement.

The criterion *contacts* comprised all key figures examining the social relationships of network members. The number of contacts and the strategic position in the network are important if opinion leaders want to transmit information because they can potentially reach many other actors. For persuasion, however, the quality of contacts is crucial. Instead of just counting the number of contacts, the intensity of the relationship is taken into account, for example, by looking at the number of reciprocal ties, the number of messages exchanged by two network members, or the frequency of interaction. The contacts are also seen as more important if they are influential themselves, do not follow too many other opinion leaders, and are

diverse, meaning they belong to different groups. The rationale behind this is that users with many diverse contacts can bridge information across group boundaries.

The second criterion *activity* measured how often someone communicates via online platforms. Having many contacts is meaningless, as long as one does not send anything to them. The simplest indicator for activity is the time spent on a particular platform. However, this criterion does not give any indication on what is done on the platform during that time and is therefore not a sufficient enough indicator for opinion leadership. Hence, it is often combined with other quantitative indicators such as the number of tweets, posts, reviews, or the number of purchases in an online shop. Sometimes the number of responses to questions is counted as well. However, Cha, Haddadi, Benevenuto, and Gummadi (2010) mention a principal problem of all key figures using the absolute number of tweets/posts. They tend to favor spam accounts, which shower their followers with content that will soon be ignored by them. That is why the quality of the content is important as well. Agarwal (2008) proposed novelty and eloquence as indicators for content quality. Novelty is measured by a low number of outlinks assuming that someone posts something original if they do not cite others. The length of a post indicates eloquence because longer posts might examine an issue more profoundly. However, these indicators seem to be rather superficial proxies for content quality. Sometimes, researchers also automatically scan texts for arguments, persuasive wording, or technical terms indicating expertise.

In contrast to the first two criteria, *feedback* takes an important premise for the influence of opinion leaders into account: By giving feedback, the opinion followers acknowledge that they have at least noticed the opinion leader's message. This is essential given that users are confronted with a vast amount of information on online platforms and cannot process all content they receive from their contacts. The quantitative part of the feedback criterion comprises selection feedback (the number of views), one-click feedbacks such as likes and evaluations, or more complex feedback actions such as comments. Mentions on Twitter can also be indicators for feedback because they often are used to directly address the originator of a message. However, a large number of feedback indicators does not automatically mean that the opinion receivers have been persuaded to share the opinion leader's attitudes. If someone mainly receives negative comments, they probably do not have an opinion leading function. Therefore, feedback quality is sometimes measured as well (e.g., by analyzing comment tonality through automated text analysis).

The last criterion is *citation/imitation.* Similar to the feedback criterion, it indicates that others have acknowledged the message. However, instead of just evaluating or commenting on it, the opinion followers now "copy" the message by sharing it with their own contacts or incorporating various passages into their own texts. The main difference between citation and imitation is that citers explicitly name the original source, but imitators do not. The criterion includes all key figures concerning the frequency of a post being linked to or retweeted. Sometimes, influence is also assumed if somebody publishes texts with sentences, words, or hashtags that are similar to an earlier original post. However, these studies usually do not analyze whether the citations or imitations are accompanied with a statement containing some kind of—possibly negative— evaluation. Therefore, it is unclear whether users whose posts are shared frequently can really spread their opinion in the network and influence others. Another indicator is conformity. If an opinion leader's opinion (usually measured by the same tonality or same interests) or behavior (e.g., clicks) is similar to the opinion receivers' opinions or behaviors, it is possible that some kind of influence has happened. However, another explanation for this kind of conformity might be homophily. People with similar opinions and interests tend to

become friends, meaning that their similarity could be the reason and not the consequence of their interactions (Aral, 2011). To rule out this explanation, some studies try to figure out whether an opinion follower's opinion or behavior has changed at a later point in time from that of the opinion leader (e.g., Aral & Walker, 2012).

Comparison

When comparing these criteria with the indicators used in traditional methods of identifying opinion leaders, we can see some striking differences: First, according to the two-step flow of communication, an important function of opinion leaders is to relay information from the mass media to a broader audience. However, this function does no longer seem to serve as an indicator for opinion leadership in the algorithms. Studies usually count only how often someone's content has been retweeted or shared instead of counting how often someone has retweeted or shared something and thus played a significant part in the distribution of a message throughout the network. There are few studies researching these transmitters of information, and they no longer call them influentials or opinion leaders but *intermediaries* (e.g., Wu, Hofman, Mason, & Watts, 2011). Consequently, the new online criteria seem to focus more on the opinion leader's ability to persuade. Second, it is not clear whether the behaviors and relationships observed on online platforms only seem similar to their offline equivalents (Mahrt & Scharkow, 2013). For example, it is not certain that such criteria as imitation really indicate influence on opinions or behaviors. Third, there is still too little research comparing the different methods of opinion leadership. For example, the findings concerning the comparability of self-assessment and assessment by others are inconclusive, with some studies finding high correlations (e.g., Gnambs & Batinic, 2011) and others not (e.g., Weimann et al., 2007). In those cases, it is often unclear whether the different judges or the different criteria are the main causes for the absence of correlations. Similarly, the number of studies comparing self-assessment or assessment by others with algorithmic assessment is too scarce to get any meaningful insights.

Overall, the different criteria used to measure opinion leadership suggest that the construct is not one-dimensional, but instead incorporates a number of different types of opinion leaders. Given that there are also many labels for opinion leadership, one might assume that these labels refer to different types of opinion leaders. However, the literature analysis found only partial evidence for this assumption: For example, mavens are almost exclusively identified through self-assessment (in 96% of the studies) and the criteria giving information and giving advice from the market maven scale by Feick and Price (1987). Influentials and influencers, on the other hand, are mainly identified by algorithmic assessment (in 87% and 84% of the studies, respectively). However, no dominant criterion emerged for defining these types of opinion leaders. Finally, for the term *opinion leader/ship*, I found a highly diverse mixture of methods and criteria, without any of them clearly standing out. Therefore, the existent labels are not entirely suitable to distinguish different types of opinion leadership. Instead, as shown earlier, the different functions of opinion leaders (transmitting information vs. persuading others) might serve to distinguish several types. Gladwell (2000) already proposed distinguishing between three types of influentials: connectors, mavens, and salesmen. Connectors are people with many contacts to people belonging to different groups. Mavens collect and transmit information, thereby giving advice to others. Salesmen are able to inspire others and to convince and persuade them. But even though some studies already have used this differentiation to get a more nuanced look at opinion leadership

(e.g., Boster et al., 2011; Budak, Agarwal, & Abbadi, 2010), the majority still does not clearly conceptualize which type of opinion leadership they are investigating.

Conclusion

With a shifting research focus from examining opinion leaders in smaller social systems (e.g., friendship groups, towns, etc.) toward searching for influentials on digital online platforms, new methods of measuring opinion leadership have emerged. Traditional methods such as self-assessment and assessment by others are complemented by new methods that are mainly based on algorithmic assessment. The criteria used to identify opinion leaders online range from the number and quality of contacts to the activity of users on SNSs, the feedback they get for their content, and their ability to inspire others to share their messages.

However, these criteria are only partially connected to the criteria used in traditional operationalization methods (see Table 7): The number of contacts, for instance, can serve as an indicator for popularity, and the frequency of answering questions by others corresponds to giving advice.

Table 7. Comparing Criteria for Opinion Leadership.

Self-assessment	Assessment by others	Algorithmic assessment
Leadership personality	Leadership personality	–
–	Formal position	–
–	Knowledge/expertise	Activity (usage of technical terms)
Interpersonal communication	Interpersonal communication/contact frequency	Contacts (contact frequency)
–	Social competence /popularity	Contacts (number of contacts)
Giving advice	Giving advice	Activity (responding to questions)
Giving information	Giving information	Feedback (number of "helpful" evaluations)
Agenda setting	**–**	Feedback (number of comments)
Influence on opinion	Influence on opinion	Imitation (increasing conformity)
Influence on behavior	Influence on behavior	

In addition, new indicators are used that better adjust to the changing communication conditions in the online world. At the same time, the algorithmic assessment of opinion leadership has its shortcomings, especially given that the data are often not qualitatively analyzed to make sure that the indicators are really suitable to identify influential users. It is also noticeable that the criteria contain few indicators for opinion leaders as information transmitters sharing content originated by other influential actors such as mass media or political and economic organizations, even though studies show that noninstitutional actors are relevant bridges and intermediaries in online news diffusion (Bobkowski, 2015; Karlsen, 2015).

This leads to another observation: When researching online opinion leadership, only a few studies distinguish between different groups of actors, especially between professional and nonprofessional communicators. SNSs create a space where all kinds of actors can communicate, consume, and interact with each other. On Facebook and Twitter, ordinary users as well as bloggers, journalists, politicians, and celebrities share their content. Collective actors such as parties, organizations, and media companies use these platforms as well. Organizations are no longer exclusively dependent on mass media to relay their messages to the public and can now directly communicate with their stakeholders through fan pages or Twitter accounts. Mass media that used to distribute information one way via newspapers, television, or radio can now communicate on the same channel as their audience, receiving immediate feedback through likes, comments, and shares.

In such an environment, the boundaries between professional and nonprofessional communicators begin to blur. For instance, bloggers that started as nonprofessional communicators begin to earn money for the distribution of sponsored content. Therefore, algorithmic assessment is often used to identify influentials without differentiating between different kinds of actors anymore, even though Lazarsfeld and colleagues (1944) originally explained the success of opinion leaders with their natural and purpose-free relationship to their followers. Recent studies also confirm that information in online reviews is perceived as more trustworthy if they come from independent reviewers (DeAndrea, van der Heide, Vendemia, & Vang, 2015). These advantages are based on the definition of opinion leaders as nonprofessional communicators. To identify them, a detailed analysis of user accounts is necessary to evaluate how much influence different groups of actors have. Some platforms already facilitate that process: The Chinese microblog Weibo, for instance, classifies users as celebrities, experts, organizations, media, and so-called virtual opinion leaders who are neither celebrities nor organizations but still have many followers with whom they actively engage (Wang & Li, 2016).

There is also a lack of studies that compare different methods of measuring opinion leadership and specify which types of opinion leaders can be identified with different criteria. Dimensions that could differentiate between types of opinion leaders already exist, for example, topic specificity (monomorphic vs. polymorphic opinion leaders), scope of influence (local vs. global), or function (information transmission vs. influence on opinions and behavior). Therefore, future studies should specify (a) which type of opinion leader they are examining and (b) test different methods to identify opinion leaders and compare the results. Bastos and Mercea (2016), for example, used a mixed-methods approach to research political activists on Twitter. First, they used the activity criterion to identify 191 topic-specific opinion leaders who had tweeted about at least 40 protest hashtags all over the world. In a second step, they

surveyed them, asking about their demographics and motives. Even though they had a low response rate (only 21 opinion leaders took part in the survey), such a combination of different methods of self and algorithmic assessment could be a valuable approach to find out more about online opinion leaders.

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