All you need is a (heuristic) cue?

An Empirical Investigation of the Use of Social Media Cues and Features and Underlying Mechanisms for Credibility Judgments of News and Political Communication

Von der Fakultät für Ingenieurwissenschaften,

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And all the memories of the pubs
And the clubs and the drugs and the tubs
We shared together
Will stay with me forever.

Peter Doherty

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Please contact the author if you are interested to obtain the following material:

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Study 2: Questionnaire & Stimulus Material

Study 3: Questionnaire & Stimulus Material

Parts of this dissertation have been presented in or accepted for talks at conferences. Please refer to the following publications for more information:

Study 1

Meinert, J., & Krämer, N. C. (2020). Which cues are credible? – The relative importance and interaction of expertise, likes, shares, pictures and involvement while assessing the credibility of politicians' Facebook postings. In *International Conference on Social Media and Society* (pp. 299-308). Chicago, USA.

Study 2

Meinert, J., Aker, A., & Krämer, N. C. (2019). The Impact of Twitter Features on Credibility Ratings - An Explorative Examination Combining Psychological Measurements and Feature Based Selection Methods. In *Proceedings of the 52nd Hawaii International Conference on System Sciences.* Maui, Hawaii.

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Abstract

In recent years, social media channels like Facebook and Twitter have brought about a fundamental transformation of communication. Besides being utilized for personal communication, social media has also developed into a broadly and often exclusively used source of news and political information (Bode, 2015; Fletcher & Nielsen, 2018; Metzger & Flanagin, 2015). Given that anybody can produce and share information on social media, communication characteristics such as real time communication, unlimited distribution, high connectivity, and the lack of editorial supervision pave the way for floods of information which severely complicate social media recipients' evaluation of the quality of online content. Therefore, it is crucial to gain a detailed understanding of how recipients assess the credibility of a message or source.

With regard to the question of how incoming information is processed, dual process models like the elaboration likelihood model (Petty & Cacioppo, 1986) and the heuristic systematic model (Chaiken, 1987) distinguish two ways of information processing which are activated depending on recipients' ability and motivation. On the central route information is thoroughly processed, whereas on the peripheral route recipients are more likely to base judgments (e.g., concerning credibility) on simple cues. Furthermore, source, message, and meta-informational cues are assumed to trigger cognitive heuristics (Kruglanski & Gigerenzer, 2011; Metzger & Flanagin, 2015; Sundar, 2008) – mental shortcuts which do not include all available information to reduce the cognitive load (Shah & Oppenheimer, 2008) and are mostly unconsciously applied by individuals (Tversky & Kahneman, 1974).

To this end, three empirical studies were conducted to explore (1) the cues upon which recipients base their credibility judgments in social media communication, (2) whether cue patterns are universal among different platforms and communication contexts, (3) whether social media cues and features and their effect on credibility perceptions can be examined by applying automated methods, (4) whether the relation between cue and judgment underlies a cognitive heuristic and (5) whether the operation of this heuristic can be measured by means of task latencies indicating effort reduction as core function of cognitive heuristics.

As a first step towards a systematic investigation, Study 1 (N = 341; postings: 1366) aimed to investigate the role and interplay of cues available in social media communication

and thus, tested the impact of source expertise, likes, shares, pictures, and topic involvement on evaluations of politicians' Facebook postings. The results revealed that source cues led to higher credibility judgments, whereas higher numbers of likes and shares unexpectedly led to decreased credibility. Contrary to expectation, recipients' involvement, need for cognition, and conformity with the message did not moderate the effects. The second study ($N = 2626$; ratings: 24823) sought to investigate not only a larger data set but also a different social media platform, namely Twitter. For large data sets, most researchers have suggested automated approaches to perform binary classification in order to determine information veracity, while studies have rarely considered recipients' perspectives and multidimensional psychological credibility evaluations. To fill this gap and gain more insights into the impact of a tweet's features on perceived credibility, a survey was conducted asking participants to rate the credibility of crisis-related tweets. The resulting 24823 ratings were used for an exploratory feature selection analysis, which revealed that credibility judgments are most affected by meta-informational features such as the number of followers of the author, the number of tweets produced, and the ratio between number of tweets and days since the creation of the author's Twitter account. Even though these features are classically defined as meta-informational (as they represent numbers aggregated by the system), they are strongly connected to the source of information, in this case the Twitter account holder.

Since both studies thus demonstrated source cues to be the most important anchors for individuals' credibility assessments, the third study ($N = 185$) was conducted to examine whether the relation between the expertise cue and resulting judgments and decisions is guided by a heuristic, namely the expertise heuristic. Therefore, a 2 (difference in expertise: yes vs. no) X 2 (number of conflicting cues: 1 vs. 2) x 2 (valence of additional cues: positive vs. negative) within-subject design was applied, asking participants to select one of two presented information sources described only by four attributes (source expertise, ratings of other users, picture, length) and related cue values. The findings indicate that the presence of the expertise cue reduced respondents' task latencies significantly. Nevertheless, the use of the expertise cue was found not to be used independently from additional information such as valence of the additional cues. This contradicts the notion of attribute substitution (Kahneman & Frederick, 2002), according to which heuristics are based on only one single cue. In sum, the results contribute to a more detailed understanding of the expertise heuristic

used in social media communication as triggered by the cue source expertise. Regarding the selection of information sources, recipients perceived source expertise to be the most important cue, and if this cue was present and positive for one of the given alternatives, the decision was easier and faster.

Overall, this dissertation provides empirical evidence regarding how social media recipients evaluate the credibility of content. This evaluation was found to be based mainly on source expertise cues, for Facebook as well as for Twitter, and for politicians' postings as well as for crisis-related communication. Consequently, source cues accelerated individuals' decision-making by means of effort reduction. In this vein, it can be argued that the relation between cue and judgment is guided by a cognitive heuristic, namely the expertise heuristic. In sum, the current work extended previous research on heuristics using self-reports or focus groups by providing empirical evidence through the measurement of effort reduction. The results can be further applied to develop support measures for users by highlighting relevant cues and features in the realm of interface design or media education.

Zusammenfassung

Social Media Plattformen wie Facebook und Twitter haben das Kommunikationsverhalten in den letzten Jahren grundlegend verändert. Neben der Nutzung für private Kommunikation werden Social Media Applikationen heutzutage weitreichend auch als – oftmals einzige – Informationsquelle für Nachrichten und politische Informationen verwendet (Bode, 2015; Fletcher & Nielsen, 2018; Metzger & Flanagin, 2015). Aufgrund der Tatsache, dass jeder NutzerIn Inhalte publizieren und verbreiten kann und Social Media sich durch Kommunikation in Echtzeit, eine unbegrenzte Verbreitung von Inhalten, eine hohe Vernetzung der NutzerInnen sowie dem Fehlen einer redaktionellen Leitung auszeichnen, werden die Rezipienten mit großen Informationsmengen konfrontiert, deren Qualität schwer einzuschätzen ist. Deshalb ist es von großer Relevanz zu verstehen, wie NutzerInnen die Glaubwürdigkeit von Nachrichten und Kommunikatoren bewerten.

In Hinblick auf die Frage, wie Informationen verarbeitet werden, unterscheiden Zwei-Prozess-Modelle wie das Elaboration Likelihood Model (Petty & Cacioppo, 1986) und das Heuristic Systematic Model (Chaiken, 1987) zwei Wege, die in Abhängigkeit der Fähigkeit und Motivation der Rezipienten eingeschlagen werden können. Auf der zentralen Route werden Informationen elaboriert verarbeitet, wohingegen auf der peripheren Route Rezipienten stärker dazu tendieren ihre Bewertungen (z.B. bezüglich Glaubwürdigkeit) auf der Basis von Hinweisreizen (Cues) zu generieren. Des Weiteren wird angenommen, dass Quellen-, Nachrichten- und meta-informationelle (System-generierte) Attribute kognitive Heuristiken aktivieren können (Kruglanski & Gigerenzer, 2011; Metzger & Flanagin, 2015; Sundar, 2008). Kognitive Heuristiken werden als mentale Abkürzungen verstanden, die den kognitiven Aufwand reduzieren (Shah & Oppenheimer, 2008), indem nicht alle verfügbaren Informationen einbezogen werden, und die zumeist unbewusst angewandt werden (Tversky & Kahneman, 1974).

Ziel dieser Dissertation war es anhand von drei empirischen Studien zu untersuchen, (1) anhand welcher Cues Rezipienten die Glaubwürdigkeit von Social Media Kommunikation bewerten, (2) ob Cue-Muster universell sind und für verschiedene Plattformen und Kommunikationskontexte Gültigkeit aufweisen, (3) ob automatisierte Methoden eine geeignete Methode darstellen, um den Einfluss von Social Media Cues und Features auf die wahrgenommene Glaubwürdigkeit aufzudecken, (4) ob die Beziehung zwischen Cue und

Bewertung von kognitiven Heuristiken gesteuert wird und (5) ob kognitive Heuristiken wie die Expertise-Heuristik anhand reduzierter Latenzzeiten gemessen werden können.

Als ersten Schritt in eine systematische Untersuchung, hatte Studie 1 ($N = 341$; Postings: 1366) eine umfangreiche Betrachtung der Rolle sowie des Zusammenspiels von Social Media Cues zum Ziel. Dafür wurde der Einfluss von Quellen-Expertise, Gefällt-mir-Angaben (Likes), Geteilt-Angaben (Shares), Bildern und Themen-Involvement auf die Bewertung der Facebook-Postings von PolitikerInnen untersucht. Die Ergebnisse zeigten, dass insbesondere Attribute der Quelle (Source Cues) zu höheren Glaubwürdigkeitsbewertungen geführt haben, wohingegen Gefällt-mir- und Geteilt-Angaben unerwarteterweise die Glaubwürdigkeit reduzierten. Anders als angenommen, haben Involvement, Bedürfnis nach Kognition (Need for Cognition) und Konformität mit der Nachricht keinen moderierenden Einfluss auf den Einfluss der Cues auf die wahrgenommene Glaubwürdigkeit gezeigt.

Die zweite Studie ($N = 2626$; Ratings: 24.823) zielte nicht nur darauf ab ein größeres Datenset, sondern auch eine andere Social Media Plattform, nämlich Twitter, zu untersuchen. Für die Untersuchung großer Datenmengen werden häufig automatisierte Methoden eingesetzt, bislang aber meist um binäre Klassifikationen von Inhalten vorzunehmen ohne den Einbezug der Rezipienten-Perspektive und multidimensionaler Glaubwürdigkeitsbewertungen. Um herauszufinden, welchen Einfluss Twitter Features auf die wahrgenommene Glaubwürdigkeit haben, wurde eine Studie durchgeführt, in der die TeilnehmerInnen die Glaubwürdigkeit von Krisen-bezogenen Tweets bewerteten. Die resultierenden 24.823 Ratings wurden mithilfe einer explorativen Feature Selection Analyse ausgewertet, die zeigte, dass die Glaubwürdigkeitsbewertungen hauptsächlich von der Anzahl der Follower des Autors, der Gesamtanzahl der Tweets und der Relation zwischen der Gesamtanzahl der Tweets und dem Alter des Twitter-Accounts beeinflusst wurden. Auch wenn diese Features klassischerweise als meta-informationell definiert werden (da sie vom System generierte Werte darstellen), sind sie stark mit dem Kommunikator verknüpft.

Da somit beide Studien gezeigt haben, dass Quellen-Attribute (Source Cues) die wichtigsten Anker für die Glaubwürdigkeitsevaluierungen der Rezipienten darstellten, wurde die dritte Studie ($N = 185$) durchgeführt, um zu untersuchen, ob die Beziehung zwischen dem Expertise Cue und resultierenden Bewertungen und Entscheidungen von der Expertise-

Heuristic gesteuert wird. Dafür wurde ein 2 (Unterschied in Expertise: ja vs. nein) X 2 (Anzahl widersprechender Cues: 1 vs. 2) x 2 (Valenz der zusätzlichen Cues: positiv vs. negativ) within-subject Design genutzt, in dem die Teilnehmenden eine Entscheidung zwischen zwei Informationsquellen treffen mussten, die lediglich durch vier Attribute (Quellen-Expertise, Bewertungen anderer NutzerInnen, Bild, Länge) beschrieben wurden. Die Ergebnisse zeigten, dass die Präsenz des Expertise-Cues die Entscheidungslatenzen der Probanden signifikant reduziert hat. Allerdings nahmen auch zusätzliche Informationen wie die Valenz der ergänzenden Cues einen Einfluss, was der Annahme der Attribute Substitution (Kahneman & Frederick, 2002) widerspricht, die davon ausgeht, dass Heuristiken durch einen einzelnen Cue aktiviert werden. Insgesamt tragen die Ergebnisse zu einem detaillierten Verständnis der Expertise-Heuristic im Rahmen von Social Media Kommunikation bei. In Hinblick auf die Auswahl von Informationsquellen haben die Rezipienten die Expertise des Autors als wichtigstes Attribut wahrgenommen, und wenn dieses Attribut präsent und für eine der beiden Alternativen mit einem positiven Wert besetzt war, fiel die Entscheidung einfacher und schneller.

Zusammenfassend liefert die vorliegende Dissertation empirische Evidenz bezüglich der Bewertung der Glaubwürdigkeit von Social Media Kommunikation. Dabei haben sich Attribute des Autors als einflussreich herausgestellt, sowohl für Facebook als auch für Twitter sowie für Politiker-Postings als auch für krisenbezogene Kommunikation. Als Konsequenz haben diese Attribute das Entscheidungsverhalten von Rezipienten durch den reduzierten Aufwand vereinfacht. Daraus resultierend kann angenommen werden, dass der Beziehung zwischen Cue und Bewertung eine kognitive Heuristik zugrunde liegt, in diesem Fall die Expertise-Heuristic. Insgesamt hat die vorliegende Arbeit den Wissensstand vorheriger Forschung in Bezug auf die Wirkung kognitiver Heuristiken, die bisher vor allem auf Fokusgruppen-Daten und Selbstauskünften basierten, durch empirische Ergebnisse hinsichtlich des Nachweises einer Aufwandreduktion erweitert. In Zukunft können diese Ergebnisse für Nutzer-Support-Methoden im Bereich von Interface Designs oder Medienbildung genutzt werden, zum Beispiel indem relevante Attribute markiert werden.

I Introduction

"We live in a world inundated in all kinds of information with varying degrees of quality" (Allan, 2017, p. 2).

Communication has gone through a substantial transformation due to the ascent of social media platforms. Technological changes result in more opportunities for content production as well as reaching a potentially broad audience using informal social media channels. Consequently, apart from private interactions, a commercial exploitation started and marketers, organizations, media persons and politicians entered social media channels (Mirbabaie, Ehnis, Stieglitz, & Bunker, 2014), what led to a further increase of communication flow and information volume. Besides beneficial outcomes such as social connection (even to public persons), interactivity and reciprocal information exchange (Kaplan & Haenlein, 2010), recipients' increasing tendency to rely on social media as only source for the consumption of news and political information (Bode, 2015; Fletscher & Nielsen, 2018) raises concerns about the quality of information distributed via these channels.

That is owed to the fact that not only journalistic sources like newspapers publish such content anymore, but rather every user is able to share information which can be subjectively biased or intentionally misleading. Especially the upsurge of fake news has shed light on this risk for society and politics (Del Vicario et al., 2016) which climaxed in the assumed impact of misinformation on election outcomes (Allcott & Gentzkow, 2017; Mitchell, Gottfried, & Matsa, 2015). Seemingly, information received through social media are easier accepted and less questioned, possibly due to an information overload and subjective evaluations. Therefore, information consumption via social media channels without any gatekeepers, filtering options or quality control, demands for a "vigilant, knowledgeable reader." (Britt, Rouet, Blaum, & Millis, 2019, p. 94) to handle all available information adequately. Furthermore, the relevance of valid credibility assessments is heavily reinforced, since online activities are supposed to be associated with subsequent offline behavior, e.g., concerning political participation (Gil de Zúñiga, Molyneux & Zheng, 2014). However, in light of the enhanced complexity of social media communication providing not only large amounts of data, but also a wide range of additional information (Metzger and Flanagin, 2015; Metzger,

Flanagin, & Medders, 2010), simultaneously the difficulty of credibility judgments seems to be enhanced.

While the credibility of online information is an almost-universal topic in both media and research, recipient's perspective of how users assess credibility is not fully understood to date. Owed to the "dizzying array of credibility cues to choose from" in social media (Metzger & Flanagin, 2015, p. 449), there is to date only sparse knowledge on which information people base their credibility judgments, how this cue information is going to be processed, and whether these cues could trigger unconscious applied rules connected to humans' judgments and decision-making. In order to support and empower users (e.g., with educational measures), first and foremost the process of how users evaluate if certain content is believable has to be sufficiently investigated and understood.

To this end, within this thesis three empirical studies were conducted to examine the relevance and interplay of source, message and meta-informational cues by means of politicians' Facebook postings (Study 1). In addition, it was investigated which cue patterns will be discriminating for real crisis-related Twitter communication, addressed via psychological measurements which are further used in combination with a comprehensive feature selection method (Study 2). Furthermore, it was tested if the relation between cue and judgment is determined by the use of cognitive heuristics, namely the expertise heuristic. To this end, a choice task with two alternative information sources was implemented and decision latencies measured to conclude if cognitive effort was reduced through the use of the heuristic triggered by the source expertise cue (Study 3).

In the following, Chapter 1 shed light on the enhanced relevance of valid credibility judgments since social media established themselves as sources for the consumption of news and political information. For this purpose, both credibility conceptualizations (Chapter 1.1) as well as challenges for credibility assessments (Chapter 1.2) are regarded. Hereafter, models of information processing (Chapter 2.1) are outlined with regard to the role of source (Chapter 2.2.1), message (Chapter 2.2.2) and meta-informational cues (Chapter 2.2.3) and their influence on recipients. Considering the assumption that cues might activate mental shortcuts, the concept of cognitive heuristics is presented (Chapter 3) with particular focus on the expertise heuristic (Chapter 3.1). Furthermore, factors which can help to differentiate heuristics from deliberated rules are described, such as cue-wise activation (Chapter 3.2) and

effort reduction (Chapter 3.3). Subsequently, Chapter 4 emphasizes the potential influence of recipients' involvement (Chapter 4.1), thinking style (Chapter 4.2) and message conformity (Chapter 4.3) on credibility judgments, followed by the presentation of the empirical studies of this dissertation. Chapter 5 presents Study 1 which examined relevant cues for credibility judgments of politicians' postings. The second study on the exploration of Twitter features by using a combination of psychological measures and a feature-based selection approach is presented in Chapter 6. Within Chapter 7 the third study is outlined - an investigation of the relation between cue and judgment. At the end of this work a general discussion of the findings (Chapter 8) and implications of the three empirical studies (Chapters 9, 10, 11) are presented as well as overarching limitations (Chapter 12) and future research directions (Chapter 13).

II Theoretical Framework

1 Social media as an information source

In general, the rise of social media has fundamentally changed (online) communication and news consumption (Messing & Westwood, 2014; Metzger & Flanagin, 2015). The term social media subsumes user-friendly and easy-to-use software applications which are mainly based on social connection, interaction, interactivity, collaboration and information exchange between users (Kaplan & Haenlein, 2010; O'Reilly, 2007; Schweitzer & Albrecht, 2011). This stands in stark contrast to formerly static websites representing one-to-many communication curated by a few technologically adept persons. The transformation of communication has brought great potential for users to receive information faster, and to connect with people around the world or with persons in the public realm, brands, political parties and organizations. Moreover, public persons like politicians are able to use social media as a "privately owned publicity channel" (Lee & Jang, 2011, p. 40) in order to directly and reciprocally communicate with potential voters, and share and explain political actions

and projects without being dependent on mass media. Even organizations and media personas like journalists and mass media journals utilize the new channels to distribute information to the public in a fast-paced manner (Mirbabaie et al., 2014), for example in cases of high uncertainty such as crisis situations or during extreme events.

As an ongoing tendency, news consumption behavior is changing, and individuals are using social media channels like Facebook, Twitter or YouTube not only for private communication, but also – given that politicians, political parties, organizations, news media and journalists have entered these channels – increasingly as sources for the consumption of news and political information (Bode, 2015; Derczynski, Bontcheva, Liakata, Procter, Hoi, & Zubiaga, 2017; Fletcher & Nielsen, 2018; Knobloch-Westerwick, Mothes, Johnson, Westerwick, & Donsbach, 2015). In recent years, social media channels like Facebook have become a "normal part of social life" (Gil de Zuniga et al., 2014, p. 627), often utilized as the only source of information (McClain, 2017; Mitchell et al., 2015) without recourse to professionally edited media such as newspapers and magazines (Elyashar, Bendahan, & Puzis, 2017). This one-sided communication behavior underlines the important role of social media as an information source, and the immense impact of the dissemination of information on social media, potentially rendering recipients vulnerable to manipulation and misinformation or accidental errors of reporting. Furthermore, it is important to consider the attention recipients give to the content of their social media consumption. Nowadays, users can be online non-stop, checking their social media apps several times per day, for instance at the bus stop, meaning that they are often passively and incidentally exposed to news, political and other public communication content while browsing through their timelines (Boczkowski, Mitchelstein, & Matassi, 2018). Consequently, information consumption on social media is not necessarily initiated by a need for information or the motivation to know a specific thing (Wathen & Burkell, 2002) but can be seen as passive consumption of news content.

Due to contextual factors like real-time communication, short messages, widespread distribution and mobile accessibility, social media platforms like Twitter and Facebook are especially predestined for consuming and producing (actively and passively) breaking news, political content and updates of emergency communication as well as current events as soon as they happen (Mendoza, Poblete, & Castillo, 2010; Shariff, Zhang, & Sanderson, 2014;

Vieweg, 2010). Among the various social media applications, Facebook has developed into the world's largest social network site, with currently around 3.77 billion active users (Facebook, 2018). On Facebook, users (private users and other stakeholders) have profiles which are connected to each other via their friends list or followership. Communication mainly happens via status updates, which are displayed not only on the user's own page but also on the timeline of all network contacts (Kaufmann, 2011). During the US congress elections of 2006, Facebook thrust itself into the political realm by providing all candidates with profiles which had already been filled out with basic information (Williams & Gulati, 2009). In this way, Facebook opened the door for utilization as a communication venue for political and societal purposes, establishing itself as "the early leader in online social networking for political campaigns" (Williams & Gulati, 2009, p. 2).

In the same vein, the microblogging service Twitter has developed into a widely used platform to quickly spread information, with its scope also extending into news and political content in recent years (Fletcher, & Nielsen, 2018). Indeed, Twitter nowadays advertises itself as showing 'what happens in the world'. With 330 million users and over 500 million tweets per day (Twitter, 2019), Twitter is also one of the global players in the area of social media. Twitter users have profiles which display the user name, a profile picture, the total number of tweets, number of followers and followees, the account creation date as well as an optional account holder description. It can be used to distribute short messages, so-called tweets, and to comment on, share or retweet other users' tweets easily. Both Facebook and Twitter have established themselves as sources for and distributors of publicly relevant information such as news and political communication (Kruikemeier, 2014; Lee & Jang, 2011; Williams & Gulati, 2009). Instagram, by contrast, has developed into one of the market leaders for marketing and advertising issues, but is utilized less for news communication (at least so far).

Another factor which strongly demarcates the use of social media for news consumption and information selection from classical media outlets is the fact that individuals can shape their social media platforms according to their personal preferences (Fletcher & Nielsen, 2018). By following specific pages and people, users can determine which information they will see on their timelines. Consequently, in contrast to news consumption via traditional news formats on TV or in newspapers, when individuals consume news on social media, it

is more likely that they will not be exposed to a broad and well-balanced diversity of information (Kim & Dennis, 2018).

Overall, beneficial opportunities of social media communication such as real-time communication and direct interaction (e.g., with politicians) are countered by a lack of gatekeepers, filtering mechanisms, and control of quality standards (Allcott & Gentzkow, 2017; Bedolla & Molla, 2012). Further aspects such as the high connectivity between users and the potentially unlimited distribution of content, reaching a wide audience within a few seconds, not only lead to large amounts of data but additionally raise concerns about the information quality, for instance concerning the credibility of content.

In the following, definitions and conceptualizations of credibility will be outlined (Chapter 1.1). In addition, it will be discussed why credibility judgments as well as measurements could be challenging with regard to specific characteristics of social media communication (Chapter 1.2).

1.1 Credibility in social media communication

Essentially, credibility describes the perception of the believability of a source, a message or a medium (Hilligoss & Rieh, 2008; Metzger & Flanagin, 2015; Fogg & Tseng, 1999; Wathen & Burkell, 2002). It is important to keep in mind that credibility is a perceptual variable, which is subjectively perceived by recipients rather than objectively attributable (Choi & Stvilia, 2015).

In contrast to the subjective nature of credibility, the concept of veracity is commonly defined as an indicator of the actual truth and correctness of data (AlDoaies, Ashi, & Alotaibi, 2017; Castillo, Mendoza, & Poblete, 2011; Derczynski et al., 2017; Gollmann, 2012), describing the pure distinction of content into true or false. In other words, if the veracity of information can be proven, then the content message is true, and if it cannot be proven, the message will be claimed to be false. Conversely, credibility implies human perceptions of whether a message or source is accepted as true, independently of the actual truth of the information (Shariff, Zhang, & Sanderson, 2017). As such, credibility assessments of sources

and messages can vary widely among individuals, which complicates the issue of making predictions about how participants will receive information and evaluate senders.

With regard to a message, credibility can be seen as how recipients estimate the "truth of a piece of information" (Umeogu, 2012, p. 113). Besides the content, a message's relevance, currency, accuracy and consistency, and presentation style tend to be used as indicators of credibility evaluations (Metzger & Flanagin, 2015; Wathen & Burkell, 2002). Additionally, content which is objective and unbiased is likely to be perceived as credible by recipients (Appelman & Sundar, 2016). In sum, message credibility can be regarded as the perceived quality of content, which is based on attributes like usefulness, accuracy and importance (Hilligoss & Rieh, 2008). Often, recipients are not able to estimate the quality and accuracy of a message, particularly if they have less knowledge about the topic and context. Furthermore, the presentation of political positions or statements will probably never be objective since it constitutes a kind of persuasive communication. In other cases, the fast speed of communication can lead to unintended biases (Westerman, Spence, & Van der Heide, 2012) such that obligations of message credibility are violated. Broadly speaking, perceptions of the message, and particularly of how the message is written and presented, are interconnected with evaluations of the source of communication (Wathen & Burkell, 2002).

Early research on communication and persuasion identified trustworthiness and expertise of the communicator as key dimensions of credibility (Hovland & Weiss, 1951; Hovland, Janis, & Kelley, 1953). This was later extended with further aspects such as goodwill (McCroskey & Teven, 1999) or attractiveness (Ohanian, 1990). In this context, perceived trustworthiness refers to the author's willingness to communicate accurate and perceived expertise, and to the author's ability to do so. Moreover, it encompasses "the extent to which a communicator is perceived to be a source of valid assertions" (Hovland et al., 1953, p. 21), referring to the experiences and skills a sender has or which are at least attributed by recipients (Fogg & Tseng, 1999). Consequently, perceived source credibility is strongly linked to the evaluation of the communicated message, insofar as the perception of the sender is able to "affect the receiver's acceptance of a message" (Ohanian, 1990, p. 41). Furthermore, credibility judgments can affect related long-term consequences such as the rating of usefulness of information and the associated attitude formation and change as well as behavioral intentions (Wathen & Burkell, 2002). Credibility focuses on interpersonal

communication between two or more human senders, which can be mediated by computers, as is the case for social media communication. Some evaluation patterns seem to be adapted from face-to-face interpersonal interactions, such as evaluating the trustworthiness of the communicator in a first step (Choi & Stvilia, 2015). However, online communication has changed communication behavior and related judgments in a way that is not yet fully understood.

Since the early days of online communication, researchers have sought to understand and explain how recipients interact with online information in order to evaluate this information in terms of credibility. This large body of research has identified various different aspects and phases as relevant. For instance, Wathen and Burkell (2002) suggested online credibility processes to be an interaction of a medium's surface and message evaluation, thus highlighting the importance of (technological) elements which come with the new media landscape.

Based on participants' diary data regarding their information-seeking behavior collected over a 10-day period, Hilligoss and Rieh (2008) suggested that the process of credibility judgments can be divided into a predictive phase (including expectations concerning the information) and an evaluation phase (exploration of whether expectations are met). This implies that people have stored associations upon which they base their expectations. As such, information processing is facilitated because information is selected according to specific aims or motivations (e.g. answering a question, writing a research report). Accordingly, credibility judgments are described as iterative loops, with a verification phase being activated as soon as conflicting information emerges. The framework postulated by Hilligoss and Rieh (2008) contains three different levels of credibility. First, the construct level describes how credibility is individually defined and might function as a superior reference class. Second, the heuristic level includes the consideration set of rules which can be applied for credibility ratings, and the authors assume that these heuristic rules do not always operate on a conscious level. Third, the interaction level consists of concrete attributes (e.g., website elements like URL links) which could be used for content evaluations.

In line with this, Metzger and Flanagin (2015) proposed a collection of potential credibility anchors, including site (medium) aspects like trust seals, author elements like contact information or message facets like data stamps or links. However, due to the

interactive nature of social media, various cues are available to the recipient. Evidently, the richness of cues within mediated communication can have an effect on the evaluation of communication content, and this has been further strengthened with the shift from online communication on websites to social media communication. All in all, changed communication environments underline the need to identify how recipients evaluate the credibility of content, and in particular which anchors (cues) and rules (heuristics) are used to assess the quality of information received through social media communication (Choi & Stvilia, 2015).

1.2 Challenges to credibility judgments and measurements

Online credibility judgments are seen as more complex than interpersonal evaluations due to the various technological aspects influencing the reception situation (Choi & Stvilia, 2015; Sundar, 2008). Further pitfalls for online credibility assessments relate to social media characteristics like the connectivity of profiles, which hampers the identification of the source of information, or the lack of standards and gatekeepers, which impedes the reliability of information a person (i.e. the source) is communicating in the profile, for instance with respect to skills and experiences. Furthermore, it has to be considered that credibility is a subjective and multidimensional construct, which together with the large amounts of data, contributes to the difficulty of measuring credibility. The following chapter reflects on potential challenges for credibility in social media communication, both in terms of judgments and measurements.

The interconnection of sources and content

A great deal of the information that is used to form impressions about the communication partner in face-to-face interactions, such as gestures, facial expressions and non-verbal behavior, is unavailable in media situations. For this reason, it is not always easy to identify who is the sender of a message due to different “layers of sources” (Sundar, 2008, p. 73; Kim & Dennis, 2018). The source can be seen as the medium in which the message is published or as the specific person who posted the message. Moreover, since interacting, sharing,

connecting and commenting are common conventions on social media, even the person who shares or likes a message can evoke the impression of being the source, because the post is displayed on the timeline of all connected network contacts. Overall, the lines of primary authorship become blurred on social media and messages cannot be allocated one to one as easily as in face-to-face contexts.

Correspondingly, Kang and colleagues (Kang, O'Donovan, & Höllerer, 2012) proposed a definition of credibility related to Twitter which is divided into tweet-level credibility and social credibility. Tweet-level credibility encompasses all assumptions concerning the believability derived directly by content aspects of the tweet. This can range from the number of words (length of the message) to the inclusion of positive sentiment, for instance. In contrast, social credibility refers to "all available metadata" (Kang et al., 2012, p. 180) related to the tweet's source. As an example, the number of followers can be regarded as a cue which can be allocated to social credibility. Although it is conceivable that the definition of credibility proposed by Kang and colleagues (2012) could be used not only to classify Twitter content and source evaluations but could also be transferred to other social media platforms, it has to be noted that the components are not clearly distinguishable. Source and content can be interwoven, and the lines between original and supporting sources can also be quite blurred (Schmierbach & Oeldorf-Hirsch, 2012), for instance if a Twitter author promotes content which originates from a news magazine, or a Facebook user shares a politician's posting. In such cases, the allocation of content to the original source, and further assumptions about source or content cues, are hampered.

Cues and information richness

Social media cue richness implies that not only does the message itself consist of several cues like length, links or specific words, but also that a lot of further aspects (e.g., performance measures like number of posts or other users' actions and reactions) are omnipresent. Moreover, as cues are related to different entities, simultaneously, message cues, source cues and system-generated aspects are also present (Metzger & Flanagin, 2015; Sundar, 2008). These different aspects are available at the same time and are potentially able to conflict with each other (Metzger & Flanagin, 2015). This raises the question of what

happens if cues contradict each other and if some cues are more dominant than others. Conversely, it may be possible that under certain circumstances, cues strengthen credibility perceptions in the sense of a "cue-cumulative effect" (Lin, Spence, & Lachlan, 2016, p. 269). For instance, a posting can include additional information such as pictures and web links and is liked by many users. A further aspect refers to the question of whether recipients are motivated to evaluate all available cues or if they use the first cue they receive as an anchor for further quality ratings.

Besides cue richness, social media communication is further characterized by information richness, which can result in information overload and also entail repeated receptions of the same content. Every user's timeline is filled with postings originating from other users, shared by contacts or selected by an algorithm, for instance in the case of sponsored posts targeted at specific user groups (Kaiser, Keller, & Kleinen-von Königslöw, 2018). The composition of all posts and content is rather intransparent to the user. Due to the high social connectivity and the fact that current information is widely distributed on social media by sharing and liking activities of members of individuals' personal networks, information that is received more than once is implicitly associated with higher credibility solely based on the perception of familiarity (Pennycook, Cannon, & Rand, 2018).

The self-reported nature of information

A further notion refers to the reliability of information, for instance with respect to the source as stated in the profile. On social media platforms, users can edit and maintain their profiles themselves, meaning that a lot of source information is self-reported and not externally validated. As such, social media authors are able to fake or manipulate information or present it in a selective manner (Metzger & Flanagin, 2015). This raises the question of whether recipients are able to perceive the risk of self-reported information being false, or whether they take any information at face value merely because it is formally presented on a professional-looking social media profile. As an example, any user can write on his/her profile that he/she has experience working as a journalist for a large magazine, irrespective of whether this is really true. Even the user's account name can be freely chosen. It has already been demonstrated that recipients perceive accounts with credible-sounding names

such as *The Denver Guardian* as credible, even when the accounts are fake news distributors which are benefitting from the supposed reputation of the account (Britt et al., 2019; Pennycook et al., 2018).

In contrast, system-generated information such as the number of likes or followers is less prone to manipulation and therefore potentially more important for credibility evaluations. For the purpose of the detection of social bots (software robots that are designed to imitate human user behavior, see Ferrara, Varol, Davis, Menczer, & Flammini, 2016 for an overview) on social media, specific system-generated measures such as follower-followee ratio have been used, because these aspects provide more reliable information about an account holder's performance (Kang et al., 2012). Nevertheless, it is also possible to buy followers or likes, which makes the reliability of this kind of information similarly difficult (Kang et al., 2012). Although such aspects highlight the difficulty and importance of valid credibility judgments in social media environments, recipients are not always able to engage in effortful cognitive judgment processes due to large amounts of information and limited cognitive resources.

Subjectivity of credibility perceptions

Since credibility is a subjective construct, it is difficult to relate it to the actual truth of information, often referred to as veracity (e.g., Derczynski et al., 2017; Gollmann, 2012). In particular, the area of political communication and news on social media has recently developed into an environment characterized by distrust, deception and strategically deployed misinformation to achieve manipulative, political or financial aims. Since the 2016 US presidential election campaign, the term "fake news" has been on everyone's lips, and the distribution of false information discrediting presidential candidate Hillary Clinton was assumed to have had an actual impact on the election results (Allcott & Gentzkow, 2017). Besides intentionally spreading misinformation, accidental errors of reporting occur, especially because news magazines tend to invest less effort in fact-checking for their online dissemination of information than for their offline publications (Bedolla & Molla, 2012). Moreover, recipients may evaluate false information as true, and true information as false, due to their subjective perceptions. Therefore, actual credibility has to be distinguished from

perceived credibility (Wassmer & Easton, 2005). The existence of two different levels of credibility, namely actual credibility which "truthfully reflects the aspect it makes a statement about" (Gollmann, 2012, p. 22) and the subjective evaluation of the believability of content, complicates credibility measurements in research and impedes the further use of the results, for instance for user support applications. This is further compounded by the fact that recipients are often not aware of the subjective nature of their credibility assessments and rather perceive their subjective perceptions as objective reality.

Another challenging aspect lies in the multidimensionality of credibility, which not only limits the ability to draw a clear distinction between credibility dimensions concerning users' perceptions, but further complicates measurements, comparability, and a common understanding (Hilligoss & Rieh, 2008). Additionally, the question arises of whether specific aspects of social media communication relate to different dimensions of credibility. A study by Lin and colleagues (2016) on the impact of cues did not show an effect on different credibility dimensions like goodwill or competence, contrary to expectations. Nevertheless, it can be argued that intentions of the communicator as attributed by the recipients can influence different dimensions of credibility.

The use of automated approaches

To efficiently tackle the large data amounts of data engendered by social media in terms of credibility measurements and data quality analysis, and for the further application of findings on credibility in social media communication, the use of automated methods can be considered. For example, knowledge of human credibility perceptions might be used for the design of future support applications for users. First attempts in this direction can be found in the design of a website (*CredEye*; Popat, Mukherjee, Strötgen, & Weikum, 2018) and a browser plugin (*NewsScan*; Kevin et al., 2018) to support users with the evaluation of online news articles. Both approaches seek to be not suggestive in their recommendations, to overcome intransparent suggestions, and to explain to the user why something is labeled as fake, for example. Indeed, it is already known from research in the area of recommender systems that people tend to accept recommendations more if they are accompanied by

explanations (Tintarev, & Masthoff, 2012). Such explanations encompass information including the kind of data upon which a recommendation is based.

Transferred to credibility-supporting methods for social media communication, it might be helpful to use the knowledge of the process by which users assess credibility for the design of interfaces and content presentations. Moreover, a further aim might be to educate users in terms of their media competence by highlighting relevant features and cues, and by providing explanations and additional information about which cue can trigger which mechanism. However, for the efficient design of automated support technologies, the investigation of large data sets is required, enabling further classifier sets to be adequately trained.

So far, automated strategies are mostly applied to detect fake content on social media (Jin, Cao, Zhang, Zhou, & Tian, 2017). These approaches can be categorized according to the features of their primary sources, i.e., some approaches rely on linguistic cues while others perform network analyses to detect behavioral patterns. In either method, after feature extraction, machine learning algorithms are used to tackle the problem. In fact, they indicate whether news is fake or factual based on the features. Most of the research in the field of automated methods is based on the concept of veracity, which refers to a binary distinction of content into true or false (Derczynski et al., 2017; Popat et al., 2018). If information can be proven, the message is true, and if not, it will be indicated as wrong or fake. In particular, this is successfully used for classifying content with the core task of identifying the veracity of messages (AlDoaies et al., 2017) and ensuring the accuracy of online information like news articles based on fact-checking methods (Bedolla & Molla, 2012). Often, in these approaches focusing on large data sets, the recipient's perspective with regard to how users perceive credibility is not sufficiently considered.

However, even if we do come to identify which approaches perform best in terms of eliminating inaccurate information online, binary judgments are not a realistic and applicable representation when it comes to human perceptions and ratings in a reception situation characterized by uncertainty and a fast speed of information flow (McCroskey & Teven, 1999; Zubiaga & Ji, 2014). For instance, even if content like satire and parody does not intentionally deceive recipients, it might nonetheless happen, because the content is not clearly identifiable as true or false. As a result, the recipient of the information must be considered as an influencing factor with respect to how information is processed and

perceived (Choi & Stvilia, 2015; Metzger & Flanagin, 2015; Shariff et al., 2017; Zubiaga & Ji, 2014).

Given that "message credibility is an individual's judgment of the veracity of the content of communication" (Appelman & Sundar, 2016, p. 63), the recipient's perspective needs to be included in the process of content evaluation. Particularly in view of the potential discrepancy between the actual truth of content and the perceived credibility, it is necessary to empower recipients by providing them with the relevant skills (and motivation) to successfully judge information which is not clearly true or clearly false, such as a political message displaying a specific position concerning a topic.

In sum, social media constitutes a challenging environment for credibility judgments. Different sources, information overload, as well as a broad variety of cues and features hamper recipients' credibility judgments. Furthermore, the likelihood of the distribution of inaccurate information is additionally increased by the lack of gatekeepers and editorial standards, and by the self-reported nature of profile information such as the account name. The subjectivity of credibility perceptions implies a strong variance among recipients, probably depending on other variables such as contextual, situational and personal factors. Automated approaches might be a promising tool to address the large amounts of data distributed through social media channels, not only to enable detailed analyses but also to develop user support measures. As a starting point for a comprehensive investigation of the process of credibility judgments on social media, it is first expedient to review how individuals actually process the information to which they are exposed.

2 Processing of information

The question of how recipients evaluate the credibility of content is strongly linked to the question of how incoming information will be processed in the human mind. Essentially, every kind of social media communication is characterized by a constant stream of information and by resultant large amounts of data. Early on, research in the field of consumer psychology found that too much input in decision-making situations can result in an information overload, which is assumed to entail severe consequences for individuals as

soon as processing boundaries are exceeded (Jacoby, 1984). Decision-making and decision accuracy are severely impeded, and the investment in terms of effort and time is amplified, leading to increased dissatisfaction, uncertainty and confusion (Jacoby, 1984). Not every piece of information is equally relevant and valuable (depending on the general and situational context as well as the domain), highlighting the need for recipients to use strategies or filtering mechanisms to protect themselves from information overload and the resulting consequences (Hilligoss & Rieh, 2008).

With regard to mediated communication, the limited capacity model of mediated message processing (Lang, 2000) explicitly proposes that humans' cognitive capacities are strictly limited, such that only a small proportion of all information to which people are exposed gets into working memory. In detail, information processing is described by three steps: encoding, storage and retrieval of information. When confronted with a huge and potentially unlimited amount of information, recipients are not always able to examine the credibility of every piece of information in an elaborated way. What kind of information will be encoded depends strongly on motivation and goals or can be unconsciously triggered by environmental stimuli (Lang, 2000).

Based on this, the following chapters outline how incoming information can be processed as posited by dual process models (Chapter 2.1), and which role cues play as anchors for credibility judgments (Chapter 2.2). Moreover, the current state of research on source (Chapter 2.2.1), message (Chapter 2.2.2) and meta-informational cues (Chapter 2.2.3) is reviewed.

2.1 The two routes of dual process models

Dual process models of information processing such as the elaboration likelihood model (ELM, Petty & Cacioppo, 1986) and the heuristic systematic model (HSM; Chaiken, 1987) state that impressions can be formed through two different ways of information processing, which are chosen depending on recipients' motivation and ability to process information thoroughly. For important or involving topics, people are far more likely to be willing to invest time and effort to obtain a valid opinion or attitude. Thus, the likelihood of scrutinizing

any given piece of information via the central route is increased for recipients with high involvement or a higher need for cognition. In contrast, the peripheral route describes a simplified processing, which is based on peripheral cues or heuristic rules. This route is taken when a person is neither willing nor able to process the information in an elaborated way. Under conditions of lower involvement or motivation, people tend to be guided by cues which evoke inferences based on heuristic or simple decision rules (Chaiken, 1987; Petty & Cacioppo, 1986).

In the same vein, Metzger's (2007) dual processing model of credibility assessment postulates that information used for credibility evaluations of online content is either processed analytically, implying that a broad range of aspects is included and deliberately processed, or processed heuristically, consisting solely of a "cursory examination" (Metzger, 2007, p. 450) of author, message or medium cues. Which kind of strategy is used mainly depends on individuals' motivation and ability to evaluate the content. As an example, Metzger described a user passively scrolling through media content, whose ability and motivation might be lower compared to a student working on a research paper.

In general, the HSM goes into greater detail about the motivational component and states that information processing is always based on one of the three main motives of accuracy, defense and impression management. These in turn affect the way of elaborating depending on motivation strength, and in relation to this, also determine the choice of related rules or heuristics (Chen, Shechter & Chaiken, 1996; Chen, Duckworth, & Chaiken, 1999). For instance, a high accuracy motive can lead to elaboration of the message content and systematic processing of information, but if the motivation to strive for accurate judgments is lower, people tend to use "heuristic cue information seen as best suited for achieving their accuracy goals" (Chen et al., 1999, p. 45). If a recipient's motivation is based on defense motives, it is thought that self-confirmation heuristics are used, which impede the evaluation of content depending on the fit to own beliefs. In situations influenced by impression management motives, heuristics which promise to avoid negative social consequences are preferred, such as the bandwagon heuristic, whereby evaluations are based on others behavior (Chen, et al., 1999; Sundar, 2008). It is likely that the heuristic chosen based on the underlying motive may additionally vary between and among people and situations. In sum, both models of information processing understand heuristics as learned "knowledge

structures" (Chen et al., 1999, p. 47), the operation of which is mainly indicated by relevance or involvement. However, both models also leave open some important questions such as: How can it be measured whether heuristics are being used, and how is the effort involved in forming a judgment or an attitude actually reduced?

Social media communication in general has been found to be processed in a more peripheral manner (Lee & Shin, 2012) compared to traditional media like newspapers, insofar as participants are able to recall fewer content-related arguments and thoughts. This finding can probably be attributed to the fast speed of communication and an almost non-stop exposure to social media content via mobile devices. Regarding humans' information processing in the realm of social media communication, an increased likelihood of peripheral processing would also imply that cues and indicative stimuli become more relevant. Due to these contextual preconditions, the likelihood of relying on simple cues as anchors for credibility evaluations is increased for social media users, especially in judgment situations characterized by a high information load which demands large cognitive effort (Metzger et al., 2010; Sundar, 2008; Tversky & Kahneman, 1974). As such, the general impact of cues on credibility judgments of social media content is assumed to be somewhat increased, as has already been stated with respect to credibility evaluations of websites (Fogg, 2003; Metzger, 2007; Wathen & Burkell, 2002).

2.2 The role of cues and features as anchors for credibility judgments

The ease of producing and distributing information on digital media and the resulting amounts of data inevitably gives rise to the need for strategies to reduce effort and complexity of information processing and corresponding decisions about the utility of content. Social media platforms in particular provide a variety of anchors that can be used for reasoning about information quality (Metzger et al., 2010; Metzger & Flangin, 2015; Sundar, 2008), which might stimulate a more peripheral processing style or, conversely, result from a rather peripheral processing style. As outlined in Chapter 2.1, peripheral processing of incoming information is more likely to be based on simple cues.

One early approach, originally applied to explain credibility ratings of websites, is the prominence interpretation theory (Fogg & Tseng, 1999), which seeks to answer the question "What precisely are users focusing on when they evaluate the credibility?" (Fogg & Tseng, 1999, p. 85). Considering that individuals are not capable of paying attention to all elements associated with online communication, two prerequisites for credibility judgments were proposed. First, users have to "noticing a prominent element" (Fogg, 2003, p. 722), for instance an element on a website such as a picture, which they further evaluate by adding meaning and relevance to it. Although this was originally applied to evaluate the credibility of websites, it might be transferred to social media communication. The user is exposed to even more cues simultaneously in social media communication, meaning that attention to a cue is a decisive precondition for involvement in further cognitive processes like judgments or decision-making.

Accordingly, as prerequisites for the use of cues, Sundar (2008) highlights the availability of the cue in the situation of the evaluation, the accessibility of a connection between cue and a corresponding rule leading to a judgment, and the applicability of this connective rule for the judgment situation. In the same vein, the rule concept (Kruglanski & Gigerenzer, 2011) suggests if-then links between cues and judgments, according to which the occurrence of a specific cue will lead to a specific judgment. Transferring this notion to the context of online credibility judgments, cues which are present in online reception situations are thought to activate a rule process by which recipients assess credibility based on experienced or socially and culturally learned connections, which can be called heuristics.

Various technological aspects of digital media result in a large number of cues (synonymously termed features) which might be used for quality evaluations. The MAIN model assumes that a medium's modality (nature of communication), agency (source), interactivity (possibilities of user actions) and navigability (structure of content) provide different samples of cues which shape individuals' impressions of whether or not something is credible (Sundar, 2008). For instance, audiovisual content might trigger more positive quality ratings because information representation is more realistic and substantial compared to other modalities (Sundar, 2008).

Furthermore, the fast-paced nature of online communication, as well as the high connectivity, can impede evaluations of online content because users can easily be exposed

to information produced by unknown authors. For instance, an unfamiliar politician´s post can appear in a recipient's newsfeed due to network contacts or advertised posts (Kaiser et al., 2018). With regard to the judgment process, people were found to concentrate on a single aspect in order to infer about quality characteristics (De Neys, Rossi, & Houdé, 2013). This unconsciously used approach is called attribute substitution (Kahneman & Frederick, 2002) and minimizes the cognitive effort of online judgments by not including all available information. In general, judgments stemming from simplified rules might be based on cues derived from the source, the message or the medium (referred to as meta-informational cues) and collude with internal states or experiences of recipients (Kruglanski & Gigerenzer, 2011; Metzger & Flanangin, 2015; Sundar, 2008; Sundar, Xu, & Oeldorf-Hirsch, 2009; Wathen & Burkell, 2002). Notably, technological approaches usually speak of features, whereas more psychologically oriented research refers to cues. Overall, both terms describe the same thing, namely aspects associated with social media communication, either derived from the source, the message or the medium (also named meta-informational cues). Empirical evidence for the relation between credibility judgments and source, message as well as meta-informational cues will be outlined in the forthcoming chapters.

2.2.1 Source cues

Usually, source cues reflect all informational evidence available about the author of online content. In classical research on persuasion (Hovland & Weiss, 1951; Hovland et al., 1953), a message's source was identified as having an influential impact on the audience's attitude formation. Not only is the source the most salient aspect, but recipients are rather accustomed to looking at who is communicating in order to estimate whether information is valuable (Sundar, 2008). The competency of a source can be gleaned from prior experiences, from experiences shared by other people, from the reputation of the source, or from source credentials, area of work and further aspects (Hilligoss & Rieh, 2008). Findings concerning the influence of source credibility might be extended to social media contexts since people probably adapt and transfer the behavioral pattern of considering the source as an initial step. Accordingly, users have been found to rely on observable aspects of the source while

assessing credibility (Metzger et al., 2010; Winter & Krämer, 2012). For instance, an already known name of a person, brand or company often implies the attribution of a credible image. This effect was mentioned by participants of a focus group study as a leading criterion for evaluating whether or not they believe in online content and is described as the reputation heuristic (Metzger et al., 2010).

In this regard, Winter and Krämer (2014) demonstrated that science articles published by sources with a high reputation are more frequently selected compared to sources with a lower reputation. Source reputation was varied by using either names of high-quality newspapers or tabloid press. Further supporting evidence for the important role of source reputation was provided by a qualitative study in which recipients reported primarily using the account names of the sources as an indicator for the credibility of content and for the selection of Twitter news (Shariff et al., 2014). Moreover, a communicator who is presented as competent or an expert in the target field due to his or her profession or an official role leads to increased credibility perceptions (Winter & Krämer, 2012). Relying on official bodies is referred to as the authority heuristic (Sundar, 2008; Sundar et al., 2009) and has been examined as an important factor for the perceived credibility (Hu & Sundar, 2010; Lin et al., 2015) and selection (Ma & Atkin, 2017) of online health information.

Lin and colleagues (2015) investigated recipients' credibility perceptions of health risk-related tweets either presented by an official organization (Centers for Disease Control and Prevention), by a peer, or by a stranger, and found that the official source was rated as most credible, whereas the other two conditions did not differ. In addition, the authors varied whether or not the tweets were accompanied by retweets − indicating replies or comments by other users − and found that conditions without retweets were rated as more credible. Hence, it can be concluded that when two types of cues are presented together, source characteristics emerge as the most influential. Similarly, a study investigating the selection and perceived credibility of website articles on violence in media combining source expertise cues with star ratings revealed the source to be most crucial (Winter, Krämer, Appel & Schielke, 2010). Articles were more often selected and rated as more credible when the author was a high-expertise source, as indicated by a profession closely related to the article´s topic (but nevertheless self-reported).

By using an automated classification method (SVM classifier) with a supervised learning paradigm, it was demonstrated that the reviewer status is an influential factor in predicting recipients' later evaluation of the usefulness of online reviews in different data sets from Yelp, Amazon and IMDb (Levi & Mokryn, 2014). For every reviewer, a status value similar to the h-index for scholars was calculated, and reviewers with above-average values were further indicated with a 'Top reviewer' badge. The more reviews evaluated as useful a reviewer had written, the higher was his or her impact score, and consequently, the more the reviewer's reviews were able to predict recipients' evaluation of usefulness. Besides self-reported expertise, source cues tend to be additionally used for accuracy predictions calculated using automated approaches.

2.2.2 Message cues

Social media postings can include text, web links, videos and pictures (Hughes, Rowe, Batey, & Lee, 2012; Walther & Jang, 2012) and it is common convention to communicate using multimedia modalities. Therefore, message cues describe all information related to the post's text, for instance whether it contains a URL or the general length of the message. In the realm of information processing, visual cues are thought to be perceived and processed more easily by recipients (Lowry, Wilson, & Haig, 2014). In consequence, visual cues are able to capture recipients' attention and increase recall and recognition of information due to facilitated processing (Clow, James, Kranenburg, & Berry, 2006). Furthermore, pictures are utilized to implicitly transport attributes of the message or specific values or feelings, for example in advertisements (Clow et al., 2006; Edell & Staelin, 1983).

According to Sundar, web users "trust in pictures over textual descriptions" (2008, p. 81), which is explained by the fact that more information is transmitted by visual cues, resulting in more realistic representations of real-world settings. Through more provided (meta-) information, recipients are better able to form impressions. Regarding the effect of pictures on credibility, previous research revealed that logos on e-commerce websites led to higher credibility ratings (Lowry et al., 2014) and a photograph of the author enhanced the perceived credibility of the author and of his / her stories posted on a website (Johnson & Wiedenbeck, 2009). In the same vein, messages which include references to further (external)

material were demonstrated to be perceived as more credible, simply because the more information is provided, the more credible the message is perceived to be. The provision of additional information in tweets such as a URL link led to higher credibility ratings (Aigner, et al., 2017; Morris, Counts, Roseway, Hoff, & Schwarz, 2012).

In addition, a study in which users were directly asked to indicate which features they would rely on to rate Twitter communication revealed that an included link, hashtags and mentioning another user via @mention influence credibility assessments (Shariff et al., 2014). All of these cues can be taken as indicators of further information. Going one step further, their impact on credibility might be explained by their function as warranting principles. According to warranting theory (Walther & Park, 2002), information published by others about a person (e.g., with regard to attractiveness) is less prone to manipulation and therefore perceived as more believable (Walther, Van Der Heide, Hamel, & Shulman, 2009). In this respect, referencing other persons or other information sources might serve to provide further validation signals. DeAndrea (2014) name such cues "warranting cues" (p. 187), which minimize the likelihood of information being manipulated. Accordingly, by using a feature selection approach, Ravikumar and colleagues (Ravikumar, Talamadupula, Balakrishnan, & Kambhampati, 2013) found that the number of included hashtags, the length of the message, whether another user was mentioned in the tweet, and whether affect was included were all found to be highly influential when users were asked to estimate the credibility.

Another message attribute which has to be considered concerning its credibility-influencing effect is the topic of the message (Morris et al., 2012). Some topics generally induce higher (or lower) levels of credibility perceptions. In this regard, a study investigating tweets' credibility ratings revealed that science-related tweets generally received higher credibility ratings than political posts (Morris et al., 2012), demonstrating that the topic of a tweet is an influential factor within credibility judgments.

Notably, Shariff et al. (2014) found that not only cues related to the message had an impact on recipients' credibility perceptions; rather, even single words that were contained in the message were perceived and integrated by individuals in their judgment processes. For instance, words like 'update' or 'breaking' appeared to serve as credibility-increasing keywords. Moreover, participants mentioned being influenced by the attitude of the

communicator towards the tweet topic, which they implicitly derived from words like 'plausible' or 'fact'. Furthermore, a regression analysis revealed that content features were decisive for the likelihood of tweets being retweeted (Naveed, Gottron, Kunegis, & Alhadi, 2011). This is based on the assumption that a tweet is only retweeted if it is perceived as interesting. In particular, the authors found that tweets containing URLs, user names, positive expressions (like 'great', 'excellent'), emoticons and question marks were more likely to be retweeted. Given this impact of tweet content on retweeting behavior, Naveed and colleagues (2011) highlighted the important nature of content features for investigating recipients' evaluations and reactions. Nevertheless, the question of which Twitter features are primarily used to rate the quality of content remains unanswered.

2.2.3 Meta-informational cues

Social media platforms are characterized by connectivity and interactivity between the users. Consequently, any piece of posted information is not displayed in isolation but is rather accompanied by reactions of other users. A further special characteristic of social media lies in the system-provided information, such as number of followers or likes and shares, presented as an aggregated value from which recipients can derive further assumptions about the source and the message or even the context. All aspects which are provided by the medium (system) can be summarized as meta-informational cues (Choi & Stvilia, 2015). This type of cue can range from design aspects to aggregated numbers of interaction and communication behavior, or insights provided into other users' behavior as well as performance indicators of the account holder (Choi & Stvilia, 2015; Metzger et al., 2010).

Due to the fast speed of communication on social media, these reactions emerge almost immediately after a post is published. In this sense, it is no longer sufficient to solely consider the source. Rather, it is necessary to also include the context which social media communication inevitably brings with it: for instance, the reactions by peers such as their likes and shares. Users' likes of a post represent a form of agreement with the post's content, whereas sharing another user's post (mostly on one's own page) can be regarded as a recommendation for contacts to read or view the post. In both cases, related network contacts are able to view these reactions, which are additionally displayed in the form of an aggregated

number below the post (Walther & Jang, 2012). Early work on the believability of self-generated content compared to other-generated (comments) or system-generated content (aggregated number of likes and shares) found that information which is not self-published − and therefore not open for manipulation − ensures truth content to a greater extent (Walther et al., 2009).

Furthermore, system-generated information like the number of Twitter followers and the follower-followee ratio was found to determine related evaluations of the account holder's credibility (Westerman et al., 2012). A large amount of positive feedback on an article or post provides users with feelings of certainty and trust (Metzger et al., 2010; Sundar & Nass, 2001). This effect is commonly known as resulting from a rule called the bandwagon heuristic, which is guided by the implicit rule that "if others think that something is good, then I should, too" (Sundar, 2008, p. 83). In the area of online purchasing, peer ratings like reviews were found to have a major effect on online product selection and purchase intentions (Sundar et al., 2008). Accordingly, the selection of online videos and Hollywood movies was found to be based on the number of views (Fu & Sim, 2011; Xu & Fu, 2014). A necessary precondition for users' reliance on the opinion of other (mostly unknown) is recipients' uncertainty about the target´s quality or utility (Metzger et al., 2010; Xu & Fu, 2014).

Applying these findings to Facebook peer cues, other users' likes presented in combination with textual comments (either pro or con, and argumentative or subjective) showed no influence on the quality ratings of an article (Winter & Krämer, 2016; Winter et al., 2015). Users probably focus on indicators which include more, and more extensive, information and might vary in valence (comments can be either positive, neutral or negative) if they are confronted with textual and numerical peer features. Concentrating on message-confirming peer cues, a positive relationship between the number of social recommendations and the selection and reading time of politics-related articles was demonstrated (Winter et al., 2016). Articles accompanied by more Facebook likes were chosen earlier in the selection process and read more frequently and for longer, compared to articles with lower amounts of likes. This effect appeared to be independent of whether the article´s position was pro, con or balanced regarding the topic.

In contrast, Messing and Westwood (2014) found that the impact of social recommendations was so strong that it overrode recipients' selection of political articles

based on the consistency between their own political orientation and the article's position. These findings suggest that peer cues on social media function as signals of "social relevance" (Messing & Westwood, 2014, p. 1048), which are apparently applied as a filtering principle to rate the utility of an article´s content. Aigner and colleagues (2017) conducted a study focusing on how recipients evaluate the believability of news on Twitter in the area of refugee-related information. The authors reported that recipients relied on the number of retweets and likes while evaluating the believability. Interestingly, moreover, tweets accompanied by high numbers of these social recommendations were rated as more credible, even if they were factually false. In a controlled experimental setting, Zubiaga and Ji (2014) investigated how features inherent in a tweet affect users' evaluation of credible information. They found that meta-information about the communicator, such as the number of followers and the location, mostly leads to higher accuracy of the ratings. However, in the experiment, all features were handled in isolation, rendering it difficult to draw assumptions about relations. Additionally, the user test did not ask users how credible they perceived the tweets to be.

In sum, a large number of credibility frameworks and approaches emphasize the important role of cues as anchors for credibility (for an extensive overview of potential cues see Metzger & Flanagin, 2015), but to date, not all postulated cues have been experimentally investigated. Previous research provides substantial evidence that source, message and meta-informational cues are used as anchors for recipients' credibility evaluations in social media communication, but some aspects remain understudied. For instance, previous studies have mostly investigated the cues in isolation, failing to address the exposure to a combination of cues, as is the case in real-life situations. Moreover, the question arises of whether these cues are able to activate stable rules such as cognitive heuristics, as has been theoretically argued (Metzger et al., 2010; Sundar, 2008).

3 Cognitive heuristics for credibility judgments

Given that humans do not have unlimited cognitive resources (Lang, 2000) as well as unlimited amounts of time and knowledge (Payne, Bettman, & Johnson, 1993), cognitive processes such as decision-making and judgments go hand in hand with the question of how

incoming information is processed and integrated. As outlined in chapter 2.1, according to dual process models (Chaiken, 1987; Petty & Cacioppo, 1986), information can be processed through two different ways - the central or the peripheral route - which will be taken depending on recipients' motivation and ability to process information thoroughly. Thus, the likelihood to scrutinize the given information via the central route is increased for recipients with higher interest in the topic or an elaborated thinking style because they strive for valid and truthful attitude formations (Petty & Cacioppo, 1984). In contrast, the peripheral route describes a simplified processing which can be based on peripheral cues or heuristic rules. Based on these general preconditions regarding the handling of information processing which will be used for decisions or inferences, the concept of cognitive heuristics can be considered as underlying mechanism explaining the relation between cues and resulting judgments (Metzger & Flanagin, 2015; Sundar, 2008).

By definition, cognitive heuristics are mental strategies that do not include all available information by what the cognitive load for decisions and judgments is immensely decreased (Tversky & Kahneman, 1974). In this light, cognitive heuristics are simple and efficient shortcuts triggered by a cue, and automatically applied by people to protect themselves from cognitive strains and information overload in order to interact efficiently with incoming information (Sundar, Knobloch-Westerwick, & Hastall, 2007). The crucial thing is that people are not aware of these rules which influence their perceptions, and furthermore not able to control these automatic inferences. Caused in that, heuristics can lead to valid outcomes, but also to biased judgments (Kahneman & Tversky, 1996). A further criterion associated with heuristics is that they are domain specific (Gigerenzer & Todd, 1999). Consequently, a set of heuristics exists for every context, from which an applicable one is automatically selected (Hiligoss & Rieh, 2008) by the trigger of a retrieved cue. Accordingly, Gigerenzer and Todd describe humans' set of heuristics as an "adaptive toolbox" (Gigerenzer & Todd, 1999, p. 3).

Particularly, heuristics are supposed to be used in situations under uncertainty in which the complexity of a task is especially high (e.g., Shah & Oppenheimer, 2008; Sundar, 2008; Tversky & Kahneman, 1974) and can be simplified by the usage of mental operations developed from generalizations and reinforced through experiences (Sundar, 2008). As a consequence, not only the needed resources are reduced, but people are said to be more

confident with inferences based on heuristics through an "illusion of validity" (Tversky & Kahneman, 1974, p. 11). That effect can be described by a simplified cue retrieval and integration with reduced cognitive effort because the integration of the cue information has already been established. This simplified fitting of information into pre-existing mental structures is going to be attributed by individuals to a high validity of the cue information, whereas in fact solely the salience and accessibility of an already established connection between a cue and a related inference is enhanced (Sundar, Kim, & Rosson, 2019). In the context of the ELM it is stated that heuristics are sourced in childhood behaviour, which is applied to compensate for a lack of experience or knowledge by using simple rules like "My mother knows what's right," or "If I play with it, I must like it." (Petty & Cacioppo, 1986, p. 131). This behaviour will be retained and applied to situations which require a quick judgement or in which recipients are not able to fully engage in elaborated processing of information due to effort and time constraints.

All things considered, Petty and Cacioppo (1984; 1986) defined heuristics as rules learned by experience which are used in situations of lower involvement to arrive at a judgement or a decision. However, little is mentioned about the detailed process and triggering cues for heuristic rules. So, a lot of questions are still not answered, for instance: Which rule is decisive in which situation depending on which cue? Furthermore, it remains unclear, how the operation of heuristics – operating as a black box between cue and judgment – can be surely proven or measured.

In contrast, with regard to the HSM, heuristic processing is defined more detailed accompanied by necessary conditions as well as motives for the use of heuristics. Hence, Chaiken (1987) stated in their work on the HSM, that the usage of a specific heuristic rule in an information processing task mainly depends on the fact that the heuristic is represented in recipients' memory, mentally accessible, and suitable to the area of judgement or decision-making (Chaiken, 1987; Chen et al., 1999). Compared to the ELM postulating a distinct separation of both elaboration routes, the HSM describes both paths of information processing as possibly interacting (Chaiken, 1987), which means the use of heuristics can occur in situations with low involvement as well as in those with high involvement.

A large body of research (e.g., Chaiken, 1987; Goldstein & Gigerenzer, 2002; Hilligoss & Rieh, 2008; Metzger et al., 2010; Marmion, Bishop, Millard, & Stevenage, 2017; Tversky

& Kahneman, 1974; Sundar, 2008) considered cognitive heuristics to explain decision-making and judgments in various contexts. As a result, differences in conceptualizations raised criticism, for instance Gigerenzer deprecated heuristics to be only "loosely characterized" (Gigerenzer, 1996, p. 592) so that they can be utilized to explain nearly any kind of behavior (Gigerenzer, 1996; Shah & Oppenheimer, 2008), often without basing these explanations on empirical evidence.

By definition, heuristics are mainly unaware (Tversky & Kahneman, 1974) by what measuring their operation becomes challenging from a methodological perspective. Tackling the operation of heuristics with the help of interviews or focus groups (Marmion et al., 2017; Metzger et al., 2010) is vulnerable for social desirability effects and recognition biases, and therefore rather insufficient to profoundly address unconscious cognitive processes. Apart from that, research is predominantly limited to computer simulations (e.g., Gigerenzer & Goldstein, 1996) and outcome-oriented studies (Sundar, et al., 2009) manipulating different cues and observing the related outcome (i.e. the judgment). Instead of outcome-oriented measures (looking on the judgment in the end), more process-related examinations are needed to address the relation between cues and judgment (Bellur & Sundar, 2014; Fiedler & von Sydow, 2015; Shah & Oppenheimer, 2008) and the question if a heuristic was used or not (Bröder, 2000).

Since only a few researchers tried to empirically investigate if a heuristic was used in decision-making or judgments, the research field of heuristics is confronted with a problem of "bridging the gap between theory and data" (Bröder, 2000, p. 1332). Accordingly, empirical investigations of the relation between cues and judgments with regard to underlying mechanism are not fully investigated to date. In particular, questions like what kind of information (cue) can trigger a heuristic and in which conditions heuristics are activated are still unanswered (Fiedler & von Sydow, 2015), at least with regard to credibility judgments of social media communication. As proposed in the framework by Shah and Oppenheimer (2008), the core function of heuristics is effort reduction which can be used as an approach to investigate the relation between cue retrieval and judgment. To measure whether this relation underlies a cognitive heuristic or another more deliberated judgmental strategy, it seems to be a suitable approach to examine if recipients' need less effort to arrive at a judgment or a decision.

The next chapters will put the lens on the expertise heuristic (Chapter 3.1) which seem to be suitable for online credibility judgments regarding the results of Study 1 and Study 2 on the impact of source expertise cues. Thereby criteria to define heuristics and their cue-wise activation are reviewed (Chapter 3.2). Subsequently, effort reduction, proposed as core function of cognitive heuristics (Glöckner, 2009; Shah & Oppenheimer, 2008) will be described and discussed as approach to address the use of heuristics within this work (Chapter 3.3). Moreover, prior attempts into the investigation of heuristics based on effort reduction are presented and reflected.

3.1 The expertise heuristic

Since cognitive heuristics are supposed to appear in humans' information processing, especially in situations of higher complexity, overwhelming amounts of information and a lack of high (task-) involvement, social media environments can be deemed as fertile ground for the occurrence of cognitive heuristics. Users of social media are confronted with large amounts of data, real-time communication, high connectivity, and the lack of editorial supervision, which paves the way for information floods and generally complicates evaluations of credibility. Furthermore, an average social media user has to make several decisions, for instance, which information or article to read, which content to judge as reliable, which persons or sources to trust, or which link to follow. This is intensified by the fact that people use social media nearly non-stop via mobile devices so that the information flood (with all resulting tasks) can become unfeasible. Moreover, social media platforms are characterized by a richness of different cues and technological aspects which are able to further guide judgments and evaluations of content quality (Metzger & Flanagin, 2013; 2015; Sundar, 2008). In this vein, the MAIN model (Sundar, 2008) proposes several heuristics described as "judgmental rule relevant to credibility evaluations" (p. 74) which are postulated to connect cues which judgments. One of the most widely known heuristics is the expertise heuristic, guided by the underlying assumption "experts' statements can be trusted" (Sundar, 2008; p. 74; Ratneshwar & Chaiken, 1991). Thereby, solely the indication or perception of a

source as competent or experienced increases perceptions of believability (as outlined in Chapter 2.2.1).

In classical research on persuasion (Hovland et al., 1953; Hovland & Weiss, 1951), a message's source was identified as having an influential impact on attitude formation of the audience. Apparently, the source is not only the most salient cue, but recipients have learned to imply the source of information to estimate the value of information (Sundar, 2008). Accordingly, Chen and colleagues explain the influence of source expertise by being "easily processed" (1999, p. 46) with just requiring minimal cognitive demands. The impact of source expertise was found to be especially powerful when recipients have less interest or involvement to elaborate extensively on the message and the sender (Petty, Cacioppo & Goldman, 1981) and is said to be based on prior experiences which are simply transferred to the current situation (Sundar, 2008). By conducting focus group interviews, Metzger and colleges (2010) evaluated that an already known name of a person, brand or company often implies the attribution of a credible image what they (theoretically) explained with a link between the source cue, which triggers a cognitive heuristic and results in a credibility judgment.

Prior research provides a lot of evidence for the influence of source cues regarding the expertise, for instance, for the selection of online articles (Winter & Krämer, 2014; 2016), recipients' confidence in online health information (Adams, 2010, Ma & Atkin, 2017) and the believability of online information (Lin et al., 2016; Metzger et al., 2010; Sundar et al., 2009; Winter et al., 2010). As outlined in Chapter 5, in Study 1, source expertise was obtained to be the most influential aspect for recipients' credibility evaluations of source and message, compared to likes and shares, pictures and topic involvement.

However, until now, it is only known that source expertise plays a major role in credibility judgments, but it remains understudied which mechanism underlies the relation between cue and judgment. Even if it can be hypothesized that source cues (which were further found to impact credibility) are able to activate a related heuristic, namely the expertise heuristic, to date empirical evidence for this relation is lacking. By attempting to answer the question of what happens between the cue retrieval of source expertise and credibility judgments and if the relation is guided by the expertise heuristic, a formalized look on the cue-wise activation of heuristics and ways of how effort reduction – as

discriminating factor between heuristics and deliberated judgment strategies – can take place, follows within the next chapters.

3.2 Cue-wise activation of heuristics

Even if heuristics are conceptualized quite different, a common understanding exists among researchers that heuristics are triggered by specific cues (Chaiken, 1987; Chen et al., 1999; Shah & Oppenheimer; 2008; Tversky & Kahneman, 1974). Accordingly, the rule concept (Kruglanski & Gigerenzer, 2011) proposes if-then links between cues and judgments which are connected by "inferential devices" (p. 98), a consideration set of rules (either deliberated rules or intuitive heuristics), which are selected based on the requirements of the task (Kruglanski & Gigerenzer, 2011). As already mentioned in Chapter 2.2, cues can be represented by various different aspects available in the judgment situation, for instance, by a well-known name of a source.

Following the assumption of the rule concept, the presence of a specific cue can activate a related heuristic which will further lead to a decision or judgment. This process is referred to as cue salience (Tversky & Kahneman, 1974). Deploying this notion to the context of online credibility judgments, cues that are available, accessible, and applicable in online reception situations are said to activate a rule process by which recipients assess credibility based on experienced or socially and culturally learned connections (Kruglanski & Gigerenzer, 2011; Payne et al., 1993; Sundar, 2008; Tversky & Kahneman, 1974).

From a formalized perspective, the underlying structure of cognitive processes like decision-making and judgments can be generally described by cues and related cue values (Payne et al., 1993) which will be weighted and integrated in information processing (Rieskamp & Hoffrage, 1999). In detail, after a cue is retrieved, a related cue value will be added from memory, the cues are weighted according to individual relevance and lead to a resulting choice or judgement. With regard to decisions between two alternatives, people tend to rely on heuristics when the two options conflict each other in at least one dimension (Payne et al., 1993). Consequently, as precondition for the operation of heuristics in decision-making, the heuristic cue has to be differentiating between the alternatives (Bröder & Newell, 2008).

Generally, human decision strategies can be characterized as compensatory or non-compensatory (Bröder & Newell; 2008; Hilbig, 2014; Payne et al, 1993; Thoma & Williams, 2013). The compensatory fashion is described by taking more than one attribute (i.e. cue) of an alternative and the related value for decision-making and judgment into account. Furthermore, cues are compared and weighted against each other, for instance, a cue with a negative cue value can be compensated by another cue with a positive value. In more detail, first of all, the relevant cues have to be identified, then related cue values are going to be retrieved and evaluated regarding their importance depending on individual ratings and experiences. This is followed by an integration process of all cues into the entire picture. While this is the last step for judgments, for decision-making an additional step is required, picturing the comparison between all present alternatives after which the alternative with the highest value score will be selected (Shah & Oppenheimer, 2008).

Examples for compensatory decision strategies are the *equal weight rule* and the *weighted additive rule* (Payne et al., 1993). While for the equal weight strategy all cue values are solely added and the option with the higher sum of cue values is chosen (just using the sum without looking on the attributes values associated with), the weighted additive rule describes a weighting of cues and their related values which will be cumulated. For instance, if a specific attribute (e.g., author's expertise) is more important to the recipient than another attribute, the cue value of this attribute will be entered to a larger degree in the calculation of the overall sum and the option with the higher sum of weighted cue values will be selected.

Conversely, non-compensatory strategies which comprise cognitive heuristics focus mainly on one important, discriminating cue (Gigerenzer & Goldstein, 1996), and if the related cue value is negative, the alternative is most likely not selected (Payne et al., 1993). The "cue-wise" (Rieskamp & Hoffrage, 1999, p. 147) activation of heuristics does not require further information and thus, additional information is not integrated into prior knowledge or mental representations (Bröder & Eichler, 2006; Bröder & Newell, 2008; Newell & Shanks, 2004). This unconsciously used approach is called attribute substitution (Kahneman & Frederick, 2002) and minimizes the cognitive effort of judgments by not including all available information. It can happen that substantial information is replaced by another – possible irrelevant – cue, just because it is more likely to be retrieved due to a higher salience or accessibility (Shah & Oppenheimer, 2008). Strictly speaking, only one cue is used, and

not further compared to or weighted against other cues concerning their values or relevance like it happens for compensatory strategies. Due to the more complex processing and integration of information, the use of compensatory strategies is supposed to require more cognitive effort than non-compensatory strategies.

In sum, what really draws the line between heuristics and other decision strategies is how information such as cues and their values is integrated in judgments and decision-making (Bröder, 2000; Gigerenzer & Goldstein, 1996). Since people are supposed to stop further processing, evaluation, and information integration if the heuristic cue is given and retrieved, it is aimed to address the question of how this effort saving mechanisms can work in detail in the following. Further, it is outlined if effort reduction turned out to be a suitable approach for the investigation of heuristics (namely *take the best heuristic* and *recognition heuristic*).

3.3 Effort reduction as an approach to measure the operation of heuristics

Already dual process models of information processing mentioned the reduction of effortful cognitive investment (in cases of a lack of ability, motivation, and interest) as a main reason for peripheral processing (Chaiken, 1987; Petty & Cacioppo, 1986). Likewise, cognitive heuristics are defined as strategies used for reducing the cognitive load and complexity of tasks (Tversky & Kahneman, 1974). Correspondingly, Payne and colleagues classified decision and judgments strategies according their "cost and benefits" (1993, p. 91), whereby costs relate to the effort and benefits describe how accurate the resulting decision is. It can be argued that the outcome and its accuracy perception can influence the experienced usefulness of the chosen strategy. Clearly, more cognitive effort is required for a detailed and elaborated comparison of alternatives and their related cues and cue values (Payne et al., 1993). Nevertheless, apart from these notions of the influential role of effort reduction for heuristics, it is not specified how the effort is reduced.

Beyond that, Shah and Oppenheimer (2008) claim that effort reduction can be regarded as the core function of cognitive heuristics and further be used as "common language to discuss about heuristics" (p. 208) to overcome differences in conceptualizations and domain applications and reach a level of common understanding and comparability. In this vein, they

state five different effort reduction principles on which systematically examination of heuristics can be based to clearly differentiate heuristics from other decision strategies and judgmental rules. The first principle is called *examining fewer cues* and describes that not all cues are considered for decision-making and judgments. Mostly, only one cue will be taken into account, in case of judgments the most important one, in case of decisions, a discriminating one. Even in this process of examining a discriminating attribute, cues are implied subsequently and not at the same time. Reducing effort by considering not all available cues culminates in attribute substitution with solely considering one single cue for judgments and decision-making (Kahneman & Frederick, 2002). Secondly, *reducing the difficulty associated with retrieving and storing cue values* was proposed for effort reduction. Therefore, individuals particularly use cues which are easy to access due to salience or mental availability and try to avoid complex cues. Fiedler and von Sydow (2015) illustrate this easy-to-access effect with the example that a word's first letter is always easier to retrieve as the third letter. This mechanism is mirrored in one of the very original heuristics, namely the *availability heuristic* (Tversky & Kahneman, 1974). For the availability heuristic, humans tend to utilize the ease of retrieval as the basis for a decision or judgment. The third mechanism is called *simplifying the weighting principles for cues*. After receiving a cue, a weight according to the cue value is added. If this effort reduction principle is applied, a weight is added to the cue without any argumentative basis. That can result in every cue receiving the same weight, or the first cue will get the highest weight just because it was first noticed. Overall, cue values are not added according to actual weights, but in a more random fashion instead. Furthermore, *integrating less information* is claimed as a fourth aspect. That means, as soon as an at least acceptable value for a cue is reached, further searching and integrating of information will be stopped. Furthermore, retrieved cues are not compared with and weighted against each other, but evaluated in isolation instead. Thereby, it is a rather intuitive decision between two trade-off cues (or to be precise: cue values) whereby people will tend to select depending on which cue is more relevant and more salient to them. This principle clearly differentiates compensatory from non-compensatory decision strategies. The fifth principle, *examining fewer alternatives* refers to a situation in which individuals can chose how many different options their integrate in their decision. The effort is thereby

reduced by simply decreasing the number of options to choose from, for instance, by pairwise comparisons, so that not every option is compared to every other one.

Overall, it is important to emphasize that the proposed effort reduction principles are not explicit and consciously selected by individuals (Shah & Oppenheimer, 2008; Payne et al., 1993). In contrast, Shah and Oppenheimer (2008) claim that heuristics are linked to specific effort reduction principles, which additionally indicate that the principles are not exclusive, and a heuristic can make use of several at the same time as it can be seen in the experiments outline below. Prior work in the realm of experimental investigation of heuristics is sparse and can be differentiated in two groups, the first one used the take the best heuristic (Bröder, 2000; Newell & Shanks, 2003; Rieskamp & Hoffrage, 1999) and the second group aims to systematically investigate the recognition heuristic (Hilbig, 2014, Oeusoonthornwattana & Shanks, 2010; Thoma & Williams, 2013).

The very first attempts into the experimental investigation of heuristics in decision-making were made by means of the take the best heuristic (TTB; Gigerenzer, Hoffrage, & Kleinbolting, 1991). The TTB heuristic describes a heuristic which is applied for decision-making and inferences under uncertainty. With regard to the effort reduction principles by Shah and Oppenheimer (2008), the TTB heuristic decreases effort by examining fewer cues and by applying a simplified weighting for cues. In this vein, effort and time are reduced because the integration of choice related information (resp. additional cues) stops as soon as a cue which discriminates between two alternatives is retrieved. In addition, the only value the discriminating cue must feature, is to be better for one alternative than for the other one. This does not include that it has to be objectively qualitative and display the simplified weighting principle Shah and Oppenheimer postulated. In sum, the decision is driven by one cue, the discriminating one (Bröder, 2000).

Under the notion that time pressure will determine if a simple heuristic is used, two experiments were conducted (Rieskamp & Hoffrage, 1999). They told participants that they should invest a certain amount of inherited money in a company. In a reduced design four different companies were presented, described by six different attributes (e.g., amount of investigations, amount of shared capital, number of employees, recognition rate, share price, dividend) which were associated with a specific cue value. The cue value was hidden and only revealed if participants clicked on an attribute. Furthermore, at any time only one value

was shown. Participants had to perform 15 choices under low time pressure and 15 under high time pressure. Results revealed that under high time pressure, participants rather used the TTB heuristic. This was figured out because they stopped clicking on the attributes to reveal the hidden cue values as soon as they found a discriminating cue, which fosters one company (they hereinafter chose). Under lower time restriction people stick more to a strategy which sums all positive cue values and thus favor the alternative with the most positive cues. This mechanism is similarly described by the equal weight rule (Payne et al., 1993) and required more time (and effort) due to the revealing process of all cue values where people had to click and remember what they saw. Caused in these finding the authors conclude that differences in required cognitive effort can be related to the use of a heuristic and are depending on time constrains.

Bröder (2000) extended the work on the experimental investigation of TTB heuristic with four experiments. Similarly, a cover story was used telling participants that they had to estimate the degree of civilization of an artificial world (experiments 1 & 2) described through several attributes such as agriculture, industrialization, artwork, etc. with related cue values (plus or minus symbol). Apart from cue valence (for the relevant as well as for the additional cues), the number of conflicting cues was varied. Furthermore, people were under time pressure for the decision. Findings indicated that the TTB strategy was outweighed by a simple addition of cues with positive valence (which relates to the equal weight rule). However, it could not be confirmed that additional information like valence and number of conflicting cues were not considered for the decision and time pressure did not strengthen the probability to choose TTB-wise. Interestingly, participants reported higher confidence evaluations for decisions with positive additional cues which might be explained by an inverse negativity bias (Rozin & Royzman, 2001) through what negative cue values were especially salient and participants tried to avoid them resulting in higher confidence rates for positive cue values.

In experiment 3 and 4 by (Bröder, 2000) participants were instructed that they are stockbrokers with a certain amount of money which they further wanted to invest in a company. Two different companies were presented which were characterized by different attributes with cue values. Furthermore, a stepwise revealing of cues was applied to better incorporate the nature of the TTB heuristic which is defined to stop information search and

integration as soon as a discriminating cue is found. A second modification was done with regard to the analysis of individual choice patterns (compared to overall mean calculation of choices) which revealed that 28 (experiment 3) and 53 (experiment 4) percent of the participants chose according to TTB heuristic. That means they stopped with requesting revealing further cue values when they found an attribute which differentiates between the two alternatives.

As the TTB heuristic is highly connected to a search and information integration behavior (and consequently much more complex to investigate), experiments on the impact of the recognition heuristic (RH; Goldstein & Gigerenzer, 2002) focus more on the presence of one specific heuristic cue. Basically, the recognition heuristic states that in decision situations recognized alternatives will be favored, just because of the perceived familiarity and independent from other quality or meta-informational aspects. Considering the proposed effort reduction mechanism by Shah and Oppenheimer (2008), three of the principles can be applied to the recognition heuristic. Namely, fewer cues are used (principle 1), the difficulty of retrieving cue values is decreased (principle 2) because the recognition of one alternative is easy to access and the weighting of the cue value is simplified (principle 3). The recognized alternative will be allocated with the higher cue value in the judgment process (Goldstein & Gigerenzer, 2002; Thoma & Williams, 2013), so that "no other information can reverse the choice determined by recognition" (Goldstein & Gigerenzer, 2002, p.82). Given this notion, Oeusoonthornwattana and Shanks (2010) conducted an experiment using a two-alternatives choice task between a well-known and an unknown brand out of a range of consumer products (including tennis racquets, potato crisps, chocolates, ear phones, and shower gels) to provide evidence for the use of recognition heuristic in consumer choices. Moreover, additional information which was either positive or negative (compared to a control condition with no information) was presented in a learning phase in form of a statement about the brand. For instance, as a negative statement, it was stated that the brand is making use of child labor. Afterwards in the decision phase, participants were exposure to 30 critical pairs consisting of a well-known and an unknown brand name which were randomly intermixed with 30 pairs with two well-known brands and 30 pairs with two unknown pairs.

It was found that choices were – opposing the assumptions – not independent from the additional information. The recognized alternative was more often selected with positive

additional information compared to none and a negative statement. Nevertheless, over all conditions the recognized option was selected more than 50 percent which was interpreted rather as systematic than chance influence of recognition on choices. As a result, authors argued that the nature of the recognition heuristic in the realm of consumer choices is probably not non-compensatory but rather compensatory which means that decisions are not exclusively based on one cue (namely recognition of one alternative). In contrast, Thoma and Williams (2013) assume that the findings regarding the influence of (positive) additional information might be due to the presentation procedure applied in the study. Considering the process of how judgments take place, all cues have to be available in the relevant situation. Strictly speaking, additional information is represented as further cues in human minds which will be ignored if a heuristic is used. Thus, Thoma and Williams (2013) used the stimulus material of Oeusoonthornwattana and Shanks (2010) but changed the way of how the additional information was presented. They presented the products for the decision task with consumer ratings in terms of a star rating-system which were either positive (five stars), neutral (three stars), or negative (one star). However, results also showed that decision behavior as well as decision times were not independent from additional information. For the actual decision outcomes, it was revealed that the recognized option was chosen more often when it was accompanied by positive consumer ratings (compared to control and negative condition). For the decision latencies, participants were faster in their decision when neutral or positive ratings were present in contrast to negative ones. Overall, it can be stated that the valence of the additional information showed a significant effect on the choices, even if overall choices were driven by the recognition mechanism. However, it has to be considered that the analysis of interaction effects with additional information was solely based on decisions in which participants have correctly selected the well-known product alternative which limits the examination to those individuals who already decided heuristic-wise.

Another experiment was conducted by Hilbig (2014) who experimentally investigated the role of the recognition heuristic in comparison with other decision strategies in consumer choices. The author revisited the findings of Thoma and Williams (2013) aiming to find an explanation for the impact of additional information, even if the recognition cue was present. Basically, Hilbig (2014) states that different persons use different models for deciding between two options. Thus, he tested which strategy was used in a consumer choice task in

which participants had to decide between two products. Besides recognition heuristic, equal weight strategy, and weighted additive strategy (Payne et al., 1993) as well as guess as default option for a random choice were included. Findings indicated that equal weight strategy accounted best as explanation for the majority of participants' choices. According to Hilbig, differences in the use of strategies could be generally explained by the influence of personal characteristics which were not addressed to date in the investigation of heuristics.

Overall, the effort reduction principles (Shah & Oppenheimer, 2008) provide a useful approach to experimentally investigate the operation of cognitive heuristics by means of effort reduction. With regard to the expertise heuristic, it can be assumed that the relevant cue – authors' expertise – is easy to access which is related to the second principle, reducing the difficulty of retrieving cue values. Probably, that can be traced back to the relevance of the source's status (e.g., in terms of competence) learned from face-to-face interactions (Sundar, 2008) and well-established in mental representations about the concept of source expertise. Due to this, the value of the source cue is easy to access for individuals. The findings of Study 1 and Study 2 of this dissertation emphasizing the important role of the competence of the source for credibility ratings contribute to this assumption.

To measure if the effort is reduced and further if decisions and judgments can be assumed to be based on a heuristic rather than on a compensatory strategy, Glöckner (2009) recommended measuring task latencies as well as task confidence. With a series of computer simulations, it was found that decision times can serve as a valid indicator to identify if an intuitive or deliberated strategy was used, probably more valid than the manipulated task time restrictions used by for the examination of heuristics. In line with this, Shah and Oppenheimer (2008) suggest combining latency measures and an outcome analysis as promising for finding out if a cue is easy to access and leads to a heuristic-congruent choice or judgment.

4 The moderating influence of recipients' characteristics

For investigating how individuals rate the credibility of online communication and which factors play a role in credibility judgments, it is crucial to put the lens on the recipient itself. As already outlined in Chapter 1.1 subjectivity is a major component of credibility perceptions in contrast to veracity which rather refers to the actual truth of information in a binary fashion. Therein, individual differences between recipients founded in prior experiences, knowledge, skills, goals, communication context, or even norms and expectations (Fogg, 2003; Kruglanski & Gigerenzer, 2011; Metzger & Flanangin, 2015; Sundar, 2008; Sundar et al., 2009; Wathen & Burkell, 2002) are supposed to guide not only which information but also how information is processed. Therefore, judgment processes (e.g., concerning credibility) are interacting with factors like relevance, motivation, prior knowledge, attitudes and affect (Chaiken, 1987; Wegener, Petty, Smoak, & Fabrigar, 2004). Results by Winter et al. (2016) delivered supporting evidence to this assumption. They found an enhanced consideration of social recommendations cues when participants were primed with a specific motivation (impression management motivation compared to defense and accuracy motivation).

According to dual process models, information processing is mainly depending on recipients' ability and motivation to elaborate on information (Chaiken, 1987; Petty & Cacioppo, 1986) which could be further traced back to specific characteristics described as stable traits like recipients' involvement or need for cognition (Haugtvedt, Petty, & Cacioppo, 1992; Metzger & Flanagin, 2015; Petty & Cacioppo, 1984). In addition, the salience or subjective relevance of specific source, message or medium cues differs due to individuals' characteristics and might result in different patterns of cues being used for judgments. In line with that assumption the prominence interpretation theory (Fogg, 2003; see Chapter 2.2) mentions involvement and individual differences in thinking as the most important aspects of why an element raises users' awareness. For instance, a user who is highly interested in daily news will potentially interact differently with given communication aspects than someone who came across the news unintendedly.

Although a lot of former work highlights potential interactions of communication cues with recipients' traits, for social media credibility judgments empirical evidence is sparse

(Metzger & Flanagin, 2015). In the following the most important recipients' characteristics are regarded in the realm of information processing and related judgment formation: Involvement (Chapter 4.1), thinking style preferences (Chapter 4.2) and conformity with the message (Chapter 4.3).

4.1 Involvement

One of the most important factors determining the willingness of effortful processing refers to recipients' personal involvement (Petty & Cacioppo, 1984) describing the degree of "personal relevance" (Petty & Cacioppo, 1984, p. 144). From a detailed point of view, involvement is more likely to be located in gradual steps on a continuum between high and low, however, to keep it simple, often only high and low levels of involvement are distinguished. Involvement can not only be defined as recipients' characteristic, but also appear as situational concept or be related to a specific topic.

Traditionally, it has been argued that in cases of higher involvement, people strive for justified judgments resulting in elaborated processing. In contrast, people with lower involvement regarding the communication's target are more likely to be influenced by peripheral cues (Petty & Cacioppo, 1986). Accordingly, the cue-salience hypothesis states that the awareness of peripheral cues decreases if topic interest increases. Due to more "issue-relevant thinking" (Petty & Cacioppo, 1984, p. 69), individuals are less attentive to peripheral – not issue-related – information bits such as cues. Caused by a lowered accessibility, cues are less salient to recipients (Petty, 1994) or aligned to the prominence interpretation theory (Fogg, 2003), less prominent. Extending results from traditional media research, a study by Winter and colleagues (2015) demonstrated that the level of involvement determined which kind of user comments (as peer related cues) affected judgments like the article's quality. Interested participants were persuaded more by argumentative comments (compared to subjective comments) which indicates the participants' willingness to obtain an accurate impression of the topic.

Analysis of the selection of political articles in an online news portal demonstrated that recipients' reliance on source cues like reputation was mainly driven by attributed importance

of the topic (Westerwick, Kleinman, & Knobloch-Westerwick, 2013). With lower involvement people tend to select more articles presented by high reputation sources like the World Trade Organization (compared to Joes-economy-blog), while highly involved individuals selected articles supporting their position regarding the topic independent of the reputation of the source to a greater extent. Overall, it can be reasoned that especially recipients who are less interested are susceptible to be guided by credibility cues such as peer recommendations (Winter & Krämer, 2016). Considering the recent evidence for a moderating function of involvement on news article evaluation and the selection of political information, the level of recipients' involvement turned out to be a relevant moderator for judging the credibility of online news and content.

4.2 Thinking style preference

Furthermore, individuals' differences in decision-making and judgments can be attributed to the predisposition of thinking styles. Basically, two major types of thinking styles are distinguished, intuitive thinking and deliberated thinking. These preferences were found to be stable characteristics (Betsch, 2004) which are connected to the processing of information, but also found to be influential for information search, evaluations, attitude formation, behavioral intentions, task fulfilment and learning (Richetin, Perugini, Adjali, & Hurling, 2007).

The differentiation between intuition and deliberation in thinking and processing is highly related to the two different modi – peripheral and central – of dual process models (Chaiken, 1987; Petty & Cacioppo, 1986) as described in Chapter 2.1 and can potentially serve as discriminating factor for individuals' degree of motivation which further influences how information is processed. Individual preferences regarding thinking styles result from prior experiences or habits (Cavojova & Hanak, 2014). Thus, preferences guide decisions, but could be moderated by situational factors such as time pressure. However, it is important to mention, that intuitive and deliberated thinking processes are not two opposite poles of a continuum, but rather two independent constructs in each case more or less pronounced for humans (Betsch, 2004; Petty, Brinol, Loersch, & McCaslin, 2009). In the following, the two

main concepts representing a deliberated (need for cognition) vs. an intuitive (faith in intuition) thinking style are regarded in detail.

4.2.1 Need for cognition

Peoples' need for cognition is defined as the tendency to "engage in and enjoy thinking" (Cacioppo, Petty, & Kao, 1984, p. 116) coming along with the overarching willingness to take on effortful cognitive tasks and thereby influencing individuals' information processing, judgments and decision-making (Haugtvedt & Petty, 1992). Since need for cognition is associated with a deliberated thinking style reflecting on arguments and content-wise aspects, incoming information is supposed to be processed via the central route (Petty, Cacioppo, Feinstein & Jarvis, 1996). For judgment and decision-making situations need for cognition determines the general willingness of individuals to search for additional information and to think about alternatives (Petty et al., 2009). Consequently, due to a profound and cognitive demanding occupation with content, need for cognition was found to foster information recall as well as more content-related thoughts which both enhanced the likelihood to detect inconsistencies in information (Lassiter, Briggs, & Slaw, 1991).

Evoking more content-related thoughts, higher need for cognition was evaluated as an indicator for more positive evaluations of message and source after the presentation of high-quality arguments (Cacioppo, Petty, & Morris, 1983; Luttrell, Petty, & Xu, 2017). In the same vein, it was demonstrated that commercials with strong arguments (highlighting product-related information) lead to more positive attitudes concerning the product for individuals with higher need for cognition than commercials with weak arguments (containing product-irrelevant aspects). In contrast, for persons with lower need for cognition no difference occurred depending on the argument quality (Haugtvedt, & Petty, 1992). Another study examined a relation between need for cognition and the enjoyment of message complexity, insofar that recipients with higher need for cognition were more willing to process messages labelled as complex compared to those indicated as simple and showed more enjoyment and arousal afterwards (See, Petty, & Evans, 2009).

According to dual process models it can be argued that differences in the impact of content aspects and cues refer to different levels of recipients' need for cognition whereby lower need for cognition values make humans generally more prone to rely on cues and heuristics for effort reduction purposes (Petty et al., 2009). With regard to the evaluation of the truth of video messages it was found that higher need for cognition enabled persons to be generally more able to decide between accurate and inaccurate messages. Furthermore, recipients with lower need for cognition only used non-verbal cues (e.g. posture shifts) to rate the veracity of the message and the credibility of the communicator, whereas higher need for cognition values tempted individuals to include both, verbal and non- verbal cues in their judgment processes (Reinhardt, 2010).

For non-digital communication, individuals with lower need for cognition were found to use peripheral cues in persuasive communication, because they were not willing or able to extensively engage in effortful thinking and processing of information (Petty et al., 1996). In detail, lower need for cognition increased the use of cues for related attitude formation or judgment processes regarding peripheral cues such as source aspects (Petty et al., 1981) or message cues such as the number of arguments (Chaiken, 1987; Petty & Cacioppo, 1984). Although in online communication a moderating impact of need for cognition did not occur for the impact of community comments (meta-informational cues) on article evaluation (Winter et al., 2015), strong arguments did affect individuals high in need for cognition concerning their perception of the general opinion climate (Winter & Krämer, 2016). In line with that finding, Lee and Jang (2010) demonstrate users with higher need for cognition to base their evaluations about the influence of news articles on other users on overall ratings rather than individual comments below the articles which indicates that more rational anchors were chosen for judgments.

Investigating the general use of social network sites, it was revealed that higher need for cognition leads to generally lower frequency of using social networks for spare time as well as study purposes (Zhong, Hardin, & Sun, 2011). Furthermore, low need for cognition participants reported to have less time to consume traditional media – besides their social network usage. Apparently, differences in need for cognition drive differences in social media consumption behavior. Although almost every framework on credibility theoretically emphasizes the role of need for cognition for information processing and related credibility

judgments, empirical evidence of the relation between need for cognition and online credibility is sparse to date. There exist first indications of the moderating role of need for cognition, for instance Flanagin and colleagues (2010) conducted a large qualitative interview study with teenagers and found a relation between high need for cognition and a general lower tendency to trust persons communicating online, whereas individuals with lower need for cognition expressed less suspect and more trustworthiness regarding online communication.

Based on the above mentioned, it can be assumed that need for cognition potentially serves as a determinant, which seem to indicate whether recipients engage in more effortful elaboration of a message. According to the postulations of dual process models, need for cognition can be regarded as discriminating factor of the degree of individuals' ability and motivation, which further determine in which way incoming stimuli will be processed. For social media communication it can be argued that need for cognition plays an important role for the reception of messages and influences whether recipients pay attentions to the content and arguments or rather perceive simple cues. Consequently, the reliance on source, message and meta-informational cues for related evaluations of the message and the source (e.g. in terms of credibility) might be decreased for high need for cognition recipients and increased for those with lower levels of need for cognition.

4.2.2 Faith in intuition

In contrast to need for cognition, faith in intuition is commonly described as humans' tendency to base decision-making and evaluations on a gut feeling resulting from learned associations, habits, affect, instinct or quickly received impressions (Alos-Ferrer & Hügelschäfer, 2014; Betsch, 2004; Cavojova & Hanak, 2014; Metzger & Flanagin, 2015). In this vein, judgments are made almost automatically without engaging in thinking or verification processes. As a consequence, judgments are less questioned and more accepted as certain and right (Alos-Ferrer & Hügelschäfer, 2014). Preferences for intuitive decision-making and judgments can be further triggered by context factors such as time pressure but are usually regarded as a stable trait of recipients (Betsch, 2004). In terms of information

processing, intuition is related to heuristic or peripheral ways of processing which are more likely to be driven by peripheral cues and rules instead of arguments and content (Cavojova & Hanak, 2014; Chaiken, 1987).

In this regard, peoples' attitudes formation was found to be influenced by faith in intuition, insofar that those with higher values in faith in intuition were rather affected by ads including pictures than verbal brand and product descriptions (Zimmermann, Redker, & Gibson, 2011). For tasks in which participants had to assess probabilities to events such as winning in the lottery, it was revealed that faith in intuition makes people more vulnerable for biases such as the "gamblers fallacy" (Shiloh, Salton, & Sharabi, 2002, p. 420), which describes that persons overestimate the likelihood of an event just because it has not happened in a long time. The authors characterized this tendency to apply simple and intuitive rules as heuristic judgments which were correlated with faith in intuition. Furthermore, in another study with probabilistic choice tasks (e.g. the Linda problem introduced by Tversky & Kahneman, 1983) an interaction effect of intuition and gender was detected, where females were more biased in their choices (Alos-Ferrer & Hügelschäfer, 2016).

Moreover, prior work found people high in faith in intuition to rate online information as generally more credible compared to those with lower levels of faith in intuition (Flanagin, Metzger, & Hartsell, 2010). Faith in intuition determined users' information search behavior insofar that they were satisfied faster and stopped searching for further information to answer a task (Cavojova & Hanak, 2014). In the context of privacy protection decisions, faith in intuition was discovered to be an explanation for risky self-disclosure (Kehr, Kowatsch, Wentzel, & Fleisch, 2015). By applying an intuitive thinking style, individuals did not rationally elaborate on potential risks of online self-disclosure. Investigating recipients' susceptibility for online fake news stories, Pennycook and Rand (2019) asked participants to rate the accuracy of news headlines (all factual false) and found a more intuitive thinking style to lead to less accurate accuracy ratings. People who relied on their intuition for the evaluation of headlines, were easier convinced of the believability of the news stories, probably because their invested less effort on the evaluation.

All in all, differences in processing, judgments and decision-making cannot only stem from recipients' level of need for cognition but further from their faith in intuition (Shiloh et al., 2002). Notwithstanding, need for cognition and intuition are not displaying two poles of

one scale, it might happen that recipients use both strategies in combination, or change strategies according to situational circumstances (Betsch, 2004). Previous findings suggest that faith in intuition is characterized by less cognitive effort invested in judgments and decision-making which might encourage peripheral information processing. Thereby, faith in intuition can serve as another important moderator – apart from need for cognition – which is associated to the tendency of intuitive and heuristic processing and can possibly explain differences in individuals' use of cues and heuristics for credibility decisions.

2.2 Conformity with the message

For information selection of news and political topics people were found to prefer content which is in line with their own beliefs (Knobloch-Westerwick & Meng, 2009; Messing und Westwood, 2014; Winter et al., 2016). Overarching psychological mechanisms like the cognitive dissonance theory (Festinger, 1962) explain individuals' striving for consistency in their attitudes with the avoidance of stress feelings induced by contradicting information. Thus, people favor information which is consistent with their opinions and prevent justifying their prior attitudes (which would urge a lot of cognitive effort). In the same vein, the confirmation bias describes the interpretation of information (e.g. regarding quality) aligned to existing beliefs and attitudes (Nickerson, 1998). Furthermore, this effect can be seen as connected to the more intuitive processing route of dual process models coming along with less effort and less time needed for judgments and decision-making (Moravec, Minas, & Dennis, 2018). Accordingly, the authors claim that the likelihood for the occurrence of confirmation biases is increased in social media environments due to a generally more "hedonic mindset" (p. 4) people have while reading social media news. Also, social media providers tend to present content to the users which is in line with their prior activities, for instance to articles they liked or shared before (Bakir & McStay, 2018; Bessi et al., 2016) enhancing not only the exposure to belief-congruent information, but additionally the perception of familiarity. Besides selecting opinion-consistent information, the confirmation bias highlights further interpretation of incoming information as corresponding with existing expectations and attitudes (Nickerson, 1998). Due to this,

attitude-supporting messages are able to strengthen prior beliefs, whereas the exposure to contradicting content can weaken existing opinion (Knobloch-Westerwick et al., 2015). Referring to the confirmation bias, Westerwick and colleagues (2013) demonstrated that recipients solely used attitude-consistent political news articles from a news portal to fulfill a searching task. In with that, Metzger and colleagues (2010) obtained individuals via focus groups to heavily rely on the fit between information and own attitudes for credibility judgments, particularly for political information and up-to data events.

Apparently, people tend to rely mostly on content congruent to their prior attitudes. In a study asking participants to assess the credibility of news article headlines, it was revealed that prior beliefs were not only the major driver for credibility evaluations (unequal whether news articles were factual false or true) but further able to determine related actions like reading, liking, sharing or writing supporting comments (Kim & Dennis, 2018). This finding on the influence of prior attitudes on credibility perceptions gains in importance against the background that even labels explicitly indicating article headlines as fake news had no effect on credibility ratings based on the fit of article topic and prior beliefs (Moravec et al., 2018). Being exposed to confirming information seems to ease the acceptance and believability of the message. Due to this, it can be argued that message agreement is able to moderate the impact of cues on credibility judgments, whereby cues will have a reinforcing effect for people who agree on the statement and an attenuating impact for those who disagree.

III Empirical Research

Following the theoretical foundations presented in the previous chapters, the overarching aim of this dissertation is to investigate the process how recipients assess credibility to social media communication. Since nowadays the usage of social media as – often the only – source for news and political information is increased (Bode, 2015; Fletcher & Nielsen, 2018; Metzger & Flanagin, 2015), the importance for recipients of being able to validly assess what kind of content is credible is immensely amplified. However, technological changes and various different information accompanying postings, make social media communication not only more complex and manifold, but also provide a large number of aspects which can be used for quality evaluations (Metzger & Flanagin, 2013; Metzger & Flanagin, 2015; Sundar, 2008).

According to approaches such as the MAIN model (Sundar, 2008) and the rule concept (Kruglanski & Gigerenzer, 2011), source, message, or meta-informational cues serve as anchors for credibility evaluations. The role attributed to cues and features with respect to credibility judgments can be traced back to information processing, as described in dual process models such as the elaboration likelihood model (Petty & Cacioppo, 1986) and the heuristic systematic model (Chaiken, 1987). Both models propose that incoming information can be processed in two different ways, the central and the peripheral route, and the chosen route will depend on the recipient's motivation and ability to thoroughly process information. The degree of motivation is supposed to be determined by individuals' characteristics such as involvement, need for cognition or faith in intuition (Fogg, 2003; Metzger & Flanagin, 2015, Petty & Cacioppo, 1984). Accordingly, recipients with a greater interest in the topic or an elaborated thinking style will be more likely to scrutinize the given information via the central route, because they strive for valid and truthful attitude formations (Petty & Cacioppo, 1984). In contrast, the peripheral route describes a simplified processing which is based on peripheral cues or heuristic rules.

Given that human cognitive capacities are limited (Lang, 2000), the ease of producing and distributing information in digital media and the resulting amounts of data inevitably require strategies to reduce the effort of information processing and corresponding decisions about the utility of content. The concept of cognitive heuristics describes mental strategies

that are used to reduce effort and complexity (Shah & Oppenheimer, 2008; Tversky & Kahneman, 1974). These simple rules, which are learned through experiences and generalization, do not include all available information that are given in a situation and are mostly unconsciously applied by individuals. One of the most widely known heuristics is the expertise heuristic, which is based on the underlying assumption that "experts' statements can be trusted" (Sundar, 2008, p. 74). Accordingly, the perception of a source as competent or experienced (as derived from cues) increases perceptions of credibility. However, the unconscious nature of heuristics makes it difficult to measure them and impedes the assessment of whether a cue has activated a specific heuristic. One promising approach relates to the use of task latencies as indicators for the operation of heuristics, since effort reduction can be regarded as the main function of heuristics (Glöckner, 2009; Shah & Oppenheimer, 2008).

In light of social media's real time communication, unlimited distribution, high connectivity, and the lack of editorial supervision, the reliance on cues generally seems to bear the risk of being easily deceived, and the relevance of examining if specific social media cues impact credibility judgments and further trigger related heuristics, which are connected to humans' judgments and decision-making, becomes abundantly enhanced. To this end, with the three empirical studies, the aim of this dissertation was to examine (1) the cues upon which recipients base their credibility evaluation in social media communication, (2) whether cue patterns are universal among different platforms and communication contexts, (3) whether automated methods are suitable to detect the credibility-enhancing impact of social media cues and features, (4) whether the relation between cue and judgment is driven by cognitive heuristics, and (5) whether the operation of a cognitive heuristic such as the expertise heuristic can be addressed by effort reduction and measured through reduced task latencies.

As visualized in Figure 1, the three studies attempted to comprehensively explore the process of credibility assessments with regard to the influence of source, message and meta-informational cues. After the reception of social media postings (on Facebook or Twitter), information is processed either centrally or peripherally (possibly by relying on a heuristic), which is supposed to be determined by recipients' characteristics such as involvement, need for cognition, faith in intuition, and conformity with the message, and further influences

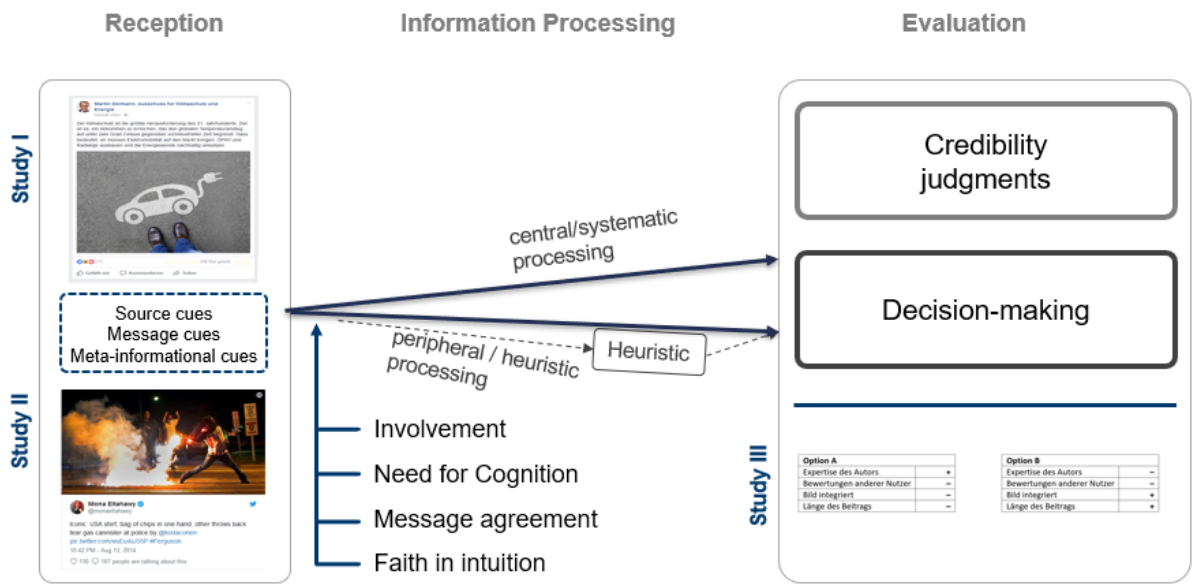

Figure 1. The process of credibility judgments as it was targeted with the three empirical studies.

the relevance and impact of cues on evaluations and resulting credibility judgments and decision-making.

As a first step into a systematical investigation of the process of human credibility judgments of social media communication, the impact of a set of different cues coming along with a Facebook posting on participants' credibility evaluations of source and message was addressed. Therefore, source expertise, likes, shares, pictures, and topic involvement of politicians' Facebook postings were varied with the aim of identifying the relative relevance and interaction of source, message and meta-informational cues. To avoid confounding effects and ensure participants to be in a situation of uncertainty about the source of communication, unknown politicians were considered for investigations. To address differences in information processing due to the effect of cues, recipients' characteristics such as involvement, need for cognition, and conformity with the message were included (see Table 1).

The second study of this dissertation focused on a different social media platform and another communication context to investigate if cue patterns are valid for broader range of social media communication. For that purpose, crisis-related tweets were used in an embedded scenario which represented a more realistic reception scenario than one single screenshot (for an overview of focus and measurements of the three studies see Table 1). The third objective addressed with the second study refers to the question if automated methods can target the balance between human credibility perceptions (with regard to specific facets of credibility) and automated selection of Twitter features which tend to be discriminating for credibility. Most prior work suggested automated approaches to perform binary classification to determine information veracity whereas recipients' perspectives and multidimensional psychological credibility evaluations are rarely considered in research (Castillo et al., 2011; Shariff et al., 2017). The second study aimed to fill this gap and gain more insights into the impact of a tweet's features on perceived credibility as well as possibilities of addressing these issues via feature selection methods for a large set of Twitter data.

After evaluating possible credibility anchors, the third study put the lens on cognitive processes between the retrieval of a cue and a related credibility judgment. In that vein, the question if the relation between cue and judgment is driven by cognitive heuristics was addressed. Since Study 1 and Study 2 both demonstrated source expertise cues to be the most important anchors for individuals' credibility assessments, the third study strived to examine if the relation between the cue source expertise and the resulting decision-making and judgment processes is guided by the expertise heuristic, based on the implicit rule "experts' statements can be trusted" (Sundar, 2008, p. 74; Ratneshwar & Chaiken, 1991). Given that effort reduction can be seen as the core function of cognitive heuristics (Glöckner, 1999; Shah & Oppenheimer, 2008), the operation of the expertise heuristic was methodologically addressed via task latencies. Thereby, recipients were confronted with a reduced choice task between two alternative information sources solely described by four attributes (source expertise, ratings of other users, picture, length). It was assumed that in decision tasks in which the heuristic cue source expertise is present, the expertise heuristic can be triggered and in turn reduce decision latencies.

Table 1.
Overview of the three conducted empirical studies regarding their focus, design and measurements.

	Study I	Study II	Study III
Focus	Source expertise, likes & shares, picture & topic involvement of politicians' Facebook postings	Broad range of Twitter features (Source, message, meta-informational) of crises-related tweets	Processing and integration of cue information & decision-making
Design	Experimental manipulation	Embedded tweet scenario	Reduced two-alternative choice paradigm
Method	Psychological measurements of credibility assessments	Combination of psychological measurements and feature-based selection approach	Assessment of effort reduction through decision latencies
Recipients' characteristics	Involvement, need for cognition, conformity with message		Involvement, need for cognition, faith in intuition
Dependent measures	Source credibility, message credibility	Message credibility	Decision latencies, source credibility

5 Study 1: Which cues are credible? – The relative importance and interaction of source expertise, likes, shares, pictures and topic involvement while assessing the credibility of politicians' Facebook postings

With the first study of this dissertation it was attempted to comprehensively investigate the role of source, message and meta-informational cues of social media communication as well as their potential interactions. Social media channels are increasingly used for the consumption of news and political information (Bode, 2015; Fletcher & Nielsen, 2018). Furthermore, the fast-pacing nature of online communication as well as the high connectivity can impede evaluations of online content because users can easily be exposed to information produced by unknown authors. For instance, an unfamiliar politician´s posting can appear in a recipients' newsfeed brought forward through network contacts or advertised posts. Therefore, the first study focused on political statements of unknown politicians to examine how recipients build their impressions in situations under uncertainty in which they cannot derive any information from the familiarity of the source. In this respect, the author's expertise status, the number of likes and shares, pictures and topic involvement of politicians postings were varied and their effect on resulting credibility evaluations of the communicator and the message assessed. Since credibility is rather perceived subjectively by recipients than objectively attributable (Choi & Stvilia, 2015; Fogg & Tseng, 1999), recipients' characteristics are supposed to play a moderating role. For instance, in the context of the elaboration likelihood model of information processing (Petty & Cacioppo, 1986), topic relevance and thinking style were found to determine which specific cues are used for judgments or whether people rely on cues at all. To tackle individual differences in processing style and the related reliance of cues, recipients' involvement, need for cognition and conformity with the message were integrated as potentially influencing factors for evaluating the credibility of message and source.

5.1 Hypotheses

Not only peoples' news consumption behavior rapidly changed due to the upsurge of social media but also the contextual conditions of communication differ tremendously from face-to-face interactions or traditional one-sided mass media communication (Metzger et al., 2010; Metzger & Flanagin, 2015; Sundar, 2008). Unfeasible amount of data spread by users without any boundaries or gate keepers ineluctably require strategies to escape from information overload and keep cognitive demands at an attainable level (Lang, 2000). Depending on ability and motivation (e.g. due to a high subjective relevance of the topic), individuals diverge from each in the way they process incoming information (as mentioned in chapter 4). In line with dual process models (Chaiken, 1987; Metzger, 2007; Petty & Cacioppo, 1986) peripheral processing can lead to the employment of cues as anchors for related judgments such as credibility ratings.

For face-to-face communication, the source of a message was found to be the main factor for further credibility evaluations (Hovland et al., 1953; Hovland & Weiss, 1951). Although, social media communication lacks observable cues such as gestures and facial expressions of the counterpart, source attributes still seem to be important, probably because humans are used to consult the source as a first step (Sundar, 2008). Analysis on the credibility-enhancing impact of source cues brought to light that aspects of the source like reputation (as indicated by the name) play a major role in several contexts, for example in online information selection (Winter & Krämer, 2014) or confidence in online health information (Adams, 2010, Ma & Atkin, 2017). In qualitative interviews, recipients reported about the importance of the source name (Metzger et al., 2010; Shariff et al., 2014) for the selection of news content and the evaluation of content quality and believability. Furthermore, empirical evidence showed that when the expertise of a source is highlighted (through the name, role or profession), communicated information are perceived as more credible (Hu & Sundar, 2010; Lin et al., 2015; Sundar, 2008; Sundar et al., 2009; Winter & Krämer, 2012). That was found for health-related tweets, website articles on media violence and online reviews. Based on the aforementioned findings of the influence of source cues in general and source expertise in particular, it is assumed that the expertise of the source will also serve as a discriminating

anchor for recipients who have to rate the credibility of an unknown politicians' Facebook postings:

H1: Higher expertise of the politician leads to higher ratings of credibility of a) the political message and b) the source.

One diverged characteristic of social media communication relates to the omnipresence of other users' actions and recommendations. System-aggregated measures like likes and shares commonly belonging to every social media posting, were found to be positively correlated with general higher levels of trustworthiness since they are not that easy to manipulate (Walther et al., 2009) and provide a stronger warranting effect (DeAndrea, 2014) to the users. While supporting actions by others can be seen as positive feedback (Metzger et al., 2010; Sundar & Nass, 2001) which individuals use as base for their own impression formation (Sundar, 2008) a positive effect on product selection and purchase intention (Sundar et al., 2008) and video selection (Fu & Sim, 2011; Xu & Fu, 2014) was already revealed. In the realm of social media communication, the selection of political articles (Messing & Westwood, 2014; Winter et al., 2016) and the assessment of news tweet credibility (Aigner et al., 2017) was driven by other users' recommendations. Altogether, prior results showing an impact of peer recommendations for online purchasing, information selection and rating of articles' quality, utility and credibility, imply the aggregated number of likes and shares of an unknown politicians' Facebook postings to be perceived as peer-recommended indicators for credibility. Therefore, it is hypothesized:

H2: A higher number of likes and shares leads to higher ratings of credibility of the a) political message and b) the source.

In addition, the message itself can convey cues. In particular, social media communication is characterized by using pictures, videos, hashtags, @mentions or external links. Visual cues like pictures are not only supposed to require less effort (Lowry et al., 2014), raise more awareness (Clow et al., 2006) and are associated with generally more trustworthiness by representing a more realistic and unadulterated image of reality (Sundar,

2008). Prior results revealed that the more information is provided in a social media posting, the more credible it was rated. For instance, providing further information by including URL links to external sources resulted in higher credibility perceptions (Aigner, et al., 2017; Morris et al., 2012). In interviews this effect was qualitatively also found for hashtags and @mentions of other users (Shariff et al., 2014). Applying this assumption and the results of visual cues influencing credibility evaluations on websites to situations in which recipients try to evaluate the credibility of an unknown politicians' postings, an included picture provides additional information and can potentially support perceived credibility. Based on this, the following hypothesis is posited:

> *H3*: A picture included in the posting leads to higher ratings of credibility of a) the political message and b) the source.

In addition, the personal relevance of the message's topic is said to be related to the effort users invest in elaborating on the content of the message because it indicates to which extent the topic is perceived as important (Petty & Cacioppo, 1984). Petty and colleagues (1981) found an interaction of issue involvement and argument quality, insofar that recipients highly involved in the topic were more strongly influenced by strong arguments. Based on the elaboration likelihood model (Petty & Cacioppo, 1986), it can be argued that the involvement level of the message indicates if the message's content is processed centrally or peripherally. When a topic is perceived as more personally relevant, the willingness of an effortful elaboration of the arguments and the message is strengthened. Conversely, people overweight cues of messages with perceived lower relevance (Petty & Wegener, 1998). In line with these classical findings, it is assumed that:

> *H4*: The impact of source expertise, likes and shares, and pictures of politicians' Facebook postings is reduced for high-involving message topics and enhanced for low-involving message topics.

To date it is not extensively investigated if different cues interact with each other and which effect cue interaction has on credibility ratings (Metzger & Flanagin, 2013).

Nevertheless, some preliminary results exist. A study by Sundar and colleagues (2009) revealed no interaction of authority (source) and bandwagon cues (meta-informational cues as likes). Accordingly, no interaction effect of message position (pro, con, balanced) and Facebook likes (high, low) emerged in the analysis of Winter and colleagues (2016). Contradicting that, the political orientation of the source and social recommendations turned out to interact with each other (Messing & Westwood, 2014), whereby social recommendations seem to have a stronger influence on the selection of political articles. Owed to the contradicting results and the sparse research concerning cue interaction, the following research question is posited:

> *RQ1*: Does the interaction of politician's expertise, number of shares and likes, and pictures increase credibility assessments for a) the political message and b) the source?

According to dual process models, information processing is mainly depending on recipients' ability and motivation to elaborate on information (Chaiken, 1987; Petty & Cacioppo, 1986). Therefore, judgment processes (e.g., concerning credibility) are interacting with factors like relevance, motivation, prior knowledge and attitudes and affect (Chaiken, 1987; Wegener et al., 2004). Results by Winter et al. (2016) delivered supporting evidence to this assumption. They found an enhanced consideration of social recommendations cues when participants were primed with a specific motivation (impression management motivation compared to defense and accuracy motivation). One of the most important factors determining the willingness of effortful processing refers to recipients' personal involvement (Petty & Cacioppo, 1984) describing the degree of "personal relevance" (Petty & Cacioppo, 1984, p. 144). Traditionally, it has been argued that in cases of higher involvement, people strive for justified judgments resulting in elaborated processing. In contrast, people with lower involvement regarding the communication's target are more likely to be influenced by peripheral cues (Petty & Cacioppo, 1986). Accordingly, the cue-salience hypothesis states that the awareness of peripheral cues decreases if topic interest increases. Caused by a lowered accessibility, cues are less salient to recipients (Petty, 1994). Extending these results, the study by Winter and colleagues (2015) demonstrated that the level of involvement determined which kind of user comments (as peer related cues) affected judgments like the

article's quality. Interested participants were persuaded more by argumentative comments (compared to subjective comments) which indicates the participants' willingness to obtain an accurate impression of the topic. Analysis of the selection of political articles in an online news portal demonstrated that recipients' reliance on source cues like reputation was mainly driven by attributed importance of the topic (Westerwick et al., 2013). With lower involvement people tend to select more articles presented by high reputation sources like the World Trade Organization (compared to Joes-economy-blog), while highly involved individuals selected articles supporting their position regarding the topic independent of the reputation of the source to a greater extent. Overall, it can be reasoned that especially recipients who are less interested are susceptible to be guided by credibility cues such as peer recommendations (Winter & Krämer, 2016). Considering the recent evidence for a moderating function of involvement on news article evaluation and the selection of political information, we suggest the level of recipients' involvement to be a relevant moderator for judging the credibility of political content:

> *H5*: Recipients' topic involvement enhances the impact of politician's expertise, number of likes and shares, and pictures on the credibility ratings of a) the political message and b) the source.

Another aspect influencing differences in the impact of cues refers to recipients' need for cognition. Need for cognition is described as the tendency to "engage in and enjoy thinking" (Cacioppo et al., 1982, p. 116). Evoking more related thoughts, higher need for cognition was evaluated as an indicator for improved message recall and more positive evaluations of message and source after the presentation of high-quality arguments (Cacioppo et al., 1983; Luttrell et al., 2017). Although a moderating impact of need for cognition did not occur for the impact of community comments on article evaluation (Winter et al., 2015), strong arguments did affect individuals high in need for cognition concerning their perception of the general opinion climate (Winter & Krämer, 2016). Overall, need for cognition serves as a determinant which seem to indicate whether recipients engage in more effortful elaboration of a message or rely on credibility cues for the assessment of credibility. Therefore, the following hypothesis is stated:

H6: Recipients' need for cognition decreases the impact of politician's expertise, number of likes and shares, and pictures on the credibility ratings of a) the political message and b) the source.

As postulated by concepts like the confirmation bias (Nickerson, 1998) and cognitive dissonance theory (Festinger, 1962) individuals prefer information which is in line with their already existing beliefs. Thus, people favor information which is consistent with their opinions and prevent justifying their prior attitudes (which would urge a lot of cognitive effort). Consequently, to avoid dealing with conflicting information and the stress that comes with it, people apparently tend to select, read and believe solely information with is in accordance to their beliefs. For information selection of news and political topics people were found to prefer content which is in line with their own beliefs (Knobloch-Westerwick & Meng, 2009; Messing und Westwood, 2014; Winter et al., 2016). Besides the selection opinion-consistent information, confirmation bias further influences the interpretation of incoming information (Nickerson, 1998). Due to this, attitude-supporting messages are able to strengthen prior beliefs, whereas the exposure to contradicting content can weaken existing opinion (Knobloch-Westerwick et al., 2015). Referring to the confirmation bias, Westerwick and colleagues (2013) demonstrated that recipients also used attitude-consistent political news articles from a news portal to fulfill a searching task. More crucial, article headlines were only evaluated as true when they were in line with own attitudes (Kim & Dennis, 2018; Moravec et al., 2018), independent from the fact whether they were factual false or correct and whether they were accompanied by fake news warning flags. Apparently, people tend to rely mostly on content congruent to their prior attitudes. Likewise, being exposed to confirming information might ease the acceptance and believability of the message. Due to this, it is assumed that conformity with the message influences the impact of cues on credibility judgments whereby cues will have a reinforcing effect for people who agree on the statement:

H7: Recipients' conformity with the political statement enhances the impact of politician's expertise, number of likes and shares, and pictures on the credibility ratings of a) the political message and b) the source.

5.2 Method

To investigate the proposed hypotheses, an online experiment with a 2 (expertise of politician: high vs. low) X 2 (number of likes and shares: high vs. low) X 2 (picture within the posting: yes vs. no) X 2 (involvement of message topic: high vs. low) within-subject design was conducted. The political messages and politicians were selected in two pilot studies.

5.2.1 Pilot studies

With the aim of selecting political statements concerning different political topics which are either highly or barely involving, ten political statements were presented to 24 participants (age: M = 33.58, SD = 10.67). All statements were taken from real politicians' Facebook or Twitter postings. To improve comparability, the length of the status updates was aligned and to avoid confounding effects, political positions or parties were removed. All postings contained the presentation of a political statement. For example, a statement focusing on climate protection stated: "Climate protection is the greatest challenge in the 21st century. Our aim is to agree on keeping the global rise in temperature below two degrees Celsius. That means, we have to realize affordable and attractive alternatives like electro-mobility and improvement of public transport networks and cycle tracks to sustainably implement the energy turnaround". After every statement, participants were asked to fill in the Personal Involvement Inventory (Zaichkowsky, 1994) to assess their topic involvement. Additionally, the valence of the posting (how do you evaluate this statement?) was measured using a 7-point semantic differential scale ranging from negative to positive. Based on the calculated mean values, the statements dealing with climate protection (M = 6.10; SD = 1.05) and anti-discrimination (M = 5.54; SD =1.41) were chosen for the high involvement condition and the postings about consumer protection (M = 3.92; SD = 1.46) and tax policy (M = 3.41; SD = 1.39) served as low involvement topics. All statements differ in the level of topic involvement (F (9;230) = 7.20; p <.001) but not in valence (F (9;230) = 1.82; p =.065).

The second pilot study was conducted to identify unknown politicians for the main study. Sixteen German politicians, all either members of the Social Democratic Party (SPD) or Christian Democratic Union (CDU), Germanys' two largest political parties, were rated in terms of familiarity and popularity by 24 participants via photographs. Participants were asked whether they know the name of the person and rated the extent of likeability and familiarity on a 7-point Likert scale (1 = I totally disagree to 7 = I totally agree). The percentage of correct names was taken as indicator of familiarity, and a medium level of popularity was chosen in order to avoid effects of prior attitudes. Accordingly, the following unknown politicians were chosen for the study: Dagmar Freitag (SPD; 0 %; $M = 3.80$; $SD = 1.77$), Martin Dörmann (SPD; 0 %; $M = 3.05$; $SD = 1.64$), Ingrid Fischbach (CDU; 0 %; $M = 4.10$; $SD = 2.26$), and Alexander Funk (CDU; 0 %; $M = 3.65$; $SD = 1.81$).

5.2.2 Material and procedure

For the main study, mock-ups were created presenting the statements as posted by the four unknown politicians. As an indicator for high expertise, for instance the label "Committee for climate protection and energy" (resp. "Committee for antidiscrimination", "Committee for consumer protection" and "Committee for tax policy") was added to the politician's name. Based on the study of Winter and colleagues (2015), the number of likes and shares was chosen (500 vs. 40). Additionally, the numbers were slightly modified to transport a less artificial impression, and marginally varied for every posting (e.g. 513 or 498). Pictures were selected based on their content fit to the topic of the posting. In the study every participant was exposed to four different postings (see Figure 2 – 5 for examples of different conditions).

Figure 2. Example of a political Facebook posting (with high involvement topic, high expertise of the politician, high number of likes and shares and an included picture).

Figure 3. Example of a political Facebook posting (with low involvement topic, low expertise of the politician, low number of likes and shares and no picture).

Figure 4. Example of a political Facebook posting (with high involvement topic, low expertise of the politician, high number of likes and shares and an included picture).

Figure 5. Example of a political Facebook posting (with low involvement topic, high expertise of the politician, low number of likes and shares and no picture).

First, participants were instructed that they will be exposed to four different politicians' Facebook postings which they had to evaluate afterwards. Then, the first posting was presented followed by the message credibility questionnaire, the source credibility questionnaire and the question concerning message agreement. Afterwards the second posting was presented followed by the same questionnaires etc. In a second round, the postings were shown again, and participants were asked to indicate their topic involvement regarding the messages' topic. In the following, participants had to answer the manipulation check questions (if the politician had an expert status, if the number of likes and shares was high or low, if the posting contained a picture and if the politician is unknown). Then, sociodemographic information and need for cognition were assessed. At the end of the survey participants were informed about the study's goal and had the opportunity to take part in a prize draw for Amazon vouchers. The procedure of the study was approved by the local ethics committee.

5.2.3 Sample

Overall 411 persons participated in the online survey. 70 participants were excluded from further analyzes since they viewed the Facebook page of the politician for less than ten seconds or failed the manipulation check questions (if the politician had an expert status and is unknown by the participant, if the number of likes and shares was high or low, if the posting contained a picture). The remaining sample of 341 persons had a mean age of 23.18 (range: 18 – 68; SD = 6.59); 210 participants were female and 131 were male. Most of them were students (295 participants), and 46 participants were employed. In general, the sample was rather interested in politics (M = 4.84; SD = 1.56; 1 to 7 = strongly). Every participant viewed four postings (randomized), so in sum 1366 postings were rated.

5.2.4 Measures

Message credibility. To assess recipients' evaluation of message credibility, the scale by Appelman and Sundar (2016) was used, asking participants on a 7-point Likert scale (1 = describes it very poorly to 7 = describes it very well) how accurate, authentic and trustworthy the message of the posting is. Furthermore, the scale was extended by the items comprehensible, important, informative and interesting. Due to the modifications, a factor analysis (principal component analysis with varimax rotation) was conducted yielding a single factor solution (explained variance: 60.62%). Therefore, a mean score was calculated (α = .88; M = 4.92, SD = 1.16), with higher values indicating higher message credibility ratings.

Source credibility. For measuring source credibility, the Source Credibility Scale by Ohanian (1990) was applied by using the ten items of the dimensions trustworthiness (dependable-undependable; honest-dishonest; reliable-unreliable; sincere-insincere; trustworthy-untrustworthy) and competence (expert-not an expert; experienced-inexperienced; knowledgeable-unknowledgeable; qualified-unqualified; skilled-unskilled) with a semantic differential from 1 to 9 (α =.93; M = 6.32; SD = 1.55). The attractiveness dimension of the scale was not used.

Involvement. Interest in the political topics of the postings was measured with the ten-item version of the Personal Involvement Inventory (Zaichkowsky, 1994). Participants rated items like "important" or "involving" on a 7-point semantic differential scale (α =.95; M = 5.04, SD = 1.24).

Need for Cognition. To assess participants' preferences in thinking and processing, the 16-item version of the Need for Cognition Scale from Bless, Wänke, Bohner, Fellhauer and Schwarz (1994) was used asking participants items like 'I really enjoy a task that involves coming up with new solutions to problems' on a 7-point Likert scale (1 = not correct at all to 7 = absolutely correct; α =.71; M = 3.55; SD = 0.55).

Conformity with message. Furthermore, participants had to indicate if they agree with the political statement made in the posting on a 7-point Likert scale (1 = I totally disagree to 7 = I totally agree; M = 5.22, SD = 1.60).

5.3 Results

Impact of cues on message and source credibility

To examine *H1*, which posited that a higher expertise of the politician results in higher credibility evaluations of the message and the source, a single-factor analysis of variance was conducted. Message credibility and source credibility served as dependent variables and expertise as factor. Results showed a significant main effect of expertise on message credibility (F (1, 1365) = 7.33; p = .007; η^2 =.005) and source credibility (F (1,1365) = 6.32; p = .012; η^2 = .005). The posting (high expertise: n = 669; M = 5.04; SD = 1.13; low expertise: n = 697; M = 4.88; SD = 1.14) and the politician (high expertise: n = 669; M = 6.41; SD = 1.51; low expertise: n = 697; M = 6.20; SD = 1.51) were evaluated as more credible if the politician was indicated as expert in the posting's topic. Although effect sizes were small, *H1* is supported for message (a) and source credibility (b).

In order to test *H2* claiming that a higher number of likes and shares increases credibility ratings, a single-factor analysis of variance was conducted. Message credibility and source credibility were entered as dependent variables and the number of likes and shares was used as factor. Results revealed a significant effect of likes and shares on message credibility (F (1,1365) = 7.05; p = .008; η^2 =.005), insofar as a low number of likes and shares (n = 681; M = 5.04; SD = 1.16) lead to higher evaluations of message credibility than a high number of likes and shares (n = 685; M = 4.87; SD = 1.15). The effect size turned out to be rather small. For the dependent measures of source credibility (F (1,1365) = 2.45; p = .118; η^2 =.002), however, no significant effect of the number of likes and shares emerged. Based on the contradicting results, *H2* has to be rejected. Unexpectedly, a lower number of likes and shares lead to higher message credibility.

Another single-factor analysis of variance was calculated to examine if pictures enhance credibility assessments (*H3*). The analysis did not show an effect of picture for message credibility (F (1,1365) = 3.20; p = .074; η^2 =.002) or source credibility (F (1,1365) = 0.86; p = .353; η^2 =.001). Based on these findings, *H3* has to be rejected.

For examining differences of the impact of cues related to the varied topic involvement of politicians' postings (*H4*), a multivariate analysis of variance was executed with message credibility and source credibility serving as dependent variables and politician's expertise,

number of likes and shares, pictures' and postings' varied topic involvement as fixed factors. For message credibility, a significant interaction effect of the level of topic involvement and pictures emerged (F (1,1350) = 6.61; p = .020; η^2 =.004), but with a very small effect size. Considering calculated mean values (Table 2), including a picture in the posting contributes to higher message credibility ratings for high involvement topics.

Table 2
Mean values and standard derivations for the interaction effect of varied topic involvement and pictures on message credibility (scale from 1 to 7).

Involvement	Picture	*M*	*SD*
High	Yes	5.35	1.10
	No	5.13	1.09
Low	Yes	4.63	1.08
	No	4.68	1.19

Furthermore, the highest values of message credibility were assessed in conditions with high involvement topics accompanied by pictures. Against expectations, message credibility was enhanced for high involvement topics when they were presented in combination with a picture. Moreover, for source expertise and likes and shares no interaction effect with the level of topic involvement was found, thus, *H4* has to be rejected.

To answer *RQ1* which asks if the interaction of expertise, likes and shares and pictures enhances credibility perceptions, a multivariate analysis of variance was performed with message credibility and source credibility as dependent variables and politician's expertise, number of likes and shares and pictures as fixed factors. Results show a three-way interaction of expertise, likes and shares and pictures on message credibility ratings (F (1,1358) = 12.23; p <. .001; η^2 =.009). This effect was characterized by a small effect size. Mean values (see Table 3) indicated that particularly high expertise in combination with low likes and shares and no pictures resulted in higher credibility evaluations of the message.

Table 3
Mean values and standard derivations for the interaction effect of expertise, shares and likes and picture on message credibility (scale from 1 to 7).

Expertise	Likes & Shares	Picture	*M*	*SD*
Low	Low	No	4.71	1.16
		Yes	5.17	1.08
		Overall	4.91	1.15
	High	No	4.90	1.12
		Yes	4.75	1.12
		Overall	4.82	1.12
	Overall	No	4.80	1.14
		Yes	4.93	1.12
		Overall	4.87	1.14
High	Low	No	5.18	1.16
		Yes	5.13	1.15
		Overall	5.16	1.16
	High	No	4.81	1.16
		Yes	5.02	1.16
		Overall	4.92	1.16
	Overall	No	5.00	1.18
		Yes	5.08	1.15
		Overall	5.04	1.16
Overall	Low	No	4.93	1.18
		Yes	5.15	1.12
		Overall	5.03	1.16
	High	No	4.86	1.14
		Yes	4.88	1.15
		Overall	4.87	1.14
	Overall	No	4.89	1.16
		Yes	5.01	1.14
		Overall	4.95	1.15

Moderating effects of involvement, need for cognition, and message agreement

To address *H5*, which proposes a moderating influence of recipients' involvement on the impact of politician's expertise, number of likes and shares and pictures on credibility, three moderated regression analyses were performed. In the first analysis, message credibility was entered as dependent variable. As predictors, expertise level of the politician (centralized and dummy-coded: high = 1; low = 0) was entered in the first step, involvement (centralized) in the second step, and the product of expertise and involvement in the third step. Apart from the main effect of expertise (F (1,1364) = 7.71; p = .009; R^2 = .006; adjusted R^2 = .004) and involvement (F (1,1363) = 168.34; p < .001; R^2 = .109; adjusted R^2 = .53) the analysis showed no significant effect of the interaction of expertise and involvement (F (1,1362) = 1.26; p = .262; R^2 = .001; adjusted R^2 = .001). The main effect of involvement on message credibility indicates that higher involvement results in higher ratings of message credibility (β = .329; p < .001). The second regression analysis, with source credibility as dependent variable, and expertise (first step), involvement (second step) and the product of expertise and involvement (third step) as predictors, revealed a similar pattern with main effects for expertise (F (1,1364) = 10.81; p = .002; R^2 = .008; adjusted R^2 = .004) and involvement (F (1,1363) = 110.48; p > .001; R^2 = .082; adjusted R^2 = .051; β = .274; p < .001), but no interaction effect (F (1,1362) = 0.37; p = .543; R^2 = .049; adjusted R^2 = .023).

With regard to a moderation effect of involvement on the impact of the number of likes and shares on message credibility the regression analysis (1st step: likes and shares; 2nd step: involvement, 3rd step: product of likes and shares and involvement) showed a main effect for likes and shares (F (1,1364) = 7.05; p < .001; R^2 = .005; adjusted R^2 = .002) with a low number of likes and shares leading to higher evaluations of message credibility (β = -.123; p < .001) and a main effect for involvement (F (1,1363) = 187.42; p < .001; R^2 = .125; adjusted R^2 = .101) with higher involvement resulting in higher credibility ratings of the message (β = .349; p < .001), but no interaction effect (F (1,1362) = 1.06; p = .305; R^2 = .126; adjusted R^2 = .104). The regression analysis with source credibility as dependent variable demonstrated a similar picture with a main effect for likes and shares (F (1,1364) = 2.45; p =.001; R^2 = .002; adjusted R^2 = .002; β = -.085) and involvement (F (1,1363) = 120.00; p <

.001; R^2 = .083; adjusted R^2 = .058; β = .287), but no interaction of likes and shares and involvement (F (1,1362) = 0.02; p = .878; R^2 = .083; adjusted R^2 = .058).

Concerning the investigation of a moderating impact of involvement on the relation between pictures and message credibility, another regression analysis was performed with message credibility as dependent variable and the factor picture (centralized and dummy-coded: picture = 1; no picture = 0) as independent variable in the first step, followed by involvement (centralized) in the second step and the product of picture and involvement in the third step. Results only pointed out an effect for involvement (F (1,1363) = 167.39; p < .001; R^2 = .111; adjusted R^2 = .079; β = .331), whereas the factor picture (F (1,1364) = 3.20; p =.211; R^2 = .002; adjusted R^2 = .002) and the interaction of picture and involvement (F (1,1362) = 0.05; p =.820; R^2 = .111; adjusted R^2 = .079) did not turn out to be significantly influencing.

The regression analysis for source credibility showed similar results with a main effect for involvement (F (1,1363) = 110.61; p < .001; R^2 = .076; adjusted R^2 = .042; β = .274), but no effects for pictures (F (1,1364) = 0.86; p =.657; R^2 = .076; adjusted R^2 = .042) or the interaction (F (1,1362) = 0.01; p =.976; R^2 = .076; adjusted R^2 = .042). Based on these results, *H5* has to be rejected.

A moderating influence of recipients' need for cognition is described in *H6* which was investigated with another set of regression analyses. First, message credibility was used as dependent variable and expertise level of the politician (centralized and dummy-coded: high = 1; low = 0), need for cognition (centralized) and the product of expertise and need for cognition as independent variables. Neither main effects for expertise (F (1,345) = 0.51; p =.478; R^2 = .001; adjusted R^2 = .001) or need for cognition (F (1,344) = 1.53; p =.182; R^2 = .006; adjusted R^2 = .004) nor an interaction effect of a moderating influence of need for cognition on the relation between expertise and message credibility was shown (F (1,343) = 0.30; p =.582; R^2 = .007; adjusted R^2 = .004). For source credibility the regression analysis revealed the same pattern with neither main effects for expertise (F (1,345) = 1.79; p =.179; R^2 = .005; adjusted R^2 = .002) or need for cognition (F (1,344) = 2.77; p =.124; R^2 = .013) nor an interaction effect (F (1,343) = 0.07; p =.787; R^2 = .013; adjusted R^2 = .009).

Furthermore, to examine a moderating impact of need for cognition on the relation of likes and shares with credibility ratings, a regression analysis was conducted with message

credibility as dependent variable and likes and shares (centralized and dummy-coded: high = 1; low = 0), need for cognition (centralized) and the product of both were treated as independent variables. No interaction effect of likes and shares and need for cognition (F (1,343) = 0.10; p =.751; R^2 = .005; adjusted R^2 = .002) was obtained. The same holds true for source credibility (F (1,343) = 0.22; p =.641; R^2 = .009; adjusted R^2 = .004). In addition, the regression analyses for a moderating effect of need for cognition on the factor pictures and credibility evaluations showed no interaction effect for message credibility (F (1,343) = 0.01; p =.981; R^2 = .005; adjusted R^2 = .002) and source credibility (F (1,343) = 0.19; p =.662; R^2 = .009; adjusted R^2 = .004). Against this background, *H6* was rejected.

In *H7,* it was assumed a moderating effect of recipients' conformity to the political statement concerning the impact of expertise, likes and shares and pictures on credibility evaluations. To explore this hypothesis, three regression analyses were calculated. For the first one, we inserted message credibility as dependent variable and expertise (centralized and dummy-coded: high = 1; low = 0), message conformity (centralized) and the product of both as independent variables. No interaction effect (F (1,1362) = 0.20; p =.653; R^2 = .437; adjusted R^2 = .402) was found besides the main effects of expertise (F (1,1364) = 7.71; p < .001; R^2 = .006; adjusted R^2 = .003; β = .075) and message conformity (F (1,1363) = 104.50; p < .001; R^2 = .437; adjusted R^2 = .402); higher agreement to the political statement led to higher message credibility ratings (β = .349; p < .001).

Regarding a moderating effect of message conformity on the relation between expertise and source credibility, the regression analysis revealed no interaction effect (F (1,1362) = 0.09; p = .769; R^2 = .314; adjusted R^2 = .291), but a main effect of message conformity (F (1,1363) = 609.32; p < .001; R^2 = .314; adjusted R^2 = .291) with higher agreement resulting in higher credibility assessments for the source of the message (β = .554; p < .001). Investigating the interaction between message conformity and likes and shares, similar results were revealed. There was no interaction effect concerning message credibility (F (1,1362) = 1.06; p = .304; R^2 = .434; adjusted R^2 = .412) and source credibility (F (1,1362) = 0.26; p = .613; R^2 = .307) but a main effect for message conformity with higher agreement leading to higher credibility ratings of the message (F (1,1363) = 103.14; p < .001; R^2 = .434; adjusted R^2 = .412; β = .655) and the source (F (1,1363) = 601.00; p < .001; R^2 = .307; adjusted R^2 = .251 β = .553).

Two further regression analyses addressing the interaction between message conformity and pictures, revealed a main effect of message conformity on message credibility (F (1,1363) = 102.92; $p < .001$; $R^2 = .434$; adjusted $R^2 = .411$; $\beta = .656$) and source credibility (F (1,1363) = 601.38; $p < .001$; $R^2 = .307$; adjusted $R^2 = .267$; $\beta = .553$) with higher agreement coming along with higher credibility assessments, but no interaction effect neither for message credibility (F (1,1362) = 0.21; $p = .648$; $R^2 = .432$; adjusted $R^2 = .401$) nor for source credibility (F (1,1362) = 0.45; $p = .502$; $R^2 = .307$; adjusted $R^2 = .267$). Since no interaction effect of message conformity and expertise, likes and shares or pictures was found, *H7* was rejected.

5.4 Discussion

Since social media channels are used not only for peer communication purposes, but also for the distribution of public information like news updates and political content, the question of how people evaluate online information gains in importance. Specifically, social networking sites like Facebook offer a space for the consumption of news and political information, but in contrast to the curated content of traditional media sources like newspapers or journalistic websites, the lack of gatekeepers and quality control mechanisms impede evaluations of content in terms of credibility. The study aimed to explore the impact of different cues accompanying politicians' Facebook postings on recipients' evaluation. An online experiment was conducted that for the first time provides a holistic analysis of the impact of source expertise, number of likes and shares, pictures and level of topic involvement on credibility ratings of message and source. Furthermore, recipients' involvement, need for cognition and message agreement were involved as moderating factors.

Results demonstrate that the expertise level of the politician highly impacted credibility perceptions. If the politician was labelled as expert, source and posting were perceived as more credible compared to politicians without an indicated expertise. In accordance with the present results, previous studies have examined source information like reputation or an expert role as key factors for the selection or perceived credibility of content (Hu & Sundar,

2010; Lin et al., 2015; Winter & Krämer, 2014). While prior work focused on newspaper sources (e.g., Winter & Krämer, 2014) and professional authors (Winter et al., 2010), the current study contributes to extend these findings to politicians as sources (of online communication).

At first glance, it seems to be a promising and reasonable strategy to rely on the source when assessing if information is credible or not, especially with regard to the fact that the politicians used in the study were unknown and participants could not derive knowledge from prior experiences. Nevertheless, it has to be considered that in social media environments users can manage and edit their account information by themselves, so that expertise communicated on social media profiles is rather self-reported than objectively attributed. However, former research also found beneficial effects of source reputation (Metzger et al, 2010; Sundar, 2008; Winter & Krämer, 2012) for communicators' self-reported profession (Winter et al., 2015). Based on the current findings, recipients' reliance on (self-reported) source expertise can be transferred to the area of politicians' social media communication. Accordingly, for politicians it looks promising to indicate their expertise field and working background (membership in committees, parliamentary tasks etc.) in their social media profiles to establish a trusted interaction with recipients. Surprisingly, in the current study, messages were evaluated as more credible when they were accompanied by a low number of likes and shares. This contradicts the assumption of the bandwagon heuristic, that other users' actions will be used as recommendations (Sundar, 2008) and system-generated cues are commonly associated with a higher warranting effect because they are not prone to manipulation (Walther et al., 2009). These results differ from former work demonstrating peer cues to guide the selection and evaluation of political articles (Winter et al, 2016). However, Winter and colleagues (2016) in fact used the wording 'recommendations' in their study so that participants might have built a less static impression in comparison to an aggregated number displayed below the posting. Accordingly, some scholars stress social media comments to be more influential than aggregated likes and shares due to their less abstract nature (Winter et al., 2015). It has to be further investigated if likes and shares by known others (friends or acquaintances) will be more likely perceived as credible recommendations. Otherwise, Messing and Westwood (2014) conclude that recommendations by other users affect recipients so strongly that even attitude-consistent

preferences of articles were overwritten. Furthermore, likes and retweets lead to perceptions of credibility also for tweets which contain misinformation (Aigner et al., 2017). The discrepancy to the current findings is probably caused in the fact that uncertainty relates to the reliance of others (Metzger & Flanagin, 2015) and participants in the current study did not feel uncertain about the political topics (e.g., compared to an unknown product aimed to be bought online). Including measures for recipients' uncertainty might be a promising approach for further work to analyze peer cues in more depth.

Another likely explanation refers to the awareness raised by media coverage of fake news in social media, filter bubbles and likes as indicators for popular opinions. Participants were possibly educated to not pay much attention to superficial cues when rating the credibility of political content. Further confirmation for this assumption can be derived from the reverse effect that message credibility was perceived higher in conditions with a lower number of likes and shares. In line with that, source credibility was not influenced by the number of likes and shares. This could have been rooted by recipients' perception of likes and shares as meta-informational aspects strongly connected to the posting, respectively the message, whereby there exists no learned direct link between postings' likes and the source. These findings suggest that users are not led by the popularity of social media content in the area of political postings. This can be evaluated positively not only from a societal viewpoint concerning political discourses, but also for - especially unknown - politicians who want to use social media channels to communicate and explain their positions and perspectives without being hindered by a popularity bias.

Against expectations, pictures did not influence credibility assessments. A study by Morris and colleagues (2012) found a similar result for the influence of profile pictures on credibility ratings. In line with that, visual information like pictures apparently do not have an influential effect on credibility ratings of politicians' postings. However, an interaction effect of pictures with the level of topic involvement of the message was obtained. For highly involving topics pictures enhanced corresponding perceptions of message credibility. It is likely that people are interested in receiving more information through aspects of the message like it was found for included URL links (Aigner et al., 2017), but this only holds true for topics which are interesting.

With regard to the investigation of potential cue combinations, the interplay of high source expertise, a small number of likes and shares and the absence of pictures resulted in the most credible ratings of the message. This finding highlights the leading role of source information as anchor for quality evaluations. It seems that some advices about the source are sufficient for people to decide about the validity of the source's communication. This is in line with prior results indicating the leading role of source aspects compared to retweets (Lin et al., 2015) or star ratings (Winter et al., 2010).

Moreover, recipients' measured involvement did not moderate the impact of cues on credibility assessments. Recipients with higher involvement rated the message as more credible, but this effect was not related to politician's expertise, the number of likes and shares or pictures and might simply underline that politically interested people have more confidence in politicians' statements or more prior knowledge about political topics which they can use to rate the messages. In contrast, prior work demonstrated involvement to influence if users select articles of high reputation sources (Westerwick et al., 2013) or are impacted by an argumentative style of user comments (compared to subjective comments) (Winter et al., 2015). However, these relations were not revealed for politicians' Facebook communication. Related to the ELM (Petty & Cacioppo, 1986), participants probably did not process politicians' postings differently due to differences in personal interests. From a practical viewpoint, it looks promising that people who are less involved and / or less informed, are apparently not more susceptible to fall for cues than interested individuals. The present finding claims that the expertise cue lends a general enhancement of credibility evaluations, regardless of viewers' political involvement.

In addition, recipients' need for cognition did not affect credibility ratings. According to the HSM (Chaiken, 1987), heuristic processing can take place on both ways of information processing. Taking this into account, the use of cues is probably not limited to a specific thinking style, and furthermore, the impact of cues on credibility does not differ among recipients depending on their need for cognition. Nevertheless, this assumption needs further investigation concerning the background knowledge participants associate with the cues which could probably deliver more information of how cues are processed.

Supporting evidence for disconfirmation bias and cognitive dissonance theory (Festinger, 1962) arose. Since message conformity showed no moderating effect for the

impact of cues on judgments regarding credibility, agreement significantly increases message credibility in general. This supports the assumption that content which is in line with prior beliefs is easily accepted and believed. Furthermore, this accords with prior work examining attitude consistency as main reason for the selection (Knobloch-Westerwick & Meng, 2009; Messing & Westwood, 2014; Winter et al., 2016) and evaluation of information as valuable (Westerwick et al., 2013).

5.5 Limitations

When interpreting the findings of the study, some limitations have to be considered. Overall, effect sizes appear to be quite small indicating that explained variance for the source effect is rather slight and probably influenced by additional factors which need further investigation. Moreover, the experiment only included four different postings, which limits generalizability. However, a pilot study ensured that the chosen messages only differed in the level of topic involvement and not with regard to valence. The reception situation was only simulated, because participants viewed a Facebook mock-up and not a real interactive Facebook page. Further investigations could therefore use a real Facebook page and integrate actions such as comments or likes as well. This would additionally contribute to a more detailed investigation of the inverse effect likes and shares seem to have in the area of political communication. A third limitation can be found in the sample composition: Participants were mainly students, consisted of more women than men, and had an above-average level of education. Despite the aforementioned limitations, the design enables to draw valuable conclusions even if a number of tests did not yield significant results as it shows the relative importance of source cues – which cannot be derived as clearly when not testing cues against each other.

5.6 Conclusion

By examining which cues will be used for credibility ratings of political content on Facebook, first steps towards a systematic investigation of the process of credibility judgments in the area of political social media communication were made. To date direct if-(cue) then (judgment) relations of judgments are understudied, especially in social media (Bellur & Sundar, 2014). For this reason, the findings of this study will contribute to a better understanding if and how politician's expertise, likes and shares and pictures serve as signals for the believability of a message. If a politician is labeled as expert in the topic's field, highly impacts resulting credibility ratings for the source and the message. It can be concluded that expertise of the communicator seems to be the most influential cue for assessing if political content is credible or not. At first glance, it seems to be an adequate strategy, but the self-reported nature of Facebook account information has to be considered. Contrary to expectations, this study did not find a positive effect of peer recommendations on credibility. Conversely, low numbers of likes and shares strengthened if a message was perceived as believable.

Overall, the impact of source expertise, likes, shares, pictures and topic involvement did not interact with recipients' involvement, need for cognition or message agreement, which suggests that cues were not processed peripherally, and the credibility-enhancing effects of cues appear to be existing for a wide range of recipients.

6 Study 2: The Impact of Twitter Features on Credibility Ratings - An Explorative Examination Combining Psychological Measurements and Feature Based Selection Methods

With the second study of this dissertation it was attempted to extend the investigation of the impact of social media cues and features by addressing a larger data set and a different social media platform, namely Twitter. Twitter provides large amounts of information concerning breaking news or crisis events which probably comes along with higher degrees of users' uncertainty (Sikdar, Kang, ODonovan, Höllerer, & Adah, 2013). In order to further investigate a more real-life setting, an embedded tweets' scenario was used by what users were exposed to crisis-related tweets as in reality. In detail, features were not manipulated as in Study 1 but rather as they appear with the tweets.

In addition, psychological credibility measurements were used in combination with an exploratory feature-based selection approach. While most work suggested automated approaches to address large social media data sets, which however, focus on binary classifications to determine information veracity whereas recipients´ perspectives and multidimensional psychological credibility evaluations are rarely considered (Castillo et al., 2011; Shariff et al., 2017), the study aimed to explore if automated approaches are suitable to detect credibility-increasing feature patterns. The use of automated approaches in combination with humans' credibility perceptions might contribute to the future development of support tools which can benefit from the knowledge of the credibility-enhancing impact of features.

6.1 Research questions

One of the most defining characteristics of social media applications refers to the huge amount of available data (Metzger & Flanagin, 2015; Shariff et al., 2017). To deal with large data sets, many researchers put the lens on the development of system-based approaches, models or algorithms for efficiently detecting the truth value of information (Derczynski et al., 2017; Shariff et al., 2017; Zubiaga & Ji, 2014). However, most work in the field so far has specialized rather on the veracity aspect of social media content and uses different

techniques to automatically assess whether content is true or not. For instance, Derczynski and colleagues (2017) designed a model to identify rumors in online information by integrating the reactions of the community. In this regard, retweets were classified into supporting, denying, querying and commenting. These community interaction patterns turned out to be efficient which supports the relevance of including recipients and their reactions and perceptions into the evaluation of online content. Further approaches consider user profile meta data like location and topicality of posting behavior to make a prediction of how accurate the author is communicating (Bodnar, Tucker, Hopkinson, & Bilén, 2014). To build a model seeking to automatically predict the credibility of websites (as it would be perceived by human raters), Olteanu and colleagues (Olteanu, Peshterliev, Liu, & Aberer, 2013) investigated a set of 37 different features concerning their predictive power with chi-squared tests. The used features were either content features like punctuations and spelling errors or social features like social recommendations and user comments. In this regard the most influential features were domain types of included URLs.

Overall, a lot of proposed models to verify online information exist, based on semantic web technologies, external source checking, extracting and highlighting the reputation and experience of the source, comparing information to facts on formal websites or applying symmetry in textual and temporal features as well as data similarity (AlDoaies et al., 2017). Scholars already started to compare and rank different models in terms of prediction rates and accuracy. However, a common feature of all models is that they put major effort into the identification of the "correct value of a fact" (AlDoaies et al., 2017, p. 228) with a view to providing valid fact checking measures to the users. The recipients' perception of the credibility of information by an empirical investigation is not considered.

Apart from that, as outlined in Chapter 2.2 user studies provided a lot of evidence for the influence of source, message and meta-informational cues which can also be named features as it is more common for technical research approaches. Broadly speaking, Twitter features like author-related, message-related and meta information-related aspects seem to have an influence on users' assessment of the content's credibility (Ravikumar et al., 2013). Nevertheless, Twitter consists of a huge number of features, and prior research do not provide a clear picture of features role in credibility judgments. With the aim of an exploratory analysis of how Twitter features impact recipients' credibility perceptions, a range of source-

related, message-related and meta-informational features were investigated which already turned out to be influential for stance detections purposes (Aker, Zubiaga, Bontcheva, Kolliakou, Procter, & Liakata, 2017). Therefore, the present research aims to investigate the impact of Twitter features on users' credibility ratings in a more comprehensive and large-scaled way. In this respect, a multidimensional measurement of credibility perceptions was combined with an automated feature selection approach to avoid both boundaries of a limited reliability through one-dimensionality and self-reported effects. Thereby, the following research questions were addressed:

RQ1: Which features of Twitter communications affect credibility ratings of recipients?

RQ2: Are different dimensions of message credibility affected by different features?

6.2. Method

To exploratively investigate which features of a tweet are influencing credibility assessments, an online survey was set up using Figure Eight (https://make.figure-eight.com), a crowdsourcing platform for data annotations and ratings. By using Figure Eight a large sample consisting of older and more diverse participants could be recruited compared to common undergraduate samples (Follmer, Sperling, & Suen, 2017; Hirth, Hoßfeld, Mellia, Schwartz, & Lehrieder, 2015). Crowdworking platforms like Figure Eight are widely and successfully used, especially for tasks with rating or labelling content (Kittur, Chi, & Suh, 2008). To ensure data quality participants were asked to add an explanatory sentence to their ratings like it was recommended by (Castillo et al., 2011). Additionally, the platform offers the option to directly embed a huge number of tweets (see Figure 6 for an example).

After viewing a tweet, participants were asked to rate its credibility. To overcome boundaries of a binary judgment the message credibility scale of Appelman and Sundar (2016) was used asking participants to indicate on a 5-point Likert scale (1 = describes it very poorly to 5 = describes it very well) how accurate, authentic and believable the tweet is. The scale was extended by adding the items comprehensible, important, informative and

Mona Eltahawy
@monaeltahawy

Iconic: USA shirt, bag of chips in one hand, other throws back tear gas cannister at police by @kodacohen pic.twitter.com/wsEu4sJ35P #Ferguson

10:42 PM - Aug 13, 2014

130 187 people are talking about this

The Telegraph
@Telegraph

There's a tank near the #Paris hostage scene telegraph.co.uk/news/worldnews... (Pic: Heathcliff O'Malley)

124 12:41 PM - Jan 9, 2015

665 people are talking about this

CBC Ottawa
@CBCOttawa

BREAKING | Centre block and east block at Parliament Hill are locked down. #cbcOTT #OTTnews

8 4:01 PM - Oct 22, 2014

159 people are talking about this

Figure 6. Examples for embedded tweets (and all displayed features) as presented in the survey.

interesting to the questionnaire (α =.94; M = 3.66; SD = 0.89). Like it is described in Chapter 1.1., credibility is a perceptual variable related to trustworthiness, competence (Hovland & Weiss, 1951) and goodwill (McCroskey & Teven, 1999) of the communicator. While the items believable and authentic refer to the trustworthiness dimension, we aim to strengthen competence evaluations (already tackled with the item accurate) with adding the items comprehensible and informative. To assess communicators´ goodwill in the area of event-related Twitter communication we included the items important and interesting. In addition, participants' gender, age and educational background was assessed. Participants had the possibility to rate as many tweets as they wanted up to a maximum of 40 and they received a fee of $0.02 for every rating. The procedure of the study was approved by the local ethics committee.

6.2.1 Data set

The tweets were selected from a publicly available data set provided by Zubiaga and colleagues (2016) consisting of real Twitter data tracked during five different crisis events (Charlie Hebdo attack, Ferguson shooting, Germanwings crash, Ottawa shooting, Sydney siege) and collected from the Twitter streaming API which were manually annotated by journalists to consist either of rumors or non-rumors. Only used source tweets (no retweets) were used to avoid redundant content. In sum, 828 tweets were evaluated, with every tweet being rated by 30 different raters. Due to technical reasons a few ratings had to be excluded, resulting in a total number of 24823 ratings.

6.2.2 Sample

2626 persons older than 18 years participated in the online survey. The sample had a mean age of 33.94 (SD = 10.93) years; 930 participants were female and 1696 were male. Most of them were employees (1264 participants), 945 participants were self-employed and 417 students.

6.2.3 Feature selection approach

In the analysis it was attempted to include author-, message- and meta-informational features, whereas especially meta-related aspects are relatively understudied until now (Shu, Sliva, Wang, Tang, & Liu, 2017). Author-related features refer to aspects of the account holder e.g. the length of the authors' Twitter account description, message features describe information related to the tweet's text, for instance if it is containing a URL, and meta-informational features include aspects like the number of followers. In total the following features were included, which turned out to be useful in prior research in the area of stance detection in Twitter communication (Aker et al.,2017) and were already annotated in the data set: for the author-related features we used authors Twitter account description, length of the account description, and role (refers to the relation between follower and followee number), for the message-related features we took URL included, location included, person included, date included, negation included, Google bad word included (using a dictionary from Google to check if the tweet contains slang words), geo information enabled, average word length, and for the meta-informational features we comprised originality (refers to the number of tweets of a user), number of followers, engagement (refers to the number of tweets related to user account age) and sentiment (describes on a scale ranging from positive to negative the valence of the tweet with an assigned value between 0 and 4).

To analyze[1] what features users associate with credibility, several features were automatically extracted and tested their relevance against the responses the raters gave for each assessment type. The responses were given on a 5-point Likert scale to improve the representation of the credibility perception and avoid forcing raters to put their answers in categories, however for the classification needed for the relevance computation, the points between 1 and 3 were collapsed as well as 4 and 5 together to obtain binary decisions. According to Beamish (2008) collapsing responses in that way, has distinct advantages in terms of capturing trends in the data which is a commonly used procedure for data classification in the realm of feature selection (Castillo et al., 2011).

[1] This analysis was performed in collaboration with Dr. Ahmet Aker (Information Retrieval, University of Duisburg Essen).

6.3 Results

In the analysis, the feature significance was tested for each of the integrated features and each item of the credibility scale using chi-squared test in the implementation provided by Python scikit-learn package (Pedregosa et al., 2011), a method widely used for feature selection based on classification (Liu & Setiono, 1995). By applying this method, a value was received indicating if the specific feature is a significant indicator to discriminate between the classes of low and high attributed accuracy, for example. Thereby, numbers over 3.84 describe a significant influence on a 95 percent level and values higher than 6.63 refer to a significant effect on a 99 percent level.

It was found that author-related features, message-related features as well as meta-informational features seem to be influential, whereby meta-information like the number of followers, the originality (sum of all tweets produced) and the engagement (ratio between number of tweets and active days) of the tweet author seem to have the most impact. As can be derived from Table 4, showing an overview of all features and their values from the feature significance test, the follower count as well as the amount of tweets a user has produced effect all seven credibility dimensions on a 99 percent level of significance. The number of followers has the highest value for rating tweets as believable, whereas originality mostly impacts the ratings of authenticity. Furthermore, the engagement of the tweet´s author, described as the ratio of number of tweets and time since the user is active, primarily determined the dimensions informative and authentic. The length of the authors' Twitter account description turned out to be a significant indicator for the differentiation between tweets rated as informative and interesting and tweets rated as less informative and interesting.

Table 4.
*Feature values indicating a significant impact on the different credibility dimensions (** p < .01; * p < .05).*

Twitter features	Credibility dimensions						
	accurate	authentic	believable	comprehensible	important	informative	interesting
Number of followers	400200.**	327400.**	519100.**	13060.**	18760.**	81240.**	6813.**
Originality	51350.**	390500.**	35600.**	83630.**	77000.**	37870.**	23630.**
Engagement	1.01	84.53**	4.56*	33.41**	8.97**	92.20**	8.24**
Length of description	16.**	0.45	20.76**	0.00	1.95	139.7**	116.2**
Geo enabled	0.33	6.80**	4.18*	0.04	0.52	1.06	0.16
Location mentioned	1.59	0.60	1.80	1.48	0.11	9.83**	0.36
Person mentioned	8.29**	1.50	0.021	0.32	0.76	0.02	2.22
Role	1.04	0.35	0.26	7.02**	1.06	1.35	0.03
Negation	5.88*	3.20	1.26	0.07	0.99	0.00	0.52
Organization mentioned	3.45	0.15	1.41	1.88	1.84	4.75*	1.26
Date mentioned	0.35	0.69	0.08	0.15	1.40	2.55	4.31*
URL included	0.39	0.10	2.16	0.16	0.13	0.02	0.04
Sentiment	0.17	3.82	0.40	0.62	2.84	0.12	9.67
Google bad words	0.28	0.07	0.72	0.42	0.05	1.70	0.00
Average word length	0.00	0.00	0.24	0.25	0.42	0.12	0.04
Description	0.02	0.00	0.00	0.01	0.04	0.00	0.00

The assessment of believability is influenced by enabled geo-information. If a location or an organization is mentioned, this affects users' ratings of how informative a tweet is, and mentioning a person predicts accuracy perceptions as well as tweets with included negations. Tweets containing dates contribute to evaluations concerning the dimension interesting and the relation between followers and followees of the tweet´s author is connected to ratings of comprehensibility of the tweets. On the contrary, an included URL, the valence of the tweet, Google bad word indicator, the average word length and the description of the Twitter account holder did not show a significant influence on the credibility rating. This pattern of feature effects on credibility ratings was shown for all tweets of the data set, independent of whether the tweets were rumors or non-rumors. Overall, among all survey participants, there was a fair level of agreement concerning the credibility ratings (Krippendorff's $\alpha = .38$).

6.4 Discussion

Social Media and Twitter in particular offer a space for producing and spreading large amounts of content. Besides the benefits of receiving information faster and consuming event-related information in real-time, recipients are confronted with the omnipresent question of how credible information is. Due to this, the relevance of valid credibility assessments enhances.

Investigating the impact of Twitter features on multidimensional credibility ratings of crisis-related tweets, which were either non-rumors or rumors, we found that credibility ratings were mainly influenced by the number of followers and the originality score which involves the total number of tweets an author has created. Both features highly impacted all measured credibility items (accurate, authentic, believable, comprehensible, important, informative and interesting). Interestingly, these features both are not visible to the user (neither in the study nor in real-life Twitter settings) but still are better predictors for perceived credibility compared to visible features such as number of words or inclusion of an URL. Future studies need to scrutinize further by which evident cues people sense that the author has a high number of followers and has written a large number of tweets. Potentially, an author with a higher number of followers communicates in a slightly different way than

someone with fewer followers – although the content-related features we assessed did not have a strong influence on credibility ratings. A person who posts a lot of tweets can be assumed to have high experience (probably including high ability to write good, convincing tweets). Similarly, someone with a large number of followers seems to be able to attract numerous people either by his/her authority or his/her tweets´ quality, both which will be recognizable to the reader. Another possible explanation refers to results derived from former communication studies. It was found that recipients especially tend to perceive information as biased if they estimate the content to be exposed to a large audience (Gunther & Schmitt, 2004). Studies revealed that people are apparently able to estimate the audience size of an information piece which increases the assumption that others might be convinced more easily by content with a higher reach (Gunther & Liebhart, 2006).With regard to the effect of the number of followers on credibility assessments we found, it can be assumed that recipients are able to predict the potential audience size (in a Twitter context the number of followers of the authors account) through the visible information of the tweet.

Most likely, both cues are strongly connected to sensing the quality of the source - or, put differently, are the only cues in our feature list that will be strongly related to the expertise and quality of the source. This would be in line with numerous findings on the importance of the source when assessing the credibility of a message (Metzger et al., 2010; Morris et al., 2012; Sundar, 2008; Winter & Krämer, 2014). Alternatively, the effect might be explainable by a bandwagon effect (Sundar, 2008). Tweets of authors with numerous followers will benefit from large amounts of likes and retweets which might also persuade readers of the quality of the posting. This is in line with results of a user study by Aigner and colleagues (2017) who found that credibility ratings mainly depend on the number of retweets and likes indicating a bandwagon effect. In this way, likes and retweets can be understood as recommendations of content by other users and might be taken as an anchor for rating something as credible.

Additionally, the authors´ engagement score, the ratio between number of tweets and period the account is active, showed an effect on at least six of the credibility dimensions. This, again, is a non-visible, meta-informational aspect – which might also be related to the quality and subsequent credibility of the source. With regard to prior results showing that recipients' ratings were influenced by the implicitly derived attitude of the author (Shariff et

al., 2014), it can be assumed recipients' ability to use implicit feature information for credibility judgments. However, further investigation is needed to explore these patterns of using implicitly transmitted cues in detail. Future work will have to identify those observable cues that are used by the reader. Following our assumption that source is the relevant variable here, a necessary next step would be to come up with categorizations of different sources.

Regarding author-related features, our results showed an impact of the length of the description stored in the Twitter profile on user ratings how accurate, believable, informative and interesting tweets were perceived. However, the fact whether an author provides a description or not (feature: description) showed no impact on any credibility dimension. This differs slightly from former findings demonstrating that recipients seemed to rely on account descriptions of the author for assessing credibility. This difference probably results from the fact that recipients report to take the description into account (Morris et al., 2012; Zubiaga & Ji, 2014), whereas the length of the description is actually the decisive factor. In general, information about the author of tweets was found to determine the accuracy of tweets verification ratings (Zubiaga & Ji, 2014) as well as user credibility assessments (Morris et al., 2012) which strengthen the influential impact of author-related aspects.

With regard to message-related features, several aspects turned out to be influential for different aspects of credibility. For instance, enabled geo information in the tweet relates to perceptions of authenticity and believability and the inclusion of an organization or location tends to be a discriminator between informative and not informative content. Furthermore, it was shown, that accuracy perceptions are determined by mentioning a person or including negation. The found impact of negation relates to the findings of Levi and Mokryn (2014) who evaluated that especially negative sentiment in online reviews enhanced perceptions of usefulness. Tweets containing a date seem to shape the impressions whether some content is interesting or not which is in line with classic news value assumptions (Galtung & Ruge, 1965).

In contrast to former findings, the current analysis showed no impact of the URL, the valence of the tweet, Google bad word indicator, the average word length and the description in the authors' profile on credibility ratings. A possible explanation for this inconsistency might be that in the user studies which explored an influence of URL, affect and user description, users indicated this tendency via questionnaires (Aigner et al., 2017; Morris et

al., 2012; Ravikumar et al., 2013). Due to the experimental setting solely involving and varying a few features, features probably have been more salient to the recipients. In contrast, the current study confronted recipients with all features like in a real-world scenario and the impact of the features were assessed via the automatic extraction based on the categorized user ratings.

Surprisingly, no difference regarding the feature impact occurred between the rumors and non-rumors. Users obviously seem to apply the same rating mechanisms for tweets consisting of true facts and tweets with false facts. In this regard, it would be interesting to examine if the impact of the features underlies a conscious process or if it happens in a more automatic way. Also, future studies should include an explicit dichotomous rating of whether the person believes the tweet to be true or false in order to be able to not only include the objective fact of whether it is a rumor or not but also the recipients' explicit judgment on this. An important factor to consider is the topic domain of the tweets rated in the current survey. According to Morris and colleagues (2012), users tend to react differently depending on the topic of Twitter communication, for example, science related tweets did generally receive higher levels of credibility judgments. However, it is not expected a large bias here as we took great care to include diverging topics that cover a broad range of events and emergency situations.

6.5 Limitations

The study was limited by the use of a feature list which is by no means exhaustive. Many more features such as the Twitter timestamp (displaying time and date when the tweet was posted) have to be investigated in future studies. Furthermore, since only one feature selection method was used, namely chi-squared tests, no comparisons could be drawn on the resulting credibility-influencing feature patterns and more general conclusions about the Twitter features which are related to credibility evaluations, independent of the used method. A third limitation is about the used tweets, all displaying crises which are already happened and covered in the media. Due to practical constraints, a data set with annotations (needed for the feature selection) had to be sued which comes along with the covering of events which

are not actual. Using a really actual data set would contribute to an even more realistic reception scenario. To ensure a reception situation close to reality, participants were not asked to fill questionnaires about characteristics such as involvement, need for cognition and conformity to the tweet's message whereby the study cannot provide any assumptions about the impact of recipients' characteristics on the findings concerning credibility assessments.

6.6. Conclusion

In sum, the study shed light on a wide range of Twitter features and investigated their role in the credibility judgment process. Thereby the common use of binary decisions between true or false was extended by incorporating recipients' perceptions and applying a multidimensional credibility measurement. The present findings demonstrate that especially meta-related information like the number of followers, the originality score (count of tweets a user has produced) as well as the engagement ratio (number of tweets related to the time the account is active) influence credibility ratings. In general, results contribute to a more detailed understanding of which Twitter features play a major role in credibility ratings of online information. Especially, the time of a tweet seems to be promising in having an influence, referring to the findings of Levi and Mokryn (2014) revealing that the later reviews were posted, the more useful they were rated. This could possibly also emerge for the credibility of information included in a tweet, in particular in the fast-pacing context of crisis-related events.

For future work it would be promising to extend the feature set and include time dimensions and tweet content, for instance on word level. Next steps can also include turning the results into a supervised classification problem. Therefore, the significant features can be used to train a machine learning model in order to perform automatic predictions. Only if we learn more about how users assess credibility and which features contribute to this process, we will be able to efficiently support social media recipients with technical solutions like highlighting credibility-relevant features (Zubiaga & Ji, 2014). Therefore, the necessity to integrate users' perceptions into the investigation to optimize methods is highly emphasized.

7 Study 3: How the expertise heuristic accelerates decision-making and credibility judgments by means of effort reduction

Cognitive heuristics can be considered as an important mechanism for decision-making and judgments in social media environments (Metzger et al., 2010; Sundar, 2008) by which recipients aim to adaptively interact which large amounts of data and overwhelming numbers of environmental cues. Prior research demonstrated the cue source expertise to be most important for the selection and evaluation of content (Adams, 2010; Lin et al., 2016; Ma & Atkin, 2017; Metzger et al., 2010; Winter & Krämer, 2014; 2016). Accordingly, the two previous studies of this dissertation obtained that recipients mainly based their credibility judgments on source expertise, either self-reported as an add-on to politicians' Facebook profile name (Study 1) or implicitly derived through meta-informational aspects such as the number of Twitter followers or the ratio between the sum of tweets and the author's account age (Study 2).

Until now, it remains unanswered by which mechanism the relation between the retrieved cue and the related credibility judgment is driven. This question is also highly related to information processing since dual process models assume the likelihood for the reliance on cues and heuristics to be increased in cases of peripheral processing due to a lower motivation or ability of recipients (probably described by involvement, need for cognition and faith in intuition). For social media communication the operation of heuristics – as unaware mental shortcuts – is especially fraught with risk as recipients easily accept and believe in messages without further elaboration (Sundar, 2008). Given the lack of gate keeper and quality standards as well as the fast communication flow and users' ongoing tendency to utilize social media as main sources for news and political communication, the relevance of examining if specific social media cues are able to trigger related heuristics which further are connected to humans' judgments and decision-making becomes abundantly clear.

To this end, the third study of this dissertation aims to experimentally address the expertise heuristic, which is assumed to be activated by the source expertise cue and potentially affects credibility judgments and decision-making. By defining cognitive heuristics along their cue-wise activation (Kruglanski & Gigerenzer, 2011; Metzger & Flanagin, 2015; Sundar, 2008; Tversky & Kahneman, 1974) and effort reduction function (Glöckner, 2009; Shah & Oppenheimer, 2008) it was aimed to overcome difficulties of how

to measure and further compare and conceptualize heuristics accordingly. Following prior experiments tackling the TTB (Bröder, 2000; Rieskamp & Hoffrage, 1999) and recognition heuristic (Hilbig, 2014; Oeusoonthornwattana & Shanks, 2010; Thoma & Williams, 2013), a reduced two-alternative choice paradigm was used. Based on formal descriptions of two alternative information sources, participants were asked to select and evaluate these afterwards. Apart from the source expertise cue, additional cues such as ratings of others, picture and length were used for the description of the information sources. Firstly, all of the additional cues are assumed to also being able to influence decisions and judgments and secondly, all three cues can be theoretically connected with heuristics which could drive users' inferences (Sundar, 2008). Thus, others' recommendations are strongly associated with the bandwagon heuristic, pictures are supposed to be more trustworthy than text ("pictures cannot lie", Sundar, 2008, p. 81) and length is related to the assumption "length implies strength" (Sundar, 2008, p. 74). Furthermore, all of them can be considered as influential cues without further context or a message being presented.

Overall, the presence of the source expertise cue, the number of conflicting cues and the valence of additional cues were varied. To account for individual differences and their assumed influence on the reliance of cues according to dual process models of information processing, recipients' involvement and thinking style preferences were included as potentially influencing factors for the use of the expertise heuristic.

7.1 Hypotheses

First of all, it was attempted to test the salience of the source expertise cue as well as the relation between source expertise and decision-making in the realm of information sources using a reduced two-alternative choice paradigm. Considering the findings of Study 1 and Study 2 of this dissertation on the relative importance of source expertise which was demonstrated to be more important than other cues for credibility judgments as well as prior studies which outlined the influence of source expertise (see Chapter 2.2.1), it was assumed:

> *H1:* Alternatives favoring source expertise are selected more frequent than alternatives favoring articles' length, ratings of others, or picture inclusion.

According to the rule concept (Kruglanski & Gigerenzer, 2011) cues are connected in form of if-then relations to judgments. As already outlined in Chapter 2.2.1 several studies provided supporting evidence for that and revealed the influence of source expertise on credibility judgments (e.g., Hu & Sundar, 2019; Lin et al., 2015; Winter & Krämer, 2012). By transferring these findings to a reduced setting in which source expertise is solely presented as label, the relation between the cue source expertise and credibility judgments was addressed by the following hypothesis:

H2: Information sources with indicated expertise (expertise cue with positive cue value) will be perceived as more credible compared to those without expertise.

Since intuitive decision strategies like cognitive heuristics require less effort due to a simplified retrieval, processing and integration of cues and related cue values, the question whether the relation between a cue and decision-making is driven by a heuristic, compared to a more deliberated judgment strategy, can be operationalized by investigating the effort reduction (Glöckner, 2009; Shah & Oppenheimer, 2008). Considering the effort reduction principles stated by Shah and Oppenheimer (2008) the expertise heuristic can be associated with a reduced difficulty of cue retrieval. That means, if the cue (source expertise) is available, salient and easy to access, processing and integration of this information is simplified. Following this approach, by means of decision latencies it is aimed to examine whether the source expertise cue activates the expertise heuristic which further accelerates the selection of information sources. Therefore, it is assumed:

H3: Decision latencies are shorter for decisions with a difference in expertise than for decisions without a difference in expertise.

Caused in a confirmation of an already established connection between cue and outcome (Glöckner, 2009; Tversky & Kahneman, 1974), higher levels of choice confidence (measured through decision satisfaction and certainty) are expected if the heuristic cue (source expertise) is present and thereby able to activate the related expertise heuristic. Choice

confidence was already found to play a role for the operation of the TTB heuristic (Bröder, 2000), although an interaction with positive additional cues unexpectedly turned out. Based on that, the following hypothesis was stated:

> *H4*: Decision certainty and decision satisfaction are higher for decisions with a difference in expertise than for decisions without a difference in expertise.

Heuristics are defined as non-compensatory strategies (Bröder & Newell, 2008; Hilbig, 2014; Payne et al, 1993; Thoma & Williams, 2013), what means they are based on the retrieval of one specific cue (Kruglanski & Gigerenzer, 2011) whereas all additional information is neglected. Moreover, effort reduction is claimed as core concept differentiating heuristics from deliberated decision strategies (Shah & Oppenheimer, 2008) and the process is supposed to take place by examining fewer cues and facilitating the effort of retrieving cue values. The latter refers to the use of a cue which is easy to access and perceived as more salient than the other cues due to the ease of retrieval. Whenever a cue is discriminating both alternatives from each other, the alternative with the higher cue value is said to be selected (Payne et al., 1993) and further cues will not be retrieved and integrated. Thus, the following hypothesis is posited:

> *H5*: Additional information such as number of conflicting cues and valence of additional cues have no influence on decision latencies, decision certainty and decision satisfaction for decisions with a difference in expertise compared to decisions without a difference in expertise.

While prior research on heuristics is limited to decision scenarios, there exists no evidence of how additional information effects credibility judgments due to the operation of a heuristic. Theoretically, it can be argued that the non-compensatory nature of intuitive strategies such as heuristics will lead to attribute substitution for credibility judgments as well whereby individuals base their judgments on one single cue (source expertise) and all other information is ignored (Gigerenzer & Goldstein, 1996; Kahneman & Frederick, 2002). Furthermore, it is stated that the cue-wise activation of heuristics (Kruglanski & Gigerenzer,

2011; Rieskamp & Hoffrage, 1999) does not require any further information (Bröder & Eichler, 2006). However, that assumption necessarily require that the expertise heuristic is triggered and perceived as suitable. Due to a lack of evidence about the role of additional information on credibility judgments, the following research question is posited:

RQ1: Does additional information such as number of conflicting cues and valence of additional cues influence the impact of expertise on credibility evaluations?

To date none of the studies addressing heuristics included recipients' characteristics which are potentially able to determine individuals' information processing as well as related decisions and judgments. Integrating personal characteristics can be promising to account for differences among participants in their general reliance on cues (and further heuristics triggered by these cues). As stated in dual process models, ability and motivation are decisive for the way of information processing, either central, based on arguments and content, or peripheral, based on cues. Characteristics like involvement and thinking style preference determine individuals' level of motivation to scrutinize incoming information (Petty & Cacioppo, 1986; Petty et al., 1981). Correspondingly, Fogg (2003) outlined the importance of individual characteristics such as involvement and thinking styles for a cue to be perceived at all. The cue-salience hypothesis states that the awareness of peripheral cues decreases if topic interest increases. Caused by a lowered accessibility, cues are less salient to recipients (Petty, 1994). If the source expertise cue is not salient to recipients due to their higher involvement or preference for deliberated thinking, the question arose if the likelihood for the operation of the expertise heuristic is reduced in that case. By addressing decision latencies, choice confidence and credibility ratings, the moderating influence of recipients' characteristics like involvement, thinking style, gender and age is sought to comprehensively examined. To address these points, the following research questions are stated:

RQ2: Do participants´ level of involvement, thinking style preference, gender or age moderate the response latencies for the decision tasks?

RQ3: Do participants´ level of involvement, thinking style preference, gender or age moderate certainty and satisfaction with the decision?

RQ4: Do participants´ level of involvement and thinking style preference moderate credibility evaluations of the information sources?

7.2 Method

To investigate the proposed hypotheses, a 2 (difference in expertise: yes vs. no) X 2 (number of conflicting cues: 1 vs. 2) x 2 (valence of additional cues: positive vs. negative) within-subject design was employed.

7.2.1 Design and material

To avoid effects of prior knowledge and experiences as well as interaction effects with the message, a reduced design was used in line with prior work on the systematic investigation of heuristics by Bröder (2000). According to prior work (e.g., Bröder, 2000; Hilbig, 2014; Oeusoonthornwattana, & Shanks, 2010; Rieskamp & Hoffrage, 1999; Thoma & Williams, 2013), a two-alternative choice paradigm was applied presenting the participants formal descriptions of two alternative information sources. These descriptions were presented without any messages or context information. For the describing attributes – apart from the heuristic cue source expertise – aspects highly related to social media communication like the ratings of other users, if a picture is included and the length of the post were added. Altogether, these attributes are supposed to be influential for recipients' inferences and can be used without additional context. In addition, others' recommendations are strongly associated with the bandwagon heuristic, pictures are supposed to be more trustworthy than text ("pictures cannot lie", Sundar, 2008, p. 81) and length is related to the assumption "length implies strength" (Sundar, 2008, p. 74).

Overall, participants were presented to six decision tasks for every of the resulting eight factor combinations, so that they performed in sum 48 different decisions between two information source alternatives which were described by four attributes (source expertise, ratings of others, picture, length) and related values indicated by either + symbol or – symbol

(see Figure 7 for an example). Participants were instructed to consider attributes accompanied by a positive cue value (+) as existent and attributes with negative cue values (–) as not existent. For instance, if length was connected to positive value that means the hypothetical post is long. The alternatives were displayed in a randomized order and the presentation of the attributes as well as the presented position (option A or option B) of the option was counter balanced. The experiment was partly conducted in a lab where up to three participants simultaneously could engage in the study. Additionally, participants were recruited online.

1. Bitte wählen Sie Option A oder Option B.

Option A	
Expertise des Autors	+
Bewertungen anderer Nutzer	–
Länge des Beitrags	–
Bild integriert	–

Option A

Option B	
Bewertungen anderer Nutzer	+
Bild integriert	+
Expertise des Autors	–
Länge des Beitrags	–

Option B

Figure 7. Example for the formal description of an information source with a difference in source expertise (indicated by the cue values).

7.2.2 Procedure

After providing consent, participants were instructed that they will be exposed to 48 different decision task and had to answer some related questions afterwards. In detail, participants were instructed that every decision will impair two alternative descriptions of information sources, both characterized by four formal attributes with cue values, either indicated by a plus symbol (+) which means that the attribute is present or a minus symbol (-) when the attribute is not present. Furthermore, it was emphasized that participants should make good decisions which means that they should not spend more time than necessary for every single decision and should imagine they are in a realistic situation where they wanted to decide which source they choose to read online.

In line with prior work (Bröder, 2000; Rieskamp & Hoffrage, 1999) this was followed by a training phase of the decision task in which participants learned how to run the task and select the option they want to take. After being informed about the end of the training phase and being provided with the opportunity to ask questions, participants performed the 48 decisions, each followed by the questions of how certain and how satisfied they are with their choice. In the following, sociodemographic information as well as thinking style preference and involvement were assessed. Then participants were exposed to 24 of the information sources separately and asked to rate their credibility. At the end of the survey participants were informed about the study's goal and had the opportunity to take part in a prize draw for Amazon vouchers. The procedure of the study got the approval of the local ethics committee.

7.2.3 Sample

In total, 187 people participated in the experiment (mean age: $M = 29.06$; range: 18-69; $SD = 10.41$), of whom 74 came to the lab and 113 performed the experiment online. For all analyses data from both samples were collapsed. Due to extreme values in the processing time of the questionnaire, two participants were excluded from further analysis. The remaining sample of 185 persons had a mean age of 29.06 (range: 18-69; $SD = 10.41$); 100 participants were female and 85 were male. Most of them were students (124 participants), and 40 participants were employed. In general, the sample was highly educated with 33 percent of the participants holding a university degree (61) and 56.2 percent (104) with a high school certificate. Gender was equally distributed (X^2 (1) = 1.22; $p < .270$).

7.2.4 Measures

Decision behavior. For every of the 48 decisions between option A or option B participants were confronted with, we assessed which option they selected.

Decision latencies. We measured the response time participants need for every of the 48 decision between the options A or B ($M = 5424.69$; $SD = 2315.35$). Before the two options were presented, participants saw a white page with the instruction to press 'M' on the

keyboard if they want to start. When they pressed the button, the two options of information sources were presented, and participants could select A or B via the keyboard. The time span between the first click to start the task and the click to select one of the options was assessed in ms.

Decision certainty. After every decision it was assessed on a 11-point Likert scale how certain participants feel with the decision (*M* = 7.88; *SD* =1.45).

Decision satisfaction. In addition, participants were asked to indicate on a 11-point Likert scale how satisfied they were with the decision (*M* = 8.25; *SD* = 1.48).

Credibility. To assess recipients' credibility evaluations of every information source description (in sum 96), the Message Credibility Scale by Appelman and Sundar (2016) was used, asking participants on a 7-point Likert scale (1 = describes it very poorly to 7 = describes it very well) how accurate, authentic and trustworthy the source and the hypothetical message is. Since in the current study a potential source of a message had to be rated, the instruction was slightly modified into 'please rate this information source as well as the hypothetical article'. Additionally, the scale was extended by the items informative, important, qualified, interesting and understandable. Factor analysis (principal component analysis with varimax rotation) yielded a single factor solution (explained variance: 60.99%). Therefore, a mean score was calculated (α = .92; *M* = 4.78, *SD* = 0.72), with higher values indicating higher credibility ratings.

Involvement. Participants were asked to indicate their involvement in the selection of online information sources. We used the ten-item version of the Personal Involvement Inventory (Zaichkowsky, 1994) whereby items like "important" or "involving" had to be rated on a 7-point semantic differential scale (α = .91; *M* = 5.08; *SD* = 1.00).

Thinking style preference. To asses if participants either tend to prefer a deliberated thinking style or an intuitive style in judgement and decision-making situations, we used the Inventory for Preference for Intuition and Deliberation (PID) by Betsch (2004). Two sub scales measure peoples' faith in intuition and need for cognition on a 5-point Likert scale (1 = I strongly disagree to 5 = I strongly agree). The sub scale for intuition (PID-I) consists of ten items, e.g, "I like situations in which I have to rely on my intuition" (α = .81; *M* = 3.47; *SD* = 0.65). Need for Cognition is assessed by nine items such as "I think before I act" (α = .76; *M* = 3.87; *SD* = 0.57).

7.3 Results

First, it was tested if the expertise cue worked as intended as the most important cue in decision behavior, which additionally checked the manipulation. To examine *H1*, which posited that alternatives favoring source expertise are selected more frequently than alternatives favoring ratings of others, pictures or length, it was descriptively investigated how often alternatives favoring the different attributes were selected. It has to be considered that every option favored four attributes and could have been chosen four times maximal. Thereby, the decisions for one attribute reported below are not exclusive, but rather focus the absolute number of choices per attribute.

Among all decisions displaying a difference in expertise (in total 24 out of 48), in 14 cases the majority of participants chose the option favoring expertise. In sum, 2029 times (out of a total of 4440 if all participants had chosen every time the expertise favoring option in all conditions with a difference in expertise) the source with an indicated expertise was chosen, which shows a likelihood of 45.7 percent. The option favoring ratings of others was chosen 12 times (from total 23 decisions with a difference in others' ratings) from the majority of participants. In sum, 1792 participants chose options based on ratings (total 4255), which relates to a likelihood of 42.1 percent. With regard to conditions representing a difference in picture inclusion, 9 from 19 times the majority of participants selected the alternative favoring an included picture. Altogether the likelihood for the selection of the option with picture was 32.5 percent with 1144 participants from a total of 3515 voting accordingly. From 22 decisions favoring source length, seven were selected by the majority of participants. Thus, the likelihood that the choice was based on the source attribute length amounted to 20.4 percent with a relation of 829 choices from a total of 4070. Afterwards, chi-squared tests were performed to investigate if the number of participants who chose alternatives with expertise differ from the number of participants who selected the alternative without expertise. As you can see in Table 5, the option with expertise was significantly chosen more frequent than the option without expertise among all critical trials (i.e., those with a difference in expertise). Based on these findings, *H1* can be regarded as confirmed.

Table 5

Significant differences (and chi-squared values) in the choices of the alternatives with expertise and without expertise (featuring 24 of the 48 decisions).

Decision	Alternative with expertise	Alternative without expertise	X^2	df	*p*
1	136	49	40.91	1	<.001
2	139	46	46.75	1	<.001
3	149	36	69.02	1	<.001
4	155	30	84.46	1	<.001
5	150	35	71.49	1	<.001
6	157	28	89.60	1	<.001
7	156	29	87.18	1	<.001
8	145	40	59.60	1	<.001
9	144	41	57.35	1	<.001
10	147	38	64.22	1	<.001
11	138	47	44.76	1	<.001
12	148	37	66.60	1	<.001
25	111	74	76.95	1	<.001
26	109	76	129.87	1	<.001
27	105	80	71.99	1	<.001
28	152	33	120.01	1	<.001
29	170	15	113.65	1	<.001
30	150	35	98.51	1	<.001
31	167	18	129.87	1	<.001
32	165	20	81.78	1	<.001
33	160	25	73.96	1	<.001
34	170	15	104.44	1	<.001
35	154	31	71.49	1	<.001
36	151	34	113.65	1	<.001

To examine the impact of the source expertise cue on credibility judgments of the information sources by assuming that those with source expertise (as indicated by a positive cue value) will be perceived as more credible (*H2*), a univariate ANOVA was conducted with source expertise as fixed factor and credibility as dependent variable. Result demonstrated a main effect of expertise (F (1, 95) = 190.09; p <.001; η^2 =.669). As it can be derived from Table 6 credibility ratings were higher for information sources with an indicated expertise. Effect sizes were rather large. In light of these result, *H2* can be confirmed.

Table 6
Mean values and standard derivations for the main effect of expertise on credibility (scale from 1 to 7).

Information sources	***M***	***SD***	***N***
with expertise	5.39	0.38	48
without expertise	4.14	0.76	48

In order to test *H3* claiming that decision latencies are shorter for decisions with different values for the source expertise cue than for decisions without a difference in source expertise, a repeated measures ANOVA with expertise difference as within factor was conducted. Results showed a significant main effect of expertise difference (F (1, 184) = 126.47; p < .001; η^2 =.409). Considering calculated mean values (Table 7), choices with a difference in source expertise were generally made faster compared to choices not displaying a difference in the source expertise cue. Effect sizes turned out to be rather large. In sum, *H3* is confirmed.

Table 7
Mean values and standard derivations for the main effect of expertise difference on decision response time (in ms).

Expertise	***M***	***SD***
Decisions with differences	4736.02	2521.82
Decisions without differences	7083.42	3155.10

To address *H4* and examine if decision certainty and decision satisfaction are higher for decisions with different values in the source expertise cue compared to those without a difference, a repeated measures ANOVA with decision certainty as within factor was performed. A main effect of expertise difference (F (1, 184) = 39.34; p <.001; η^2 = .177) was obtained. Mean values in Table 8 demonstrate that participants were more certain about decisions which featured a difference in the source expertise cue.

Table 8
Mean values and standard derivations for the main effect of expertise difference on choice certainty (scale from 1 to 11).

Expertise	***M***	***SD***
Decisions with differences	8.18	1.52
Decisions without differences	7.54	1.68

A second repeated measures ANOVA addressing differences in decision satisfaction, showed a main effect of expertise difference (F (1.183) = 17.97; p <.001; η^2 = .089). Taken the mean values into account (Table 9), decisions with a difference in source expertise lead to higher satisfaction values. Effect sizes for the effect of the difference of the source expertise cue on choice certainty and satisfaction were of average heights. Based on these findings, *H4* could be confirmed.

Table 9
Mean values and standard derivations for the main effect of expertise difference on choice satisfaction (scale from 1 to 11).

Expertise	***M***	***SD***
Decisions with differences	8.45	1.50
Decisions without differences	8.05	1.77

H5 assumes that additional information (number of conflicting cues, valence of additional cues) has no influence on decision times, decision certainty and decision

satisfaction as long as the heuristic cue is present (and able to activate the related expertise heuristic). That means, for decisions with different cue values of the source expertise cue (supposed to trigger the heuristic which further guide the selection of the alternative with source expertise), the impact of additional information such as number of conflicting cues and valence of additional cues is supposed to be eliminated. To test this hypothesis, three repeated measures ANOVAs (for decision times, decision certainty and decision satisfaction) were calculated with the within subject factors expertise difference, number of conflicting cues and valence of additional cues.

Decision latencies. For response times, an interaction effect of expertise difference, number of conflicting cues and valence of additional cues was found (F (1,184) = 23.83, $p < .001$, $\eta^2 = .115$). Furthermore, results revealed main effects for the number of conflicting cues (F (1,184) = 33.59, $p < .001$, $\eta^2 = .155$) and the valence of the additional cues (F (1,184) = 122.98, $p < .001$, $\eta^2 = .402$). With regard to the mean values (Table 10) the shortest response times emerged for decisions without a difference in expertise with two conflicting cues, followed by conditions with a difference in expertise and one conflicting cue and with a difference in expertise and two conflicting cues. These three conditions have in common that the valence of the irrelevant cues was negative.

Table 10

Mean values and standard derivations for the interaction effect of expertise difference, number of conflicting cues and valence of additional cues on choice response time (in ms).

Expertise difference	**Number of conflicting cues**	**Valence of additional cues**	***M***	***SD***
Decisions with differences	2	Negative	4334.04	2043.55
		Positive	5459.06	3230.67
	1	Negative	3991.37	2575.01
		Positive	5159.61	3888.14
Decisions without differences	2	Negative	3457.82	1964.85
		Positive	6756.96	3175.84
	1	Negative	6648.89	5208.65
		Positive	7589.77	3913.80

Decision certainty. A second repeated measures ANOVA with the within subject factors expertise difference, number of conflicting cues and valence of additional cues, revealed an interaction between expertise difference, cue number and cue valence (F (1,184) = 58.24, $p < .001$, $\eta^2 = .242$). In addition, for number of cues (F (1,184) = 39.30, $p < .001$, $\eta^2 = .178$) and valence of the additional cues (F (1,184) = 36.80, $p < .001$, $\eta^2 = .168$) main effects were observed. Participants assessed to be most certain after decisions without a difference in expertise, two conflicting cues and positive additional cues, followed by decisions displaying a difference in expertise, one conflicting cue and positive additional cues (Table 11).

Table 11

Mean values and standard derivations for the interaction effect of expertise difference, number of conflicting cues and valence of irrelevant cues on decision certainty (scale from 1 to 11).

Expertise difference	**Number of conflicting cues**	**Valence of additional cues**	***M***	***SD***
Decisions with differences	2	Negative	7.91	1.68
		Positive	8.11	1.54
	1	Negative	8.06	1.92
		Positive	8.61	1.49
Decisions without differences	2	Negative	7.50	1.60
		Positive	8.91	1.59
	1	Negative	7.15	2.18
		Positive	6.76	3.03

Decision satisfaction. To address differences in decision satisfaction, a repeated measures ANOVA was conducted with the within subject factors expertise difference, number of conflicting cues and valence of additional cues. For expertise difference, cue number and cue valence an interaction effect was found (F (1,184) = 56.55, $p < .001$, $\eta^2 = .237$). In addition, the number of conflicting cues (F (1,184) = 46.61, $p < .001$, $\eta^2 = .204$) and the valence of the additional cues (F (1,184) = 12.98, $p < .001$, $\eta^2 = .067$) showed a main effect on decision satisfaction. Mean values (Table 12) indicate that participants satisfaction

reached the highest values after decisions without a difference in expertise, two conflicting cues and positive additional cues and decisions with a difference in expertise, one cue conflicting and positive additional cues. Due to the fact that the impact of additional information such as number of cues and valence of the additional cues on decision latencies, decision certainty and decision satisfaction was not systematically diminished in decisions which differed in source expertise, *H5* has to be rejected.

Table 12

Mean values and standard derivations for the interaction effect of expertise difference, number of conflicting cues and valence of additional cues on decision satisfaction (scale from 1 to 11).

Expertise difference	**Number of conflicting cues**	**Valence of additional cues**	***M***	***SD***
Decisions with differences	2	Negative	8.18	1.70
		Positive	8.31	1.49
	1	Negative	8.44	1.78
		Positive	8.82	1.54
Decisions without differences	2	Negative	8.30	1.89
		Positive	9.17	1.49
	1	Negative	7.58	2.23
		Positive	7.13	2.97

To evaluate *RQ1* asking if additional information such as the number of conflicting cues and the valence of additional cues influences the impact of the cue source expertise on credibility evaluations, a univariate ANOVA was performed with expertise difference, cue number and valence as fixed factors and credibility as dependent variable. Results revealed a main effect for cue valence (F (1, 95) = 61.13; p <.001; η^2 =.394), but no effect for number of cues and no further interaction effects with expertise. In Table 13 mean values are displayed which revealed that information sources with positive cue values were rated as more credible compared to options with mostly negative cue values. Effect sizes were rather large.

Table 13

Mean values and standard derivations for the main effect of cue valence on credibility (scale from 1 to 7).

Cue valence	***M***	***SD***	***N***
Negative	4.29	0.70	48
Positive	5.24	0.47	48

To address *RQ2* which addresses moderating effects of participants level of involvement, faith in intuition, need for cognition, gender and age on decision latencies, a multiple regression analysis was performed with involvement, faith in intuition, need for cognition, gender and age as predictors and decision latencies as dependent variable. Overall, the model turned out to be not significant (F (5; 180) = 1.95; p =.089) with a rather small model fit (R^2 = .052; adjusted R^2 = .025). Apart from recipients' age (β = .172; p = .022), neither involvement (β = .077; p = .308), intuition preference (β = -.082; p = .293), need for cognition (β = .059; p = .419) nor gender (β = -.130; p = .089) tend to be significant predictors for decision latencies. If participants were older, their response latencies were longer.

To answer *RQ3* which asks if recipients' involvement, preference for intuition, need for cognition, age or gender moderate decision certainty and satisfaction, a regression analysis for decision certainty was conducted. Results reveal the model to be not significant (F (5; 180) = 1.00; p =.4.18; R^2 = .027; adjusted R^2 = .001). Furthermore, none of the predictors turned out to be significant. For decision satisfaction, the regression model (F (5; 180) = 1.87; p =.102; R^2 = .050 adjusted R^2 = .023) was not significant but need for cognition tend to significantly predict decision satisfaction (β = .156; p = .035). Higher need for cognition values lead to higher decision satisfaction.

For examining *RQ4* addressing if participants level of involvement and thinking style preference moderate credibility evaluations of the information sources, a regression analysis was performed. The model turned out to be significant (F (5; 180) = 5.37; p <.001; R^2 = .130; adjusted R^2 = .106). Need for cognition moderated participants' credibility perception (β = .235; p = .001), insofar that higher levels of need for cognition lead to ratings of the information sources as more credible.

7.4 Discussion

Real-time communication, unlimited distribution, high connectivity and the lack of editorial supervision pave the way for information floods which complicate social media recipients' credibility evaluations of sources and content as well as the choices of information sources. Since specific cues coming along with social media communication were revealed to influence individuals' judgments, the importance to comprehensively investigate the process of credibility judgments and decision-making is increased. Given that humans' cognitive resources are not unlimited (Lang, 2000; Petty & Cacioppo, 1986), adequate strategies are required to handle social media environments. According to dual process models, information processing is governed by individuals' ability and motivation to elaborate on information or either base their inferences on simple cues and heuristic rules. Particularly, cues related to the source of information were found to influence the selection and evaluation of online content (Adams, 2010; Lin et al., 2016; Ma & Atkin, 2017; Metzger et al., 2010; Winter & Krämer, 2014; 2016;). However, it is unknown to date, what happens between the retrieval of the cue and the judgment. Approaches like the rule concept (Kruglanski & Gigerenzer, 2011) and the main model (Sundar, 2008) claim that the relation between a cue and a judgment (or decision) can be described by cognitive heuristics as underlying mechanism. In that vein, cues which are available, accessible and applicable in the judgment situation are able to activate a related heuristic (Sundar, 2008).

Cognitive heuristics are strategies which reduce the mental effort in judgment and decision-making situations (Glöckner, 2009; Shah & Oppenheimer, 2008; Tversky & Kahneman, 1974) by not including all available information, but rather relying on one single heuristic cue (Kahneman & Frederick, 2002). Although the role of heuristics for human judgments and decision-making is highlighted by many scholars (e.g., Chaiken, 1987; Goldstein & Gigerenzer, 2002; Hilligoss & Rieh, 2008; Marmion et al., 2017; Metzger et al., 2010,; Sundar, 2008; Tversky & Kahneman, 1974), conceptualizations often differ and empirical evidence on cognitive heuristics is sparse (apart from focus groups and self-reports). Among others that owed to the unaware nature of heuristics which hampers measuring the operation of heuristics (e.g., via self-reports).

Considering the cue-wise activation of heuristics (Kruglanski & Gigerenzer, 2011; Metzger & Flanagin, 2015; Sundar, 2008; Tversky & Kahneman, 1974) and their effort reduction function (Glöckner, 2009; Shah & Oppenheimer, 2008), experimental investigations can be approached by means of task latencies which should differentiate heuristic (intuitive) strategies from deliberate strategies (Glöckner, 2009; Shah & Oppenheimer, 2008; Thoma & Williams, 2013). While in the realm of online credibility judgments the cue source expertise turned out to effect recipients the most (Study 1 and Study 2), it can be argued that the relation between the cue source expertise and related credibility judgments is driven by a cognitive heuristic, namely the expertise heuristic (as outlined in Chapter 3.1). Probably, peripheral processing can be seen as a necessary precondition for the reliance on cues for decision-making and judgments.

In this respect, the current study sought to investigate the operation of the expertise heuristic for the selection and credibility evaluation of information sources by addressing decision latencies to examine if recipients used an intuitive, heuristic strategy such as the expertise heuristic when they are exposure to a two-alternatives decision situation and the expertise cue is available. Moreover, it was further addressed whether characteristics like involvement, need for cognition or preference for intuition (as indicators for participants' processing style) impact decision latencies, choice confidence and credibility evaluations.

First, results confirmed the availability, accessibility and applicability of the expertise cue (Chen et al., 1999; Sundar, 2008) as alternatives favoring source expertise were chosen more often than alternatives favoring the other attributes like ratings of other users, pictures or length. Consequently, it can be argued, that the cue source expertise was stored in participants' memory, retrieved from memory when faced with the task of selecting an information source and perceived as relevant for the decision task. Thus, the attribute source expertise was taken as the most important cue for selecting an information source which prove that the experimental manipulation worked as intended and support previous findings about the role of source competence (Chaiken, 1987; Hovland et al., 1951, Sundar, 2008), e.g. for the selection of online articles (Winter & Krämer, 2014; 2016). With regard to credibility evaluations, results confirmed prior assumptions about the effect of source expertise on credibility ratings, even if this source expertise was solely presented by a label in reduced setting as it was the case in the current study. Information sources with source

expertise were perceived as more credible than those without source expertise. This finding contributes to previous studies on the important role of source expertise for credibility evaluations (e.g., Hu & Sundar, 2019; Lin et al., 2015; Winter & Krämer, 2012) and further proved the cue source expertise to be influential for decision-making *and* judgments in the realm of information sources, even in a quite reduced design where no further information about the kind of expertise is provided. Additionally, this is in line with previous results of this dissertation (Study 1) demonstrating that it is equal who reported about an authors' expertise, apparently it is likewise not important what kind of expertise the author has since that was not to derive from the applied setting in this study.

Furthermore, the current experiment examined that decision latencies were significantly shorter if the two alternatives differed in the cue value of the expertise cue compared to those decision trials without a difference in expertise. In detail, participants were faster in selecting one of the information sources when one alternative had a positive cue value for the cue source expertise and the other a negative one compared to choices in which both alternatives had either positive cue values or negative cue values for expertise and individuals needed more time to choose one of the options. Transferring these findings to the notion of effort reduction as core function of heuristics (Glöckner, 2009; Tversky & Kahneman, 1974) and potential indicator for the operation of a heuristic (Shah & Oppenheimer, 2008), it can be argued that in the current study the cue source expertise triggered the expertise heuristics. Reduced decision latencies for decisions in which one alternative was characterized by the presence of the heuristic cue provide evidence to this assumption. Basically, individuals saved time when the alternatives were differentiated by the heuristic cue source expertise. Furthermore, this observed tendency conforms to theoretical statements on heuristics referring to reduced cognitive demands (Tversky & Kahneman, 1974) and the differentiating function of cues which trigger a related heuristic in humans decision-making under time pressure or uncertainty (Bröder & Newell, 2008; Gigerenzer & Goldstein, 1996; Payne et al., 1993). The findings of the current study on reduced decision times extended prior results by Rieskamp and Hoffrage (1999) who investigated participants' reliance on heuristics when they were set under time pressure for a decision, to a more real-life scenario. When individuals had to select an information source, they perceived source expertise to be the most important cue and if this cue is present and positive for one of the given alternatives,

the decision is easier and faster. That appears to happen automatically in the current study without artificial time restrictions. In sum, the diminished task latencies for decisions in which the heuristic cue was present and differentiated one alternative from the other, might be taken as an indicator for the conclusion that participants applied the expertise heuristic for decision-making.

In a similar vein, also certainty and satisfaction with the choice, in sum choice confidence, was higher after decision trials with a difference in the cue source expertise compared to those without a difference. An explanation to this finding can be derived by the match of input and output which is further characterized by an expectancy consistency (Tversky & Kahneman, 1974). Hence, people choose an information source because source expertise was accompanied by a positive cue value, and a connection between source expertise (input) and decision (output) was already established, so that the actual choice is perceived as confirmation for this relation. This effect can be described like a self-confirming circle, potentially able to further strengthens the connection between cue and decision-making which has to be investigated in future studies. Moreover, an information which is easy to retrieve is perceived as the right solution, just because of its easy retrieval (Tversky & Kahneman, 1974). A further explanatory aspect for the increased confidence values refers to the balance between costs and benefits which means that a choice was made which did not require a lot of effort and seem to lead to an adequate solution, whereby an alternative was chosen better than the other alternative (Payne et al., 1993).

By examining the TTB heuristic, Bröder (2000) also found an effect of higher confidence ratings when a heuristic was used, but this effect interacted with the valence of the additional cues in the decision task. In detail, in his study participants indicated to be more confident after decisions with positive additional cues. In conformity to Bröder (2000) the current study also obtained an interaction effect of expertise with additional information on decision latencies, decision certainty and decision satisfaction. Results revealed that decision times were faster for decision trials with two conflicting cues (contradicting the cue value of the expertise cue) and negative additional cues than for one conflicting cue and positive valence of the additional cues. An interaction effect showed additionally that participants made the fastest decisions in conditions without a difference in expertise, with two conflicting cues and negative additional cues. These findings heavily contradict the

concept of attribute substitution, which states that heuristics are only making use of one, discriminating cue (Kahneman & Frederick, 2002) and do not integrate additional information. However, effects of additional information were found for TTB heuristic (Bröder, 2000) and recognition heuristic (Oeusoonthornwattana and Shanks, 2010; Thoma & Williams, 2013) as well. Since choices potentially based on these heuristics do not seem to be independent from additional information, the authors stated that these heuristics probably are not non-compensatory but rather compensatory which describes that decisions are not exclusively relying on one cue, for instance recognition. Given that the current results are equally not independent from additional information such as the number of conflicting cues and the valence of the additional cues, it might be assumed that with regard to the expertise heuristic it also has to be considered that the heuristics underlies a more compensatory nature, at least in the current experiment.

Thoma and Williams (2013) partly used the stimulus material of Oeusoonthornwattana and Shanks (2010) to test for effects of the presentation style of the additional information. But as the exposure to statements about the brand and products, star ratings of other users as well as additional attributes used by Bröder (2000) and in the current study lead to the same result that additional information actually impacts decisions, it really has to be considered as a stable finding. However, with regard to effort reduction, it still can be plausible that participants' cognitive effort was reduced, even if additional information was not ignored. Considering the effort reduction principles by Shah and Oppenheimer (2008), it can be stated that the principle 'examining fewer cues' is not applicable to the current results. Notwithstanding, the principle which was said to be related to the expertise heuristic, 'simplifying the retrieval of cue values' can still hold true. Given the assumption, source expertise was the cue which was the easiest to retrieve from memory and thereby guiding the resulting decision, it might have happened that additional cues were indeed processed and integrated, but in a subordinate fashion. Of course, this assumption has to be further investigated by future studies. Even if decision latencies are a promising approach to investigate effort reduction, it is not possible to address if and how cue values were retrieved from memory and integrated in information processing as a whole. Therefore, further studies could integrate recall and recognition tasks to test for the easy-to access assumption of cues. In addition, asking participants to note their thoughts after the decision could put the lens on

the way of how information is processed, connected to retrieved cue values from memory and integrated. This procedure was successfully applied by Lee and Shin (2012) to explore differences in information processing after individuals' exposure to either a social media communication or a newspaper interview. Similar patterns as for the impact of additional information were found for decision certainty and decision satisfaction in the current study, except the fact that for both positive additional cues lead to higher values. Bröder (2000) explained the influence of positive additional cues on choice confidence as a kind of supportive evidence participants integrated after the choice to validate it. Even if this additional information is irrelevant, the more information is given and the more positive it is, the more confident individuals are after the decision. This explanation approach might probably account for the findings of the current study concerning the impact of positive irrelevant cues on choice confidence.

Basically, for differentiating between intuitive (namely heuristics) and deliberated strategies most researchers conjecture human information processing to be guided by two independent processes, an intuitive and a deliberated one (Fiedler & von Sydow, 2015). In contrast, the HSM (Chaiken, 1987) postulates that both modi can interplay with each other and happen simultaneously. Based on that, peripheral processes such as the operation of a heuristic can interact with deliberated processes. The attenuation hypothesis (Ratneshwar & Chaiken, 1991) claims that especially in ambiguous situations heuristic cues tend to interact with other incoming information. Similarly, Gigerenzer and Goldstein (2011) provided an explanation for the influence of additional information which claims that a heuristic *plus* evaluation mechanism took place. During this evaluation process, further cues are implied. It can be hypothesized that such a process also accounts for the influence of additional cues in the current study.

Furthermore, the valence of the additional cues turned out to influence credibility assessments, insofar that information sources with positive additional cues were perceived as more credible than sources with negative additional cues. This observed effect can potentially be traced back to participants' inference the more cues are given (as indicted by positive cue values), the more credible the source is. Another explanation which seem to be plausible refers to a negativity bias that is, events, objects or information with a negative valence are perceived as more salient and arousal-evoking than positive ones (Rozin and

Royzman, 2001) and thereby information sources with negative irrelevant cues were rated as less credible by participants.

Concerning the influence of recipients' characteristics like involvement, thinking style preference, age and gender on decision latencies and choice confidence, we only found need for cognition to positively moderate decision satisfaction. It can be argued that need for cognition triggers individuals' self-efficacy due to prior experiences so that they know they are good in selecting appropriated information sources and thereby satisfied with their decisions. Given the co-occurrence of the two processing modi as proposed by the HSM (Chaiken, 1987) it could be promising to include participants' current motivations (e.g. accuracy, defense or impression management motivation as highlighted in the model) rather than stable traits like involvement and thinking style. Supporting evidence for this approach can be derived by the results of Winter and colleagues (2016). They found an enhanced consideration of social recommendation cues when participants were primed with a specific motivation (impression management motivation compared to defense and accuracy motivation). Similarly, situational involvement could be manipulated or primed as is was already found to be an influential predictor for information processing and the reliance on cues (Petty, 1994; Petty & Cacioppo, 1986). Participants' need for cognition predicted credibility evaluations of the information sources, whereby higher values in need for cognition resulted in higher credibility ratings. Need for cognition serves as a determinant which seem to indicate whether recipients engage in more effortful elaborations or rely on cues for the assessment of credibility. However, in the current study solely cues were given, so it can be assumed that those individuals high in need for cognition potentially engaged in more effortful cue value retrieval and integration.

For future studies it should be considered that differences between subjects could probably be explained by prior experiences with information sources. Someone who always relies on the Facebook recommendation of a close friend, whereby until now his or her expectations were met by these recommendations, probably tend to overestimate the effect of recommendations or ratings by other people. On the other hand, if someone has only good experiences by selecting articles based on their authors, the cue source expertise would be important.

7.5 Limitations

When interpreting our findings, some limitations have to be considered. First, participants were exposed to an artificial scenario where they had to choose between only two information sources. In this setting no further context, no task and no articles or messages were provided. In reality, information sources are selected in interdependence with an article or further information. Furthermore, from a methodological viewpoint, credibility judgments were not connected to time measures which potentially would have provided further insights on the effort reduction for judgments. Likewise, credibility judgments and choice behavior were measured independently, although in reality they are highly related to each other. It can be argued that evaluation processes which could possibly explain the effect of the additional information was evoked due to participants' perception of being under observation which could have strived the motivation to make as good choices as possible (as it was stated in the instruction). A further limitation can be found in the sample composition: Participants were mainly students, consisted of more women than men, and had an above-average level of education.

7.6 Conclusion

The results of the current study provide ample evidence to the assumption that source expertise is the most important cue for decision-making and judgments in the realm of information sources. Furthermore, the presence of this cue was able to diminish decision latencies and resulting the cognitive effort participants had to invest for the decision which can further be taken as an indicator for the operation of the expertise heuristics. In contrast, this is contradicted by the finding that additional information such as conflicting cues and the valence of additional cues was not ignored, but rather integrated in information processing which was mirrored in decision times and decision confidence. In sum, the current study can be regarded as first step into the experimental investigation of heuristics by means of effort reduction. It can be assumed that the relation between the cue source expertise and resulting decisions and judgments is driven by the expertise heuristic. Nevertheless, future studies must address the role of additional information in more depth to gain a clear picture on how

heuristics work regarding the use of cues and the integration of cue information in information processing.

IV General Discussion

In the following, the findings of the three empirical studies of this dissertation are summarized, discussed and interpreted by referring to the theoretical background as well as prior studies and approaches (Chapter 8). With regard to the impact of cues on credibility judgments of social media communication and the operation of heuristics during information processing, several theoretical implications are discussed (Chapter 9). Further on, the contribution of this work to the field of online credibility judgments is outlined and practical as well as methodological implications for the applied use of the gained knowledge for support measures or automated detection approaches are derived and discussed (Chapter 10 and 11). Additionally, limitations are reviewed (Chapter 12) and further directions for future research questions, studies and perspectives are provided (Chapter 13). The discussion finishes with a conclusion of the entire work (Chapter 14).

8 Summary of main findings

The main objective of this dissertation was to conduct an in-depth examination of the process by which recipients evaluate social media communication in terms of credibility. This was guided by the underlying question of whether individuals base their judgments on specific aspects and information inherent in social media posts. Given the ubiquity of social media and the role these channels nowadays play for information-seeking purposes and for the consumption of news and political information (Bode, 2015; Fletcher & Nielsen, 2018; Metzger & Flanagin, 2015), it is becoming increasingly relevant to ascertain which pieces of information recipients use as anchors for credibility assessments. Contemporaneously, social media environments have led to an enormous increase in the amount of available information

(Metzger & Flanagin, 2015; Sundar, 2008). Any user can consume and produce content, leading to the disappearance of quality control and editorial standards. Crucially, moreover, users are able to maintain their own profile information, their networks, and the information they share, which can guide the impressions made by others. Besides the benefits for the free expression of opinions and the use of channels away from mainstream media, the absolute lack of editorial (or moral) supervision also entails risks concerning deception and manipulation of recipients. Further considerations relate to the fast speed of social media communication and the high connectivity between users' profiles, meaning that content can quickly go viral (Hardalov, Koychev, & Nakov, 2016). Confronted with floods of information, but only having limited capacities to process the incoming information (Lang, 2000), recipients are not always able or motivated (e.g. while scrolling passively through social media newsfeeds) to deliberately elaborate on every piece of incoming content. In light of these challenges, the question has arisen of how social media recipients choose information sources and evaluate the credibility of sources and online content. Moreover, the need for adequate and valid credibility assessments has significantly amplified.

Social media channels are characterized by a richness of social and informational cues which are potentially able to guide impressions of the communicator and of the published content. This leads to the question of which aspects recipients draw on in order to form evaluations, especially in order to assess whether or not information is credible. Above all, the diversity of cues as well as the diversity of communication cases, contexts and sources complicates this endeavor. For instance, the competence of a source can be perceived based on the name, profession, active account days, role or related activities stored in the profile. As a further complicating factor, social media is open to news magazines to publish articles, to private persons to articulate personal opinions, to politicians to distribute their positions via political statements, or to official bodies like the police or governmental offices in order to provide people with information.

Therefore, the aim of this dissertation was not only to examine relevant cues on the basis of which recipients form their credibility evaluations, but also to further investigate the comparability of cue patterns for different platforms and communication contexts in order to obtain an overall picture and use these insights to develop support measures in the future. According to the rule concept, cues are able to trigger credibility judgments (Kruglaski &

Gigerenzer, 2011), with the only requirement of being available, accessible and applicable in the judgment situation (Sundar, 2008). Nevertheless, social media contains an elusively huge number of cues, which are thought to potentially impact further evaluations of the content as well as of the source.

To systematically explore the cue-judgment process, three empirical studies were conducted. As a first step towards a systematic investigation of the process of credibility judgments, a comprehensive range of cues was focused to investigate which cue would have the greatest impact and to assess what happens if cues are presented in combination with each other (either conflicting or confirming each other). To thoroughly analyze the relative impact and interaction of different cues, an experimental manipulation was used, varying the source expertise, the number of likes and shares, the inclusion of pictures and the topic involvement of politicians' Facebook posts. Furthermore, recipients' involvement, need for cognition and agreement with the published message were integrated as moderating factors to evaluate the credibility of message and source. Broadly speaking, source cues emerged as the most important for recipients' evaluations of the source and the message.

Considering the aforementioned variation of use cases for social media communication, the second study attempted to investigate whether cue patterns are equally reliable for another social media platform and another context, namely crisis-related tweets. Basically, it was investigated whether source cues also emerge as the most important anchors for credibility judgments on a different platform. Furthermore, in the second study, a more realistic reception scenario was applied, with a large number of embedded tweets displayed. An additional aim was to transfer the found cue impact to a real reception situation, with cues taken as they appear in reality and not manipulated as in Study 1. Since automated detection of biased or fake content is becoming increasingly important, the second study targeted a larger data set on a different social media platform, aiming to investigate the impact of a large range of features on recipients' tweet credibility ratings. A combination of psychological measurements and an automated feature-based selection approach were applied to gain insights into the potential of using automated approaches for credibility recommendations. The findings revealed that meta-informational cues were the most significant discriminators for credibility. Thinking ahead, these meta-informational cues, such as the number of followers, the number of all produced tweets, and the ratio of the latter with the age of the

account, might also describe the experience of the author, and probably associated with this, perceptions of the author's competence.

Taken together, indications of source expertise mostly, and significantly, strengthened recipients' credibility perceptions for political statements concerning different topics (Study 1) as well as crisis-related tweets (Study 2). Building on these findings, the aim of the third study was to explore the underlying mechanisms between the cue and the resulting judgment. As a theoretical basis, cognitive heuristics, which describe so-called mental shortcuts, can be considered to function as the connection between a cue and a judgment. The third study aimed to assess whether the relation between the source expertise cue and related decision-making and credibility judgments was guided by the expertise heuristic. Therefore, a two-alternatives choice paradigm was applied, in which participants were confronted with the formal description of two information sources. Assuming that the use of heuristics reduces complexity and effort (Glöckner, 2009; Shah & Oppenheimer, 2008; Tversky & Kahneman, 1974), the operation of the expertise heuristic is assumed to reduce task latencies for the selection of information sources. The study therefore measured recipients' task latencies based on the underlying assumption that conditions with a difference in source expertise (indicated by cue values) will trigger the expertise heuristic and reduce decision latencies, in contrast to conditions without a difference in source expertise.

First, the results confirmed that the availability, accessibility and applicability of the expertise cue, as alternatives favoring source expertise, were chosen more often than the alternatives without source expertise. Second, task latencies were reduced for those decisions with a difference in expertise, leading to the assumption that the presence of the source cue further triggered the expertise heuristic. In the following, the impact of source, message and meta-informational cues on credibility judgments and decision-making is discussed. Furthermore, the role of heuristics in information processing is outlined, and the moderating role of individual differences between recipients such as involvement, need for cognition, faith in intuition and agreement with the message is elucidated.

Source cues

For social media communication, it emerged that information about the communication source, such as competence or experience, is decisive regarding recipients' evaluations of the quality of content or the selection of information sources. When investigating which cues of social media posts impacted credibility judgments of message and source, the findings revealed that source cues had the most relevance as credibility-enhancing cues. For the reception of politicians' Facebook posts, the indicated source expertise led to higher credibility perceptions of the message and of the source (Study 1). Even though scholars claim that traditional processes of credibility judgments have changed with the rise of social media (Metzger et al., 2010; Sundar, 2008), in light of the findings of Study 1, it appears that the information source and attributes such as competence are still used as the most important indicator for source and message credibility, which contributes to the classic research of Hovland and colleagues (1951).

At first glance, a useful strategy appears to be to focus first on the question of who is communicating, and to strongly link credibility with the producer of the information and his or her attributed intentions. Evaluating a politician's post as more credible if it is indicated that the politician is a member of a committee related to the post's topic appears to be an adequate mechanism for use as an anchor for evaluations. This is especially the case in situations of high uncertainty, when the recipient does not know anything about the politician or the content of the post. Overall, the expertise level of the politician worked strongly as a peripheral cue impacting credibility perceptions. If the politician was labeled as an expert, the source and post were perceived as more credible compared to politicians without any indicated expertise. This is in line with previous studies examining source information such as reputation or an expert role as a key factor for selection, reception and evaluation processes of online information (Hu & Sundar, 2010; Lin et al., 2015; Winter & Krämer, 2014). While previous studies focused on newspaper sources (e.g., Winter & Krämer, 2014) and professional authors (Winter et al., 2010), the current study extends these findings to politicians as sources (of online communication) who have their own intentions and goals within their communication strategy.

The strategy of relying on the source to assess whether or not information is credible initially appears to be promising and reasonable, especially given that the politicians used in the study were unknown and participants were unable to derive knowledge from prior experiences. Nevertheless, it has to be considered that in social media environments, users can manage and edit their account information themselves, meaning that expertise communicated on social media profiles is self-reported rather than objectively attributed. However, previous research also found beneficial effects of source reputation (Metzger et al, 2010; Sundar, 2008; Winter & Krämer, 2012) and communicators' self-reported profession (Winter et al., 2015). Based on the findings of this dissertation, recipients' reliance on (self-reported) source expertise can be now transferred to the area of politicians' social media communication. An interesting question for future research would be to evaluate whether recipients are aware of the self-reported nature of source information on social media, i.e. that authors are able to state even fake competence, for instance concerning membership of a specific expert working group or other competence-related information in their Twitter or Facebook description.

The fact that profile owners are able to communicate whatever they wish on their social media profiles (without any supervisory body) may imply critical consequences regarding the deception of users. Producers of misinformation have already begun to use credible-sounding names such as *CNN_politics* or *The Denver Guardian* (Britt et al., 2019; Pennycook, et al., 2018), or faked account names like the name of former New York Mayor Giuliani (Rogers & Bromwich, 2016) in order to distribute fake information. As recipients were found to be susceptible to any information pertaining to the source which can be interpreted as source competence or experience, it is difficult for recipients to identify such accounts as fake, meaning that the source and message are likely perceived as credible due to the purported reputation of the account.

Given that even in the reduced design of Study 3, source expertise was most important for participants' decision-making and judgments, without them having precise knowledge about which kind of expertise was meant, it can be assumed that the effect of expertise relevance for credibility judgments is widespread and used universally as a credibility anchor. Accordingly, for politicians and other persons with persuasive communication intentions, it appears to be useful to indicate their field of expertise and work background (membership of

committees, parliamentary tasks etc.) on their social media profiles. This should enable them to establish a trusted interaction with recipients who are accustomed to considering all information they can relate to source expertise as a sign of credible communication.

Furthermore, for the selection of information sources, source expertise was found to be the most important cue: Information sources with expertise were selected more frequently than other cues such as recommendations by others, length and pictures. This proves that source cues are accessible, available and applicable as anchors in the context of credibility evaluations of news and political information on social media. Moreover, the use of a reduced-choice task design without the provision of any further information revealed that information about the competence level of the person who published a message or article is most important for individuals' judgments. Overall, the source seems to be the most prominent aspect, also in cue-rich social media environments, when it comes to communication and related evaluations, as was already found in face-to-face interactions and traditional media environments (Hovland et al., 1951; Sundar, 2008). Potentially, this effect might be explained by users' desire to attribute some kind of responsibility to the source for the things he or she is publishing.

The findings were somewhat different with respect to the Twitter context, in which features related to the author were not demonstrated as particularly impactful for credibility ratings. This inverse effect may be attributable to differences between social media platforms. Considering that aspects like an author's Twitter account description, length of the account description, and the authors' role (referring to the relation between follower and followee number) are classically taken as author-related features on Twitter (Aker et al., 2017), a different picture can be obtained. Source expertise was not explicitly measured. More precisely, recipients had to perceive attributes like authors' competence through implicit aspects. This gives rise to the question of whether attributes which are classically categorized as system or meta-relational are not better suitable for gleaning source expertise.

According to Hilligoss and Rieh (2008), information about a source's competence can be perceived through the recipient's previous experiences with the source, experiences from other people shared offline or online, the reputation or credentials of the source, descriptions or the area of work. In fact, Metzger and Flanagin (2015) stated that people are able to reason on source quality based on the pure absence of commercial motives. Apparently, users are

willing to draw on even the smallest piece of information to judge the competence of someone who is trying to communicate something to them.

Using feature-based selection combined with credibility measures, with regard to author-related features, it was demonstrated that only the length of the Twitter account description influenced recipients' credibility ratings, whereas the presence or absence of an account description and the role of the author had no influence. It can be argued that the longer the description, the more information about the author's background can be stated. Potentially, recipients assume longer descriptions to be more informative, even without being aware of the actual content of the description. Since this work found source expertise to be the most useful and mostly frequently used cue for recipients' perceptions, further investigations concerning different conceptualizations of source expertise and the effect of potential differences in expertise levels on credibility are strongly warranted. Such investigations would enable a systematic classification and the derivation of valid conclusions about which source information can really and universally trigger further rules for decision-making and judgments.

Based on the results of the three empirical studies of this dissertation, it can be assumed that a broad range of different cues are adopted by individuals to draw conclusions about the competence and experience of the source. According to the study findings, the desire to make inferences about the communicator's experience seems to be the strongest driver for users when they are asked to evaluate content credibility.

Message cues

In addition, messages published through social media channels are richer in cues than traditional articles or text-based communication. Usually, social media posts consist of text, web links, videos, links and pictures (Hughes et al., 2012; Walther & Jang, 2012) and it is common convention to communicate using multimedia modalities. However, for the reception of politicians' posts, message cues like pictures were not demonstrated to be influential signals for credibility evaluations of the source and the content (Study 1). In fact, pictures did not affect evaluations at all, which strongly contradicts theoretical assumptions

and previous results. Visual information like pictures were previously found to attract attention and to be easily processed by recipients (Clow et al., 2006; Lowry et al., 2014; Sundar, 2008), which should foster their potential to serve as peripheral cues. Beyond this, the more information is given, the more trustworthy and credible messages are perceived to be in general. This effect was already confirmed for message cues like URL links, as the provision of additional information in tweets such as a link led to increased credibility ratings (Aigner, et al., 2017; Morris et al., 2012).

However, this mechanism was only demonstrated for the interaction of pictures and topic involvement of the message, another message attribute which has to be considered concerning its impact on credibility (Morris et al., 2012). The current work demonstrated that posts including a picture which matched the content of the topic resulted in higher message credibility ratings for high-involvement topics (Study 1). Apparently, recipients are solely interested in additional information if the topic is interesting or relevant. Interestingly, message aspects appear to solely affect message credibility, which indicates that they are independent of the source of communication. By contrast, source cues were found to affect credibility ratings both of the source and of the message, demonstrating that their impact is stronger and more far-reaching compared to message cues. It is likely that the absence of source information may strengthen the impact of message cues. This might be interpreted as a first hint for the question raised by Metzger and Flanagin (2013) of whether a hierarchical order of cues exists. However, this assumption requires further detailed investigation. Another explanation to consider is that visual cues such as pictures are not strongly related to credibility when they are presented in combination with text which is perceived as more important. When comparing media modalities, it was found that pictures presented directly after video material were seen as the most credible form of media because they cannot be easily manipulated (Carter & Greenberg, 1965; Sundar, 2008). Finally, it can be assumed that the pictures were not substantial enough to evoke further interest.

Apart from pictures, other message cues also failed to influence evaluations. No impact on credibility was found if tweets contained URL links, sentiment words or bad words (slang words indicated by a dictionary) (Study 2). Notably, message cues are subject to a very complicated mechanism of action and probably need to be investigated in a more fine-grained manner. In Study 2, it was shown that message features often impacted a single credibility

dimension, meaning that their effect seems to be quite specific and cannot be generalized to a wide range of items. For instance, enabled geo-information in a tweet is related to perceptions of authenticity and believability and the inclusion of an organization or location tends to discriminate between judgments of informative and non-informative content. Furthermore, it was shown that accuracy perceptions are determined by mentioning a person or including negation. The impact of negation relates to the findings of Levi and Mokryn (2014), who reported that especially negative sentiment in online reviews enhanced perceptions of usefulness, probably because they are perceived as being more honest. Tweets containing a date seem to shape the impression of whether some content is interesting and timely. In particular, the time cue fosters the assumption that the context of the social media communication is especially able to determine the impact of message cues: For the evaluation of crisis-related tweets, the date was perceived as impactful, which can be seen as logical consequence of real-time and fast crisis communication. With regard to the selection of sources, it emerged that message cues like pictures and message length were the least important and therefore less frequently chosen (Study 3). Nonetheless, also in these scenarios and for decision-making tasks in general, it might be interesting to examine whether the absence of source information increases the relevance of message information which contributes to the assumed hierarchical order of cues concerning their credibility-enhancing impact.

Meta-informational cues

Strictly speaking, meta-informational cues refer to all information which is presented by the system, mostly in the form of aggregated numbers such as likes or followers. Nevertheless, system-generated key figures can be regarded as automatically created performance measures of the account holder because basically, all of these numbers refer to him / her and his / her behavior on the platform as well as the resonance of others with that behavior (Choi & Stvilia, 2015; Metzger et al., 2010). According to effects such as the bandwagon heuristic, other users' reactions are able to guide recipients' impressions insofar as they apply the rule 'if others think something is good, I should think so, too' (Sundar, 2008). In this vein, 'likes', which work as a kind of recommendation, determined the

selection of online articles (Messing & Westwood, 2014; Winter et al., 2016) and the credibility of tweets (Aigner et al., 2017). Controversially, likes and shares showed an inverse effect for credibility assessments of politicians' post, as posts with a lower number of likes and shares led to higher credibility evaluations. This contradicts the assumption of the bandwagon heuristic that other users' actions will be used as recommendations (Sundar, 2008) and system-generated cues are commonly associated with a higher warranting effect because they are not prone to manipulation (Walther et al., 2009). Essentially, this is a promising finding in terms of societal education and the consumption of news and political information. Evidently, people are not always susceptible to other users' reactions, which hopefully implies that they form their own impressions.

Concerning the conflicting findings from other studies, it can be assumed that the reliance on others draws heavily from the context of communication as well as one's own level of experience with the topic. The discrepancy is probably due to the fact that reliance on others is related to uncertainty (Metzger & Flanagin, 2015) and participants in the current study did not feel uncertain about the political topics (e.g. compared to an unknown product to be bought online). Including measures of recipients' uncertainty might be a promising approach for further work in order to analyze peer cues in more depth. Another possible explanation refers to the high media coverage of topics such as the risk of filter bubbles, the danger of believing in some content just because it has a lot of likes (which, moreover, might have been bought) and related key words. Probably, people are on the path to rethinking their previously applied strategies, but this is merely a loose assumption which remains to be tested. The study (Study 1) was conducted in summer 2017, when the area of political communication was generally associated with mistrust and deception by many people. This may have prevented participants from using likes and shares for evaluations.

A different picture emerged for crisis-related tweets (Study 2). In particular, meta-informational features were pivotal for participants' credibility evaluations. The number of followers, the sum of all tweets ever written by the author, and the ratio between sum of tweets and account age were most influential for all measured facets of credibility (accurate, authentic, believable, comprehensible, important, informative and interesting). By definition, the number of followers and tweets as well as the relation to active days on the platform are classically system-generated cues. Nevertheless, they still describe performance

characteristics about the source. It might even be suggested that these meta-informational cues like the number of followers and tweets provide recipients with a sense of the author's experience and competence rather than indicating the author's popularity. A person who posts a lot of tweets can be assumed to have high experience (probably including high ability to write good, convincing tweets). Similarly, a person with a large number of followers is apparently able to attract numerous people either by his/her authority or by the quality of his/her tweets, both of which will be recognizable to the reader. Most likely, both cues are strongly connected to the perception of the quality of the source – or are the only cues in the used feature list that will be strongly related to the expertise and quality of the source. This would be in line with numerous findings on the importance of the source when assessing the credibility of a message (Metzger et al., 2010; Morris et al., 2012; Sundar, 2008; Winter & Krämer, 2014). While system-generated information is generally more trustworthy (Walther et al., 2009) due to the higher warranting effect (Walther & Park, 2002; Walther et al., 2009), it seems reasonable to use such aggregated numbers to gain a sense of whether or not an author is competent.

Alternatively, the effect might be explained by the bandwagon effect (Sundar, 2008). Tweets of authors with numerous followers will benefit from large amounts of likes and retweets, which might also persuade readers of the quality of the post. This is in line with the results of a user study conducted by Aigner and colleagues (2017), who found that credibility ratings mainly depend on the number of retweets and likes, thus indicating a bandwagon effect. In this way, likes and retweets can be understood as recommendations of content by other users and might be taken as an anchor for rating something as credible. However, this explanation would contradict the results of Study 1, which was unable to find a credibility-enhancing effect of likes and shares. This highlights the obvious differences between platforms (Facebook vs. Twitter), social media context and communication purposes (political communication vs. crisis-related tweets), which future studies should target in greater depth.

On the relation between source cues and judgments and decision-making

With regard to the question of what happens in the time between cue retrieval and judgment formation, the present work provides some evidence that this relation could be guided by a heuristic. When recipients were asked to select between two formally described information sources, sources with positive cue values for source expertise were selected more frequently (Study 3). Moreover, decision latencies were significantly faster when information sources differed in source expertise, indicating that less effort was required to make the decision. Presumably, this provides evidence that a heuristic was being operated. Furthermore, it can also be interpreted as proof that the cue of source expertise acts as a heuristic cue which is able to trigger the related expertise heuristic.

Additionally, following decisions between information sources which differed in source expertise, participants showed greater levels of certainty and satisfaction, due to the fulfillment of expectations and the match between investment and outcome (Glöckner, 2009; Tversky & Kahneman, 1974). By relying on the expertise heuristic, they were able to free up time, which further supports the notion that effort reduction represents a core function of heuristics (Shah & Oppenheimer, 2008). Moreover, this observed tendency is in line with theoretical statements on heuristics with respect to reduced cognitive demands (Shah & Oppenheimer, 2008) and in terms of the differentiating function of cues, which trigger a related heuristic in people's decision-making under time pressure or uncertainty (Bröder & Newell, 2008; Gigerenzer & Goldstein, 1996; Payne et al., 1993). The current results on reduced decision times (Study 3) correspond to previous findings by Rieskamp and Hoffrage (1999), who investigated participants' reliance on heuristics when they were under time pressure for a decision and extend their findings to a more realistic scenario without artificially restricting decision times. In Study 3 of the present work, when individuals had to select an information source, they perceived source expertise to be the most important cue, and if this cue was present and positive for one of the given alternatives, the decision was easier and faster. In sum, the diminished task latencies for decisions in which the heuristic cue was present and differentiated one alternative from the other might give rise to the conclusion that participants applied the expertise heuristic for decision-making.

However, the expertise heuristic did not work as a non-compensatory rule, as additional information of irrelevant cues was included in information processing and impacted decision-making. This not only contradicts the attribute substitution hypothesis (Kruglanski & Gigerenzer, 2011), but also raises the question of how the effort was actually reduced if participants also elaborated on the other cues. It is likely that individuals also weigh other cues according to their personal experiences and subsequently put them into context with the overarching relevant cue source expertise. Presumably, latent patterns of cue relations exist in the realm of decision-making, which describes a more active task compared to the passive reception of posts (Study 1). Consequently, it needs to be asked whether only the expertise heuristic is non-compensatory, or whether the other cues were too important for participants to decide not to include them. Taking this a step further, it might be argued that there exists a threshold for the non-compensatory fashion of heuristics. Given that participants were not found to differ in their processing according to involvement and need for cognition, it is possible that a combination of peripheral (based on the heuristic) and central (evaluation of the other cues) processing took place. This assumption would resonate with similar theoretical foundations, for instance by Chaiken and colleagues (1989), who suggested that heuristic cues (as being used during the peripheral path of processing) might interact with other incoming information. Thereby, central and peripheral processing is not independent from each other (Chaiken, 1987). Similarly, Gigerenzer and Goldstein (2011) provided an explanation for the influence of additional information, stating that a heuristic plus evaluation mechanism occurred.

Given that recipients' cognitive resources are not unlimited (Lang, 2000), it is important to investigate how users' decision-making and judgment actually take place, particularly against the background of social media communication and the risk of an easy deception due to peripheral cues and unconsciously applied heuristics. Cognitive heuristics are strategies that are supposed to reduce mental effort (Shah & Oppenheimer, 2008; Tversky & Kahneman, 1974), but due to their unconscious nature, heuristics are difficult to capture. Study 3 suggests that effort reduction is a promising approach to experimentally investigate heuristics. According to this approach, the use of intuitive versus deliberated decision and judgment strategies can be identified by means of parameters like decision times and decision confidence (Glöckner, 2009; Shah & Oppenheimer, 2008; Thoma & Williams, 2013).

Using the expertise heuristic for decision-making and judgments in the context of social media communication appears to be an adaptive strategy insofar as heuristics facilitate users' handling of the demands inherent in social media communication, such as information overload, unknown sources and the fast communication flow. In line with that, heuristics can be regarded as useful and adaptive methods (Gigerenzer & Todd, 1999; Kruglanski & Gigerenzer, 2011). However, heuristics can also lead to biases in judgments (Tversky & Kahneman, 1974), which are barely detectable by individuals due to the unconscious nature of heuristics. Therefore, cognitive and behavioral outcomes after applying heuristics should be further investigated in order to determine the level of risk of being distracted by cues and unconsciously used heuristics. Such an investigation could elucidate which consequences this might have for biases in decisions and judgments and further related attitudes and behavior.

Individual differences

Theoretical considerations in the realm of dual process models such as the ELM and HSM (Chaiken, 1987; Petty & Cacioppo, 1986) strongly suggest that individual differences determine the selection, processing and evaluation of information. For instance, a person who is interested in a topic or a task is willing and motivated to invest more time and effort than a person whose interest is generally low. In a similar vein, further aspects suggest that an individual's ability (for instance when confronted with large amounts of information) and general personality characteristics such as need for cognition determine the individual's overall tendency to engage in effortful thinking (Cacioppo et al., 1982). These individual specificities determine which kind of information is used as the basis for credibility judgments and whether information is processed more peripherally or centrally. Additionally, the propensity to rely on peripheral cues and to unconsciously apply heuristics for decision-making and judgments is also assumed to be increased for persons with lower levels or involvement or motivation (Petty & Cacioppo, 1986).

Credibility perceptions are subjective due to the fact that all recipients bring their own context, background and personality traits to the table. In line with this, Fogg (2003) states that involvement and individual differences in thinking style are the main criteria for a cue

to be perceived at all due to its prominence. Accordingly, the claim that individual differences are important to address in research regarding the process of credibility assessments, seems to be well reasoned.

However, the present findings revealed no impact of recipients' involvement on the influence of cues on credibility judgments. The reliance on cue information such as source expertise, likes and shares and pictures was not found to be stronger in those individuals with lower involvement in the topic (Study 1). Although people with higher levels of involvement rated messages as generally higher in terms of credibility, this effect was independent of the use of cues as anchors for evaluations. By contrast, in the third study, credibility evaluations were found to be completely independent of recipients' involvement. Involvement has traditionally been found to be a discriminating factor in terms of the question whether information will be processed centrally or peripherally. However, in light of the present findings, the question arises whether the central and the peripheral route of information processing work in tandem rather than separately. The results of this work suggest that cues and heuristics are not only processed in a peripheral way; probably, cue information can also be used as central information.

In contrast to previous research which revealed that the attractiveness of the speaker functions as a peripheral cue, the present work found that cues like source expertise, other users' recommendations and pictures within a post are more substantial in the degree of information they provide. For this reason, it might be the case that cues within social media communication are not perceived as peripheral information and are taken as credibility signals for recipients with lower involvement and motivation. For instance, other users' likes could be taken as a hint of how popular the content is, which may be further interpreted as experience of the author. Accordingly, in Study 2, it was found that especially the number of followers, count of tweets and the ratio between number of tweets and account age influenced credibility ratings, which might be attributed to their function as signals of an author's experience. In terms of the question of how people perceive such information that is not explicitly observable, it might be argued that recipients take such numbers as indicators of competence and experience. Following this line of thought, it can be assumed that cue information within social media communication is not taken as a peripheral cue but rather as central information, which will be processed in a central way. Alternatively, it might be

possible that social media communication cues were indeed perceived as peripheral information but that both types of information processing took place in an interconnected manner (Chaiken, 19987; Epstein, 1990). This is in line with scholars such as Epstein (1990), who argued that central and peripheral processing are not clearly distinguishable from each other and can take place simultaneously. This suggests that the assumption that cue information can work solely as a peripheral cue needs to be revisited.

With regard to decision-making, in the present work, involvement did not determine decision latencies, decision certainty or satisfaction. On the one hand, this finding can be regarded as a hint that involvement did not differentiate between the use of heuristics, since we assume that heuristics bring about a reduced effort and therefore reduce task latencies. On the other hand, the findings might suggest that the operation of the expertise heuristic is linked to an evaluation process. The same was found in a study investigating the recognition heuristic (Thoma & Williams, 2013) and the take the best heuristic (Bröder, 2000) and was used to explain the inclusion of additional cue information (Gigerenzer & Goldstein, 2011).

From a methodological perspective, it can be argued that involvement was not strongly fostered in the current studies, in which recipients merely looked passively at the posts. This may have limited their motivation to engage in effortful thinking, because there were no related consequences or benefits associated with the reception situation. Differences in levels of information processing might be enhanced if participants are primed with specific goals, leading to differing levels of involvement. This assumption is supported by Winter et al. (2016), who found an enhanced consideration of social recommendation cues when participants were primed with a specific motivation (impression management motivation) compared to defense and accuracy motivation. Therefore, priming participants' task involvement could provide stronger results in future studies on the relation between involvement and cue reliance for credibility assessments in social media communication (Lucassen & Schraagen, 2013).

Besides users' involvement, need for cognition is commonly seen as an indicator of whether recipients will engage in effortful deliberation (Fogg, 2003; Petty & Cacioppo, 1986). In contrast to theoretical foundations and previous research (Cacioppo et al., 1983; Luttrell et al., 2017), in Study 1, need for cognition did not impact the use of cues for credibility ratings of social media posts. Contrary to expectation (Petty et al., 2009), higher

levels of need for cognition did not prevent participants from relying on cues for credibility ratings. By contrast, in Study 3, need for cognition did influence participants' credibility perceptions, with a higher need for cognition being associated with higher credibility evaluations. It can be argued that this difference is attributable to the different tasks employed: In Study 3, only formal cue values were given, which probably increased participants' willingness to engage in sense-making. This might have involved higher elaboration on the cues and their meaning for credibility, in particular because no further information such as the message was provided. Study 1 referred to the reception of Facebook postings, to which people are more accustomed. Moreover, Study 1 provided messages with arguments, meaning that the need for cognition should have strengthened the use of the argumentative content of the messages. However, it can be argued that the reception situation was less involving because participants did not choose the posts themselves and there were no consequences after reception. Accordingly, even persons with a higher need for cognition (regarded as a stable trait) were less motivated to elaborate on the political messages (as a situational impairment).

Furthermore, in Study 3, higher need for cognition did lead to higher decision satisfaction after the two-choice task. This might be attributable to a likely higher degree of self-efficacy in individuals with a high need for cognition: They know what they know and what they are capable of. Due to more experiences in elaborating on incoming information, they trust their decisions more based on the effort and resources they have invested. Another finding concerning recipients' characteristics refers to the agreement with the message. This did not interact with the cues accompanying social media posts but provided supporting evidence for mechanisms like the confirmation effect (Nickerson, 1998) and cognitive dissonance theory (Festinger, 1962). The more people agree with a post's message, the more credible they evaluate the message to be (Study 1). The confirmation bias describes individuals' tendency to select, read and solely believe the information they are already convinced of in order to avoid feelings of stress through conflicting information which would require verification processes, potentially attitude changes and a lot of cognitive effort. When they are in a passive and leisure-oriented mindset without fulfilling a specific task, people are more vulnerable to confirmation biases (Moravec et al., 2018). The results of this work deliver supporting evidence for this effect. Furthermore, this corresponds with previous

studies examining attitude consistency as a main reason for the selection (Knobloch-Westerwick & Meng, 2009; Messing & Westwood, 2014; Winter et al., 2016) and evaluation of information as valuable (Westerwick et al., 2013).

However, if content which is in line with one's prior beliefs is easily accepted and believed, the impact of this on news consumption and public as well as societal communication is extensive and has to be taken seriously. This underlines the importance of prior attitudes for valid credibility judgments, because a correction or adaptation of information seems to be hampered by the strong belief in one's own attitudes. Even more crucially, the same effect of message agreement was found for ratings of source credibility, in that if a message fitted with one's own attitudes, the source was perceived as credible. Apparently, one single message received from a random source (in Study 1 an unknown politician) is able to guide evaluations of the source. While all users in social media environments are easily exposed to unknown messages from other random users (due to the high connectivity of profiles), the vulnerability to misinformation and the formation of filter bubbles is increased if users begin to follow those sources which publish content that is congruent with their beliefs. Although the link between message and the interaction with message agreement source carries some risk concerning news consumption on social media, it needs to be determined whether this effect is of long-term duration and whether the source will be stored as generally credible in recipients' minds.

In sum, considering the findings of the studies of this work, the impact of source expertise as the most relevant cue seems to function independently of recipients' characteristics, highlighting the important and overarching role of source cues for credibility evaluations. Apparently, the credibility-enhancing impact of cues is not universally applicable for all social media platforms or communication contexts but is applicable for a wide range of recipients.

9 Theoretical implications

In line with the process of if-then relations between cues and credibility judgments, the present work provides empirical evidence for the theoretical assumption that cues are important anchors for related credibility evaluations (Metzger & Flanagin, 2015; Sundar, 2008). In detail, the present results deliver an answer to the question of whether and how cues are hierarchically ordered and what happens in cases of cue conflicts which is an understudied issue (Metzger & Flanagin, 2013). Source expertise was conceptualized differently in the three studies but was nevertheless the most important for recipients. For the process of credibility judgments of news and political information, information about the communicator turned out to be ultimately relevant, even if it is communicated via source cues (for Facebook postings) or via meta-informational cues (for crisis-related tweets) such as sum of all tweets ever written. Two interesting aspects emerged in this respect. First, recipients seem to be able to perceive the quality of an author through features that are not directly observable. Second, expertise turned out to be quite transferable, meaning that the author can be either skilled in the field of the topic (such as being a member of a related committee, Study 1) or can have written a lot of tweets and have held a social media account for a long time (Study 2).

With regard to information processing, the present findings demonstrated that participants did not differ in their reliance on cues according to different levels of involvement, need for cognition, faith in intuition or agreement with the message. This might indicate that peripheral and central processing acted simultaneously rather than independently. Moreover, this implies that social media cues are not solely peripheral cues, in contrast to classical peripheral cues like the attractiveness of the source, for instance. According to Fiske & Taylor (2008), both modes can work simultaneously, but the peripheral mode is thought to be faster. When interaction takes place, it is assumed that processing stops when recipients are sufficiently satisfied. To date, it is not clearly known when this stage is reached. The present findings can be viewed as supporting evidence for an interaction of processing strategies, in which cues probably no longer serve as solely peripheral information, at least in social media communication. Although the concept of cognitive heuristics is often mentioned as being important for credibility judgments online (e.g.,

Hilligoss & Rieh, 2008; Metzger et al., 2010; Sundar, 2008), direct observations of cues and heuristic rules are quite sparse. According to Bellur and Sundar, heuristics are rather "inferred based on contextual factors rather than measured directly" (2014, p. 117). Empirical evidence on heuristics is scarce, due to difficulties in assessing heuristics which operate unconsciously. As proposed by Shah and Oppenheimer (2008), this work attempted to establish effort reduction measures as providing evidence for the operation of cognitive heuristics such as the expertise heuristic. This could be further applied as a standardization tool for comparable conceptualizations of heuristics in different contexts and disciplines.

For the selection of information sources, based on the findings of this work, it can be argued that source expertise triggered the expertise heuristic, which facilitated cognitive effort and led to reduced task latencies. It can be assumed that a heuristic occurred in this context, even though participants did not solely consider one cue (source expertise), contrary to the attribute substitution theory (Kahneman & Frederick, 2002). Nonetheless, this work contributed to the research on cognitive heuristics in social media communication and delivered insights (at least partly) confirming the assumption that source cues which enhance credibility perceptions are guided by a cognitive heuristic, which reduces complexity and cognitive demands for social media recipients.

Although many scholars (e.g., Metzger & Flanangin, 2015; Sundar, 2008; Wathen & Burkell, 2002) have highlighted recipients' characteristics as a discriminating factor for information processing (either peripheral or central) and impression formation, in the present work, differences in the use of cues and the triggered heuristic were not found to depend on individual differences, at least when no specific motivation or task was present or required. This could be taken as promising sign of the universality of cues.

10 Practical implications

Since the US presidential elections of 2016, often seen as the climax of a post-truth age and the rise of misinformation and fake news, there have been growing calls for more observation and control on social media in order to optimize the identification of misleading content. However, apart from the binary distinction of content as true or false, it is very difficult to define the credibility and identify the trustworthiness of information, given the

large amounts of data spread through social media channels and the subjectivity of credibility perceptions. The insights obtained from this work into the process of credibility assessments of social media communication can be used as a first step for the development of support measures for users, such as highlighting features in the realm of interface design or media education. In particular, the knowledge about the role of features and cues for credibility judgments and decision-making is useful. Educational measures are particularly called for due to the influential role of source cues, which can consist solely self-reported information due to the structural and formal factors of social media (e.g. anybody can maintain their own profile and present information in a selective way) and are nevertheless able to influence source and message credibility as well as decision-making. Education and media competence are the key to empowering users to consciously handle online communication (Fogg & Tseng, 1999). For this purpose, it is important to know which cues trigger which mechanisms and which consequences might emerge. Since omnipresent social media cues are able to activate cognitive heuristics, i.e. so-called mental shortcuts which determine credibility ratings and decisions in situations of uncertainty, and can potentially bias judgments (Tversky & Kahneman, 1974), the relevance of user empowerment to generate valid credibility ratings increases enormously.

Given that individuals are not aware of the operation of heuristics and not able to control them but are thought to be able to recognize situations in which processing was biased (Tversky & Kahneman, 1974), the integration of the knowledge on cues into support methods seems to be promising. As an example, recipients could be taught to double-check and verify source expertise information in order to avoid being blindly caught out by the expertise heuristic (experts can be trusted). There is a large body of work focusing on the development and design of automated approaches to automatically detect the accuracy of information in terms of truth values (e.g., Castillo et al., 2011; Derczynski et al., 2017; Shariff et al., 2017) in large social media data sets. One possible approach for defining the truth is to adopt the definition of Appleman and Sundar, who refer to the "veracity of the content of communication" (2016, p. 63). In fact, this means that if the included information can be proven, the message is true, and if not, it will be labeled as fake. However, it should be considered that even a concept like veracity is situated on a continuum, and a binary decision

between true or false − as it is performed by today's automated methods − is probably not (always) sufficient.

Involving the recipient's perspective would overcome the binary distinction of online information into true or false and contribute to a more realistic representation. Using the understanding of human credibility perception in social media environments gained by analyzing a range of source, message and meta-informational cues that influence whether or not a message is perceived as credible can be helpful to answer the call for "systems that match the needs of users and instill confidence in the information being provided" (Wathen & Burkell, 2002, p. 138). For instance, 'critical' cues could be marked to remind the user to deliberately think about this cue information or double-check it with additional sources. Furthermore, cues which are assumed to trigger an underlying heuristic (unconscious and potentially able to bias processing and judgments) can be highlighted (Fogg, Cueller, & Danielson, 2007; Sundar, 2008; Zubiaga & Ji, 2014).

Since source expertise cues were found to be the most important, recipients could be either warned or be informed by an info box explaining the risk of relying solely on self-reported source cues or the number of followers, for example. Source-related information could be highlighted in order to be salient, centrally perceived and probably more elaborately processed and integrated in further cognitive processes. However, given that any kind of label limits users' freedom to decide which content to select, which article to read and which information to believe, it is probably better to invest in media education and teach users about the potential pitfalls of, for instance, relying on the number of likes and shares without knowing the audience of the message or looking in detail at source information, for instance whether it is self-reported or system-generated. Removing or blocking this content from the discussion because some recipients are potentially unable to get the joke, understand the message, or double-check the information with other sources has to be viewed with caution.

Overall, it is a balancing act between supervision and freedom of speech and expression (Goodman, 2017). Most authors are quite critical of governmental control over the media, especially when also considering historical examples of misuse. Once media regulation methods are applied, they can also be extended or encroached upon within a change in government. Therefore, strengthening recipients' media competence instead of building up (governmental) control (Douglas, Ang, & Deravi, 2017) would positively support users in

identifying false information and learning about suitable fact-checking methods. Generally, the limitation of expression and publication of opinions and information brings with it a restriction of freedom of speech. In particular, marking posts as fake contradicts the idea that social media represents a platform where everyone has an opportunity to express opinions and thoughts (Isaac, 2016). In sum, the knowledge on cue relevance can be used to support users "to make an informed judgment" (Fogg et al., 2007, p. 28), while nevertheless still leaving the choice of information sources as well as credibility judgments up to the recipient.

However, the examination of different platforms and communication contexts in the present work revealed differences in the relevance of cues. It can be further argued that if-then relations work differently for different application contexts. As already stated fairly early on by Walthen and Burkell (2002), new media forms always bring new factors into the discussion of how credibility assessments work. Since the discussion about online credibility is nowadays quite specific, as it mainly focuses on particular applications like Twitter and no longer on websites as a broader class, the development of every new social media application probably requires new and further investigation, because these communication rooms are highly specific. This notion would limit the obtained results to the context of Facebook and Twitter communication.

11 Methodological implications

From a methodological point of view, this dissertation contributed to gaining new insights into the usage of automated methods for the assessment of humans' credibility ratings. Until now, most approaches using automated methods focused on fake news detection with the overarching aim of ensuring the accuracy of information (Derczynski et al., 2017; Popat et al., 2018). For that aim content is mostly binary classified in true or false which implies a simplified view on information, for instance with regard to political statements. Politicians' messages will almost always consist of a subjective point of views since they represent a kind of persuasive communication which aims to convince potential voters or supporters. Nonetheless, the use of automated approaches provides a suitable approach to deal with large data sets as they are produced in social media channels. However, considering the subjective nature of credibility perceptions, the integration of recipients'

perspective is indispensable to develop and establish sufficient measures for user support purposes. In this regard, one aim of this thesis was to explore if automated methods are suitable to detect the credibility-enhancing impact of social media cues and features as if perceived by humans.

As it was revealed in Study 2, by incorporating recipients' perceptions and applying a multidimensional credibility measurement, significant features were selected based on the ratings of the recipients. Based on the gained knowledge on the relevance of specific Twitter features, a machine learning model can be developed which further train the data to automatically predict the credibility of tweets, as it was rated by the participants of the study. However, besides a large amount of valid user ratings, this approach requires annotated data on which the classification can be based. Furthermore, to date this approach would only suit to Twitter data since insights on the features accompanying a tweet are needed and to date are only available from Twitter.

In sum by extending the common use of automated methods for binary decisions between true or false, the possibility to apply automated approaches for the investigation of human (subjective) credibility perceptions has been proven. For the future, to deal with large data sets, automatic extraction of features and resulted recommendations could be provided for social media (at least Twitter) users like it is already known from the area of fake news detection and accuracy predictions. With the findings of this dissertation first attempts into the integration of users' actual credibility assessments in automated approaches were made, as highlighted by scholars as coming along with a great potential for the development of efficient and effective user support systems (Metzger et al., 2010; Wathen & Burkell, 2002).

12 Limitations

In the following overarching limitations of this work are addressed. Most importantly while interpreting the results, it has to be considered that – despite all efforts to create a reception situation as realistic as possible – participants were exposed to mockups of social media communication. Even if in Study 2 an embedded tweet scenario was used, in none of the studies participants were able to scroll, to interact with the content or to follow links (e.g. external URLs provided in the tweets) which describes a severe violation of normal social

media usage behavior. Besides the artificial reception situation, participants' attention was directed to the postings they were asked to evaluate, a fact which could reduce the generalizability of the findings. Normally, attention-raising is a precondition of further evaluations (Fogg, 2003; Fogg & Tseng, 1999) which was not tackled in the studies.

Additionally, the lack of a specific task could be regarded as a further limitation. To employ related consequences (such as the fulfilment of a task) would probably have enhanced participants' motivation of building accurate credibility evaluations of the presented content. Another aspect which could be seen as limiting the results is owed to the fact that individuals' situational context was neither controlled (due to the nature of online experiments) nor measured. Some scholars (Kim & Dennis, 2018) state that in particular for social media research the assessment of actual mood and motivation is relevant. That is an amendment to classical assumptions of dual process models and the discriminating role of ability and motivation for the way of information processing (Chaiken, 1987; Petty & Cacioppo, 1986). Since social media communication generally was found to force peripheral processing (Lee & Shin, 2012) and to put recipients in a hedonistic mood (Moravec et al., 2018) the assessment of participants actual mood might have provided substantial insights, for instance about a missing accuracy motivation for incoming information or the level of need for information (Wathen & Burkell, 2002). Although, both, mood and motivation might explain variance for differences between individuals, this work initially concentrated on constructs which are commonly mentioned by scholars as influential factors for the examination of information processing and credibility assessments processes (e.g. involvement, need for cognition, message conformity) (Fogg, 2003; Kruglanski & Gigerenzer, 2011; Metzger & Flanangin, 2015; Sundar, 2008; Wathen & Burkell, 2002). To capture a complete picture, the assessment of further situational and personal characteristics could enlighten the findings, in particular because they are likewise related to ability and motivation as main discriminators for the way of information processing in dual processing models (Chaiken, 1987; Petty & Cacioppo, 1986).

In none of the studies recipients' actual news consumption behavior was assessed which could possibly serve as a moderating factor for the use of cues. For instance, if individuals are used to look on specific criteria and have made positive experiences with that kind of evaluation strategy could result in differences in social media usage patterns. In the same

vein, usage intensities of the specific platforms under investigation were not addressed which could have accounted for differences in the use and relevance of cues and provide further information about participants ability to sense author's expertise through non-observable features like it was found in Study 2.

Subject to certain limitation is also that the same recipients' characteristics were not consistently assessed among all three studies. Variations in the inclusion of different moderating factors result from technical reasons (Study 2) and a slightly different focus (Study 3) and result in a lack of comparability. However, apart from problems with the comparability of individuals' characteristics, the three studies provided valuable insights by applying a different focus coming along with different moderators.

13 Future research directions

Within this chapter future research directions for credibility research in the area of social media communication are acknowledged in a subsumed way. First of all, in light of the results of this dissertation indicating source expertise to be the most influential cue information for recipients, the systematic examination of source cues which transfer aspects about authors' expertise is an important issue for future research. Particularly, since it turned out that not only classical source cues were taken to sense about the communicator's competence, but individuals rather employed also meta-informational aspects such as the sum of all tweets an author ever wrote, to build an impression. A systematic investigation on all aspects potentially able to serve as information about the cue would provide further evidence to capture a comprehensive picture of the source's impact for credibility. A related question to address is if source cues are context-depending and if different source cues are suitable to different contexts. Especially for crises-related communication (assumed to be time-sensitive) people were very keen to gain an impression about the source. In addition, a more detailed investigation on how recipients receive implicit source aspects like the number of followers or tweets or if those implicit aspects are derived from explicit elements, are an interesting obstacle for further studies on the relation of source cues and credibility. Probably,

think-aloud approaches could initially serve as suitable measurements into a systematic investigation on different source expertise cues.

More research on pursuing attitude formation and change as well as behavioral intentions resulting from the reliance on cues for credibility evaluations of social media content needs to be undertaken to deeply understand implications from cue use for judgments and decision making. Several questions remain unanswered at present. For instance, what happens after the reception of a social media posting featuring an unknown politician's opinion? In case the posting was perceived as credible by recipients (based on perceived source expertise) are these judgments strong and predictive enough to impact related behavior, for instance, in the area of political communication, actual voting behavior? Since immediate activities like reading or commenting an article were found to be connected to prior credibility ratings (Kim & Dennis, 2018; Morave et al., 2018), it would be interesting to first investigate more consequences on a long-term perspective and extend observations of the connection between credibility judgments and behavior to the offline context.

Considering the claims of dual process models of information processing (Chaiken, 1987; Petty & Cacioppo, 1986) the way of processing further determines attitude formation. Attitudes built on the peripheral route due to the use of cues or heuristics are considered to be less persistent and predictive, which would mean that on a long-term perspective, credibility perceptions of social media communication based on cues as anchors for credibility are less strong predictors for related behavioral intentions. Furthermore, attitudes formed by the use of cues are easier to change, for instance due to the expose of conflicting positions. Future studies scrutinizing on long-term effects of cue reliance and credibility ratings based on heuristics can also contribute to a deeper understanding of social media communication and its specific characteristics like cues and their impact for evaluations on societal communication and omnipresent topics like the distribution of fake news and the formation of filter bubbles.

With regard to information processing, an important issue for future research is to examine how social media cue information is processed, peripherally, central or in a mixed manner? While the result of the three studies indicate participants' processing to be interconnected or peripheral with an evaluation process as proposed by Gigerenzer and Goldstein (2011), the inclusion of specific measurements can bring clarity about this issue.

Promising might be recall and recognition measures which could additionally provide insights about the role of message content and arguments (are they remembered?) or asking participants to note all thoughts they have during the reception situation. According to Lee and Shin (2014) if thoughts are more related to the communicator, processing can be assumed to be more peripheral and also centered on the source of communication, whereas more topic-related thoughts point to a central way of processing. Considering theoretical constraints stated in the ELM, it is a remaining question how long-term judgments and decision-making based on cues will remain. In line with the ELM attitude persistency is especially related to an elaborated way of processing. To investigate this question could provide a further possibility to find out if cues are working as peripheral or central information triggering the related way of information processing.

Even though the current work demonstrated first insights into the relative importance and interaction of cues for recipients' credibility perceptions, there is abundant room for further research in exploring a) further cue hierarchies in general as requested by Metzger and Flanagin (2013) and b) the influence of message and meta-informational cues (by carefully considering their blending with implicit source competence cues) if no source cues are available. Concomitant with that is the question if the relation between other social media cues like likes and shares and credibility judgments is also driven by a cognitive heuristic (e.g. the bandwagon heuristic, Sundar, 2008) and if this could be measured through a reduction of the required cognitive effort. However, the context implies further questions like: How other cues work in terms of triggering cognitive heuristics? Furthermore, although the relative importance and interaction of cues were indeed investigated, the way how related heuristics interact with each other was not part of this investigation. Therefore, the examination of what happens when cues trigger conflicting heuristics could be subject to further work on heuristics.

However, the examination of different platforms and communication contexts brought about differences in the relevance of cues. It can be further argued that if-then relations are working differently for every application context. As already quite early stated by Walthen and Burkell (2002) new media forms always bring new factors into the discussion of how credibility assessments work. Since the discussion about online credibility is nowadays quite specific as it mainly focuses on specific applications like Twitter for example and no longer

on websites as a broader class, the development of every new social media application probably needs new and further investigation because these communication rooms are highly specific. This notion would limit the obtained results to the context of Facebook and Twitter communication and require future work for the investigation of cue relevance for other social media platforms such as Instagram.

Cues and heuristics are supposed to be domain-specific which means their use has to fit to the context of the judgment or decision-making (Fogg, 2003; Kruglanski & Gigerenzer, 2011; Sundar, 2008). Bearing that in mind, it would be interesting and with the goal to establish support measures even more necessary, to transfer the current findings in other domains where valid credibility assessments are quite similar important, for instance online health information or financial information. It would be interesting and informative to investigate which cues and features are used by individuals to evaluate that kind of information and if similar patterns of cue relevance occur.

Further research should be done to investigate the usefulness of the found results on cue patterns for support methods. As already outlined the knowledge of cue use for credibility evaluation could be applied to support and educate users to make more valid credibility assessments. By highlighting cues which are demonstrated to be influential and explaining that these cues and related heuristics are often unconsciously used for quality judgments, users media literacy can be addressed with the goal of empowering users so that they are able to make self-determined and informed judgments and learn how to handle social media communication (Livingstone, 2004). User studies are highly required to examine how this support methods should be designed, for instance answering if it is sufficient to highlight potential pitfalls. For the usefulness of recommender systems, it was showed that people tend to accept recommendations for products more if they were accompanied by explanations which can possibly be beneficial for credibility support systems as well (Tintarev & Masthoff, 2012).

14 Conclusion

Due to the challenges of contemporary social media environments such as overwhelming amounts of information, which are quickly distributed by questionable sources, recipients' valid evaluation of the content of communication becomes difficult. While at the same time people increasingly tend to rely on online information for the consumption of news and political information, the relevance of reliable credibility judgments is simultaneously sharply increased. Since social media communication provides far more information (e.g., about the source or other users' activities and reactions) as the pure content of messages, the question arises on which information recipients base their evaluations.

The present thesis provides knowledge about individuals' exploitation of source, message and meta-informational cues for credibility judgments of social media communication, for instance of politicians' postings or crisis-related tweets. In detail, findings indicate that recipients mostly seek to sense the expertise of sources, both through the use of self-reported cues as well as meta-informational aspects which are not directly observable such as the number of followers or the sum of all published tweets. Although this sound like an adequate strategy, it has to be considered that these cues do not display the actual competence of a source. Furthermore, by investigating the relation between cue and judgment with regard to underlying mechanisms, it was demonstrated that this process might be guided by an unconsciously applied decision rule, namely the expertise heuristic by which every indication of source expertise will directly lead to an assessment of credibility (by applying the implicit rule 'experts' statements can be trusted'). However, future research must identify to which degree this mechanism in fact will evoke biases.

Overall, more work on the relation between social media cues and credibility judgments is highly emphasized, for instance by incorporating larger cue and feature sets and observing additional communication contexts. Only if we comprehensively learn which social media cues (and rules such as heuristic activated by them) contribute to users' credibility evaluations, we can work on technical support measures, and e.g. highlight credibility-relevant communication aspects to improve users' credibility judgments.

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