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Speaking the news

How conversational agents influence trust and issue salience

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Chapter 1

General Introduction

Imagine a world overloaded with information. In this world, you decide to trust a conversational agent (CA) as your news recommender. Jos is such a news recommender. Every morning, Jos wakes you up with the weather, the meetings you have planned for the day, and the most important news headlines of the day, but one morning you notice something strange. Jos claims that the recent elections were stolen by a massive amount of election fraud. The information is sensational and has a strong political bias. This leaves you confused and worried. Why is Jos saying the elections were stolen? Where is Jos getting this information from? When you decide to check the sources that Jos uses to tell news stories, you find out that most of them are from a well-known conspiracy theory news outlet. What is worse, some of the stories Jos is telling do not even have a source. You feel betrayed and angry. Jos is not providing you with the most reliable or diverse news items; instead, Jos is following its own agenda.

Although this is a fictional scenario, it reflects a real possibility. A similar claim was made by Alexa about the 2020 presidential elections in the United States (Zakrzewski, 2023). In this case, Alexa was acting as a news recommender. Recommender systems are information filters based on an individual's specific needs (Karimi et al., 2018). Recommenders, traditionally embedded in website interfaces, are evolving to include CAs, such as Alexa or Google Assistant. The transition to more conversational news recommenders can make the news delivery more personal and interactive (Ford & Hutchinson, 2019; Jones & Jones, 2019). As the interaction with news recommenders becomes more personal, users who fully trust a particular news recommender can face important vulnerabilities, as seen in the example of Jos.

Trust in technologies has traditionally been based on their functionality, reliability, and predictability (Botsman, 2017). However, a shift is occurring in our relationships with technologies, since technologies are becoming more relational and personal to us (Coeckelbergh, 2012). Today, we increasingly trust technologies for many tasks, including decision-making processes. By allowing technologies, such as the CA Jos, to advise and possibly decide on the best course and timing of different actions, we unload cognitive tasks on these agents. Unavoidably, delegating tasks on technology affects our relationship with them and requires a higher level of trust in their abilities to fulfill our expectations. In a media environment with multiple risks for users, it is crucial to understand users' willingness to depend on a technology for news recommendations. Particularly since users' willingness to trust a technology can reflect users' acceptance of the technology's decision-making processes and advice (Hyan Yoo & Gretzel, 2008; Liu & Wang, 2024).

As trust is an important part of the recommendation process, it is important to adhere to one definition of **trust in recommender systems**. This dissertation uses Komiak and Benbasat's (2006) definition, which refers to trust as a combination of competence, benevolence, and integrity in

providing relevant and reliable recommendations. Competence refers to the ability to meet users' needs and provide relevant and reliable information. Benevolence is the ability to do good for the user by recommending real information, and integrity means to adhere to accepted rules of conduct to recommend information without bias (Hwang & Kim, 2007; Mayer & Davis, 1999). Weidmüller et al. (2021) indicates that this definition of trust in recommender systems is acceptable in the context of CAs. This definition is for general recommender systems; however, since the core concept of providing relevant and reliable information for users is the same, it can be extrapolated to news recommenders.

Trust only comes into play when something is at stake (Bodó et al., 2023). Specifically, in the context of news, this means accepting the advice provided by the news recommender (Van Drunen et al., 2022). However, in the news context, trust in news recommenders cannot be evaluated in isolation as it is intertwined with the broader concept of media trust. In this dissertation, **media trust** refers to users' willingness to accept information that, due to the inability of resources, they are unable to verify (Strömbäck et al., 2020). Given the connection between media trust and trust in news recommenders, the trust placed in CA-based news recommenders, for example, could have implications for democracy (Resendez et al., 2023). Recommender systems can act as gatekeepers of information that users receive (Nechushtai & Lewis, 2019). By gatekeeping information, recommenders can control the information flow that reaches the public (Helberger, 2021; Seipp et al., 2023). Control over the information can shape public issue salience (i.e., the degree to which a person is concerned about an issue; Krosnick, 1990). The greater the trust users place in a recommender to deliver information, the more likely they might be to accept the recommendations (Hyan Yoo & Gretzel, 2008; Liu & Wang, 2024). Additionally, the more users trust a recommender for news delivery, the more they use the recommender system (Acharya et al., 2022; Yang, 2021). The use of a specific recommender may lead users to be more exposed to the issues that the recommender selects. Therefore, trust in the news recommender can play an important role in moderating the impact of the news selected from a recommender (e.g., CAs) on issue salience.

Most research on recommender systems has examined their use on website interfaces (Jannach, 2023). However, as more sophisticated CAs, such as OpenAI's ChatGPT, are developed and adopted, understanding the potential influence of CAs on the media becomes crucial. In this dissertation, **conversational agents** refer to systems that engage via dialogue with the user by both receiving and delivering responses in natural language (Griol et al., 2013). In the context of news, CAs are being used to distribute news directly to users, making the experience feel more personal, private, and interactive (Ford & Hutchinson, 2019; Jones & Jones, 2019). By exchanging dialogue with users, the adoption of CAs for news distribution changes the way people interact with news (Guzman, 2019). Despite the prevalence of

research on CAs in e-commerce and marketing (Alimamy & Kuhail, 2023; Foehr & Germelmann, 2020; Ischen, Araujo, van Noort, et al., 2020; Selamat & Windasari, 2021), there is a notable gap in research concerning the impact of CAs as recommender systems and particularly as news recommenders (Jones & Jones, 2019).

This gap is critical because the exchange of dialogue between CAs and users could influence trust in news recommenders differently than traditional website-based systems or social media interfaces. Therefore, it is imperative to measure the impact of CAs as news recommender systems. This dissertation aims to address this gap by posing the following research question:

How does interacting with conversational agents for news recommendations impact trust in the news recommender and subsequently issue salience of users?

Conversational Agents and Trust

To address this research question, it is important to clarify the role of CAs in influencing trust in news recommenders. CAs are dialogue systems designed to communicate with humans using natural language (Feine et al., 2019; Griol et al., 2013). Within the news context, the implementation of CAs for news is motivated by the idea of conversational journalism (Jones & Jones, 2019; Zhang et al., 2022). This innovative form of journalism employs conversational strategies and new technologies to attract and engage users typically uninterested in news (Jones & Jones, 2019).CAs can serve as tools for news organizations to engage with users, as they can help them access filtered or aggregated information (Natale & Cooke, 2021). Examples of CAs include embodied CAs (i.e., fully visual and audio agents), voice assistants (e.g., Siri and Alexa), and chatbots.

This dissertation focuses on the functional and affective experiences of user interactions with CAs and their impact on trust in news recommenders. With this approach, this dissertation integrates aspects of human–computer interaction, communication science, and journalism (Cho et al., 2019; Diakopoulos, 2019; Ha et al., 2021; Ischen, Araujo, van Noort, et al., 2020; Ischen, Araujo, Voorveld, et al., 2020). Focusing on the experiences the users have is crucial, as trust in technology is influenced by initial experiences with the technology and prior experiences with other technologies (Gefen et al., 2003; X. Li et al., 2008; McKnight et al., 2020). When examining user experiences in the context of news recommenders, it is the interface of the news recommender that influences users' assessments of the output (A. Beldad et al., 2010; Diakopoulos, 2015). Therefore, understanding how the user interface of news recommender systems shapes initial user experiences is critical to evaluating trust in these types of technologies.

From a user-centered approach, trust in CA-based news recommenders can be influenced by both the dialogue with CAs and the modality of the information (e.g., audio or text). To build trust in the news recommender, it is relevant to consider the influence of the dialogue and modality on key factors (Graca et al., 2017; Komiak & Benbasat, 2006; Mero, 2018). These factors, also referred to as antecedents of trust, are perceived enjoyment, perceived ease of use, perceived personalization, and privacy concerns. Perceived enjoyment is the value that users derive from using a technology (Hwang & Kim, 2007). Perceived ease of use is the quality of a technology that makes it easy and effortless to use (Venkatesh, 2000). Perceived personalization is the degree to which a technology adapts to the user's preferences and needs (C. Li, 2016), and privacy concerns are the risks that users perceive when sharing their personal information with a technology (Dinev & Hart, 2006). Each of these factors might be affected by the dialogue with CAs (Ischen, Araujo, van Noort, et al., 2020; Ischen, Araujo, Voorveld, et al., 2020; Lei et al., 2022; Selamat & Windasari, 2021). The insights from prior studies suggest that interacting via dialogue with a CA can shape user's trust in the news recommender by influencing antecedents of trust.

However, the modality of information through which a user interacts with the CA– for example, audio or text–can also influence trust in the news recommender. In this dissertation, **modality** refers to how the information is conveyed and how this affects the way messages are processed by individuals (Sundar et al., 2016). CAs are often available via audio modality, which presents a convenient way to interact with the user through auditive verbal dialogue (Newman, 2018; Rzepka et al., 2022). Feine et al. (2019) indicate that the use of audio can increase the perception of sociality (i.e., the idea of interacting with another social being). This perceived interaction with another social being can potentially increase perceived personalization and, therefore, trust. At the same time, interactions via audio can evoke tension for the user, as audio interactions require a microphone to continuously listen and collect data (Turow,2021). Therefore, users may perceive a risk of their data being collected when audio interactions are used, leading to privacy concerns for the user and consequently diminishing trust in the recommender system (Hoffman & Novak, 1996).

In summary, earlier research on CAs that has mainly taken place in the context of e-commerce and marketing suggests that the dialogue and modality of the system may affect users' trust in CAs (Cho et al., 2019; Ischen, Araujo, van Noort, et al., 2020; Ischen, Araujo, Voorveld, et al., 2020; Lei et al., 2022; Selamat & Windasari, 2021; Turow, 2021). However, much research is missing in the context of news, specifically in CAs as news recommenders. With prior research mainly taking place in the context of e-commerce and marketing, there is a current gap in our understanding of whether these findings can be extrapolated to the context of news recommenders. The distinction between contexts is crucial. Unlike e-commerce and marketing,

which primarily focus on business and commercial activities, news recommenders serve a democratic function by providing relevant societal and political information (Helberger, 2021).

Trust and the Organizations Behind the Conversational Agent

It is also important to acknowledge that trust in these technologies can be influenced by the organizations behind them (Foehr & Germelmann, 2020). In the context of news recommendations through CAs, there are two primary categories of organizations that can play a role in developing and maintaining the CA.

Tech companies such as Google, Amazon, and Microsoft represent one category of organizations central to the development and maintenance of CAs. CAs from tech organizations mainly aggregate information from multiple sources. In the context of news, these tech companies do not produce news themselves but rather rely on news organizations to supply news content for users (Newman, 2018; Sundar et al., 2007). However, this dynamic might lead to an overrepresentation of certain sources over others (Haim et al., 2018; Newman, 2018). Moreover, tech companies can use CAs as one more tool to monitor users' activities across their different services, gaining more knowledge about their users (Goulden, 2021; Humphry & Chesher, 2021). With the usage of CAs as another tool to increase their knowledge of users, tech companies expand their opportunities for financial profit (Turow, 2021) and societal influence (Helberger,2021; Seipp et al., 2023).

Newsrooms represent another category of organizations developing CAs to interact with the public. Since 2016, newsrooms have been experimenting with CAs to produce and distribute information (Jones & Jones, 2019), driven mainly by economic pressures and a part of the public preferring conversational news (Ford & Hutchinson, 2019). CAs can serve news organizations as a tool to reach new audiences and capitalize on future interactions (Jones & Jones, 2019). For example, CAs can offer different viewpoints on a news story (Nicolaou, 2024; Zarouali et al., 2018). These agents can act as a tool to increase the number of subscribers (Nicolaou, 2024), thereby allowing news organizations to capitalize on CAs.

However, news organizations' adoption of CAs is not without challenges. First, building, procuring, and maintaining CAs is a resource-intensive task, demanding both time and financial investment in an industry already facing funding issues (Jones & Jones, 2019; Jones et al., 2022). Second, the reliance on third-party CAs, such as voice assistants (e.g., Google Assistant), for engaging with new audiences diminishes the opportunities for news organizations to build direct relationships with their audience (Newman, 2018). Particularly, since third-party CAs do not share a lot about

the audience with news organizations (Newman, 2018). Additionally, when news organizations rely on third-party platforms, there is a winner-takes-all dynamic, where a small number of news organizations might receive more benefit than others (Newman, 2018; Nieborg & Poell, 2018).

It is also important to note that tech organizations developing CAs have gained their users' trust (Noble, 2018). Despite the questionable practices of the tech organizations behind CAs (Bodó, 2021), trust in these organizations seemingly extends to the technologies they create (Natale & Cooke, 2021). Thus, CAs developed by tech companies might be trusted due to the reputation of the organization behind the technology (Foehr & Germelmann, 2020). In contrast to tech organizations, news organizations have been experiencing a decline in trust over the past years (Newman, 2022). This disparity in trust dynamics could lead to an uneven playing field where CAs from tech companies may be more trusted due to the inherent trust in their brand. In the subsequent section, this dissertation addresses the role of regulations in aiming to level the field by imposing transparency and explainability requirements on very large online platforms.

The Relationship Between Regulations and Trust

Trust in news recommenders can also be influenced by regulations. Regulations such as the Digital Services Act (DSA), or the General Data Protection Regulation (GDPR) aim to create the conditions for emerging technologies to become trustworthy (Van Drunen et al., 2019, 2022). It is important to clarify that these measures do not automatically generate trust; rather, they aim to provide a framework that assists users in assessing trustworthiness. For instance, the GDPR grants individuals the right to be informed about how their data is being processed, including any profiling or automated decision (General Data Protection Regulation, 2016). Similarly, the DSA mandates platforms to disclose the main parameters involved in a recommendation (Digital Services Act, 2022). This requirement suggests that recommender systems should incorporate explanations of the main parameters used for the recommendations. Due to the importance of explainability in this dissertation, it is important to define it for consistency. This dissertation refers to **explainability** as the extent to which a system can justify the rationale behind its decisions or outputs (Chazette et al., 2019; Coeckelbergh, 2020). By mandating explanations, these regulatory frameworks aim to assist users in making informed decisions about the extent to which they should trust these systems.

However, explanations can influence the extent to which users trust a technology for two main reasons. First, explanations can act as a cue for users when deciding to trust a technology (Eiband et al., 2019). Second, it remains challenging to define and operationalize what constitutes an

effective explanation for users (Dobber et al., 2021), particularly since there is also a risk of information overload potentially overwhelming users (Dogruel, 2019). Thus, explanations might affect the extent to which users trust a recommender regardless of its trustworthiness (Van Drunen et al., 2019, 2022). As users might trust a recommender system despite it not being trustworthy, in the following section, this dissertation addresses the different behavioral consequences of trust in a news recommender.

Consequences of Trusting a News Recommender

Trusting a recommender system can have different behavioral consequences for users. For instance, the degree of trust in recommenders can influence the likelihood of users adopting a recommender system (Beldad & Hegner, 2018; Choung et al., 2023). In addition to the adoption of recommenders, trust in recommender systems affects the believability of their advice (Liu & Wang, 2024; Venkatachalam & Ray, 2022). Drawing from general insights on recommender systems, the greater the trust users have in a news recommender, the more likely they are to depend on it for information and to follow the recommendations given. Therefore, the more users trust news recommenders for information, the greater their willingness to utilize and accept the information recommended (Strömbäck et al., 2020).

Next to the impact of trust in the actual news recommenders, the organizations behind the news recommender systems can also have an impact on how users see these technologies. These different organizations, such as tech companies and newsrooms, can develop and maintain news recommenders, including CAs, which may be optimized according to varying objectives (Helberger, 2021). For instance, while tech companies might focus on financial gains, public service media may aim to provide relevant information to the public. Given the differences in optimization logic, the information presented to users can also vary per news recommender system (Haim et al., 2018; Newman, 2018; Weidmüller et al., 2021). The different information that reaches the public can, in turn, affect users' perceptions of the most important societal issues, influencing individual and public issue salience (Resendez et al., 2023; Seipp et al., 2023). Trust may enhance the impact of the recommender system, as users trusting a news recommender are also more likely to accept the information given (Liu & Wang, 2024; Pingree et al., 2013; Tsfati & Cohen, 2005; Venkatachalam & Ray, 2022). Despite the insights provided by existing studies (Haim et al., 2018; Newman, 2018; Weidmüller et al., 2021), a gap remains in our understanding. Specifically, in how trust in news recommenders moderate the relationship between CAs and issue salience. As CAs can exchange dialogue with the users, CAs might increase trust in the news recommender. Consequently, trust in the news recommender might increase the impact

of the information curated by CAs as news recommenders. Particularly, the impact of trust in the news recommender can moderate the influence of CAs on issue salience.

Traditionally research has focused on less dialogue-oriented interfaces, specifically in the context of recommender systems (Jannach, 2023). Therefore, it is important to compare the influence of traditional interfaces for recommender systems (e.g., social media or news websites) with more dialogic-oriented interfaces such as CAs. To bridge this gap, this dissertation established different goals. The following section describes the approach and the objectives of the dissertation.

Aims and Objectives

This dissertation aims to test and understand (1) the consequences of trust in news recommenders such as CAs and (2) the extent to which the dialogue and audio modality of CAs influence users' trust in news recommenders. To fulfill these aims, this dissertation uses three questions to evaluate how does interacting with conversational agents for news recommendations impact trust in the news recommender and subsequently issue salience of users:

1. *How do conversational agents influence issue salience?*

2. *What antecedents affect trust in a news recommender when interacting with a recommender system in a conversational agent or a news website?*

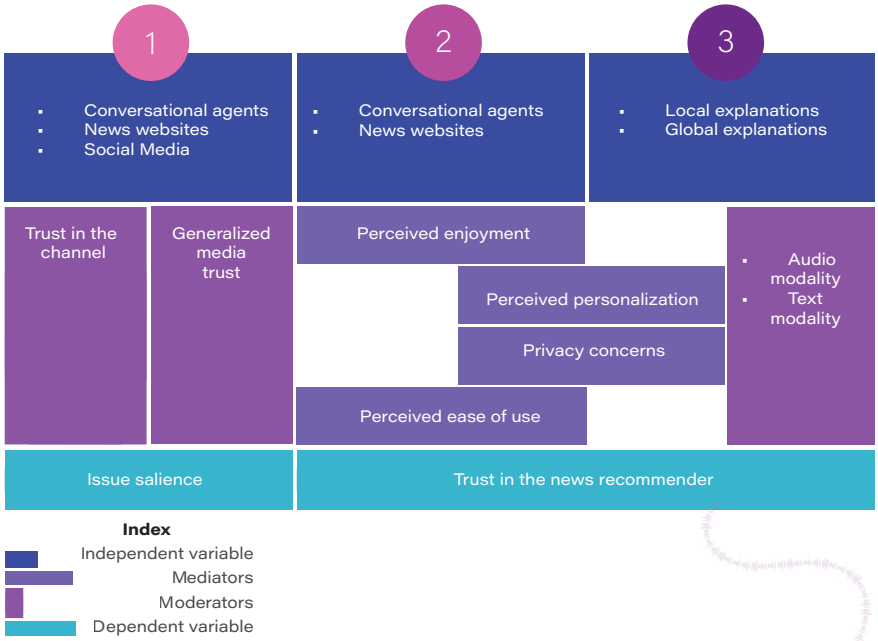
3. *To what extent does the explainability of news recommendations through text and audio influence trust, perceived personalization, and privacy concerns with regard to the news recommender?*

In the following section, this dissertation provides an overview of the chapters' structure, followed by a graphical representation of the variables per chapter.

Overview of the dissertation

This dissertation addresses the research question through a longitudinal survey and two experimental studies, with each study being the main subject of a separate chapter, namely, chapters 2, 3, and 4. The chapters have been published or submitted for publication in peer-reviewed journals. Consequently, all chapters contain an individual abstract, theoretical background, methodology, results, and conclusions for each study. Additionally, to clarify the outline of this dissertation, Figure 1.1 provides an overview of the relationship between chapters and the variables examined throughout the dissertation.

Figure 1.1.
Overview of the variables per chapter



Chapter 2: Hey Google! What is in the News?

Chapter 2 starts by investigating the societal consequences of news recommendations through CAs and how trust affects these consequences. A gap in knowledge is present in evaluating the broader societal implications of CAs. Even though studies have evaluated the information quality disseminated through CAs (Dambanemuya & Diakopoulos, 2020) and how users perceive news distribution through these agents (Ford & Hutchinson, 2019).

This dissertation departs from the idea that CAs expand the challenges within the media ecosystem, particularly concerning the quality and quantity of information that reaches the public (Dambanemuya & Diakopoulos, 2020; Weidmüller et al., 2021). CAs do so by controlling and personalizing the information flows that reach the public, affecting what the public perceives as important (i.e., public issue salience) in comparison to other channels of information. The relevance of issue salience lies in its capacity to shape public opinion, which is crucial for formulating policies that effectively address the most pressing problems (Paul & Fitzgerald, 2021). As users increasingly turn to CAs for their news and information (Weidmüller et al., 2021), these technologies can shape public opinion on various issues. Chapter 2 explores the concept of issue salience by examining the extent to which individuals agree on the importance of issues and prioritize them based on their primary news consumption channels. The measurements of issue salience at the individual level, when aggregated, address public issue salience. This approach provides an overview of the agreement on the most important issues across social media, traditional news websites, and CAs.

Additionally, when evaluating issue salience, it is crucial to understand media trust as it relates to the acceptance of the information provided (Strömbäck et al., 2020). Thus, Chapter 2 starts connecting the influence of the technology and the organization behind a technology on trust and public issue salience. The chapter focuses on two layers of media trust that influence the acceptance of information by multiple recommenders, including CAs. The first layer of media trust, generalized media trust, refers to trust in news institutions in general (Strömbäck et al., 2020). At this level, generalized media trust serves as a baseline within the social imaginary of modern societies, shaping the perceived role and significance of news media (Jakobsson & Stiernstedt, 2023). The second layer, trust in the channel, indicates the extent to which users are willing to rely on specific platforms or brands for news consumption. This chapter refers to trust in the channel as "the public's reliance on specific brands for news" (e.g., Facebook, Google, or Nederlandse Omroep Stichting; Strömbäck et al., 2020). This conceptualization is an aggregated level of trust in the news recommender. However, evaluating trust in these channels is particularly insightful to understand the impact of algorithmically curated news, as

users often consume information from sources without fully understanding its origin (Martens et al., 2018). The two conceptualizations of trust aim to disentangle how traditional media and algorithmically mediated media can have different implications for users.

In summary, Chapter 2 investigates how receiving news recommendations through CAs compared to social media and traditional news websites may affect issue salience and how trust moderates this effect. This chapter evaluates the extent to which users agree on the most important issues for the country (i.e., the Netherlands) when consuming news through a CA (Google Assistant), compared to a social media platform (Facebook) and a traditional news website (Nederlandse Omroep Stichting; NOS). To conduct the study, a seven-day longitudinal survey was used to compare the most important issues reported by users (N = 352) consuming news in different channels, including CA, social media, and news websites.

Chapter 3: The Influence of Conversational Agents on Trust in News Recommenders

Chapter 3 examines how the type of interface —either a CA or a traditional website— impacts trust in news recommenders. More specifically, this chapter focuses on how dialogue, a key affordance of CAs, influences trust in the news recommender. Understanding trust in the news recommender is crucial, as it affects how users perceive the information curated for them (Hyan Yoo & Gretzel, 2008; Liu & Wang, 2024; Thurman et al., 2019). In this chapter, the dissertation adapts the Komiak and Benbasat's 2006 definition to evaluate trust in CAs or websites as the news recommender. The adaptation involves examining the extent to which users believe that the news recommender has the competence, benevolence, and integrity to provide relevant and reliable news. Trust in the news recommender can be influenced by the interface on which it is embedded. Particularly since news recommender can be influenced by the interface on which it is embedded. Particularly since the interface via which the user interacts with the recommender system is crucial in shaping the antecedents of trust in the news recommender. For instance, CAs facilitate an exchange of information, allowing for more direct and explicit user feedback to reveal desires and preferences (Jannach, 2023). The dialogic nature of CAs can influence trust antecedents, such as perceived ease of use, perceived enjoyment, perceived personalization, and privacy concerns (Alimamy & Kuhail, 2023; Ischen, Araujo, van Noort, et al., 2020; Ischen, Araujo, Voorveld, et al., 2020; Xiu et al., 2023; Zhao et al., 2023).

In contrast, websites offer one-way interactions relying on user behavior, such as clicks, instead of an explicit indication of their preferences via dialogue (Jannach, 2023; Nguyen et al., 2022). Thus, websites might have

a more limited influence on the antecedents of trust. Despite insights from previous studies on how CAs might influence trust antecedents (Alimamy & Kuhail, 2023; Ischen, Araujo, van Noort, et al., 2020; Ischen, Araujo, Voorveld, et al., 2020; Xiu et al., 2023; Zhao et al., 2023), there is a gap in comparing the influence of CAs with other interfaces, such as websites, in the context of news. Additionally, none of the earlier studies have investigated the influence of perceived ease of use, perceived enjoyment, perceived personalization, and privacy concerns on trust in the context of news recommenders. Thus, Chapter 3 aims to fill this gap by examining how CAs and websites influence trust in news recommenders differently through the four antecedents.

In summary, Chapter 3 evaluates how the level of trust in news recommenders differs when users receive news in a dialogical manner via CAs compared to traditional news websites. To understand these differences, this chapter investigates the role of different antecedents that lead to trust in recommender systems, namely perceived ease of use, perceived enjoyment, perceived personalization, and privacy concerns. To investigate this, a between-subjects experiment was conducted, exposing participants to either a CA or a website (N = 595) recommending real-time news.

Chapter 4: News Recommenders Explained

Chapter 4 evaluates how the modality of CAs, affects trust in the news recommender. However, in this chapter, the dissertation also acknowledges that CAs operate within an ecosystem. Thus, trust in recommender systems is not only influenced by the technology but also by the regulatory frameworks in place (Aımeur et al., 2016). Regulations such as the GDPR provide users with a right to transparency regarding the way their data is being processed and if they are subject to profiling and automated decision making (General Data Protection Regulation, 2016). Similarly, the DSA requires platforms to disclose the main parameters involved in a recommendation (Digital Services Act, 2022). Therefore, recommender systems should integrate explanations in their terms and conditions to provide users with more information about how information is recommended.

In this chapter, the dissertation focuses on two taxonomies of explanations—global and local explanations—due to their complementary nature that helps users satisfy their information needs (Dodge et al., 2019). Global explanations refer to disclosures that explain how the algorithm works in general, which can vary from sharing source code and training data to mentioning the overarching features in the model. In contrast, local explanations provide details on each specific output the user is exposed to in the model. By focusing on these two explanations, this dissertation addresses a gap in the literature, aiming to enhance the current understanding of the appropriate level of detail required for explanations

intended for the public (Büchi et al., 2021). Then, this dissertation discusses the modalities of interaction with CAs; CAs use different modalities, such as text and audio.

Historically, modalities have been distinguished by their medium, such as text for print, sound for radio, and both for television. The evolution in media formats has led to technologies such as CAs integrating audio to increase convenience and mimic a human–human interaction (Newman, 2018; Turow, 2021). Audio interactions with CAs can evoke a perception of interacting with another human being, potentially affecting users' perceptions of personalization and thereby increasing trust (Alimamy & Kuhail, 2023; Cho et al., 2019). However, interactions through audio can make users more aware of the data collection processes employed by the companies behind CAs, which could potentially heighten privacy concerns and, in turn, diminish trust (Ha et al., 2021; Turow, 2021). The dual impact of audio interactions on trust—both enhancing it through perceived personalization and potentially undermining it due to privacy concerns—sets a complex backdrop for examining the role of explanations across different modalities in the context of news recommendations. With the rise of multimodal information systems, where audio interfaces are emerging (Newman, 2018), it is crucial to analyze the impact of various types of explanations based on the modality of interaction (e.g., text or audio). For this reason, this dissertation evaluates the interrelationship between two types of explanations (global and local) and the modality of the interaction (audio and text).

In summary, Chapter 4 examines how two explanation types (global and local) and two different modalities in CAs (audio and text) influence trust in the news recommender. Specifically, it evaluates the extent to which the modality and explanations influence antecedents of trust, such as perceived personalization and privacy concerns, in the news recommender. To investigate the impact of explainability and modality on user trust, a 2x2 between-factors experiment was conducted (N = 599).

Chapter 5: Conclusion

The final chapter, Chapter 5, presents the conclusions drawn from the findings of the previous chapters. The discussion focuses on the theoretical, methodological, and practical implications of the dissertation, acknowledging its limitations. Additionally, it outlines potential directions for future research in this field.

Overall, this dissertation contributes to the understanding of trust in news recommendation systems by evaluating various antecedents (dialogue and modality) that affect users' trust in these technologies and its consequences (public issue salience).

References

Acharya, N., Sassenberg, A.M., & Soar, J. (2022). Consumers' behavioural intentions to reuse recommender systems: Assessing the effects of trust propensity, trusting beliefs and perceived usefulness. *Journal of Theoretical and Applied Electronic Commerce Research, 18*(1), 55–78.

Aımeur, E., Lawani, O., & Dalkir, K. (2016). When changing the look of privacy policies affects user trust: An experimental study. *Computers in Human Behavior, 58*, 368–379.

Alimamy, S., & Kuhail, M. A. (2023). I will be with you Alexa! The impact of intelligent virtual assistant's authenticity and personalization on user reusage intentions. *Computers in Human Behavior, 143*, 107711. https://doi.org/10.1016/j.chb.2023.107711

Beldad, A., De Jong, M., & Steehouder, M. (2010). How shall I trust the faceless and the intangible? A literature review on the antecedents of online trust. *Computers in Human Behavior, 26*(5), 857–869.

Beldad, A. D., & Hegner, S. M. (2018). Expanding the technology acceptance model with the inclusion of trust, social influence, and health valuation to determine the predictors of German users' willingness to continue using a fitness app: A structural equation modeling approach. *International Journal of Human–Computer Interaction, 34*(9), 882–893.

Bodó, B. (2021). Mediated trust: A theoretical framework to address the trustworthiness of technological trust mediators. *New Media & Society, 23*(9), 2668–2690.

Bodó, B., Bene, M., & Boda, Z. (2023). Standing naked in the storm–European citizens' trust in social media, users, information. *Amsterdam Law School Research Paper Forthcoming*.

Botsman, R. (2017). *Who can you trust?: How technology brought us together–and why it could drive us apart*. Penguin UK.

Büchi, M., Fosch Villaronga, E., Lutz, C., Tamò Larrieux, A., & Velidi, S. (2021). Making sense of algorithmic profiling: User perceptions on Facebook. *Information, Communication & Society*. https://doi.org/10.1080/1369118X.2021.1989011

Chazette, L., Karras, O., & Schneider, K. (2019). Do end-users want explanations? Analyzing the role of explainability as an emerging aspect

of non-functional requirements. *2019 IEEE 27th International Requirements Engineering Conference (RE)*, 223–233. https://doi.org/10.1109/RE.2019.00032

Cho, E., Molina, M. D., & Wang, J. (2019). The effects of modality, device, and task differences on perceived human likeness of voice-activated virtual assistants. *Cyberpsychology, Behavior, and Social Networking, 22*(8), 515–520. https://doi.org/10.1089/cyber.2018.0571

Choung, H., David, P., & Ross, A. (2023). Trust in AI and its role in the acceptance of AI technologies. *International Journal of Human–Computer Interaction, 39(*9), 1727–1739.

Coeckelbergh, M. (2012). Can we trust robots? *Ethics and Information Technology, 14*, 53–60.

Coeckelbergh, M. (2020). Artificial intelligence, responsibility attribution, and a relational justification of explainability. *Science and Engineering Ethics, 26*(4), 2051–2068. https://doi.org/10.1007/s11948-019-00146-8

Dambanemuya, H. K., & Diakopoulos, N. (2020). Alexa, what is going on with the impeachment? Evaluating smart speakers for news quality. In *Proc. Computation+ Journalism Symposium*.

Diakopoulos, N. (2015). Algorithmic accountability: Journalistic investigation of computational power structures. *Digital Journalism, 3*(3), 398–415.

Diakopoulos, N. (2019). *Automating the news: How algorithms are rewriting the media*. Harvard University Press.

Dinev, T., & Hart, P. (2006). An extended privacy calculus model for e-commerce transactions. *Information Systems Research, 17*(1), 61–80. https://doi.org/10.1287/isre.1060.0080

Dobber, T., Kruikemeier, S., Goodman, E. P., Helberger, N., & Minihold, S. (2021). Effectiveness of online political ad disclosure labels: Empirical findings. *Institute for Information Law, University of Amsterdam*.

Dodge, J., Liao, Q. V., Zhang, Y., Bellamy, R. K. E., & Dugan, C. (2019). Explaining models: An empirical study of how explanations impact fairness judgment. In *Proceedings of the 24th international conference on intelligent user interfaces*, 275–285. https://doi.org/10.1145/3301275.3302310

Dogruel, L. (2019). Too much information!? Examining the impact of different levels of transparency on consumers' evaluations of targeted advertising.

Communication Research Reports, 36(5), 383–392.

Eiband, M., Buschek, D., Kremer, A., & Hussmann, H. (2019). The impact of placebic explanations on trust in intelligent systems. In *Extended abstracts of the 2019 CHI conference on human factors in computing systems*, 1–6. https://doi.org/10.1145/3290607.3312787

European Parliament and the Council of the European Union. (2016). *Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation - GDPR)*. *Official Journal of the European Union, L 119*, 1–88. Retrieved August 2, 2023, from https://gdpr-info.eu/

European Parliament and the Council of the European Union. (2022). *Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a single market for digital services and amending Directive 2000/31/EC (Digital Services Act)*. Retrieved August 9, 2023, from http://data.europa.eu/eli/reg/2022/2065/oj/eng

Feine, J., Gnewuch, U., Morana, S., & Maedche, A. (2019). A taxonomy of social cues for conversational agents. *International Journal of Human-Computer Studies, 132*, 138–161.

Foehr, J., & Germelmann, C. C. (2020). Alexa, can I trust you? Exploring consumer paths to trust in smart voice-interaction technologies. *Journal of the Association for Consumer Research, 5*(2), 181–205. https://doi.org/10.1086/707731

Ford, H., & Hutchinson, J. (2019). Newsbots that mediate journalist and audience relationships. *Digital Journalism, 7*(8), 1013–1031. https://doi.org/10.1080/21670811.2019.1626752

Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. *MIS Quarterly, 27*(1), 51–90. https://doi.org/10.2307/30036519

Goulden, M. (2021). 'Delete the family': Platform families and the colonisation of the smart home. *Information, Communication & Society, 24*(7), 903–920.

Graca, S. S., Doney, P. M., & Barry, J. M. (2017). An institutional view of the communication flows between relation-based and rule-based countries. *International Journal of Emerging Markets, 12*(1), 79–92.

Griol, D., Carbó, J., & Molina, J. M. (2013). An automatic dialog simulation technique to develop and evaluate interactive conversational agents. Applied Artificial Intelligence, 27(9), 759–780.

Guzman, A. L. (2019). Voices in and of the machine: Source orientation toward mobile virtual assistants. *Computers in Human Behavior, 90*, 343–350. https://doi.org/10.1016/j.chb.2018.08.009

Ha, Q. A., Chen, J. V., Uy, H. U., Capistrano, E. P., & Nam, V. H. C. M. (2021). Exploring the privacy concerns in using intelligent virtual assistants under perspectives of information sensitivity and anthropomorphism. *International Journal of Human-Computer Interaction, 37*(6), 512–527. https://doi.org/10.1080/10447318.2020.1834728

Haim, M., Graefe, A., & Brosius, H. B. (2018). Burst of the filter bubble? Effects of personalization on the diversity of Google News. *Digital Journalism, 6*(3), 330–343.

Helberger, N. (2021). On the democratic role of news recommenders. In *Algorithms, automation, and news* (pp. 14–33). Routledge.

Hoffman, D. L., & Novak, T. P. (1996). Marketing in hypermedia computer-mediated environments: Conceptual foundations. *Journal of Marketing, 60*(3), 50–68.

Humphry, J., & Chesher, C. (2021). Preparing for smart voice assistants: Cultural histories and media innovations. *New Media & Society, 23*(7), 1971–1988. https://doi.org/10.1177/1461444820923679

Hwang, Y., & Kim, D. J. (2007). Customer self-service systems: The effects of perceived web quality with service contents on enjoyment, anxiety, and e-trust. *Decision Support Systems, 43*(3), 746–760. https://doi.org/10.1016/j.dss.2006.12.008

Hyan Yoo, K., & Gretzel, U. (2008). The influence of perceived credibility on preferences for recommender systems as sources of advice. *Information Technology & Tourism, 10*(2), 133–146.

Ischen, C., Araujo, T., van Noort, G., Voorveld, H., & Smit, E. (2020). "I am here to assist you today": The role of entity, interactivity and experiential perceptions in chatbot persuasion. *Journal of Broadcasting & Electronic Media, 64*(4), 615–639.

Ischen, C., Araujo, T., Voorveld, H., van Noort, G., & Smit, E. (2020). Privacy concerns in chatbot interactions. In *Chatbot Research and Design:*

Third International Workshop, CONVERSATIONS 2019, Amsterdam, The Netherlands, November 19–20, 2019, Revised Selected Papers 3 (pp. 34–48). Springer International Publishing.

Jakobsson, P., & Stiernstedt, F. (2023). Trust and the media: Arguments for the (irr)elevance of a concept. *Journalism Studies, 24*(4), 479–495. https://doi.org/10.1080/1461670X.2023.2169191

Jannach, D. (2023). Evaluating conversational recommender systems. *Artificial Intelligence Review, 56*(3), 2365–2400. https://doi.org/10.1007/s10462-022-10229-x

Jones, B., & Jones, R. (2019). Public service chatbots: Automating conversation with BBC News. *Digital Journalism, 7*(8), 1032–1053. https://doi.org/10.1080/21670811.2019.1609371

Jones, B., Jones, R., & Luger, E. (2022). AI 'everywhere and nowhere': Addressing the AI intelligibility problem in public service journalism. *Digital Journalism, 10*(10), 1731–1755.

Karimi, M., Jannach, D., & Jugovac, M. (2018). News recommender systems – survey and roads ahead. *Information Processing & Management, 54*(6), 1203–1227. https://doi.org/10.1016/j.ipm.2018.04.008

Komiak, S. Y. X., & Benbasat, I. (2006). The effects of personalization and familiarity on trust and adoption of recommendation agents. *MIS Quarterly, 30*(4), 941–960. https://doi.org/10.2307/25148760

Krosnick, J. A. (1990). Government policy and citizen passion: A study of issue publics in contemporary America. *Political Behavior, 12*(1), 59–92. https://doi.org/10.1007/BF00992332

Lei, S. S. I., Chan, I. C. C., Tang, J., & Ye, S. (2022). Will tourists take mobile travel advice? Examining the personalization-privacy paradox. *Journal of Hospitality and Tourism Management, 50*, 288–297.

Li, C. (2016). When does web-based personalization really work? The distinction between actual personalization and perceived personalization. *Computers in Human Behavior, 54*, 25–33. https://doi.org/10.1016/j.chb.2015.07.049

Li, X., Hess, T. J., & Valacich, J. S. (2008). Why do we trust new technology? A study of initial trust formation with organizational information systems. *The Journal of Strategic Information Systems, 17*(1), 39–71.

Liu, W., & Wang, Y. (2024). Evaluating trust in recommender systems: A user study on the impacts of explanations, agency attribution, and product types. *International Journal of Human–Computer Interaction*, 1–13.

Martens, B., Aguiar, L., Gómez, E., & Mueller Langer, F. (2018). The digital transformation of news media and the rise of disinformation and fake news. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3164170

Mayer, R. C., & Davis, J. H. (1999). The effect of the performance appraisal system on trust for management: A field quasi-experiment. *Journal of Applied Psychology, 84*(1), 123.

McKnight, D. H., Liu, P., & Pentland, B. T. (2020). Trust change in information technology products. *Journal of Management Information Systems, 37*(4), 1015–1046.

Mero, J. (2018). The effects of two-way communication and chat service usage on consumer attitudes in the e-commerce retailing sector. *Electronic Markets, 28*, 205–217.

Natale, S., & Cooke, H. (2021). Browsing with Alexa: Interrogating the impact of voice assistants as web interfaces. *Media, Culture & Society*, *43*(6), 1000–1016.

Nechushtai, E., & Lewis, S. C. (2019). What kind of news gatekeepers do we want machines to be? Filter bubbles, fragmentation, and the normative dimensions of algorithmic recommendations. *Computers in Human Behavior, 90*, 298–307.

Newman, N. (2018). The future of voice and the implications for news. *Reuters Institute for the Study of Journalism*. https://reutersinstitute.politics.ox.ac.uk/our-research/future-voice-and-implications-news

Newman, N. (2022). Journalism, media, and technology trends and predictions 2022. *Reuters Institute for the Study of Journalism*.

Nguyen, Q. N., Sidorova, A., & Torres, R. (2022). User interactions with chatbot interfaces vs. menu-based interfaces: An empirical study. *Computers in Human Behavior, 128*, 107093.

Nicolaou, A. (2024, February). Microsoft in deal with Semafor to create news stories with aid of AI chatbot. *Financial Times*. Retrieved February 16, 2024, from https://www.ft.com/content/b521a662-a272-49a1-b76e-3deea4754b76

Nieborg, D. B., & Poell, T. (2018). The platformization of cultural production: Theorizing the contingent cultural commodity. *New Media & Society, 20*(11), 4275–4292. https://doi.org/10.1177/1461444818769694

Noble, S. (2018). *Algorithms of oppression: How search engines reinforce racism*. New York University Press. Retrieved January 29, 2024, from https://nyupress.org/9781479837243/algorithms-of-oppression

Paul, H. L., & Fitzgerald, J. (2021). The dynamics of issue salience: Immigration and public opinion. *Polity, 53* (3), 370–393.Pingree, R.

J., Quenette, A. M., Tchernev, J. M., & Dickinson, T. (2013). Effects of media criticism on gatekeeping trust and implications for agenda setting. *Journal of Communication, 63*(2), 351–372.

Resendez, V., Araujo, T., Helberger, N., & de Vreese, C. (2023). Hey google, what is in the news? the influence of conversational agents on issue salience. *Digital Journalism,* 1–23.

Rzepka, C., Berger, B., & Hess, T. (2022). Voice assistant vs. chatbot–examining the fit between conversational agents' interaction modalities and information search tasks. *Information Systems Frontiers, 24*(3), 839–856.

Schweighofer, S., Garcia, D., & Schweitzer, F. (2020). An agent-based model of multi-dimensional opinion dynamics and opinion alignment. *Chaos: An Interdisciplinary Journal of Nonlinear Science, 30* (9).

Seipp, T. J., Helberger, N., de Vreese, C., & Ausloos, J. (2023). Dealing with opinion power in the platform world: Why we really have to rethink media concentration law. *Digital Journalism, 11*(8), 1542–1567.
Selamat, M. A., & Windasari, N. A. (2021). Chatbot for Smes: Integrating customer and business owner perspectives. *Technology in Society, 66*, 101685.

Shin, D. (2021). The effects of explainability and causability on perception, trust, and acceptance: Implications for explainable AI. *International Journal of Human-Computer Studies, 146*, 102551.

Strömbäck, J., Tsfati, Y., Boomgaarden, H., Damstra, A., Lindgren, E., Vliegenthart, R., & Lindholm, T. (2020). News media trust and its impact on media use: Toward a framework for future research. *Annals of the International Communication Association, 44*(2), 139–156.

Sundar, S. S., Bellur, S., Oh, J., Jia, H., & Kim, H. S. (2016). Theoretical importance of contingency in human-computer interaction: Effects of

message interactivity on user engagement. *Communication Research, 43*(5), 595–625.

Sundar, S. S., Knobloch Westerwick, S., & Hastall, M. R. (2007). News cues: Information scent and cognitive heuristics. J*ournal of the American society for information science and technology, 58*(3), 366–378.

Thurman, N., Moeller, J., Helberger, N., & Trilling, D. (2019). My friends, editors, algorithms, and i: Examining audience attitudes to news selection. *Digital journalism, 7*(4), 447–469.

Tsfati, Y., & Cohen, J. (2005). Democratic consequences of hostile media perceptions: The case of gaza settlers. *Harvard International Journal of Press/Politics, 10*(4), 28–51.

Turow, J. (2021). *The voice catchers: How marketers listen in to exploit your feelings, your privacy, and your wallet*. Yale University Press.

Van Drunen, M., Helberger, N., & Bastian, M. (2019). Know your algorithm: What media organizations need to explain to their users about news personalization. *International Data Privacy Law, 9* (4), 220–235.

Van Drunen, M., Zarouali, B., & Helberger, N. (2022) Recommenders you can rely on: A legal and empirical perspective on the transparency and control individuals require to trust news personalisation. *J. Intell. Prop. Info. Tech. & Elec. Com. L., 13*, 302.

Venkatachalam, P., & Ray, S. (2022). How do context-aware artificial intelligence algorithms used in fitness recommender systems? A literature review and research agenda. *International Journal of Information Management Data Insights, 2*(2), 100139.

Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information systems research, 11*(4), 342–365.

Weidmüller, L., Etzrodt, K., Löcherbach, F., Möller, J., & Engesser, S. (2021). Ich höre was, was du nicht hörst (Tech. Rep.).

Xiu, L., Chen, Y., Yu, G., & Yang, Y. (2023). The impact of conversational interaction on users' cognitive absorption in mobile news reading context: Evidence from eeg. *Behaviour & Information Technology*, 1–14.

Yang, X. (2021). Determinants of consumers' continuance intention to use

social recommender systems: A self-regulation perspective. *Technology in Society, 64*, 101464.

Zakrzewski, C. (2023). Amazon's Alexa has been claiming the 2020 election was stolen [Tech Policy]. Retrieved December 26, 2023, from https://www.washingtonpost.com/technology/2023/10/07/amazon-alexa-news-2020-election-misinformation/

Zarouali, B., Van den Broeck, E., Walrave, M., & Poels, K. (2018). Predicting consumer responses to a chatbot on facebook. *Cyberpsychology, Behavior, and Social Networking, 21*(8), 491–497.

Zhang, X., Zhu, R., Chen, L., Zhang, Z., & Chen, M. (2022). News from messenger? A cross-national comparative study of news media's audience engagement strategies via Facebook messenger chatbots. *Digital Journalism*, 1–20.

Zhao, X., Chen, L., Jin, Y., & Zhang, X. (2023). Comparing button-based chatbots with webpages for presenting fact-checking results: A case study of health information. *Information Processing & Management, 60*(2), 103203.