

## **DISSERTATION / DOCTORAL THESIS**

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# "Incidental exposure in the online world: antecedents, mechanisms, and consequences"

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#### 1 Introduction

"Ehm, I think, we need a strong presence there. I definitively support our troops. So, if they are in Wakanda, I think they should... they have a reason to be there" (a pedestrian on Jimmy Kimmel Live, 2018).

This quote is the response of an unlucky pedestrian to the question whether it was "time to bring the U.S. troops home from Wakanda". The pedestrian was most likely unaware of two crucial things at the time of the interview. First, the interviewer was an employee of a nation-wide latenight TV show in the US whose main goal was to trick people into looking like fools during the interview. And, second, the interviewee probably did not know that Wakanda is a fictional country which its creators, two comic book authors, imagined to be located somewhere in East Africa. Readers who have watched the Oscar-winning Marvel Studios movie "Black Panther" may also recognize it as the setting of the movie. But, of course, the U.S. did not have any troops or foreign affairs interests in Wakanda. The TV show's studio audience - and I assume also some of the viewers at home – laughed at the grotesque answer the gullible victim gave to the question. Some of them may have even been slightly bewildered by the lack of awareness their fellow citizen showed - wondering why the interviewee was seemingly not able to rule out that the own government sent troops into a foreign country they have never heard of. However, to be fair, I also doubt that all members of the audience would have been brave enough to admit that they had absolutely no clue (and opinion) about a – at first sight – harmless question regarding current events. For such entertainment programs, the interviewers may even actively aim at this mix of self-pride of "knowing the news" and confident ignorance to produce such answers. The video clip from which the quote comes is part of a re-occurring segment called "Lie Witness News". As a TIME journalist put it, for this part of the show, interviewers aim to get "unsuspecting passerby to reveal that they may not be as informed on a variety of topics as they think" (McCluskey, 2018). While this quote as well as the other "Lie Witness News" clips should be considered as entertaining examples for the slight ignorance individuals may have toward the current events in the news, they also serve as a great introduction to this dissertation's topic.

Some of the scholars interested in political communication, citizens' knowledge and engagement, political processes, or – more general – democratic life may have felt quite similar to the audiences watching the interviewee's foolish answer. In fact, over the history of these research areas, scholars periodically report that citizens do not know a lot about politics – sometimes not even very basic facts (see e.g., Converse, 2006; Delli Carpini & Keeter, 1996; Friedman, 1998;

Lupia, 2016). It is also frequently observed that some parts of the population are not – and were never – particularly inclined to follow the political discourse actively (e.g., Baum, 2006; Downs, 1957; Prior, 2007). The bewilderment regarding the public's lack of knowledge may lie in the misconception that some scholars may "confound 'important to me' and 'valuable for'" (Lupia, 2016, p. 287) a regular citizen. Some scholars seem to be surprised by these revelations, others react condescending to the public's so-perceived ignorance. But, I believe, the majority of scholars is well aware of this circumstance. Nonetheless, it is necessary to dispense with the fiction that politics plays a major role in citizens' daily life. Following all the most recent developments in the political sphere in today's 24/7 news cycle is just not among the most pressing tasks individuals pursue in their day-to-day lives.

Knowing that there is little awareness of the political discourse and also quite limited motivation to follow the political discourse actively, political communication scholars pursue the question how today's democracies can still function as they do (even though, it is also debated whether they function as intended, but this is a different discussion). A massive bulk of literature, at least partially influenced by cognitive psychology, suggests that individuals can make political decisions even with little knowledge (e.g., Lau & Redlawsk, 1997, 2001; Lupia, 1994; Sniderman et al., 1999). In short, citizens often do not have to know a lot of details about a political issue to form an opinion or decision which is reasonably in line with their underlying attitudes or values. For example, party labels or endorsements may act as shortcuts, allowing individuals to impute whether a candidate has a similar standpoint as their own without studying the candidate's stances and programs in detail.

All these low-information techniques act upon the assumption that individuals receive at least some information about the current political events (e.g., Popkin, 1994). However, research suggests that quite substantial parts of the public refrain from following the political discourse actively (e.g., Aalberg et al., 2013; Toff & Kalogeropoulos, 2020). This might seem particularly concerning in an era where individuals do not frequently tune into linear television or read traditional newspapers that are curated by journalists putting emphasis on informing the public about politics. Scholars have argued that individuals may still encounter political information unintentionally (e.g., Tewksbury et al., 2001; Valeriani & Vaccari, 2016). Survey research suggests that, today, individuals get news online via social media platforms while they are online for other reasons than getting the news (e.g., Pew, 2016, 2021). A phenomenon that has been referred to with the term incidental exposure. For example, individuals may visit social media platforms to see

updates about their favourite pastimes or to stay up to date with the activities of friends and family. But then, suddenly, they may stumble upon political information. Such information may encompass political news articles, an invitation to a political rally by a friend, political advertising, or the posts of a political actor that has been spilled in their newsfeed due to contacts interacting with it. In short – as I will state it later in this dissertation –, individuals might be exposed "to political information that individuals did not intend to be exposed to" (Nanz & Matthes, 2022a, p. 347). It has been argued that incidental exposure can affect political outcomes. Individuals' awareness of the current discourse may increase. Due to such incidental exposure, they may also learn about political topics or actors. Even small chunks of information (e.g., knowing a politician's party affiliation) could help them in their decision making, given that such information can act as a cue for a heuristic. Furthermore, incidental exposure could also act as a driver of political engagement in the public discourse. It may also introduce them to opportunities to participate (e.g., online petitions, rallies). In sum, in a society that follows the political discourse only to a limited manner, incidental exposure may cater political information to citizens. This dissertation studies exactly this fundamental path in today's societies of getting political information and the consequences of such exposure for democratic outcomes. In other words, the five studies in this dissertation investigate how and why citizens can learn about and get involved in the political discourse via incidental exposure to political information in the online world.

#### 1.1 Research gaps

Since the phenomenon of incidental exposure was first discussed in academic literature (for an early mention, see Downs, 1957), a lot of research has been dedicated to this area of research. Particularly, the rise of the internet re-ignited the interest in incidental exposure. Nonetheless, scholars have identified substantial gaps and conceptual issues in the current literature. The following five are addressed in this dissertation.

**Competing findings**. The literature on the effects of incidental exposure is characterized by mixed – and sometimes even contradictory – findings (e.g., Kaiser et al., 2021; Kligler-Vilenchik et al., 2020; Matthes et al., 2020). For example, in the strand of research on incidental exposure's effect on political participation, some researchers find positive effects (Valeriani & Vaccari, 2016) while others doubt the robustness of these findings by applying longitudinal designs (Heiss & Matthes, 2019). Furthermore, researchers come to opposing conclusions about the implications incidental exposure has on different parts of the electorate. For example, Kim et al. (2013) conclude that incidental exposure could widen the gap in political participation between

individuals that attend to the news and those that prefer other content than news, while Valeriani and Vaccari (2016) come to the opposite conclusion, noting that participation gaps are likely to be reduced due to incidental exposure. A similar pattern of contradicting findings also emerges for other variables that are heavily studied in combination with incidental exposure, such as political knowledge. While some studies find a positive relationship between incidental exposure and political knowledge (e.g., Bode, 2016; Morris & Morris, 2017; Tewksbury et al., 2001; Weeks et al., 2021), other find null effects or even a negative relationship (e.g., Feezell & Ortiz, 2021; S. Lee, Nanz, et al., 2022; Oeldorf-Hirsch, 2018). Additionally, some studies suggest a mediated relationship (e.g., Marcinkowski & Došenović, 2021). Similar to the findings on participation, the research on knowledge is divided on whether incidental exposure can help to close existing knowledge gaps (Morris & Morris, 2017; Weeks et al., 2021) or is likely to widen gaps (Kümpel, 2020). In sum, the current literature displays a mixed picture. Prior to this dissertation, there were no systematic reviews of research on incidental exposure that could lift the fog of competing findings. Furthermore, little empirical research has been conducted to investigate the reasons for the competing findings. However, multiple authors pointed out that the competing findings in the field could be the result of insufficient theorizing and a lack of a clear conceptualization (e.g., Kaiser et al., 2021; Matthes et al., 2020; Vraga et al., 2019; Wieland & Kleinen-von Königslöw, 2020).

**Ill-defined conceptualization.** The conceptualizations used in earlier studies on incidental exposure have received criticism (e.g., Bode et al., 2017; Kaiser et al., 2021; Matthes et al., 2020; Thorson, 2020; Wieland & Kleinen-von Königslöw, 2020). Previous studies often offered a variety of examples of situations that are considered incidental exposure. For instance, the seminal paper by Tewksbury et al. (2001) speaks of situations where the news users' "interest is aroused long enough for them to register a headline and perhaps click and read the accompanying story" (p. 536). But they also mention situations in which "headlines may flash into consciousness whether the reader is interested or not" (p. 535). The notion that situations in which individuals briefly glimpse at incidentally encountered information as well as the occasional instances in which individuals may deeply engage with incidentally encountered content is prevalent in most previous research on incidental exposure (e.g., Fletcher & Nielsen, 2018; Kim et al., 2013; for a review, see Matthes et al., 2020). This "lack of differentiation" (Kaiser et al., 2021, p. 79) between inherently different information encounters has drawn criticism. Given that one may expect distinct effects from these

very different types of situations that are all labelled as incidental exposure, it is crucial to distinguish between them.

Furthermore, the current political communication literature almost exclusively looks at incidental exposure to political information when individuals were looking for non-political content. These situations have been labelled *intention-based* incidental exposure (Matthes et al., 2020; Yadamsuren & Erdelez, 2016). However, *topic-based* incidental exposure to political information – defined as incidental exposure to another political topic while looking for political information – is almost completely neglected. According to survey data, a substantial share of individuals (24%) report that they stumble upon news "while getting news on another topic" (Pew, 2017, p. 18). Such topic-based incidental exposure has been overlooked in previous research even though one may expect similar processes as well as consequences for this type of incidental exposure (Matthes et al., 2020).

**Unclear theoretical foundation for effects research**. Related to the ill-defined conceptualization of the phenomenon, the current literature also lacks a coherent theoretical underpinning. Even though previous research considers incidental encounters in which individuals attentively process the information as incidental exposure, the majority of researchers refers to passive learning theory as theoretical mechanism behind effects. Passive learning refers to knowledge acquisition in situation where individuals lack the interest or motivation to learn but also do not feel the need to resist the information (Krugman, 1965; Krugman & Hartley, 1970; Zukin & Snyder, 1984). However, some of the information encounters described as incidental exposure may not align with the notion of passive learning. For examples, if individuals thoroughly read incidentally encountered news articles because "interest may [have been] piqued by a headline" (Tewksbury et al., 2001, p. 536), potential learning effects cannot be explained with passive learning theory. In other words, sometimes incidental exposure involves information consumption that is guided by a specific goal or interest. For these instances, other theoretical mechanisms must be consulted to hypothesize about (positive) effects of incidental exposure.

Antecedents remain unclear. There is only little research concerned with the antecedents of whether individuals engage with incidentally encountered information or not. The majority of research on antecedents of incidental exposure does not distinguish between situations in which individuals attentively process incidental exposure content and situation in which such information is scanned but dismissed (e.g., Ahmadi & Wohn, 2018; Lu & Lee, 2019; Scheffauer et al., 2021). However, one may expect that these two types of situations are driven by different sets of

antecedents. For example, scholars suggested that political predispositions such as political interest may have diametral effects on whether individuals engage with incidentally encountered content or not (Kümpel, 2020; Thorson, 2020). Furthermore, next to individual predispositions, situational, message, and source factors may also affect whether individuals engage with incidental exposure content (Matthes et al., 2020). While some previous research on content selection on social media sheds light on content- and endorsement-related cues such as characteristics of recommending peers or media source characteristics (Anspach, 2017; Kaiser et al., 2021), little research is specifically directed at incidental exposure situations.

**Distraction effects neglected.** Incidental exposure research primarily investigates whether and how incidental exposure to political information can affect political outcomes such as political knowledge, participation or political discussion. Thereby, scholars emphasized that new media technologies such as social media are particularly prone to expose individuals to content that is not in line with their initial goal motivating their media use. However, it has been almost completely neglected that these characteristics of new media may also bear negative consequences in case individuals are distracted from political information (Matthes, 2022). More specifically, due to the logic of the internet and social media, individuals seeking for political information will frequently be exposed to non-political content. For example, algorithmic curation will cater non-political content aligned with their interests to them. Such incidental exposure to non-political information may divert attention and distract individuals from their political goal. As a consequence, individuals might be less aware of, learn less about or be less engaged in the politics than if they were in an environment that does not bombard them constantly with non-political information custom-tailored to their interest. Thus, incidental exposure to non-political information is a relevant but neglected aspect of the phenomenon of incidental exposure.

#### **1.2** Structure of the thesis

This dissertation in structured in multiple chapters. The next part (chapter 2) after this introduction puts emphasis on the theoretical background and the state of the art in the research field. Chapter 2 encompasses four parts: First, key terms and theories of traditional news consumption research are introduced. Second, I briefly discuss previous research on the most important dependent variables in the field, such as political knowledge, political participation, political expression, and political discussion. Third, I give an overview of the research on incidental exposure previous to the rise of the internet. Fourth, after introducing more recent research on

incidental exposure in the online world, the manuscript discusses the shortcomings of previous studies and highlights the research gaps filled by this dissertation.

In chapter 3, the political incidental news exposure model (PINE, Matthes et al., 2020) is introduced. I outline the key terms and assumptions mentioned in the PINE model. Then, I will briefly recap different conceptualizations of incidental exposure. Chapter 4 lays out the methodological approach of this dissertation's studies.

After these introductory sections, the next chapters represent the five studies (see Table 1). Chapter 5 features the first original study of this dissertation: a meta-analysis of previous quantitative research on incidental exposure (Study I, Nanz & Matthes, 2022a). Using data from 106 distinct samples, the meta-analysis tackled the question of competing findings in the previous literature. Moderator analyses regarding measurement and research design offered additional insights. For chapter 6, I conducted an online experiment which studied the effect of incidental exposure on political learning (Study II, Nanz & Matthes, 2020). The experiment investigated whether briefly glimpsing at incidentally encountered information and thorough processing of incidentally encountered information affect political learning differently. To study this question, the relevance of incidentally encountered information was manipulated. Furthermore, the study manipulated the type of incidental exposure (i.e., intention-based vs. topic-based). In chapter 7, I present survey data investigating whether briefly glimpsing at and thorough processing of incidentally encountered political information affect political outcomes differently (Study III, Nanz & Matthes, 2022b). The study featured a new measurement to assess incidental exposure, for which the validity was assessed with a cross-sectional dataset from Austria. Then, three two-wave panel surveys were used to study incidental exposure's relationship with changes in political knowledge, political participation, political expression, and social media use for political information. Chapter 8 presents the fourth study of this dissertation. Based on some of the survey data from Study III, my co-authors and I studied antecedents of briefly glimpsing at and thorough processing of incidentally encountered political information. Chapter 9 features the final study of this dissertation (Study V). In this study, my co-author and I turned around the logic of previous research on incidental exposure by studying incidental exposure to non-political information and its effects on political learning. We conducted an online experiment that manipulated the relevance of nonpolitical information while individuals were exposed to a newsfeed featuring political information they were asked to learn about. In other words, we studied whether incidental exposure to nonpolitical information can distract individuals from political learning goals.

Chapter 10 summarizes the key findings of the five dissertation studies. The final chapter (chapter 11) discusses the normative, theoretical, and methodological implications. Additionally, limitations of the five studies are discussed. Finally, I provide an outlook for future research on incidental exposure.

Table 1. List of studies in this dissertation.

Study 1	Nanz, A., & Matthes, J. (2022). Democratic consequences of incidental
	exposure to political information: A meta-analysis. Journal of Communication,
	72(3), 345–373. doi: <u>10.1093/joc/jqac008</u>
Study 2	Nanz, A., & Matthes, J. (2020). Learning from incidental exposure to political
	information in online environments. Journal of Communication, 70(6), 769-
	793. doi: <u>10.1093/joc/jqaa031</u>
Study 3	Nanz, A., & Matthes, J. (2022). Seeing political information online
	incidentally. Effects of first- and second-level incidental exposure on
	democratic outcomes. Computers in Human Behavior, 133, 107285.
	doi: <u>10.1016/j.chb.2022.107285</u>
Study 4	Nanz, A., Kaskeleviciute, R., Stubenvoll, M., & Matthes, J. (submitted).
	Scanning vs. thorough processing the news: Antecedents of first- and second-
	level incidental exposure and the role of the relevance appraisal.
Study 5	Nanz, A., & Matthes, J. (submitted). Let me entertain you: Distracted from
	political learning due to incidental exposure to entertainment content.

#### 2 State of the art

Most traditions of democratic theory cannot be thought without an active public sphere. Normative theories of democracy may have diverging perspectives on the role and functionality of the public sphere (see e.g., Ferree et al., 2002; Strömbäck, 2005), but the need to have some sort of information transmission between various actors, ranging from the state and government actors to private citizens, is deemed essential for a healthy and well-functioning democracy. The circulation of political information and news is an antecedent – if not a requirement – for a variety of political acts and behaviours that contribute to the flourishing of a democracy. Political information can supply citizens with new information that allows them to learn about the political world (e.g., Delli Carpini & Keeter, 1996; Lupia, 2016). Political news may also offer a variety of topics for interpersonal political discussion or political expression (e.g., Cho et al., 2009; Mondak, 1995; Shah, 2016). Furthermore, exposure to the political discourse may inspire individuals to engage in politics themselves (e.g., Dimitrova et al., 2014; Shah et al., 2005).

#### 2.1 Background: Traditional news consumption research

A large share of research builds upon the notion that citizens actively follow the political discourse by reading, watching and listening to political news and other channels that provide them with political information (e.g., party communication, political interest groups). I will now briefly introduce some theories and debates at the core of intentional news consumption research, given that they also influenced incidental exposure research and remain relevant up to this day as the foundation of incidental exposure research. It should be noted that none of these overviews should be considered as exhaustive.

The uses and gratifications approach (U&G) is a prominent theoretical framework in this area. The U&G approach offers an alternative to more mechanistic media effects perspectives which focus on a media message's "direct influence on message recipients" (Rubin, 2009, p. 165). In contrast, the U&G approach puts the audiences' needs at the centre of the investigation. Thereby, media audiences are viewed as active: individuals turn to media to fulfil a variety of needs and goals (see e.g., Katz et al., 1973). Based on the gratification(s) recipients experience during media consumption, they may alter their expectations about media content which could consequently affect media usage (Rubin, 2009). Furthermore, depending on the needs and goals that foster media usage, media effects may differ for (groups of) recipients. For example, individuals that turn to news media for surveillance motivations may learn more from the media than individuals that use news due to other motivations (e.g., Perse, 1990; but see also Eveland, 2001). Uses and

gratifications approach is also widely used to explain internet and social media usage (e.g., Brandtzaeg & Heim, 2009; Leiner et al., 2018; Whiting & Williams, 2013).

Relatedly, **theories of information processing** are an essential part of intentional news consumption research (see e.g., Eveland & Garrett, 2017). Even though there are quite a few models that are concerned with information processing (e.g., Chaiken, 1980; Entman, 1989; Knobloch-Westerwick, 2015), I will focus on introducing two of them: the cognitive mediation model (Eveland, 2001) and the limited capacity model of mediated message processing (Lang, 2000). The selection is based on the prominence of these two theories in previous research on news exposure and incidental exposure particularly.

The cognitive mediation model of learning from the news (Eveland, 2001) is a widely cited theoretical perspective on political knowledge acquisition from news content. In contrast to earlier research that modelled exposure as main driver of learning, it puts special emphasis on cognitive processes – namely attention and elaboration – that shape learning effects. Starting with the assumption that individuals' media consumption is rooted in uses and gratifications motivations, the model argues that surveillance gratifications during news media use foster information processing strategies that are beneficial for knowledge acquisition. One of the initial formulations of the cognitive mediation model (Eveland, 2001) focusses on attention and elaboration. Thereby, attention to media content increases the availability of the information in the working memory, which makes it more likely to be reproduced at a later stage. Attention precedes cognitive elaboration which is defined as "the process of connecting new information to other information stored in memory, including prior knowledge, personal experiences, or the connection of two new bits of information together in new ways" (Eveland, 2001, p. 573). Further elaboration after news exposure makes retrieving the newly stored information easier, according to the model. In other words, the cognitive mediation model states that individuals that are motivated to process news (i.e., have surveillance motivations) are more likely to attend and reflect on news which, in turn, increases learning from the news. The cognitive mediation model also influenced various refined and adapted communication mediation models (see N. Lee, 2017 for an overview). For example, later adaptions and investigations of the O-S-O-R models (e.g., D. M. McLeod et al., 1994; J. M. McLeod et al., 1999) incorporate the intrapersonal cognitive factors mentioned in the cognitive mediation model into their theorizing (see e.g., Cho et al., 2009; Yamamoto & Morey, 2019).

The **limited capacity model** (Lang, 2000) offers another theoretical angle at information processing of mediated messages. Information processing requires mental resources. However, the

model assumes that "a person's ability to process information is limited" (Lang, 2000, p. 47). In contrast to the cognitive mediation model, this model puts more emphasis on the cognitive subprocesses happening during and after exposure to media content. Specifically, encoding, storing, and retrieval are distinguished. Encoding describes the process necessary to translate a stimulus into a mental representation. Due to the limitations on available resources, individuals cannot transform the whole and often broad range of information conveyed by a stimulus into mental representations. Only a fraction of it is encoded. With encoding, the mental representation of the stimulus enters working memory and/or activates related memories. To determine how much and what kind of information is encoded, researchers usually use recognition measures. The subprocess storage describes the process of storing the information encoded from the encountered stimulus alongside old information. After encoding, individuals may think about the stimulus or connect the newly encountered information with previous knowledge. This will foster storage. "The more a person links a new bit of information into this associative memory network, the better that information is stored" (Lang, 2000, p. 50). Importantly, individuals may dedicate more cognitive resources to some aspects of the stimulus than to others shaping the mental representation stored in memory. Assessing (the thoroughness of) storage is usually done with cued recall measures. The third subprocess is concerned with retrieval of previously stored mental representations. In other words, retrieval refers to reactivating chunks of information in the memory (Lang, 2000). Furthermore, retrieval also takes place during the other subprocesses. Stimuli may activate stored information during encoding. Similarly, storage activities during and after exposure may activate related information in the memory. To measure how easy retrieval of information is scholars usually turn to free recall measures. The limited capacity model has been widely used to study news media effects in traditional offline media as well as in the online domain (e.g., Eveland & Dunwoody, 2001; Kim et al., 2013; Sülflow et al., 2019; Vraga et al., 2019).

Next to these widely used models concerned with processing of political information and news, this dissertation also has some links to **selective exposure** research. "Selective exposure is the motivated selection of messages matching one's beliefs" (Stroud, 2017, p. 531). This research tradition argues that individuals select into consuming information that supports their priors and avoid information that is incongruent with their priors (e.g., Iyengar & Hahn, 2009; Stroud, 2008). The theoretical mechanisms scholars use to explain selective exposure behaviour have evolved over the years. Early research often referred to Festinger's (1957) theory of cognitive dissonance which postulates that individuals aim to reduce cognitive dissonance to a minimum. To achieve

this, individuals may adapt their information consumption (i.e., avoid challenging information but seek out supporting information). In response to reviews that found modest empirical support for this thesis (e.g., Frey, 1986; Sears & Freedman, 1967), scholars revised the concept (e.g., Frey, 1986; Garrett, 2009; Stroud, 2008). For example, Garrett (2009) suggested to distinguish more clearly between reinforcement seeking and avoiding challenging information, based on finding more evidence for the former. More recent research on selective exposure also cites motivated reasoning theory (Kunda, 1990), emotions (Valentino et al., 2009), perceptions about information credibility (Metzger et al., 2020), and other mechanisms as explanations for selective exposure tendencies (for a review, see Stroud, 2017). In political communication research, selective exposure often postulates that individuals seek out political information that is in line with their prior political beliefs. For example, research suggests that partisans tend to use news outlets that align with their political attitudes (Iyengar & Hahn, 2009). Given that the large array of choices in the internet offers various opportunities for political selective exposure, scholars have dedicated a substantial attention to this phenomenon in the online world (e.g., Ohme & Mothes, 2020; Sude et al., 2019).

#### 2.2 Background: Research on democratic outcomes

Besides news consumption research, this dissertation is also situated in the much broader context of research concerned with – but not limited to – democracies, democratic processes, citizens, and their behaviours and attitudes. While it is impossible – and also not necessary for this dissertation – to review this vast body of literature stemming from various corners of the social sciences and spanning over multiple decades, I will very briefly introduce some core variables that are also of interest for four of the five studies in this dissertation.

**Political knowledge** (or sophistication, competence) is a central variable in political science and political communication research. Normative theories of democracy consider an informed electorate as a crucial component of a functioning democracy. Political science research showed that higher socioeconomic status (e.g., highly educated, high income) is related to more political knowledge (e.g., Delli Carpini & Keeter, 1996), but also that the media's attention to various issues plays a crucial role for knowledge (e.g., Jerit et al., 2006). The assessment of political knowledge in survey studies has been debated intensively (e.g., Boudreau & Lupia, 2011; Delli Carpini & Keeter, 1993; Mondak, 1999; Prior & Lupia, 2008). In a review of measures used in previous research, Barabas and colleagues (2014) classified knowledge items along two

dimensions.<sup>1</sup> The temporal dimension refers "to the recency of the fact" (Barabas et al., 2014, p. 841), while the topical dimension categorizes items regarding its subject (i.e., whether the items concern more general or policy-specific matters). When it comes to media effects, it is particularly crucial to consider the temporal dimension. For example, asking respondents to recite electoral rules such as parliamentary thresholds might be less likely to be affected by media exposure than surveillance facts (e.g., knowing the cabinet position of a politician), given that (a) static facts are less often the subject of change (i.e., electoral laws do not change as often as ministers), and, thus, (b) receive less media coverage (i.e., the news value of reiterating the current electoral rules might be lower than reporting about (the current actions of) a minister).

It is hardly contested that the concept of political knowledge is crucial to studying political behaviour. However, it remains contested whether the data generated by assessing factual knowledge with survey items allows valid inferences, for example, on the quality of political decisions made by everyday citizens or the electorate as a collective (e.g., Lupia, 1994, 2016; Popkin, 1994; Sniderman et al., 1999). In simplified terms, knowing or not knowing the number of seats in the parliament may not be informative about the ease an individual has while navigating the political sphere.

Next to political knowledge, **political participation** is a widely studied variable in political (communication) research. While a central building-block in most normative theories of democracy, particularly participatory theories put special emphasis on the relevance of an engaged electorate (Ferree et al., 2002).<sup>2</sup> A vast bulk of literature engages with political participation and its antecedents as well as consequences on various levels (i.e., macro, meso, and micro). There are various approaches, some of them stemming from political science or sociology, to study (different forms of) political participation including, but not limited to, perspectives discussing political opportunity structures (e.g., Tarrow, 2011), social movements (e.g., Klandermans & Oegema, 1987), socioeconomic factors and resources (e.g., Brady et al., 1995), social networks (e.g., Campbell, 2013), social capital (e.g., Putnam, 2000), or media use (e.g., Boulianne, 2009; J. M. McLeod et al., 1999). This dissertation will mainly focus on the last one which is located at the

<sup>&</sup>lt;sup>1</sup> While using survey items to assess knowledge might be the most widely used measurement in the field, it should be noted that there are also other operationalizations for knowledge (e.g., knowledge structure density, Eveland et al., 2004).

<sup>&</sup>lt;sup>2</sup> Elitist theories of democracy (e.g., Schumpeter, 2005) can be located on the other side of the spectrum, ascribing little significance into participatory acts of the general public.

intersection between political communication science and political science. It has been shown that political knowledge (e.g., Delli Carpini & Keeter, 1996), traditional media use (e.g., Eveland & Scheufele, 2000; J. M. McLeod et al., 1999), but also internet use and social media use are positively related to political engagement (e.g., Boulianne, 2009, 2020; Skoric et al., 2016). Often acts of political participation are divided into online participation and offline participation (Gibson & Cantijoch, 2013; Oser et al., 2013), even though there are also competing approaches that call for an effort-based distinction (e.g., Knoll et al., 2020; Nanz et al., 2022; Valentino et al., 2008). The concept of political participation has been gradually extended over the decades. While early research in the 1940s mainly focused on electoral participation (i.e., voting), the repertoire of acts that are today considered as political engagement is much broader (e.g., civic engagement, consumerism, social media participation, Theocharis, 2015; van Deth, 2014). Thus, the field today features "[a] virtually endless list of conceptualizations and definitions of political participation" (Theocharis & van Deth, 2018, p. 45), ranging from quite traditional and narrow definitions (e.g., Brady, 1999) to very broad definitions (for a review, see Ruess et al., 2021).

Thus, in today's research, a lot of participation measures also feature items that tap political expression or other expressive forms of engagement (Ruess et al., 2021). With the rise of the internet and social media platforms, political expression has received increased attention (Theocharis & van Deth, 2018). However, whether such expressive forms of engagement have an substantial impact on democratic processes has also been questioned. The term "slacktivism" describing "inauthentic, low-threshold forms of political engagement online," (Dennis, 2019, p. 185) has been used to call into doubt whether acts of expressive engagement, such as commenting on or "liking" political posts on social media, can have any meaningful consequences. Some have noted that such "feel-good" acts could even distract citizens from more meaningful ways of participation (for a review, see Skoric, 2012). Despite this criticism, there are also proponents of doing research on expressive forms of engagement (e.g., Dennis, 2019). It has been theorized that political expression itself can have effects on politically relevant variables such as attitude clarity or stability (Pingree, 2007). Additionally, political expression has been identified as an antecedent of more traditional forms of political participation (Gil de Zúñiga et al., 2014). As noted above, studies in political communication frequently include expressive forms of political engagement in measures to assess political participation, even though they do not always align with the definition of political participation provided by the study's authors (Ruess et al., 2021).

Related to engagement, scholars have also studied effects on **political discussion**. Particularly in deliberative theories of democracy, political discussion is considered to be at the heart of the democratic process (Ferree et al., 2002; see e.g., Habermas, 2015). In contrast to the more recent focus on political expression, research on political discussion has a long history dating back to the beginnings of modern empirical social science research (e.g., Lazarsfeld et al., 1969). Various studies investigated how political talk and, for example, its frequency, network structure or heterogeneity, are related to other democratic outcomes (e.g., Eveland & Hively, 2009; Huckfeldt & Sprague, 1995). More recently, the internet and social media have been acknowledged as a place for political discussion (Stromer-Galley & Wichowski, 2011; Valenzuela et al., 2012) and, at least to some extent, deliberative interaction (e.g., Dahlgren, 2005; Stromer-Galley, 2017).

#### **2.3** Incidental exposure research prior to the internet

Even though the vast majority of incidental exposure research is concerned with the online world, the basic idea of unintentional exposure to political information widely precedes the internet. The idea that individuals can encounter political information without the intention to encounter such information has been voiced for decades. Notably, in his seminal work "An Economic Theory of Democracy", Downs (1957) canvassed the notion of incidental exposure. Building upon the observation that searching, accessing, and considering political information is inherently resource-intensive for citizens, he stated that it might not be rational for a large share of the population to make a comprehensively informed voting decision by actively attending to the political discourse. In essence, the often relatively marginal benefits of casting the "correct vote" (i.e., being in line with one's individual preferences) may be outweight by the costs of acquiring the information necessary to form an opinion. However, Downs noted that individuals also frequently encounter "accidental data [which] are by-products of the nonpolitical activities of a citizen; they accrue to him without any special effort on his part to find them" (Downs, 1957, p. 223).

While Downs' take on incidental exposure might be among the first one's in the sphere of political research, other research areas also reflected on how individuals may learn information from the mass media which they did not initially look for. Another line of research that made its mark on political communication research stems from a strand of advertising research heavily influenced by cognitive and social psychology. Krugman (1965) pointed to TV commercials as an vehicle that potentially fosters learning and attitude change in uninvolved recipients. Later, Krugman and Hartley (1970) advanced this thought also for non-commercial programming on TV. They introduced the notion of *passive learning* which is theorized to occur when individuals are

not involved but also lack "aroused resistance to what is learned" (Krugman & Hartley, 1970, p. 188). As noted previously, the idea of passive learning has been picked up in multiple influential publications about incidental exposure to political information (e.g., Bode, 2016; Tewksbury et al., 2001; Yadamsuren & Erdelez, 2016) – even though most papers did not study television (but see Marcinkowski, 2013; Zukin & Snyder, 1984).

Another line of research that turned out to be influential for news exposure and incidental exposure research is concerned with the effects of *high-choice media environments* (e.g., Baum, 2006; Prior, 2007; Van Aelst et al., 2017). In contrast to the previously mentioned information processing models and passive learning theory, this is by far not a fully-fledged theoretical model but a prominent debate between two related lines of literature. With the introduction of new technologies, the amount of media choices available to individuals increased substantially. The increased number of media choices, the diversification into various (sub-)genres, and the widely varying amount of political information across options prompted the question how these changes affect democratic life.

Initially, this debate was mainly concerned with the medium television (Baum, 2006; Prior, 2007). Proponents of one perspective – most notably Prior (e.g., 2003, 2005, 2007) – have argued that the transition from broadcast television which featured a limited set of TV programs to cable (and, later, satellite) TV which suddenly offered a much larger variety of channels affected political information consumption in the electorate substantially. In the days of broadcast TV, the mixing of various programs, some of them including political information (e.g., news reels), on the limited set of channels forced recipients to watch political news to some extent. Thus, even individuals that watched TV mainly for non-political reasons were exposed to political information. Their only other option was to stop watching TV. But, due to the increasing number of TV channels that came with the introduction of cable TV, recipients were now able to circumvent exposure to political information. In short, instead of relying on the content curation by channel managers and programming directors, individuals were able to pick from a larger variety of – often non-political – TV programs. Thus, particularly individuals that prefer entertainment content over political content may tune out of the political discourse all together.

On the other side of the issue, advocates of another perspective – most notably Baum (e.g., Baum, 2002, 2003, 2006; Baum & Jamison, 2006) – have argued that even entertainment-oriented individuals may learn about politics from television programming that features political information in entertainment content. This view acknowledges that a substantial share of the

electorate is not inclined to watch political news programs, given that a lot of people are not particularly interested in politics and, thus, do not gain a lot of gratification from following political news. However, according to Baum (2006), the costs of paying attention to political information have declined. For example, talk shows, morning shows, and other forms of so-called soft news pick up salient political issues. While the main motivation to watch such shows might be nonpolitical and entertainment-related, weaving pressing political topics into the flow of television shows ultimately exposes individuals not actively following the political discourse to political news. In other words, according to this perspective, "soft news" programming frequently "attach[es], or piggyback[s], high-cost political information to low-cost entertainment-oriented information" (Baum, 2006, p. 30). Thus, receiving information about high-profile political topics, such as foreign affairs, "become[s] a free bonus, or an incidental by-product, of paying attention to entertainmentoriented information" (Baum, 2006, p. 30). In contrast to Prior's (e.g., 2007) perspective, this suggests a much more optimistic prospect regarding the dominance of entertainment content in media environments.

Clearly, these two perspectives come to quite different conclusions. On the one hand, political information that piggybacks on "light" entertainment content may help to inform even uninterested audiences about the most pressing issues in the political discourse. On the other hand, the diverse mass of (entertainment) choices in today's media environments may lead to a fragmentation of the audience leaving the segment of the population with an entertainment-preference with very little exposure to political information. While this debate initially focused on television, the impact of the media environment (e.g., choice set, fragmentation) on media effects also remains an important question in new media environments (e.g., Fletcher & Nielsen, 2018; Panek, 2016; Pearson, 2021; Shehata & Strömbäck, 2021; Van Aelst et al., 2017).

#### 2.4 Research on incidental exposure in the online sphere and its shortcomings

With the rising popularity and penetration of the internet, the academic discourse about incidental exposure shifted towards these new technologies. In the earlier days of the internet, various portals or email providers offered a path to incidental exposure for web users. For example, with the goal of checking one's email, users may have been confronted with the latest news on the login page of their email provider (e.g., Kobayashi et al., 2020). Similarly, portal pages or side banners featured information on recent developments that were unrelated to individuals' goal of using the internet. In their seminal paper, Tewksbury and colleagues (2001) scrutinized the

relationship between incidental exposure and political knowledge. They found some initial support for a positive relationship in one of the three analysed surveys.

The rise of social media platforms further increased scholarly attention to incidental exposure. Social media were (and are) regarded as spaces in which various streams of information commingle (e.g., Thorson & Wells, 2016). According to previous research, social media use is often driven by non-political motivations such as, for example, relaxation, social interaction, relationship maintenance or entertainment (e.g., Brandtzaeg & Heim, 2009; Leiner et al., 2018; Whiting & Williams, 2013). Even though most people may not log into social media for political content, they still encounter political information their social contacts as well as other curating actors posted online. Thus, these platforms can offer additional opportunities for incidental exposure to political information. This notion has been echoed in many of the newer publications (e.g., Kim et al., 2013; J. K. Lee & Kim, 2017; Valeriani & Vaccari, 2016; Weeks et al., 2017). Relatedly, some scholars have argued that a share of users may even rely on these encounters and have the perception that the news will find them (Gil de Zúñiga et al., 2017).

However, the research stemming from this initial wave of enthusiasm about the phenomenon of online incidental exposure received substantial criticism (e.g., Kaiser et al., 2021; Matthes et al., 2020; Thorson, 2020; Vraga et al., 2019; Wieland & Kleinen-von Königslöw, 2020). I will now reiterate the five main research gaps mentioned in the introduction of this dissertation while giving a more nuanced overview.

First, the research area is characterized by **competing findings** in effects research. Scholars scrutinized the relationship between incidental exposure to political information and various political outcomes, including political knowledge (e.g., Marcinkowski & Došenović, 2021; Tewksbury et al., 2001), political participation (e.g., Heiss & Matthes, 2019; Valeriani & Vaccari, 2016), political expression (e.g., Yamamoto & Morey, 2019), and news use (e.g., Fletcher & Nielsen, 2018; Park & Kaye, 2020; Strauß et al., 2020). Incidental exposure has also been studied across various contexts (e.g., across different social media platforms, see S. Lee, Nanz, et al., 2022; across different countries, see Vaccari & Valeriani, 2021) and for multiple decades. But still, the bulk of literature does not allow a fully conclusive verdict whether and how incidental exposure to political information is related to political outcomes. In fact, authors frequently note that the research area features competing and sometimes contradictory findings and conclusions (e.g., Heiss & Matthes, 2019; Kaiser et al., 2021; Matthes et al., 2020; Vaccari & Valeriani, 2021; Vraga et al., 2019; Weeks et al., 2021). While some of these competing findings may be partly the "result of

differences in scholars' approach" (e.g., methodological differences but also competing conceptualizations of incidental exposure; Vaccari & Valeriani, 2021, p. 36), there are also multiple instances in which scholars use similar (methodological) approaches but come to diverging conclusions (Heiss & Matthes, 2019; Kim et al., 2013; Morris & Morris, 2017; Valeriani & Vaccari, 2016; Weeks et al., 2021).

Second, previous incidental exposure research builds upon ill-defined an conceptualization of the phenomenon. Despite the mixed findings, most of the research on incidental exposure to political information in the online sphere acts upon a remarkably similar definition of incidental exposure. Most previous research defined incidental exposure "as exposure to political information that individuals did not intend to be exposed to" (Study I, Nanz & Matthes, 2022a, p. 347; but see e.g., J. K. Lee & Kim, 2017; Kim et al., 2013; Oeldorf-Hirsch, 2018; Weeks et al., 2021). Nevertheless, scholars tend to list various strikingly different situations which they consider as incidental exposure. For example, Lee and Kim (2017) note that "when an individual is initially exposed to a link to news in her Facebook news feed, she could ignore it and move to the next posts, or could click on the link to read about and engage with the news" (J. K. Lee & Kim, 2017, p. 1009). Similarly, internet users may stumble upon a headline, a teaser or even click on and read an incidentally encountered article (Fletcher & Nielsen, 2018).

Third, and related, previous incidental exposure research lacks a theoretical foundation for effects research. The vast majority of incidental exposure research discusses passive learning (Krugman & Hartley, 1970) as the main driver of (positive) effects of incidental exposure to political information on political outcomes (e.g., Bode, 2016; Kim et al., 2013; J. K. Lee & Kim, 2017; Marcinkowski & Došenović, 2021; Tewksbury et al., 2001; Valeriani & Vaccari, 2016; Weeks et al., 2021). For situations, in which individuals click on and attend to incidentally encountered information, it is unlikely that passive learning is at work, given that the cognitive processes do not fit the definition of passive learning (i.e., lack of motivation; Krugman & Hartley, 1970). Building upon the theoretical contributions mentioned in the section about information processing models, it is reasonable to assume that the effects stemming from the diverse situations scholars listed as examples for incidental exposure may differ drastically. Nonetheless, previous research lumps together these information encounters under the term incidental exposure.

The unprecise conceptualization as well as the lack of a theoretical foundation are also reflected in the methodological choices in the field. In line with the definition above, survey researchers usually ask respondents "how often [...] [they] come across news and information on

current events, public issues, or politics when [they] may have been going online for a purpose other than to get the news" (Valeriani & Vaccari, 2016, p. 1865). Similar wordings have also been used (e.g., Heiss & Matthes, 2019; Kim et al., 2013; Weeks et al., 2017). The definition of "coming across" news and whether individuals engaged with incidentally encountered political information or neglected it after the first blink remains unmeasured (Matthes et al., 2020). Previous experimental research struggles with related issues. For example, a study by Bode (2016), which is widely cited in incidental exposure research, exposed participants to twelve posts "and asked [them] to browse it as they would their own News Feed" (Bode, 2016, p. 33). In the treatment group, one of the posts was political, while the control group saw only non-political posts. The design manipulates exposure to political information but does not allow conclusions about incidental exposure. Participant's intentions while being exposed to the news feed remain completely unclear. Individuals may have even focussed on the political post for most of the time, given that it differed from the other posts. Any difference between control and treatment group might be rooted in demand effects (Iyengar, 2011).

Furthermore, the most commonly used wordings in survey research mainly measure incidental exposure to political information (or news) while individuals were looking for other content than political information or news. Thereby, the possibility of incidental exposure to political information while looking for information on another political topics is ignored.

Fourth, the **antecedents** of different situations considered as incidental exposure **remain unclear**. Using similar survey measures as mentioned above, researchers have studied various antecedents of incidental exposure to political information in online environments (e.g., Ahmadi & Wohn, 2018; Barnidge, 2021; Goyanes, 2020; Nanz et al., 2022; Scheffauer et al., 2021). However, under the assumption that attending to incidentally encountered content and briefly glimpsing at incidentally encountered information leads to diverging effects, it is crucial to study the antecedents of these forms of incidental exposure.

Previous research using a survey measure that did not differentiate whether people attended to or disregarded incidentally encountered content found no relationship between political interest and incidental exposure. However, it has been theorized that individuals with high political interest might be more inclined to engage with incidentally encountered political information and, subsequently, profit more from such content than those with little interest (Kümpel, 2020). Thus, trait-like individual-level characteristics, such as political interest, may be positively related to the likelihood of attending to incidentally encountered political information. Various characteristics of incidentally encountered content may also affect whether individuals attend to incidentally encountered (political) information. For example, peer recommendations, source cues (Anspach, 2017), prior knowledge (Karnowski et al., 2017; Kümpel, 2019), information utility (Atkin, 1973; Knobloch-Westerwick, 2015) are well-known predictors of attending to (political information) – even though, they have not been studied extensively in the area of incidental exposure research.

Fifth, it has been criticised that current incidental exposure research neglects the potential consequences of incidental exposure to non-political information. As noted previously, incidental exposure research builds upon the assumption that today's media environments offer the opportunity for incidental exposure to political information because they offer spaces in which political and non-political content commingles. For example, social media platforms may feature political posts right next to private updates from peers. The field mainly focuses on political information in the mix of political and non-political content. Thus, scholars frequently investigate why some individuals have more opportunities to see political information online than others (e.g., Thorson et al., 2021). Relatedly, the composition of political networks and its implications for the flow of political information are scrutinized (Bakshy et al., 2015; J. K. Lee & Kim, 2017; Nanz et al., 2022). Current research almost exclusively considers the impact of political information on political outcomes. However, the internet and social media are also actively used for information purposes related to politics by citizens. During these media reception situation in which individuals use the internet to learn or engage with politics, they might be incidentally exposed to non-political information (Matthes et al., 2020). While such non-political incidental exposure has been hardly researched with respect to online environments, this notion connects with the arguments voiced in the era spanning around the switch to cable and satellite TV (Prior, 2007). Essentially, the internet and specifically social media platforms with their strong reliance on algorithmic curation may confront individuals that want to learn about politics in a certain reception setting with well-tailored non-political content that catches their attention.

#### **3** Theoretical framework

It is quite striking that comprehensive theoretical approaches to the phenomenon of incidental exposure are quite rare in communication research and most of them are quite new as of the writing of this dissertation. Though, it should be noted that scholars from neighbouring disciplines such as library and information sciences have proposed models related to similar phenomena (e.g., Bates, 2002; Erdelez, 2004; Heinström, 2006). However, the majority of these models are not concerned with the political domain. Thus, these models often do not specify or allow clear-cut predictions regarding the effect of incidental exposure on politically relevant outcomes, such as knowledge, participation, or discussion. Furthermore, this line of research shares some of the fundamental shortcomings with previous research from communication research, which I discussed in the previous section.

Due to this lack of frameworks for research on incidental exposure in general and in the political domain specifically, the vast majority of previous research on incidental exposure builds upon theoretical models developed with intentional news consumption in mind (e.g., Kim et al., 2013; Oeldorf-Hirsch, 2018; Valeriani & Vaccari, 2016; Yamamoto & Morey, 2019). Thereby, previous research may neglect theoretical aspects that come with the specifics of the phenomenon of incidental exposure (see e.g., Chen et al., 2022; Kaiser et al., 2021; Matthes et al., 2020; Wieland & Kleinen-von Königslöw, 2020). In response to the shortage of adequate theoretical model, multiple scholars proposed their theoretical approaches to approach incidental exposure. A special issue in *Journalism* features multiple theory papers and conceptual approaches to the phenomenon (see Kümpel, 2020; Matthes et al., 2020; Mitchelstein et al., 2020; Thorson, 2020; Weeks & Lane, 2020; Wieland & Kleinen-von Königslöw, 2020). One of these papers (Matthes et al., 2020) acts as starting point for this dissertation.

Together with my colleagues, Jörg Matthes, Marlis Stubenvoll, and Raffael Heiss, I have co-authored the Political Incidental News Exposure model (PINE, Matthes et al., 2020). The full model is laid out in the article published in *Journalism* (Matthes et al., 2020) which is not part of this dissertation. The PINE model acts in slightly revised version as a roadmap for this dissertation.

#### 3.1 The political incidental news exposure (PINE) model

With the PINE model we put forward a theoretical framework to study effects of incidental exposure on political outcomes. In this section, I will introduce the core aspects and terminology used in the model and the remaining parts of this dissertation.

First, the PINE model assumes that individuals have a so-called *processing goal* in every media reception situation (Matthes et al., 2020; see also Study II). The PINE model distinguishes between non-political and political processing goals. The processing goal is conceptualized as dynamic. In other words, individuals can switch between political and non-political processing goals during reception situations. When individuals encounter content, such content can either be in line with the processing goal or unrelated to the processing goal. In case of the latter, this information encounter is considered to be incidental. Over time, processing goals may become chronically accessible (Study II, Nanz & Matthes, 2020).

While the first formulation of the PINE model argued that "processing goals are in line with the uses and gratifications" (Matthes et al., 2020, p. 1033), this dissertation (see Study II, Nanz & Matthes, 2020) refines the definition of processing goals. I will briefly lay out the reason for this re-specification of the PINE model. The uses and gratifications approach typically considers very broad needs and motivations as drivers of media consumption (Rubin, 2009). For example, "entertainment" or "communicatory utility" (Whiting & Williams, 2013) are considered to be drivers of social media use. Such universal motivations might be fulfilled by various content types. Furthermore, whether a motivation is gratified by some sort of content may also vary widely between individuals. For instance, someone's entertainment motivations could be fulfilled by watching a romantic comedy but also by watching political satire. For a certain part of the population, the latter may not gratify their entertainment needs (Young, 2013). But only the latter can be hypothesized to affect political outcomes such as political knowledge. In other words, the term motivation as it is used in uses and gratifications approach can be quite uninformative regarding the content different individuals want to see. Thus, the term "processing goals refer[s] to the engagement with the content individuals want to see and not the underlying gratification sought" (Study II, Nanz & Matthes, 2020, p. 772). Furthermore, uses and gratifications approach assumes that recipients can verbalize their needs and motivations (Katz et al., 1973; Rubin, 2009). The revised PINE model does not make this assumption about processing goals (see Study II, Nanz & Matthes, 2020).

Second, it is assumed that individuals constantly scan the content with which they are confronted to determine whether it is in line with their processing goal. This process is called the *relevance appraisal*. The PINE model adopts this term from the Social Media and Political Participation model (SMPPM, Knoll et al., 2020). The process of appraising relevance is deemed to be particularly important when a myriad of content is presented to individuals. Most websites –

and particularly social media – offer individuals with a constant stream of information (Thorson & Wells, 2016). However, individuals only have limited resources to engage and attend to information (e.g., time, motivation, but also cognitive resources, see Lang, 2000). The relevance appraisal is a process individuals must engage in to handle the amount of content they encounter. More specifically, "[i]ndividuals engage in relevance appraisals because they consider the process of a relevance appraisal as a mean of assessing the fit between processing goal and encountered content" (Study II, Nanz & Matthes, 2020, p. 773). The relevance appraisal can have three different outcomes: While scanning, individuals may determine that the content is in line with the current processing goal. In this case, individuals will attend to the information at hand. Such information encounters cannot be considered to be incidental. The other two outcomes refer to situations in which the content at hand is not in line with the processing goal: In most cases, individuals might not appraise the (incidental exposure) content as relevant. For instance, after reading the first words of a headline, individuals may recognize that this is not the article they want to read. In the language of the PINE model, this is a negative relevance appraisal. Individuals will now move on to the next piece of content. However, sometimes it might be the case that content unrelated to the current processing goal is appraised as more relevant than the current processing goal. Consequently, individuals will switch processing goals and dedicate their attention toward the content appraised as relevant (Matthes et al., 2020). The PINE model calls this a positive relevance appraisal (see Study II, Nanz & Matthes, 2020, p. 773).

Third, the PINE model distinguished between two levels of incidental exposure: "Firstlevel [incidental exposure], which is the scanning of incidentally encountered information, and second-level [incidental exposure], defined as the effortful processing of incidentally encountered information" (Study II, Nanz & Matthes, 2020, p. 770). The two levels closely relate to the outcomes of the relevance appraisal. In case of a negative relevance appraisal, individuals will remain in first-level incidental exposure. First-level incidental exposure is characterized by rather superficial scanning of information. For example, individuals may start reading the first part of a social media post before making the decision to skip it (Bode et al., 2017). During this process, individuals have to encode at least some parts of the message but do not necessarily have the motivation to store this information (Lang, 2000). Passive learning theory may help to explain knowledge acquisition (Krugman & Hartley, 1970). In sum, first-level incidental exposure "may leave memory traces" (Study II, Nanz & Matthes, 2020, p. 774) but will not have particularly large effects on knowledge and related outcomes. In case of a positive relevance appraisal, individuals will often engage in second-level incidental exposure. The PINE model acknowledges that sometimes circumstances (e.g., time or situational constraints) may hinder individuals from entering second-level incidental exposure during a reception situation. Nonetheless, a positive relevance appraisal will likely lead to second-level incidental exposure. During second-level incidental exposure content "will be processed more thoroughly, that is, cognitive resources will be allocated to the content" (Matthes et al., 2020, p. 1039). Thereby, individuals will encode but also store newly encountered information actively. Additionally, related information stored in memory might be retrieved (Lang, 2000), encouraging further cognitive elaboration (Matthes et al., 2020). The information processing during second-level incidental exposure resembles cognitive processes during intentional learning more than the processes at work for passive learning. Thus, second-level incidental exposure.

Fourth, the PINE model distinguishes between intention-based and topic-based incidental exposure (see Matthes et al., 2020; Yadamsuren & Erdelez, 2016). To reiterate, intention-based incidental exposure to political information is described as incidental encounters with political information while individuals were looking for non-political information. Most of the previous research focusses on this type of incidental exposure (Matthes et al., 2020). Topic-based incidental exposure to political information refers to situations in which individuals are looking for political information on a specific topic (e.g., an upcoming referendum, current foreign policy crisis) but stumble upon political information about another topic. In the first version of the PINE model, we argued that "[t]opic-based [incidental exposure] may have the same effects as intention-based [incidental exposure]" (Matthes et al., 2020, p. 1037). The PINE model also does not formulate diverging expectations for intention- and topic-based incidental exposure. However, in Study II (Nanz & Matthes, 2020) of this dissertation, I refine this argument. Study II argues that topic-based incidental exposure should have stronger effects on learning that intention-based incidental exposure. Goal systems theory (e.g., Kruglanski et al., 2002, 2015) assumes that goals are linked in a hierarchical network. Thereby, two goals clustered below one higher-level goal have more links than two goals that are related to different higher-level goals. In Study II, I argue that incidentally encountered information about another political topic might be more congruent to the higher-level goals which drive the political processing goal than the higher-level goals which propel non-political processing goal.

Fifth, the PINE model explicitly considers incidental exposure to *non-political* information (Matthes et al., 2020). In other words, individuals pursuing a political processing goal may encounter non-political information incidentally. The PINE model (see also Study V) argues that such incidental exposure to non-political information may distract individuals from political information consumption and, subsequently, may be detrimental regarding the democratic consequences. Building upon work distinguishing soft and hard news by Reinemann et al. (2012), the PINE model defines political information as information "which include the mentioning of (1) political actors, (2) decision-making authorities, (3) activities of planning, decision-making or realizing programs that relate to societal issues, or (4) news on the groups or people which are concerned by political decisions" (Matthes et al., 2020, p. 1035; see Reinemann et al., 2012, p. 237).

Taken together, these five points represent the building blocks of the PINE model. In Figure 1 (reprinted from Matthes et al., 2020, p. 1040), the dynamic process logic of the PINE model is shown.<sup>3</sup>

<sup>&</sup>lt;sup>3</sup> It should be noted that the Figure does not show all the facets explained in the previous paragraphs. Due to the focus of the PINE model on processes that are happening *in case* of incidental exposure, the Figure does not explicitly visualize that relevance appraisals are also occurring when individuals are exposed to content that is in line with their initial processing goal (see the box with the dashed line). However, the relevance appraisal is a process that is considered to be happening regardless of whether exposure is incidental (Knoll et al., 2020; Matthes et al., 2020).



Figure 1. The political incidental news exposure model (PINE). Reprinted from Matthes et al. (2020, p. 1040).

#### **3.2** Different conceptualizations of incidental exposure

As mentioned, the PINE model is not the only theoretical framework put forward for studying incidental exposure. Some of the PINE model's core ideas were echoed in more recent empirical studies (e.g., Chen et al., 2022; S. Lee, Nanz, et al., 2022) or appear in similar form in other theoretical models (e.g., Wieland & Kleinen-von Königslöw, 2020). I will now briefly introduce some of the other more recent conceptualizations of incidental exposure that – at least partially – recognize the criticism voiced in previous sections of this dissertation. While this section can only be understood as a very brief and selective introduction in some of the competing and finely nuanced perspectives on incidental exposure, it should offer insights into similarities and differences between these approaches and the PINE model. I will later revert back to some of these approaches in the discussion section of this dissertation.

In a similar vein to the PINE model, Wieland and Kleinen-von Königslöw (2020) conceptualize multiple types of incidental exposure: "automatic, incidental, and active" (2020, p. 1050). These three paths correspond to behavioural patterns that are typical for social media: scrolling, stopping to scroll, and opening a link to a news article. This model also borrows the

notion of the relevance appraisal from Knoll and colleagues (2020) to form expectations about content selection during scrolling.

Similar to the PINE model and the model by Wieland and Kleinen-von Königslöw (2020), Kümpel (2020) advocates for distinguishing between attending to and glimpsing at incidentally encountered content. However, Kümpel's model (2020) puts special emphasis on the inequalities regarding the opportunities for incidental exposure as well as the subsequent engagement with incidentally encountered content. The so-called Matthew Effect (the term is borrowed from Merton, 2010) in social media news use "suggest[s] (relative) enrichment among users already interested in news and (relative) impoverishment among those with little or no interest in current affairs information" (Kümpel, 2020, p. 1084).

An ecological model of incidental exposure has been proposed by Weeks and Lane (Weeks & Lane, 2020). In contrast to the PINE model, this model does not explicitly feature testable hypotheses but details interdependencies between various factors in today's media environments. Specifically, the model considers six different levels of factors: cognitive, identity/demographic, environmental perceptions, motivations, social networks, and media systems (Weeks & Lane, 2020). Thus, "it serves as a foundation to help diverse groups of researchers theorize incidental exposure within and across individual and environmental levels" (Weeks & Lane, 2020, p. 1131) and allows "to identify topics of inquiry, generate questions about how factors at different levels might be influential (or interact), or create variables for studies" (Weeks & Lane, 2020, p. 1131).

Others have not offered a specific model to investigate the phenomenon of incidental exposure but argued for a reconceptualization. For example, based on an extensive interview study, Mitchelstein et al. (2020) argue that incidental exposure should be understood as a continuum from most intentional to most incidental practices of media use. They also incorporate the creation of an environment that leads to future news exposure (e.g., following news sources on social media; i.e., personal curation) into their conceptualization. The continuum also includes practices that are theorized in the PINE model, such as "bumping into news incidentally and then choosing to dig in" (i.e., second-level IE, Mitchelstein et al., 2020, p. 1142).

Some scholars also have argued to "zoom out" from incidental exposure. They argue that scholars should rather consider news exposure on social media in more general terms. For example, Thorson (2020) questioned whether incidental and intentional exposure to news are that distinct on social media, given that content selection is also strongly shaped by other factors (e.g., algorithmic curation) than user behaviour and motivations. The PINGS framework (Kümpel, 2022) argues that

"[n]ews experiences on social media are personalized, incidental, non-exclusive, as well as granularized and social (PINGS)" (Kümpel, 2022, p. 224). Thereby, the frameworks reframe incidentality as one of multiple conditions under which news are encountered in social media environments, while putting special emphasis on the interdependencies between the different factors.

While these different conceptualizations of incidental exposure provide a diverse view on the phenomenon, they also fall short of acknowledging some aspects of the phenomenon which are, however, considered by the PINE model. First, some of the models do not differentiate between different processing strategies of incidental exposure content. Second, none of the mentioned models actively acknowledges topic-based incidental exposure. They also fail to provide a reason why scholars should exclusively focus on intention-based incidental exposure, which would be important given that the existence of topic-based incidental exposure is theoretically in line with main assumptions of the research tradition and has been documented in previous empirical research (Pew, 2017; Yadamsuren & Erdelez, 2016). Third, the relevance of non-political information as part of the phenomenon is rarely acknowledged. Moreover, the impact of incidental exposure to non-political information is completely neglected, even though it might affect political outcomes (e.g., by distracting from political processing goals). Fourth, some of the frameworks fall short of formulating testable assumptions about the cognitive processes that follow incidental exposure. Thus, to formulate predictions about these processes, scholars would have to rely on additional theorizing. Due to these shortcomings of other models, this dissertation mainly builds upon the PINE model.

#### 4 Methodological approach

This dissertation's methodological approach is threefold. To address the research gaps identified in the first part of this dissertation, I opted for three quantitative methods: meta-analysis, experimental designs, and (longitudinal) survey designs. The methodological approach in each study is grounded in the research interest. I will now briefly introduce the three methodical approaches and highlight some of the characteristics (e.g., strengths and weaknesses).

**Systematic literature search and meta-analysis**. To address the question regarding the competing findings in the field of incidental exposure, in Study I, I conducted a systematic literature search and synthesized the quantitative empirical findings with meta-analytic methods. Prior to a meta-analysis, scholars have to conduct a systematic literature search. Typically, scholars search bibliographic databases such as Web of Science or Scopus, use "reference chasing", and screen

conference proceedings (e.g., Card, 2012; Glanville, 2019). These approaches favour the inclusion of published studies, while unpublished studies often remain overlooked. Unfortunately, it is wellknown that published studies often differ substantially from unpublished studies – leading to a phenomenon called publication bias. One of these biases is that studies reporting significant findings are more likely to get published than non-significant findings (e.g., de Vries et al., 2018; Simonsohn et al., 2014). Given that it is easier to find published studies with a systematic literature search than other studies (e.g., grey literature, unpublished datasets), this type of publication bias can be a severe threat to meta-analyses (e.g., Card, 2012; Vevea et al., 2019). To soothe this problem, Study I aims to include unpublished manuscripts as well as unpublished relationships from datasets that have been used in publications about incidental exposure. For example, I screened other publications by authors who published on incidental exposure to determine whether the dataset in their incidental exposure studies was used for other publications. If these other publications also included dependent variables of interest for the meta-analysis, I asked the authors to provide the relationships between their incidental exposure measure and the dependent variable of interest. Furthermore, I used methods to investigate for publication bias that are commonly used in meta-analyses in communication science (e.g., Egger et al., 1997; Rosenthal, 1979).

Meta-analyses also offer multiple advantages in comparison to other forms of literature reviews, such as the narrative review (e.g., Borenstein et al., 2009). During the planning of a metaanalysis, scholars must explicitly define the inclusion and exclusion criteria. Normally, scholars lay out their reasoning why they included or excluded studies with a certain set of characteristics. While these decision rules may be criticized by readers, they are transparent. Narrative reviews are often not as explicit about the reasons why some studies receive a lot of space while others are barely mentioned.

Meta-analyses that build upon effect sizes from primary studies can go far beyond narrative reviews regarding summarizing statistical results. "The narrative review has no good mechanism for assessing the consistency of effects" (Borenstein et al., 2009, p. 12). Similarly, there are no clear rules to summarize the statistical significance of effects in narrative reviews. This issues also applies to vote-counting procedures (i.e., counting and comparing the number of significant findings), that are frequently used in communication science (e.g., Boulianne, 2009; Copeland & Boulianne, 2020; Oser & Boulianne, 2020). For example, vote-counting procedures and narrative reviews cannot account for type II error (i.e., falsely accepting the null hypothesis). In research areas that notoriously underpower their studies, such procedures may lead to biased conclusions.

A meta-analysis that extracts statistical information about effect sizes from primary studies can circumvent these problems (Borenstein et al., 2009). There are also multiple other advantages regarding the statistical analysis that cannot be reviewed in detail here (e.g., estimating heterogeneity, accounting for dependency between studies and/or effects sizes, moderator analysis).

Survey design. Complementary to the meta-analysis, I also employed survey methods in two studies. For Study III, I rely on one cross-sectional and three two-wave panel surveys to develop a measurement for first- and second-level incidental exposure and to investigate the relationship between the two levels of incidental exposure and multiple democratically relevant outcomes. Study IV utilizes two of the panel surveys from Study III to study the antecedents of first- and second-level incidental exposure. Survey designs are quite frequently used in incidental exposure research (Matthes et al., 2020; Nanz et al., 2022). However, there are some severe limitations. Self-reported media exposure measures are known to be imprecise, if not biased (e.g., Prior, 2009; Scharkow, 2016, 2019). Given that (first-level) incidental encounters with information - per definition - lack an initial motivation to process the information, concerns about measurement might be amplified in this area of research. For example, politically interested individuals might be more likely to recall incidental exposure to political information than less interested individuals. Nonetheless, survey studies may shed some light on the phenomenon. Panel surveys allow additional insights in relationships, stability and dynamics. Panel survey analysis with autoregressive effects goes beyond mere correlations. Causal identification is not possible with the panel surveys used in this dissertation, given that there is a variety of assumptions (Angrist & Pischke, 2009; Cunningham, 2021) that may not hold in most panel survey designs. In contrast to most experimental research, surveys may offer more ecological validity.

**Experimental design.** Random allocation to treatment group(s) and control group(s) allows scholars to investigate causal effects with experimental designs (e.g., Holland, 1986). To study the effects of first- and second-level incidental exposure, I conducted two online experiments (Study II, Study V). In both studies, respondents were exposed to a mock website featuring multiple news headlines. Similar to real websites, respondents were able to view the full articles by clicking on the headline. Exposure measures (collected with JavaScript code) and knowledge assessed right after exposure were the outcome measures. Clearly, such designs do not allow any inference regarding the longevity of effects of incidental exposure. Also, given that today's media environments are much more complex (e.g., content is often accompanied by multiple diverse cues, unknown processes of algorithmic curation), such a simple experimental design may lack
ecological validity. Nonetheless, given that there was no empirical test of the PINE model's predictions prior to this dissertation, a rather basic but internally valid experimental design must be the first step in a research program dedicated to theory testing.

## 5 Study I: Nanz & Matthes (2022a)

Nanz, A., & Matthes, J. (2022). Democratic consequences of incidental exposure to political information: A meta-analysis. *Journal of Communication*, 72(3), 345–373. doi:10.1093/joc/jqac008

## ORIGINAL ARTICLE

# Democratic Consequences of Incidental Exposure to Political Information: A Meta-Analysis

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In the last two decades, communication research dedicated substantial attention to the effects of incidental exposure (IE) to political information. In this meta-analysis, we analyzed the relationship of IE and five outcomes relevant for democracies. Including 106 distinct samples with more than 100,000 respondents, we observed positive cross-sectional relationships between IE and news use, political knowledge, political participation, expressive engagement, and political discussion. These effects shrink substantially but remain significant for panel studies. While we found a stronger relationship with knowledge for experiments compared to surveys, the relationship between IE and discussion and participation was not significant for experiments. Overall, findings suggest that IE matters, but its effects are smaller and more nuanced than previously thought. Also, the effects of IE are strongest when there is congruence between the exposure setting and the outcome setting. We discuss theoretical and methodological implications for IE research and the field at large.

Keywords: Incidental Exposure, Meta-Analysis, News Use, Political Discussion, Political Knowledge, Political Participation, Political Expression

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Most democratic theories rest on the idea that the electorate reads, discusses, and knows about politics (Ferree et al., 2002). In that context, exposure to political news plays a crucial role. However, not all citizens are interested in actively pursuing behaviors that empower them to learn about the political sphere. As a consequence, communication scholars became increasingly interested in unintentional forms of political information consumption (e.g., Tewksbury et al., 2001; Valeriani & Vaccari, 2016). Especially on social media, citizens are likely to encounter political information by chance, that is, without intentionally looking for it.

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This phenomenon, called incidental exposure (IE)-exposure to news that people encounter without actively searching for it-has become increasingly relevant in political communication research. Although the potential positive effects of IE have been noted more than 50 years ago (e.g., Downs, 1957; Krugman & Hartley, 1970), the rise of social media has renewed the interest in the phenomenon of IE. In order to explain how IE shapes civic outcomes, work on IE often draws on passive learning as a theoretical mechanism (e.g., Tewksbury et al., 2001; Valeriani & Vaccari, 2016). However, the current body of research does not allow clear conclusions if and how IE shapes democratic citizenship. While some studies suggest positive effects of IE on knowledge or participation (e.g., Valeriani & Vaccari, 2016), others observed no (e.g., Oeldorf-Hirsch, 2018), or conditional relationships (e.g., Lee & Kim, 2017). Recently, scholars suggested that particularly interested and engaged individuals may experience and profit from IE (e.g., Kümpel, 2020). Thus, a reliance on cross-sectional surveys in the field might disguise whether IE can actually benefit democratic outcomes. In addition, there is a plethora of different outcomes and study designs, and hence, the literature lacks a clear synthesis of the existing evidence.

A meta-analysis on the democratic consequences of IE can advance our understanding of how political information contributes to an active and informed citizenship. First, IE can serve as a gateway to intentional forms of *news use*, as for instance, when individuals stumble upon political information and then turn to intentional forms of news use. In line with that, IE can be theorized to foster *learning of political information* because citizens are exposed to bits of information they were not intentionally looking for. By the same token, IE may affect *political engagement* such as political participation, expression, and discussion, because exposure to new information is a key driver of getting politically involved.

A meta-analysis is a milestone to better understand these outcomes, it helps to systematically examine the conditions for statistical relationships, and it is indispensable for theory building and conceptual development (Rains et al., 2020). It can guide future research in the area toward new questions which have hardly been discussed in previous studies (e.g., comparing different media types on which IE occurs). Furthermore, without relying on potentially subjective narrative reviews or vote counting procedures, a meta-analysis allows researchers to overview the massive bulk of research that has been generated in the last decades based on formal statistical analysis. In addition, a meta-analysis can allow conclusions about the role of different research approaches in observing outcomes of IE. Against this background, we analyzed, for the first time, the entire body of available research on IE, including research from 106 samples, with more than 100,000 respondents.

## Conceptualizing incidental exposure

A share of the population is not particularly interested in politics or does not really follow political news. Without active exposure to the political discourse, these

individuals do not encounter opportunities to become engaged or learn about politics. Thus, communication scholars directed their attention to the potentially beneficiary effects of IE. It has been argued that IE may happen through a variety of sources ranging from interpersonal discussion to entertainment media (e.g., Downs, 1957). Particularly after broadcast TV became popular, the mixing of entertainment programs and political information was regarded as a way that can inform less interested parts of the public. However, some argued that the increasing number of TV channels and choices would also allow audiences to avoid opportunities for IE (Prior, 2007). Today, online media offer additional pathways for IE (e.g., Wojcieszak & Mutz, 2009). Particularly, social media users do not have full agency over content selection. Algorithms or network characteristics affect the mash of information (Thorson & Wells, 2016).

Most scholars consider situations in which "people inadvertently consume news and information [...] when they are not actively seeking it" (Kim et al., 2013, p. 2608) as IE. Building on this, a few more fine-grained approaches emerged as well (e.g., Kümpel, 2020; Matthes et al., 2020; Wieland & Kleinen-von Königslöw, 2020). In line with previous work, we define IE as consisting of two aspects that are generally agreed upon. First, IE has to be unintentional, that is, encounters with information have to happen without individuals actively looking for the information. Second, given that we are concerned with variables that are related to democratic outcomes, IE refers to exposure to political information. That is, serendipitous encounters with non-political information are clearly not of interest. Thus, we define IE as *exposure to political information that individuals did not intend to be exposed to*.

#### Effects of incidental exposure

IE has been related to various democratically relevant outcomes: news use (e.g., Strauß et al., 2020), political knowledge (e.g., Lee et al., 2022), political participation (e.g., Heiss & Matthes, 2019), political expression (e.g., Yamamoto & Morey, 2019), and political discussion (e.g., Kwak et al., 2020). In explaining the effects of IE, research builds on established theories of political information processing. For example, the cognitive mediation model (Eveland, 2001) or various forms of the OSROR model (e.g., Cho et al., 2009) are prominently featured in IE research (e.g., Chen et al., 2022; Oeldorf-Hirsch, 2018; Yamamoto & Morey, 2019). Only recently, more nuanced theoretical accounts found their way into the literature (e.g., Kümpel, 2020; Matthes et al., 2020). The Political Incidental News Exposure model (PINE; Matthes et al., 2020), for instance, posits two distinct levels of IE. First-level IE describes the "passive scanning of information deemed as irrelevant" (Matthes et al., 2020, p. 1035), while second-level IE refers to the effortful processing of incidentally encountered information appraised as relevant (see also Nanz & Matthes, 2020). When not appraised as relevant (i.e., first-level IE), IE may still affect democratic outcomes because individuals must process at least fragments of the information to

check for its relevance. Theories of passive learning, accessibility or goal-priming can help to understand effects of first-level IE. Yet when individuals appraise IE content as relevant, more attention and cognitive resources are dedicated to the processing of the information. In this case, next to cognitive accessibility, theories of elaboration and intentional learning aid to explain the effects of IE. The model helps to explain why IE may influence news use, political knowledge, political participation, expressive engagement, and political discussion.

#### News use

It has been argued that IE can act as a catalyst for intentional news use (e.g., Strauß et al., 2020). That is, incidentally encountered information may spark interest, and as a consequence, individuals intentionally tune in for news. In a qualitative study, Boczkowski et al. (2018) report of a young man who "said he regularly visits '9gag . . . and it happened to me a lot that I find out news there . . . [then] I always turn to online newspapers or websites" (p. 3532). In another study, participants reported that they encountered an interesting story incidentally but did not have the time to read it in a given moment, yet they turned to news media intentionally later (Antunovic et al., 2018). In other words, the quick scanning of incidentally encountered information may catch individuals' attention which urges them to seek out political information (Karnowski et al., 2017). In line with this, a longitudinal experiment by Feezell (2018) suggests that exposure to information about political issues on Facebook can increase issue salience. In summary, IE can raise the awareness for political matters which in turn motivates individuals to subsequently seek out political information intentionally. Thus, we assume:

#### H1: There is a positive relationship between IE and news use.

Next to offline media, online news media and social media play a considerable role in news diets. Importantly, the hypothesized relationship (H1) between IE and news use may differ for various media. On the one hand, technical affordances may shape such differences. Most social media platforms use algorithms to select the content shown to individuals based on their previous behavior (Thorson & Wells, 2016). Due to algorithmic curation, individuals experiencing IE that click on the content may see additional political content. The increased amount of political news in one's newsfeed can transform the platform into an increasingly suitable way of getting political information intentionally. Thus, especially social media news use might be increased by IE. On the other hand, one could argue that individuals might prefer turning to offline media and online versions of legacy media after IE because these media sources are, by and large, comparatively high in trust. In fact, a Pew poll showed that only 3% have "a lot" and only 31% of users have "some" trust in information from social media (Pew, 2017). Thus, even though IE may raise awareness of political issues, individuals might be inclined to turn to traditional offline media for additional information. Besides, offline media may offer in-depth information,

and thus serve information needs more directly compared to social media. Given these competing theoretical arguments and a lack of prior research (but see Strauß et al., 2020), we state a research question.

RQ1: Does the relationship between IE and news use differ for offline news use, online news use, and social media news use?

#### Political knowledge

The argument that individuals may accumulate political knowledge through IE has been echoed for decades (e.g., Downs, 1957; Tewksbury et al., 2001). According to Matthes and colleagues (2020), first-level IE, which is the brief scanning of incidentally encountered political information, may lead to learning because parts of the IE content are processed by individuals to determine whether the content is relevant. Scholars often refer to the theory of passive learning (Krugman & Hartley, 1970) to explain why IE can foster the public's political knowledge. Given both, a lack of intention to learn and absence of resistance to learn, individuals may absorb information by passive learning. Experimental research suggests that individuals can recognize IE content even when they were instructed to attend to another task during exposure (Lee & Kim, 2017). Thus, IE can leave memory traces.

Second-level IE may lead to more substantial learning (Nanz & Matthes, 2020). Sometimes individuals are exposed to information that they were not actively looking for but which is relevant for them. In this case, individuals appraise content as relevant and attend to it. For example, incidentally encountered headlines may spark interest while users log into their email accounts and distract from the initial task (checking emails). Second-level IE leads to more intensive processing and elaboration of IE content. In turn, elaboration and thorough processing leads to increased knowledge (e.g., Eveland, 2001). Both paths have not been sufficiently distinguished in prior empirical research on IE which might explain the mixed findings. While some researchers report positive relationships (e.g., Weeks et al., 2022), other find no or even negative relationships (e.g., Oeldorf-Hirsch, 2018). Nonetheless, based on the prior theorizing, we expect that IE has a positive relationship with knowledge.

H2: There is a positive relationship between IE and political knowledge.

#### Political participation and expressive engagement

Political participation is one of the key outcome variables in research on IE (e.g., Nanz et al., 2020; Valeriani & Vaccari, 2016). On social media, algorithms and other users may supply individuals with mobilizing information tailored to their interests. Previous work particularly draws on theoretical explanations derived from research on intentional news use. Research shows that participation is fostered by (intentional) news consumption because it provides issues for interpersonal discussions and new information that adds to citizen's knowledge (e.g., Cho et al., 2009;

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Delli Carpini & Keeter, 1996). Scholars argued that similar effects should occur in case of IE (e.g., Kim et al., 2013; Valeriani & Vaccari, 2016).

Media consumption leads to knowledge gains and higher levels of political knowledge are connected to higher levels of political participation (e.g., Delli Carpini & Keeter, 1996). Other studies explicitly refer to political discussion and expression as mediators leading to political participation (Yamamoto & Morey, 2019). IE may not only increase political participation by providing individuals with (factual) knowledge, it may also foster political discussion and expression, which in turn, drives political participation. As psychological mechanisms, thorough processing of information, goal priming, or agenda-setting may explain the relationship between IE and participation (Feezell, 2018; Knoll et al., 2020). Overall, we expect a positive relationship between IE and political participation.

#### H3: There is a positive relationship between IE and political participation.

Scholars often distinguish between offline and online acts of participation. While offline participation includes, for example, signing paper petitions or joining protests, online participation encompasses acts like joining online groups that supports political causes or signing online petitions. There are two reasons why we expect that IE's relationship with online participation is stronger than with offline participation. First, online political participation is sometimes described as being connected with less effort than offline participation. Some acts of participation are easier to conduct or more accessible via the internet than in the offline world. For example, sending a written letter might need more resources (e.g., stamp, time) than sending a message to a politician via social media.

Second, when individuals experience IE in an online environment, they are often simultaneously presented with opportunities that can qualify as online participation (e.g., signing online petitions, contacting a politician). In contrast to offline participation, individuals often do not have to leave the situation in which IE occurred (e.g., they must not leave the house, put down their mobile phones) in order to participate online.

# H4: The relationship between IE and online political participation is stronger than the relationship between IE and offline political participation.

A related but distinct democratic outcome encompasses expressive acts such as sharing political news or opinion expression on social media. Building upon the refined "conceptual map of political participation" by Theocharis and van Deth (2018), we distinguish between behavior which we will call *expressive engagement* and *political participation* in this article. Theocharis and van Deth (2018) distinguish between *targeted* definitions of participation, which align closely with more traditional definitions of political participation (e.g., Brady, 1999), and *circumstantial* definitions that account for the context and motivation of a given behavior. While we consider acts targeted at political actors, community problems and, more

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generally, the political sphere (i.e., targeted definition) as political participation, we label acts to which the circumstantial definition applies (i.e., political context or motivation) as expressive engagement (e.g., sharing political news, posting political thoughts). Even though some researchers doubt the real-world impact of expressive engagement (for a review, see Skoric, 2012), expressive behavior itself is believed to have substantive effects on various antecedents (e.g., attitude strength, clarity; Pingree, 2007) of more impactful participation. In general, we expect that similar mechanisms as described above for participation should be responsible for a positive relationship between IE and expressive engagement. Namely, IE may foster antecedents of expression such as awareness and knowledge about political topics.

#### H5: There is a positive relationship between IE and expressive engagement.

Ranging from wearing buttons of a party to sharing personal political experiences on social media, researchers have operationalized various acts of expressive engagement (Heiss & Matthes, 2019; Lee & Xenos, 2022). Differentiating between these forms may be crucial when the potential political impact is considered. For example, writing a lengthy post about one's policy stances on social media—and thereby putting substantial effort in message composition—might affect subsequent behaviors more intensively than merely passing on a link (Pingree, 2007). To our knowledge, there is not sufficient theorizing about differential relations between IE and these types of expressive engagement. Thus, we ask:

RQ2: Does the relationship between IE and different forms of expressive engagement differ?

#### **Political discussion**

Given that the idea of a "new" public sphere created by the internet and social media (e.g., Dahlgren, 2005) was (and is) highly influential for research on IE, we believe that it makes sense to distinguish between political discussion and forms of expressive engagement. "[R]esearch has largely conceived of political discussion as an informal, voluntary communicative interaction between ordinary citizens" (Cho, 2015, p. 1). Thus, while engaging in a political discussion must always be accompanied with some form of political expression, *expression can occur without one of the core features of political discussion*. We argue that mere expression lacks "the opportunity for discussants to be exposed to other opinions and values" (Stromer-Galley, 2017, p. 841) in an interactive manner. Theoretical accounts on expression mainly focus on the effects on the sender (Pingree, 2007). However, the deliberative potential of political discussion stems not only from expression effects but also the free flow of thoughts between individuals and the critical examination of arguments from other discussants (i.e., discursive interaction).

Although most studies conceptualize political discussion as a mediator between IE and political knowledge or participation, it makes sense to look at political

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discussion on its own. Similar to the rationale regarding participation and expressive engagement, theoretical explanations for a relationship between IE and discussion are rooted in news consumption research. Various studies showed that intentional news use fosters political discussion (e.g., Mondak, 1995). Similarly, OSROR models expect that an individual's news consumption is a predictor of political discussion (Cho et al., 2009). Media use can "provide the basis for political discussion" (Shah et al., 2005, p. 535). For example, the consumption of political information can hand individuals content they can discuss about in their network. Thus, IE to political information may also motivate individuals to discuss political issues (Ardèvol-Abreu et al., 2019). Overall, there are strong theoretical arguments that IE should be positively related to political discussion.

H6: There is a positive relationship between IE and political discussion.

#### Media types

Researchers discussed IE on offline media (e.g., Barnidge, 2020), online media (e.g., Tewksbury et al., 2001), and social media (e.g., Lee, 2018). TV viewers may incidentally watch news updates in a football game's half time break, internet users may stumble upon political headlines while visiting their email provider's website, and social media users can come across a friend's political post while they are looking for updates on their hobbies. However, to our knowledge, hardly any study considered that the relationship of IE with various outcomes may differ depending on the media on which IE is experienced. The majority of studies on IE looked at only one media or even mixed multiple media types into one scale (e.g., Park, 2019). In Oeldorf-Hirsch's (2018) study, respondents reported equally high IE scores for multiple sources-including online, social, and traditional media. However, just the prevalence of IE (i.e., whether individuals experience more IE via one media type than the other) does not necessarily affect the effect's magnitude. Next to other factors, the characteristics of the political content available (e.g., length, emotionality), the consumption situation (e.g., couch, in the bus), and various attitudes and behaviors (e.g., likelihood of second-level IE) connected to using a certain media type may influence the relationship.

Clearly, several explanations for differences between the media types are possible. TV, newspapers, and radio could promote learning more than online and social media by offering a larger share of factual information. In contrast, social media and the internet may offer more opportunities (e.g., clicking on links) to engage with and elaborate on IE content than linear media. To our knowledge, there is no previous theorizing about this. Because the current research does not allow us to state hypotheses regarding media types, we ask:

RQ3: Do the relationships between (a) news use, (b) political knowledge, (c) political participation, (d) expressive engagement and (e) political discussion and IE online, IE on social media, and IE offline differ?

#### Methodological characteristics

Public opinion scholars noted that typical (survey) experiments may lead to larger effect sizes than researchers find in the real-world (e.g., Barabas & Jerit, 2010; Gaines et al., 2007). There are also multiple reasons for this assumption when it comes to the comparison between experiments manipulating IE and survey research on IE. First, experiments may use unrealistically strong treatments. For example, experiments might expose respondents to a limited set of content within a time-frame of 15 minutes before assessing the dependent variable. However, on a given day, individuals may encounter hundredths of pieces of information. Some of them might even contradict each other. Second, experiments lack the randomness of actual exposure to content that can be theoretically expected to affect the dependent variable. For instance, survey respondents can encounter a lot of political information incidentally but may not see a specific piece of information (e.g., an article mentioning the unemployment rate) that can be expected to affect the dependent variable (e.g., knowing the unemployment rate). Thus, we state the following hypothesis.

H7: The relationship between IE and (a) news use, (b) political knowledge, (c) political participation, (d) expressive engagement, and (e) political discussion are larger in experiments than in cross-sectional surveys.

In general, the question of causality is a reoccurring issue in meta-analyses. Great reliance on cross-sectional research may lead to an overestimation of effects. For example, a substantial share of a correlation between the independent and the dependent variable could be due to a third variable (e.g., political interest) that affects both variables. Unfortunately, testing cross-sectional coefficients against panel coefficients can be problematic (see Online Appendix F). Additionally, finding evidence that longitudinal studies produce smaller effect sizes than cross-sectional ones would not necessarily render the effect inconsequential, trivial, or meaningless. Thus, in RQ4, we specifically ask whether estimates which account for the level of the dependent variable in the prior wave are statistically distinguishable from zero.

RQ4: Is there a positive effect of IE on (a) news use, (b) political knowledge, (c) political participation, (d) expressive engagement, and (e) political discussion for semipartial correlations stemming from panel surveys?

#### Method

#### Study retrieval and selection

We conducted a systematic search in June 2021 in the following databases: Web of Science, Communication and Mass Media Complete, ScienceDirect, PsycInfo, and Scopus.<sup>1</sup> Additionally, we checked the manuscripts' references, web pages of scholars, reviewed all papers citing the influential paper by Tewksbury et al. (2001) on Google Scholar, and screened the program of the last two annual conferences of

ICA, APSA, and AEJMC. In sum, we found 866 results. After removing duplicates, a list of 572 records remained.

A figure laying out the steps for study selection is available in Online Appendix A. In the first step, we excluded records that (a) did not use survey or (quasi-)experimental designs, (b) were not in English or German, and (c) were clearly unrelated to our research goal.<sup>2</sup> Based on these criteria, we excluded 351 studies.<sup>3</sup> The second step concerned three aspects. First, the remaining records were reviewed and all records unrelated to our research interest were discarded. Second, the operationalization of IE must be a measure for or manipulation of exposure to political information or news. Multiple studies discuss IE in the hypothesis section but operationalized general media use variables. Such studies were excluded, because these measures are clearly uninformative about IE.<sup>4</sup> Similarly, studies that did not explicitly refer to IE to political information, news, or public affairs were excluded. Third, the operationalization of IE must clearly portray the incidental nature of the information encounter. We only included operationalizations and measures that clearly depicted that information encounters were unintended.<sup>5</sup> Experiments that (a) made sure that respondents pursued a task or goal unrelated to the IE content during exposure, (b) showed respondents a stimulus with at least 50% non-political content (e.g., Bode, 2016), or (c) were a field experiment and manipulated the (amount of) exposure to political information were not discarded (e.g., Feezell & Ortiz, 2021).<sup>6</sup> In the second step, we excluded 159 records.

In the final step, we excluded 16 records that used samples that were already in our database but did not add to the number of coefficients.<sup>7</sup> Then, we contacted all authors from which we needed additional information. In eight cases, authors did not provide the requested information or did not respond to our request. In the third step, 24 studies were excluded because of (a) duplicated samples or (b) missing statistical data. Additional to the samples featured in the 38 records,<sup>8</sup> we searched Pew's website for additional samples including IE measures. We found six samples not featured in any of the records (see Online Appendix G). This meta-analysis builds upon statistical information from 106 distinct independent samples.

#### Retrieving and calculating effect sizes

We used Pearson's r and semipartial correlation sr as effect sizes. A positive r respectively sr indicates that (more) IE is related to a higher score on the dependent variables. At first, we identified all relevant variables for each sample. Few papers linked to open data or reported all information necessary for inclusion. For all the other records, we contacted the authors and asked them to provide additional statistical information. For some studies, we calculated the statistical information on our own. We calculated r for all relationships. For panels, we additionally calculated sr. Details regarding the process of retrieving and calculating effect sizes are available in Online Appendix C.

#### Moderators

#### Variation in the dependent variable

We coded five different types of news use: Offline news use (e.g., TV news, print newspaper, radio), online news use (e.g., online newspapers, news aggregators, "getting news in the internet"), social media news use (e.g., getting news from Facebook), mixed news use (i.e., items measuring online *and* offline news use; e.g., "did you read the newspaper online or offline?"), and other forms of news use (e.g., time used to get news, getting news in person). The last category was not included in the moderator analysis due to substantial heterogeneity in measurement. For samples assessing political participation<sup>9</sup>, we distinguish between two measures of participation: Online and offline participation. For expressive engagement, we distinguish between offline acts (e.g., wearing a button of a party), consumerism, political expression involving message composition, and sharing of political information (see Online Appendix E for details).

#### Media of incidental encounters

We coded four categories to distinguish different media types to which the IE measure referred to: offline IE (e.g., TV, print newspapers, and radio), online IE (e.g., websites or "internet"; we also included scales that mixed various online media sources next to social media items in this category), IE on social media (e.g., Facebook, Twitter), and other forms (e.g., in person, no media mentioned, scales that mix online and offline media). The last category was excluded from the moderator analysis.

#### Design

We distinguish survey samples (n = 41 cross-sectional; n = 46 at least some panel coefficients), and (quasi-)experimental samples (n = 19).

#### Analysis procedure

Since the five outcome variables are distinct, we conducted five separate metaanalyses. All analyses were conducted in R with the package *metafor* (Viechtbauer, 2010). We converted r and sr to Fisher's z (Zr; Borenstein et al., 2009; Card, 2012). We present Fisher's z next to r, respectively sr, which was converted back from Fisher's z after the analysis using the formula by Lipsey and Wilson (2001). Given that our data are nested,<sup>10</sup> we ran multi-level meta-analyses (Assink & Wibbelink, 2016).<sup>11</sup> Along the average effect size, we also present the  $I^2$  and Q statistics (Borenstein et al., 2009).<sup>12</sup> For the moderator analyses,<sup>13</sup> we added fixed-effects to the random-effects model used for the overall effect analyses. Running multi-level meta-analysis is one but not the only recommended way to account for dependent effect sizes in meta-analyses. Thus, we checked the robustness of all our hypothesis and RQ tests by recalculating the models with robust variance estimates (RVE; *metafor*'s robust function; Hedges et al., 2010). In case, the results differed, we reported this in the text.

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Some meta-analysts recommend against including different types of effect sizes into one analysis (e.g., Aloe & Thompson, 2013). Thus, in the first set of analyses, we used the cross-sectional correlation between the dependent from W1 and the IE measure from W1 for panel surveys. For RQ4, we re-ran the overall effect size analyses with panel surveys only using the semipartial correlation as effect size.<sup>14</sup> For a publication bias analysis, we present fail-safe N,<sup>15</sup> funnel plots<sup>16</sup> (in Online Appendix A), and Egger's regression test (Egger et al., 1997). Prior to the publication bias analysis, we calculated a weighted mean for each study that reported multiple effect sizes due to conflicting recommendations how these typical methods investigating publication bias can be applied to multi-level meta-analyses.

#### Results

In the overall effect analysis for news use, we found a positive relationship, r = .26, Zr = 0.26, p < .001 (95% CI = [0.20, 0.33]). H1 was supported. We found significant heterogeneity (Q(669) = 19172.47, p < .001). Total variability was due to within-study ( $I^2 = 53.06\%$ ) and between-publication variability ( $I^2 = 44.57\%$ ). In RQ1, we asked whether the effect of IE differ for offline news use, online news use, and social media news use. A moderator analysis yielded significant differences ( $\chi^2(3) = 87.16$ , p < .001). We found the largest effect sizes for social media news use (r = .36, Zr = 0.37, 95% CI [0.30, 0.45]). This relationship was significantly larger than the one with online news use (r = .29, Zr = 0.30, 95% CI [0.23, 0.37]; z = -3.94, p < .001), offline news use (r = .19, Zr = 0.20, 95% CI [0.13, 0.26]; z = -8.69, p < .001), and the mixed category (r = .25, Zr = 0.25, 95% CI [0.17, 0.33]; z = -4.61, p < .001). IE and online news use were more strongly related than IE and offline news use (z = -5.41, p < .001). The other comparisons did not yield significant differences.

Turning to political knowledge, we found a positive and significant relationship, r = .11, Zr = 0.11, p < .001 (95% CI = [0.05, 0.17]). H2 was supported. We found significant heterogeneity (Q(112) = 1736.31, p < .001;  $I^2$  level 2 = 41.1%,  $I^2$  level 4 = 54.96%).

For political participation, we found a positive relationship with IE, r = .13, Zr = 0.13, p < .001 (95% CI = [0.08, 0.18]). H3 was supported. We found significant heterogeneity, (Q(493) = 9881.96, p < .001;  $I^2$  level 2 = 38.8%,  $I^2$  level 3 = 12.87%,  $I^2$  level 4 = 45.02%) A moderator analysis ( $\chi^2(1) = 9.75$ , p = .002) showed that IE affects online participation (r = .17, Zr = 0.17, 95% CI [0.11, 0.23]) significantly stronger than offline participation (r = .12, Zr = 0.12, 95% CI [0.07, 0.17]). H4 was supported. However, this finding was not fully robust, given that the moderation did not remain significant when using RVE.

In line with H5, we found a positive relationship with expressive engagement, r = .23, Zr = 0.23, p < .001 (95% CI = [0.16, 0.30]). We found significant heterogeneity, (Q(310) = 12654.21, p < .001;  $I^2$  level 2 = 57.7%,  $I^2$  level 3 = 15.98%,  $I^2$  level 4 = 24.41%). We ran a moderator analysis for RQ2, yielding significant results

 $(\chi^2(3) = 10.57, p = .014)$ . The relationship of IE with offline expression (r = .10, Zr = 0.10, 95% CI [-0.02, 0.21]) was significantly smaller than the one with online expression (r = .24, Zr = 0.24, 95% CI [0.17, 0.32]; z = 2.88, p = .004) and sharing (r = .24, Zr = 0.25, 95% CI [0.17, 0.33]; z = 2.85, p = .004). The other comparisons did not yield significant differences.

For political discussion (H6), we also found a positive relationship with IE, r = .22, Zr = 0.22, p < .001 (95% CI = [0.16, 0.29]). Again, significant heterogeneity was found (Q(108) = 6186.95, p < .001;  $I^2$  level 2 = 75.69%,  $I^2$  level 4 = 22.46%).

We ran five moderator analyses with respect to the media type on which IE happened (RQ3). We found a significant moderation for news use (RQ3a,  $\chi^2(2) = 12.83$ , p = .002). A post-hoc comparison showed that offline IE (r = .18, Zr = 0.18, 95% CI [0.09, 0.27]) affected news use less than IE on social media (r = .27, Zr = 0.28, 95% CI [0.20, 0.36]; z = -2.89, p = .004) and online IE (r = .26, Zr = 0.27, 95% CI [0.19, 0.35]; z = -3.32, p < .001). Turning to expressive engagement (RQ3d), we found a significant moderation effect ( $\chi^2(1) = 16.30$ , p < .001). We found a significant difference for social media IE (r = .29, Zr = 0.30, 95% CI [0.23, 0.38]) and online IE (r = .13, Zr = 0.13, 95% CI [0.05, 0.21]; z = 4.04, p < .001). For the other outcomes, we did not find differences regarding the media type on which IE occurred (political knowledge (RQ3b):  $\chi^2(1) = 1.51$ , p = .220; participation (RQ3c):  $\chi^2(1) = 0.36$ , p = .547; discussion (RQ3e):  $\chi^2(1) = 0.12$ , p = .726).

H7 expected that the relationship between IE and the five democratic variables should be larger for experiments than surveys. Due to the lack of experiments measuring expressive engagement and news use, we tested this hypothesis only for the other three variables. Moderator analyses presented in Table 2 show that experiments report larger effect sizes than surveys for political knowledge ( $\chi^2(1) = 10.44$ , p = .001). H7b was supported. We found smaller estimates for experiments than surveys measuring discussion and participation. H7c and H7e were rejected. The moderator analyses for discussion ( $\chi^2(1) = 3.81$ , p = .051) and participation ( $\chi^2(1)$ ) = 2.55, p = .110) were not significant—even though this finding is not fully robust given that both moderator analyses were significant when we used RVE. Notably, the subgroup estimates for experiments measuring discussion (r = .05, Zr = 0.05, 95% CI [-0.14, 0.23]) and participation (r = .00, Zr = 0.00, 95% CI [-0.16, 0.17]) were both not significant. In the next analysis for RQ4, we only used semipartial correlations from panel surveys (see Table 3). Even in panel surveys, IE had a positive effect on all five dependent variables (news use: r = .05, Zr = 0.05, p < .001(95% CI = [0.03, 0.07]); political knowledge: r = .02, Zr = 0.02, p = .012 (95% CI = [0.004, 0.03]; political participation: r = .05, Zr = 0.05, p < .001 (95% CI = [0.03, 0.05]0.08]); expressive engagement: r = .07, Zr = 0.07, p < .001 (95% CI = [0.04, 0.10]); political discussion: r = .10, Zr = 0.10, p < .001 (95% CI = [0.05, 0.15])). Semipartial and bivariate correlations are both constrained between 0 and 1. We can observe that the effect sizes for panels were substantially smaller than the ones from cross-sectional studies.

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Meta-Analysis of Incidental Exposure

	Ч	Numb	er of									$I^2$ for <sup>a</sup>	
Outcome	Res.	ES	Stu.	Pub.	r	Zr	95% CI	Ζ	Р	Q	Level 2 (%)	Level 3 (%)	Level 4 (%)
News use	77,502	670	88	27	.26	0.26	[0.20, 0.33]	7.73	<.001	19172.47	53.06***	0.00	44.57
Political knowledge	50,707	113	99	27	.11	0.11	[0.05, 0.17]	3.51	<.001	1736.31	$41.10^{***}$	0.00	$54.96^{**}$
Political participation	62,181	494	54	22	.13	0.13	[0.08, 0.18]	4.86	<.001	9881.96	$38.80^{***}$	$12.87^{***}$	$45.02^{***}$
Expressive engagement	52,017	311	47	18	.23	0.23	[0.16, 0.30]	6.50	<.001	12654.21	$57.70^{***}$	$15.98^{***}$	$24.41^{*}$
Political discussion	63,916	109	58	23	.22	0.22	[0.16, 0.29]	6.60	<.001	6186.95	75.69***	0.00	22.46
Note. Res. = number	of respon	dents;	ES =	numb	er of e	effect s	izes; Stu. = n	umber	of studi	es; Pub. =	number of pu	iblication clus	ters; $r =$

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correlation (calculated from Zr); Zr = Fisher's Z; 95% CI = 95% confidence interval for Zr; Z = Z test value; p = p-value; Q = weighted

squared deviations from the mean;  $I^2 =$  proportion of variance for the respective level. <sup>a</sup>stars denote significance level of the log-likelihood test comparing the final model with a model with  $s^2$  constrained to zero for the respective level.

\*\*\*p < .001, \*\*p < .01, \*p < .05.

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Table 2. Moderator Analyse	es									A. N
			Estimate	for moderator lev	el		Moderato	ır analysis		lanz &
	k	r	Zr	95% CI	Ь	Est.	95% CI	test	ב. וע ב	& J. N
News use								$\chi^2$ (3) = 87.16	<.001	lattl
Offline news use	191	.19	0.20	[0.13, 0.26]	<.001				les	hes
Online news use	173	.29	0.30	[0.23, 0.37]	<.001	0.10	[0.07, 0.14]			
Social media news use	151	.36	0.37	[0.30, 0.45]	<.001	0.18	[0.14, 0.22]			
Mixed news use	131	.25	0.25	[0.17, 0.33]	<.001	0.06	[-0.00, 0.11]			
Political participation								$\chi^2$ (1) = 9.75	.002	
Online participation	73	.17	0.17	[0.11, 0.23]	<.001					
Offline participation	385	.12	0.12	[0.07, 0.17]	<.001	-0.05	[-0.08, -0.02]			
Expressive engagement								$\chi^2(3) = 10.57$	.014	
Offline	14	.10	0.10	[-0.02, 0.21]	760.					
Consumerism	38	.20	0.20	[0.11, 0.29]	<.001	0.10	[-0.01, 0.22]			
<b>Online Expression</b>	159	.24	0.24	[0.17, 0.32]	<.001	0.15	[0.05, 0.25]			
Sharing	100	.24	0.25	[0.17, 0.33]	<.001	0.15	[0.05, 0.26]			
News use								$\chi^2(2) = 12.83$	.002	
Online IE	197	.26	0.27	[0.19, 0.35]	<.001					
Social media IE	178	.27	0.28	[0.20, 0.36]	<.001	0.01	[-0.05, 0.07]		IVIC	Me
Offline IE	90	.18	0.18	[0.09, 0.27]	<.001	-0.09	[-0.14, -0.04]		ta-r	ta-A
Political knowledge								$\chi^{2}(1) = 1.51$	.220	Anal
Online IE	35	.15	0.15	[0.06, 0.24]	.002				ysis	vsis
Social media IE	35	.10	0.10	[0.01, 0.18]	.021	-0.05	[-0.13, 0.03]		UI.	of
Political participation								$\chi^2(1)=0.36$	.547	Inci
Online IE	83	.15	0.15	[0.07, 0.23]	<.001				uen	den
Social media IE	139	.12	0.12	[0.06, 0.19]	<.001	-0.03	[-0.12, 0.06]			tal Exp
								Co	ntinued	osure

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Table 2. Continued

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		2	Estimate	for moderator leve	el el		Moderat	or analysis	
	k	r	Zr	95% CI	Р	Est.	95% CI	test	Р
Expressive engagement								$\chi^2(1) = 16.30$	<.001
Online IE	65	.13	0.13	[0.05, 0.21]	.002				
Social media IE	94	.29	0.30	[0.23, 0.38]	<.001	0.17	[0.09, 0.26]		
Political discussion								$\chi^2(1)=0.12$	.726
Online IE	24	.20	0.21	[0.10, 0.32]	<.001				
Social media IE	50	.23	0.23	[0.14, 0.31]	<.001	0.02	[-0.11, 0.15]		
Political knowledge								$\chi^2(1) = 10.44$	.001
Cross-sectional	92	.05	0.05	[-0.01, 0.12]	.123				
Experiment	21	.21	0.22	[0.13, 0.30]	<.001	0.17	[0.07, 0.27]		
Political participation								$\chi^2(1)=2.55$	.110
Cross-sectional	489	.14	0.14	[0.09, 0.19]	<.001				
Experiment	S	00.	0.00	[-0.16, 0.17]	.982	-0.14	[-0.31, 0.03]		
Political discussion								$\chi^{2}(1) = 3.81$	.051
Cross-sectional	103	.24	0.24	[0.18, 0.31]	<.001				
Experiment	9	.05	0.05	[-0.14, 0.23]	.623	-0.19	[-0.39, 0.00]		
Note $k = $ number of effe	oct cirec.	- COTTP	lation (cale	ulated from Zr). Z	r — Ficher's	7. 95% CI	- 95% confidence	interval for Zr. h - t	-oulev-
est. = estimate of moder.	ator level	in compa	arison to r	eference level; 95%	CI = 95% c	confidence in	nterval for estimate	$r_{r}$ test = Omnibus te	st of
moderators; $p = p$ -value f	for omnib	us test.							

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Meta-Analysis of Incidental Exposure

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**Table 3** Overall Effect Size Analysis for the Relationship between IE and News Use,Political Knowledge, Political Participation, Expressive Engagement, and PoliticalDiscussion with Semipartial Correlations (sr) from Panels

	N	lumb	er of								
Outcome	Res.	ES	Stu.	Pub.	sr	Zr	95% CI	Ζ	P	Q	$I^{2}$ (%)
News use	30,492	356	48	12	.05	0.05	[0.03, 0.07]	5.22	<.001	642.96	49.25
Political knowledge	21,224	54	28	8	.02	0.02	[0.004, 0.03]	2.50	.012	131.59	58.70
Political participation	6,512	109	11	7	.05	0.05	[0.03, 0.08]	3.91	<.001	234.80	54.32
Expressive engagement	6,933	87	12	8	.07	0.07	[0.04, 0.10]	4.36	<.001	331.82	73.90
Political discussion	6,489	25	11	8	.10	0.10	[0.05, 0.15]	3.77	<.001	146.13	85.18

*Note.* Res. = number of respondents; ES = number of effect sizes; Stu. = number of studies; Pub. = number of publication clusters; sr = semipartial correlation (calculated from Zr); Zr = Fisher's Z; 95% CI = 95% confidence interval for Zr; Z = Z test value; p = p-value; Q = weighted squared deviations from the mean;  $I^2$  = sum of proportion of variance for level 2, 3, and 4 combined.

Finally, we turn to publication bias analysis for which we averaged the bivariate effect sizes for each dependent variable per study. Funnel plots are available in Online Appendix A. None of the five Egger's regressions was significant (news use: t(85) = 1.77, p = .080; knowledge: t(63) = 1.12, p = .269; participation: t(51) = -0.09, p = .932; expressive engagement: t(44) = 0.88, p = .385; discussion: t(55) = -1.43, p = .159). We found extremely large fail-safe *Ns* for some of the five dependent variables (news use: 114,379; knowledge: 8,002; participation: 20,484; expressive engagement: 33,679; discussion: 76,076).

#### Discussion

In this meta-analysis, we reviewed the current body of research on the effects of IE on five outcomes key to modern democracy. There are four main findings. First, our results amplify concerns about cross-sectional research. To reiterate, cross-sectional studies should be treated with caution because findings could be spurious and the causal order is unclear. This matter is alleviated given that particularly individuals that are already politically interested and engaged may experience more IE (see e.g., Kümpel, 2020). Specifically, on social media, highly interested individuals might be entangled in a positive feedback loop<sup>17</sup> with the algorithmic system that flushes more and more relevant IE content into their newsfeed (see e.g., Thorson et al., 2021) which in turn is more likely to lead to second-level IE. In the meantime, individuals that mainly stay in first-level IE may have over time even less opportunities

for IE due to the lack of positive feedback (e.g., clicking on posts) for the algorithm. Including panel surveys into the meta-analysis allowed us to calculate semipartial correlations which control for the level of the dependent variable in W1. Even though, the overall effect size analyses with bivariate correlations from crosssectional data as well as the analyses with semipartial correlation stemming from panel surveys yielded significant results for all five outcomes, the magnitude of the effect size estimate differ substantially. While we find rather strong relationships between IE and news use (r = .26), expressive engagement (r = .23), and political discussion (r = .22) and slightly smaller relationships for political participation (r =.13) and political knowledge (r = .11) in the cross-sectional data. The meta-analytic analysis of panel data shows that only fractions of these relationships remain. Clearly, smaller effect sizes in longitudinal studies are not particularly surprising. Furthermore, small effect sizes may still be relevant and consequential in the long term. However, since the effect sizes are small, an overly optimistic perspective arguing that IE can bring new live to democracies struggling with an uninterested and unengaged electorate is not fully supported by our data.

Second, and irrespective of the causal nature of the relationships, we found evidence that the media type on which IE occurs matters for some of the outcomes. Compared to IE happening via offline media, IE on social media as well as online IE displayed the largest relationships with intentional news use. The reason may be that online platforms curate the content based on previous behaviors (Thorson & Wells, 2016). Also, users can personalize most of their favorite websites and selfselect their networks on social media. Such personalized content selection processes may prioritize content perceived as particularly relevant, making subsequent thorough processing more likely. In the language of the PINE model (Matthes et al., 2020), IE in the online realm makes it more likely that IE content is appraised as relevant (i.e., second-level IE) compared to offline media IE. Also, internet content might, in many instances, elicit more emotions compared to offline media (see Knoll et al., 2020). Interestingly, when it comes to expressive engagement, we even found a stronger relationship for IE on social media than for online IE. In other words, particularly IE on social media leads to political expression. One may explain this with the fact that individuals experiencing IE on social media do not have to leave the reception situation (e.g., leave the social media app) to express their thoughts or share their position.

Additional analyses crossing the variation in the dependent variable (e.g., online-offline distinction for participation) with the media type of the independent variable (e.g., online IE, offline IE; see online Appendix F) revealed that the congruence between media type of IE and the dependent variable seems to matter. While it may not be a major surprise that IE on a media platform is more strongly related to behaviors that are related to this media platform, this aspect has been neglected in the previous literature even though, it may have substantial implications. For example, if IE on social media primarily increases intentional news consumption on social media but not more traditional forms of news use, potentially negative

#### Meta-Analysis of Incidental Exposure

consequences of social media news use (e.g., having the "feeling" of being informed without actual learning, see e.g., Schäfer, 2020) should be considered in research. This also offers new and more complex theoretical perspectives on the effects of IE. For example, it could be hypothesized that the existence of learning effects instigated by IE on social media are contingent on the mode of news consumption individuals engage in after experiencing IE.

On a related note, we found that IE had a larger effect size for online than offline participation—even though, this finding was not fully robust. Potentially, multiple paths characterized by different information processing strategies may lead to different forms of participation. According to the PINE model, first-level IE may instigate online acts of participation that are accessible to individuals right after exposure (e.g., links to online petitions). Subsequently, such online participation may translate into offline forms of participation. Second-level IE may even affect acts of participation that are more distant from the reception situation or more effortful directly (Matthes et al., 2020). Panel studies with more than two waves could help to answer these questions.

Third, while comparing survey with experimental designs, we find some discrepancies regarding the literature's main message. We will first turn to the seemingly special case of political knowledge. While the meta-analysis revealed a very modest relationship between IE and knowledge in surveys (r = .05, sr = .02), we find a comparatively large estimate for experimental research (r = .21). One possible explanation is that individuals experiencing IE do not encounter the political information scholars typically ask for in knowledge batteries. Tracking data that also relies on screen capture combined with content analysis may resolve this discrepancy. Interestingly, we did not find a positive relationship between IE and political discussion and political participation in experimental research. The lack of a positive relationship is surprising in light of the substantial effect size we found for political knowledge in experiments and opens up a new research gap. During the coding of studies, we noticed that most experimental work assesses whether individuals (intend to) participate or discuss a specific issue (e.g., healthcare). According to the PINE model, the relevance of an IE topic matters for the effects. Thus, incorporating data on the (perceived) relevance of the IE topic could explain the null finding or even reveal a moderated relationship.

Fourth, we noticed an almost alarming degree of variation in the labeling and measurement of some of the core outcomes in the field. Particularly, forms of expression, discussion, and participation are sometimes thrown together. For example, while some studies explicitly operationalize political expression or political discussion, other studies use almost identical items to assess political participation. In short, the field uses similar items to measure different concepts, but simultaneously uses similar items to measure variables that are then labeled differently. This also concerns our own work (e.g., Nanz et al., 2020). Additionally, double-barred questions mentioning behaviors falling into different dependent variables are also a reoccurring theme in the literature (see online Appendix E for examples). We applied

great caution and a prominent theoretical framework (Theocharis & van Deth, 2018) to guide us out of this clutter for this meta-analysis. However, future research must apply more scrutiny regarding measuring and labeling these key concepts of communication research.

#### Limitations

Some limitations should be noted. First, a substantial share of studies included in this meta-analysis use survey methods. Self-report measures for exposure should always be analyzed with caution given that recalling IE can be biased. This limitation of the primary studies partially extends to this meta-analysis as well. Second, the media type category IE via offline media is very rare in our meta-analysis, allowing us only to test RQ3a with offline IE as a moderator category. Third, we only examined research in two languages. Fourth, unpublished studies may not be found through the databases we used. These limitations notwithstanding, our sample compares well to prominent meta-analyses in the field.

#### Theoretical and methodological implications

In this meta-analysis, we found that IE can affect political outcomes such as participation, discussion, expressive engagement, and knowledge. Putting the comparison of the magnitude aside, these relationships are quite similar to what has been documented for (intentional) news exposure for decades. In the beginning of this article, we also extensively documented that IE researchers often build their reasoning upon the empirical and theoretical work on (intentional) news exposure. Thus, readers may wonder: what makes IE different from intentional news consumption? The current literature mentions multiple reasons why IE is worth studying. For example, some scholars argue that IE in the Internet may reach parts of the population that would otherwise not be confronted with politics (i.e., individuals that do not consume political information actively). Relatedly, scholars argued that IE may have become one of the most important ways individuals encounter news nowadays. In other words, intentional news consumption might be less relevant due to people's reliance on IE. Furthermore, recent theoretical models, such as the PINE model, shifted the attention towards related but less acknowledged consequences of the developments in the media environment accompanying IE. Specifically, stumbling upon non-political information while looking for political information may even distract citizens from political information goals (Nanz & Matthes, 2020). In sum, there are quite some arguments why the scholarly attention to IE is not without merit. However, future research in this area should address this question more directly. For instance, scholars could investigate the compositional effects on citizens or consider the potential impact of preceding goals on the information processing during IE. This remains a gap to fill for future research.

On the theoretical side, research needs to examine the interdependencies between the various outcomes of IE more carefully. In fact, a substantial share of

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studies is concerned with only one single outcome (e.g., Heiss & Matthes, 2019; Oeldorf-Hirsch, 2018; Marcinkowski & Došenović, 2021), and the relationships between the outcomes are typically ignored. However, most likely, the various outcomes of IE are intertwined. Related to that, we need a better theorizing about the underlying mechanisms leading to the various outcomes of IE. Considering cognitive and affective mechanisms more closely may advance the field. Cognitive mechanisms, for example, may include increases in topical interest due to IE, leading to subsequent engagement with IE content. Affective mechanisms may include the elicitation of anger (leading to mobilization), or anxiety (leading to additional information search). Thus, we need more complex theoretical approaches targeting the underlying psychological mechanisms. Along those lines, the PINE model suggests that the effects of IE may depend on the effort of processing: Second-level IE, involving the effortful processing of IE content appraised as relevant, may lead to stronger democratically relevant outcomes than first-level IE, which refers to the mere scanning of IE content.

We found that effects of IE are strongest when there is congruence between the exposure setting and the outcome setting. In short, IE has the strongest effect when the outcome happens at the same platform or in the same situation in which IE happens. One explanation is that effects of IE are rather immediate, potentially shortlived. Future research should therefore pay more attention to the temporal order of effects. That is, IE on social media may primarily affect, for instance, intentional news consumption on social media. This news consumption on social media may not lead to strong learning effects itself. It may, however, spark interest, leading to offline media use, which then fosters deeper learning. Two theoretical implications follow: First, we need additional theorizing on the longevity of effects. If IE happens, potential effects may quickly disappear when there are no situation-congruent opportunities for democratically relevant outcomes. Second and related, research on IE needs to establish a diachronic perspective (Matthes & Schemer, 2012), that is, a process perspective rather than an outcome-oriented perspective. This means that outcomes of IE need to be understood in their temporal order. Estimating effects on various outcomes simultaneously, as evident in most studies, may fall short. This perspective calls for news designs, especially experiments, which are able to observe real processes rather than counting mere effects.

This insight might also be applicable to other subfields of communication research in which IE plays a role (e.g., health communication, advertising). The impact of IE to health information could be shaped by the congruency between the media type on which IE occurred and the opportunities provided during the reception situation. In case these findings translate into the context of health communication, health campaigns should approach individuals wherever they stumble upon health information. For example, articles and posts about diseases and health risks should be accompanied by related opportunities to schedule medical checkups, vaccination appointments or other preventive measures.

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On the methodological side, there is quite some variation in experimental designs. In fact, some experiments on IE (e.g., Bode, 2016; Feezell & Ortiz, 2021) could be criticized for not fully ensuring that individuals possess a processing goal unrelated to the IE content. We included experiments for which it was reasonable to assume that respondents did not intentionally turn to the IE content. However, future research should rely on more rigorous experimental designs. This is particularly important given the mere participation in an experiment can have unintended consequences (e.g., respondents may turn to political stimuli more often due to demand effects). We recommend that experiments directly manipulate the processing goal, making sure that participants pursue a task unrelated to the IE content.

Furthermore, existing survey measures have substantial room for improvement. We detected two aspects future research has to attend to. First, there are no validated scales to measure IE. As noted above, based on previous definitional and theoretical work, we decided to include only surveys that mentioned the incidental nature of the exposure explicitly in the survey items. Thereby, some widely cited papers were not included. This decision rule has been criticized by reviewers as being strict. We believe that this rule is reasonable given that we can thereby at least ensure some level of face validity for survey measures. In our perspective, this means that survey measures must signal the incidental nature of exposure to respondents explicitly. However, other measures that do not explicitly mention IE may still touch on the phenomenon (e.g., Barnidge & Xenos, 2021). But they may also not. Therefore, future research should aim to develop and validate scales to assess IE. Given that self-report exposure measures have been criticized, future validation efforts for IE measures should also involve non-survey data (e.g., trace data, eye-tracking, see e.g., Vraga et al., 2019).

Second, most existing survey measures do not distinguish the passive scanning of incidentally encountered information from the elaboration of IE content appraised as relevant (Matthes et al., 2020). Hardly any study has considered information processing occurring during IE (but see e.g., Oeldorf-Hirsch, 2018). It can be argued that the distinction between effortful processing and the brief scanning of IE content may explain variance across outcomes of IE. Additionally, given that there is already some heterogeneity in question wording, future research should explicitly discuss their choice of question wording and reflect more carefully on the decisions during operationalization. As another methodological implication, our findings on media types clearly suggest that studies should not create IE scales by averaging items that assess levels of IE on different media types.

#### Conclusion

Using a meta-analytical approach, this study aimed at quantifying the effect of IE on five key political outcomes. Our findings suggest that IE to political information has, in fact, democratically relevant consequences. However, when it comes to experiments and panel studies, the relationships are small and nuanced, qualifying the

hope that IE can strongly inform and reengage citizens detached from politics. We also show that the effects of IE are strongest when there is congruence between the exposure setting and the outcome setting. With these findings, this meta-analysis opens up completely new theoretical and methodological avenues for IE research and beyond. Future research should particularly focus on the congruency between the exposure setting and the outcome setting. Additionally, improved survey measures and elaborate experimental designs are needed.

#### Supplementary material

Supplementary material is available online at Journal of Communication.

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#### **Conflict of interest**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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#### Notes

- The search string was ("news" OR "politic\*" OR "media") AND ("incidenta\* expos\*" OR "incidental news expos\*" OR "incidental news" OR "stumbling upon" OR "accidental\* expos\*" OR "inadverten\* expos\*"). Because ScienceDirect did not allow wildcard operators (\*), the search string was slightly adapted for this database.
- 2. In this step, we only excluded non-social science research as well as social science research concerned with non-political topics like advertising or health. All studies concerned with political outcomes remained in the dataset and were reviewed more closely.
- 3. Some studies matched more than one exclusion criteria (e.g., content analysis in advertising research).
- 4. More specifically, the usage of specific media channels (e.g., Facebook) measured in general terms (e.g., hours per day) or for various purposes (e.g., social interaction motivation for social media use) does not tell us anything about IE. In this step, we also excluded experimental research for similar reasons. Importantly, for the inclusion decision, we cannot take into account whether a paper's narrative builds upon or mentions IE. Only the design and operationalization is relevant for this decision. Thus, some studies that

(heavily) discuss IE or related concepts but do not operationalize IE were excluded from this meta-analysis.

- 5. Measures of the level of attention dedicated to political information or news are not sufficient to qualify as IE measures. Clearly, even intentional exposure can be accompanied by very low levels of attention. Items must have explicitly mentioned that exposure lacked intention. Additionally, studies using (digital) trace or logging data which were sometimes accompanied by surveys were excluded because the operationalization does not allow any assumptions about the user's intention during exposure. Multiple studies matched more than one exclusion criteria.
- 6. First, experimental designs that provided participants with a task unrelated to the IE content clearly manipulate IE given that they make sure that participants have a processing goal unrelated to the IE content during exposure. Similarly, quasi-experimental research assessing the processing goal retrospectively falls into this category. Second, we also included experiments that exposed respondents to stimuli with at least 50% nonpolitical content (e.g., Bode, 2016). Such experiments made sure that respondents were exposed to a substantial amount of non-political content they could attend to during stimulus exposure, making it more likely that exposure to the IE content was indeed incidentally. Third, field experiments that manipulated the amount of political information in the participant's newsfeeds (e.g., asking respondents to follow an account that posts political information) were included because we can reasonably assume that individuals did not have the goal to see the content they encountered due to the experimental manipulation (e.g., Feezell & Ortiz, 2021). While we strongly believe that the first variant of experiments should be considered as the gold standard of experimental research on IE due to the fact that it is the only variant that offers experimental control of (a) the amount of exposure and (b) the processing goal during exposure, the other two types of experimental design may also be able to shed light on some aspects of the phenomenon of IE, and thus were included in this meta-analysis. We excluded experiments lacking a proper control group (e.g., Nanz & Matthes, 2020). In case of experimental research, we included measures of participation intentions and discussion intentions.
- 7. In a few instances, multiple records used the same sample but each record added variables of interest that were not mentioned in any of the other records. We only kept the first record coded as eligible. However, we list all the other papers that helped us to identify additional outcomes of interest for each study in Online Appendix C.
- 8. It is not uncommon that only a small share of initial search results is eligible for inclusion in a meta-analysis. For example, searches in large databases spanning across multiple disciplines can produce a share of unrelated work (e.g., toxicology research about *incidental exposure* to chemical mixtures). The PRISMA figure in Online Appendix A shows the amount of records excluded at each stage of the eligibility-coding procedure.
- In case of experimental research, we also included measures for intention. This also applies to the dependent variable political discussion.
- 10. In many cases, studies reported more than one effect size per dependent variable (e.g., multiple participation measures). Two (or more) effect sizes calculated from the same participants might be more alike (i.e., correlated) than effect sizes from different studies. Given that we do not have the covariances between outcomes for every study, we were not able to compute a covariance matrix for the outcomes. We turned to multi-level modeling.
- 11. We modeled sampling variance at the first level, within-study variance at the second level, within-publication variance at the third level, and between-publication variance at the fourth level. We added random effects for effect sizes (i.e., not assuming homogeneity within studies), studies, and publications. The publication-level cluster variable was

coded based on the record through which we found the study (see Online Appendix C). Additionally, all Pew studies were coded as one cluster. Hypothesis tests for the overall effect size analyses were fully replicated with meta-analysis models using aggregated effect sizes per study as proposed by Lipsey and Wilson (2001). The magnitude of effect sizes differed for some of the outcomes from the estimates reported in Table 1 due to different weighting.

- 12. We calculate the *Q* statistic to conduct a test for heterogeneity. A significant test suggests heterogeneity which is statistically improbable to be created by random error. The  $I^2$  statistic signals the proportion of observed variance in effect sizes caused by the respective cluster level in the multi-level analysis. We used log-likelihood-ratio tests to determine whether the variance component of level 2, 3, and 4 were significant.
- 13. Moderator categories represented by less than three studies were excluded from the analyses. We compared the estimate for each level of the moderator against zero and tested levels of the moderator against each other.
- 14. A formal moderator analysis comparing sr and r in one model is available in Online Appendix F. However, due to reasons outlined in the appendix (e.g., substantial differences in variance between r and sr), results of the moderator analysis should be interpreted with caution.
- 15. The file-drawer analysis is based on recommendations by Rosenthal (1979). The reported fail-safe N is the number of additional null-findings it would need to render the overall effects analysis insignificant.
- 16. A lack of studies with small samples that report small effect sizes can be an indicator for publication bias (Lipsey & Wilson, 2001). Studies with small samples (i.e., larger standard error) and small effect sizes should appear in the lower left corner of the funnel. If this portion of the funnel seems to have fewer data points compared to the other parts, this is an indicator for publication bias. Additionally, we report results from an Egger's regression test which is a test for funnel plot asymmetry (Egger et al., 1997). Significant results can be an indicator for publication bias if the visual inspection of the funnel plot led to a similar conclusion.
- 17. We thank an anonymous reviewer for coining this wording.

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# 5.1 Appendix for Study I

Supplementary materials document for "Democratic Consequences of Incidental Exposure to

Political Information: A Meta-Analysis"

## **APPENDIX A: Figures**

## Figure 1

PRISMA flow diagram (Moher et al., 2009)



## Figure 2

Funnel plots



 $Funnel\ plots\ for\ meta-analyses\ of\ news\ use,\ political\ knowledge,\ political\ participation,$ 

expressive engagement, and political discussion

## **APPENDIX B: Sample Description**

Almost half of the samples were collected in the USA (n = 44). Germany was represented with twelve samples, Austria and the United Kingdom were represented with five samples each while four samples from Italy were included. Multiple other countries were represented with three (Spain, Poland, South Korea) or two (Japan, Greece, France, Denmark) samples. Of the 106 samples, 71 studies recruited respondents via online panels (most of them with quotas). Only the Pew Research Center studies (17) used random sampling methods. Additionally, nine studies were run on crowd work platforms such as MTurk, seven made use of student samples, and one different type of convenience sample was used. For one study, the type of sample was not clear.

## APPENDIX C: Additional Information on Retrieving and Calculating Effect Size

Before contacting the authors, we reviewed the measurement sections of (a) the paper and (b) other papers that used the same sample which we found by looking into the authors' other work to identify all relevant variables. Authors that reported a regression predicting political participation while controlling for political discussion were not only asked to provide data for IE and political participation but also for IE and the measure of political discussion. We also went through other publication unrelated to IE but authored by researchers who have published on IE. For example, based on the method section and sample description we assumed that the one of the samples featured in Lee and Xenos (2020) was also used in Lee and Xenos (2019). The publication from 2019 uses the variable "political knowledge" while the 2020 publication about incidental exposure does not. We then proceeded to ask the authors to provide statistical data regarding their IE measure and all relevant dependent variables we found. We believe that this strategy does not only increase the sample of effect sizes but can also reduce the threat of publication bias which is eminent for meta-analyses relying only on published work (Borenstein et al., 2009; Card, 2012).

We then contact authors of publications for which the missing statistical data were not available online or in the paper via e-mail. For experiments, we asked for means and standard deviations, and *N* of all groups relevant for the meta-analysis. Researchers that conducted crosssectional surveys were asked for bivariate correlations between their measure of IE and the dependent variable. For panel surveys, we asked scholars to provide a variance-covariance or a correlation matrix with three variables: (a) the IE measure from W1, (b) the dependent variable from W1, and (c) the dependent variable from W2. We asked researchers to provide these data for the same set of respondents (i.e., only W2 respondents). To conduct the moderator analyses

in the meta-analysis, we asked authors to report some items that were transformed into a scale in the publication separately. Furthermore, authors that pooled data from multiple samples in their analyses were asked to provide statistical information for each sample separately (e.g., Valeriani & Vaccari, 2016). However, for one record we had to include the pooled statistical information because the author did not respond to our request.

Some authors sent us the dataset with all relevant variables. Most of the Pew datasets used in the studies by Tewksbury et al. (2001) and Morris and Morris (2017) were available online. Additionally, we downloaded six other Pew samples from Pew's website. In these cases, we screened the questionnaires and calculated the missing statistical information from the original data. For political knowledge, we followed the approach outlined in Tewksbury and colleagues' (2001) article by excluding non-political knowledge items (e.g., "Do you happen to know if high cholesterol is generally regarded as good for your health, or bad for your health?"). The list of variables we used from Pew samples is available in Online Appendix G. We received correlations for one of Pew's samples used in Tewksbury et al. (2001) from the authors because data were not available online.

We then calculated the effect size for each pair of an IE measure and a dependent variable. Means, standard deviations, and group size from experiments were converted into correlations with the formula by Lipsey and Wilson (2001, p. 193, Table B11). Semipartial correlations for panels were calculated based on the formula by Card (2012; see also Aloe & Thompson, 2013). We used the formula for converting two-sample t-test results into correlations by Lipsey and Wilson (2001, p. 193) to calculate an effect size for one record (Feezell & Ortiz, 2021). For dichotomous IE measures (e.g., Pew samples), we relied on the formula provided by Lipsey and Wilson (2001) to calculate the effect size *r*.
Study	Year <sup>a</sup>	Design	N <sup>b</sup>	News use	Political knowledge	Political participation	Expressive engagement	Political discussion	Overall
Ahmadi & Wohn (2018)	r.	Cross-sectional	250	2	0	0	0	0	2
Anspach et al. $(2019)^1$	ŗ	Experiment	670	0	1	0	0	0	1
Ardèvol Abreu et al. (2019) <sup>2</sup>	2013	Some panel	622-1018	9	0	2	0	5	13
Bastien et al., (2017)	2016	Cross-sectional	585-771	7	1	14	6	-	33
Bode (2016) – Experiment <sup>3</sup>	2011	Experiment	721	0	1	0	0	0	1
Britzman (2018) - Study 1 <sup>4</sup>	2016	Experiment	601	0	1	0	0	0	-
Britzman (2018) - Study 2 <sup>4</sup>	2017	Experiment	825	0	1	2	0	1	4
Britzman (2018) - Study 3 <sup>4</sup>	2017	Experiment	677	0	1	0	0	0	1
Castro et al. (2021) - Austria	2019	Some panel	852-1652	10	2	16	8	2	40
Castro et al. (2021) - Belgium	2019	Some panel	764-1627	10	2	16	8	2	40
Castro et al. (2021) - Denmark	2019	Some panel	751-1638	10	2	16	8	2	40
Castro et al. (2021) - France	2019	Some panel	889-1702	10	2	16	8	2	40
Castro et al. (2021) - Germany	2019	Some panel	968-1657	10	2	16	8	2	40
Castro et al. (2021) - Greece	2019	Some panel	895-1643	10	2	16	8	2	40
Castro et al. (2021) - Hungary	2019	Some panel	811-1630	10	2	16	8	2	40
Castro et al. (2021) - Israel	2019	Some panel	995-1679	10	2	16	8	2	40
Castro et al. (2021) - Italy	2019	Some panel	854-1684	10	2	16	8	2	40
Castro et al. (2021) - Netherlands	2019	Some panel	864-1668	10	2	16	8	2	40
Castro et al. (2021) - Norway	2019	Some panel	641-1588	10	2	16	8	2	40
Castro et al. (2021) - Poland	2019	Some panel	856-1666	10	2	16	8	2	40
Castro et al. (2021) - Romania	2019	Some panel	663-1651	10	2	16	8	2	40
Castro et al. (2021) - Spain	2019	Some panel	905-1680	10	2	16	8	2	40
Castro et al. (2021) - Sweden	2019	Some panel	660-1626	10	2	16	8	2	40
Castro et al. (2021) - Switzerland	2019	Some panel	848-1635	10	2	16	8	2	40
Castro et al. (2021) - UK	2019	Some panel	1002-1633	10	2	16	8	2	40
Feezell & Ortiz (2021) - Study 1	2014	Experiment	210	0	1	0	0	0	1
Feezell & Ortiz (2019) - Study 2	2015	Experiment	136	0	1	0	0	0	-
Goyanes et al. (2021) <sup>5</sup>	2019	Some panel	419-1365	16	1	0	0	0	17
Heiss & Matthes (2019) <sup>6</sup>	2017	Panel	559	12	2	16	12	4	46
Heiss et al. (2020)	2015	Cross-sectional	282-291	4	0	1	2	2	6
Kim et al. (2013)	2008	Cross-sectional	988-1158	8	1	12	2	1	25
Kobayashi & Ichifuji (2015)	2013	Experiment	562	0	1	1	0	0	2
Lee & Kim (2017) - Experiment	2008	Experiment	98	0	2	0	0	0	2
Lee & Kim (2017) - Survey	2012	Cross-sectional	826-1008	5	1	18	3	4	31
Lee & Xenos (2020) - Study 17	2016	Panel	594	1	1	11	7	1	21
Lee & Xenos (2020) - Study 2 <sup>8</sup>	2018	Panel	805	Э	1	5	9	1	17
Lee $(2018)^9$	2016	Cross-sectional	740	4	1	1	3	1	10

APPENDIX D: Descriptive Information for all Studies Included in this Meta-Analysis

 Table D1: Descriptive information for all studies included in this meta-analysis.
 Particular and the studies included in the studees i

9

Lee et al. (2022)	2020	Panel	752	10	1	5	4	2	22
Leeper (2020) <sup>10</sup>	2012	Experiment	569	0	1	0	0	0	-
Lu & Lee $(2019) - \text{Experiment}^{11}$	2017	Experiment	16-06	0	2	2	1	2	7
Lu & Lee (2019) – Survey <sup>12</sup>	2016	Some panel	478-1274	5	1	0	2	б	11
Marcinkowski & Došenovic (2020)	2017	Cross-sectional	886-988	8	2	4	0	0	16
Marcinkowski & Flemming (2014)	2013	Cross-sectional	1050	1	7	0	0	0	8
Marcinkowski (2013)	2008	Experiment	558	0	1	0	0	0	1
Nanz & Matthes (2021) - Study 1	2019	Panel	450	8	4	18	10	2	42
Nanz & Matthes (2021) - Study 2	2020	Some panel	524	4	4	18	8	2	36
Nanz & Matthes (2021) - Study 3	2020	Panel	106	10	4	16	12	9	48
Oeldorf-Hirsch (2018)	2015	Cross-sectional	400	144	12	0	48	0	228
Park (2019)	2014	Cross-sectional	1003	5	2	0	0	1	8
PEW 1996	1996	Cross-sectional	977-984	4	1	0	0	0	5
PEW 1998 April	1998	Cross-sectional	824-1182	4	1	0	0	0	5
PEW 1998 October	1998	Cross-sectional	1958-1977	4	1	0	0	0	5
PEW 1999	1999	Cross-sectional	555-556	-	0	0	0	1	2
PEW 2000	2000	Cross-sectional	831-2817	1	0	1	1	1	4
PEW 2002	2002	Cross-sectional	1382-1909	4	1	0	0	0	5
PEW 2004 April	2004	Cross-sectional	1427-2038	4	1	0	0	0	5
PEW 2004 March	2004	Cross-sectional	531-1175	1	0	0	0	1	2
PEW 2004 November	2004	Cross-sectional	847-1304	5	0	6	1	3	18
PEW 2005	2005	Cross-sectional	1015	1	1	0	0	0	2
PEW 2006 April	2006	Cross-sectional	1325-1400	4	1	0	1	0	9
PEW 2006 November	2006	Cross-sectional	1544-1547	ŝ	0	2	4	0	6
PEW 2008	2008	Cross-sectional	269-1142	S	1	0	3	0	6
PEW 2010	2010	Cross-sectional	139-1222	9	1	0	3	0	10
PEW 2012	2012	Cross-sectional	155-1278	9	1	0	З	0	10
Schäfer (2020)	2018	Experiment	342	0	1	0	0	1	2
Schäfer (2022) - Pretest 1	2016	Experiment	187	0	1	0	0	0	1
Schäfer (forthcoming) - Pretest 2	2018	Experiment	68	0	1	0	0	1	2
Schäfer (forthcoming) - Study 1	2018	Experiment	337	0	1	0	0	1	2
Scheffauer et al. $(2021)^{13}$	2014	Cross-sectional	867	ŝ	0	0	0	1	4
Strauß et al., (2020) - Argentina	2015	Panel	298-336	9	0	0	0	0	9
Strauß et al., (2020) - Brazil	2015	Panel	304-330	9	0	0	0	0	9
Strauß et al., (2020) - China	2015	Panel	367-376	9	0	0	0	0	9
Strauß et al., (2020) - Estonia	2015	Panel	668-698	9	0	0	0	0	9
Strauß et al., (2020) - Germany	2015	Panel	604-634	9	0	0	0	0	9
Strauß et al., (2020) - Indonesia	2015	Panel	278-295	9	0	0	0	0	9
Strauß et al., (2020) - Italy	2015	Panel	542-561	9	0	0	0	0	9
Strauß et al., (2020) - Japan	2015	Panel	537-551	9	0	0	0	0	9
Strauß et al., (2020) - Korea	2015	Panel	521-546	9	0	0	0	0	9
Strauß et al., (2020) - New Zealand	2015	Panel	554-572	9	0	0	0	0	9
Strauß et al., (2020) - Philippines	2015	Panel	142-152	9	0	0	0	0	9
Strauß et al. (2020) - Poland	2015	Panel	592-618	9	0	0	0	0	9

0 6	0 6	0 6	0 6	0 6	0 6	0 1	0 1	0 1	2 8	2 8	2 8	2 8	2 8	2 8	2 8	2 8	2 8	1 17	1 17	1 17	2 17	2 35	1 12	0 15	109 1767
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	1	1	3	16	1	7	311
0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	-	-	1	10	10	10	9	8	5	9	494
0	0	0	0	0	0	-	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	113
9	9	9	9	9	9	0	0	0	5	5	S	S	S	5	5	S	5	S	5	2	c	С	S	7	670
511-528	276-288	400-409	305-322	601-631	454-473	57	123	139	1088	1225	1385	1359	1424	1287	1360	1192	1887	1223-1225	1193-1297	1231-1304	574-904	794-1056	647-669	415-431	100757
Panel	Panel	Panel	Panel	Panel	Panel	Experiment	Experiment	Experiment	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Cross-sectional	Panel	Some panel	Cross-sectional	Panel	
2015	2015	2015	2015	2015	2015	2011	2014	2013	2015	2017	2017	2015	2018	2015	2015	2017	2016	2014	2014	2014	2012	2016	ī	2016	
al (2020) - Russia	ıl., (2020) - Spain	ıl., (2020) - Taiwan	al., (2020) - Turkey	al., (2020) - UK	al., (2020) - USA	Scacco (2015) - Study 1 <sup>14</sup>	Scacco (2015) - Study 2 <sup>14</sup>	Scacco (2015) - Study 3 <sup>14</sup>	: Valeriani (2021) - Denmark	č Valeriani (2021) - France	& Valeriani (2021) - Germany	& Valeriani (2021) - Greece	& Valeriani (2021) - Italy	& Valeriani (2021) - Poland	& Valeriani (2021) - Spain	z Valeriani (2021) - UK	č Valeriani (2021) - USA	& Vaccari (2016) - Germany <sup>15</sup>	& Vaccari (2016) - Italy <sup>15</sup>	& Vaccari (2016) – UK <sup>15</sup>	al. (2021) - Study 1 <sup>16</sup>	al. (2021) - Study 2 <sup>17</sup>	ren et al. (2012)	o & Morey (2019)	

coefficients in this sample

<sup>1</sup> The effect size from this study stems from the comparison between the control group and the "Full News Feed Treatment".

<sup>2</sup> Some of the coefficients stem from variables used in other publications (Gil de Zúñiga & Diehl, 2019; Yoo & Gil de Zúñiga, 2019).

<sup>3</sup> The effect size from this study is based on the "recall of information" measure.

<sup>4</sup> Conditions showing at least 50% non-political posts were pooled and compared against the control group.

<sup>5</sup> Some of the coefficients stem from variables used in another publication (Gil de Zúñiga et al., 2021).

<sup>6</sup> Some of the coefficients stem from variables used in other publications (Heiss, 2020; Naderer et al., 2020; Nanz et al., 2020).

<sup>7</sup> Some of the coefficients stem from variables used in another publication (S. Lee & Xenos, 2019).

<sup>8</sup> Some of the coefficients stem from variables used in other publications (S. Lee, 2020a, 2020b).

<sup>9</sup> Some of the coefficients stem from variables used in another publication (S. Lee, 2019).

<sup>10</sup> The effect size from this study stems from the comparison between the two groups within the preference trial "chose entertainment" arm of the experiment.

<sup>11</sup> Some of the coefficients stem from variables used in another publication (Lu, 2019).

<sup>12</sup> Some of the coefficients stem from variables used in other publications (M. Kim et al., 2021; Lu et al., 2018).

<sup>13</sup> We only included the UK sample, given that the US sample is also used in Ardèvol Abreu et al. (2019)

<sup>14</sup> The effect size from these studies stems from the comparison between the "Entertainment-News" condition (excluding participants that selected news) and the "News Sidebar" condition (excluding participants that selected news).

<sup>15</sup> Some of the coefficients stem from variables used in another publication (Vaccari & Valeriani, 2016).

<sup>16</sup> Some of the coefficients stem from variables used in other publications (Kwak et al., 2020; Lane et al., 2017; Weeks et al., 2017).

<sup>17</sup> Some of the coefficients stem from variables used in other publications (Kwak et al., 2018; Lane et al., 2019)

#### **APPENDIX E: Coding of Dependent Variables**

For political participation and expressive engagement, we rely on the refined conceptual map of political participation by van Deth and Theocharis (Theocharis & van Deth, 2018; van Deth, 2014, 2016) to code the dependent variables. Theocharis and van Deth (2018) suggest to distinguish between five modes of participation. The minimal definition (PP1) includes "voluntary, non-professional activities that are located in the area of politics, government, or the state" (Theocharis & van Deth, 2018, p. 87) such as donating money to candidates/campaigns, voting, and attending political meetings. The second mode (PP2) encompasses activities targeted at the political system or government (e.g., attending a demonstration, signing a petition). PP3 includes activities "targeted at problems or community issues" (Theocharis & Deth, 2018, p. 88, e.g., donating to charities, volunteering in one's community). PP2 and PP3 are considered to be *targeted definitions* of political participation. The first three modes of participation were coded as acts of "political participation" in the meta-analysis.

Theocharis and van Deth (2018) additionally offer two *circumstantial definitions* of PP. PP4 refers to activities that are non-political but occur in a "political context" (Theocharis & Deth, 2018, p. 88). For example, commenting on political posts or sharing links to political articles belong to this category. The final category of activities (PP5) is characterized by being driven by a political motivation. Consumerism is a frequent example of this category. We coded activities that fell into the categories PP4 and PP5 as "expressive engagement" in the metaanalysis. For very few cases, it was not imminently clear which category the item belongs to. For example, Valeriani and Vaccari asked respondents whether they "participated *in an offline political activity* to which you were invited via the Internet" (Valeriani & Vaccari, 2016, p. 1865)<sup>i</sup>. Individuals that participated in a political action group meeting (PP1) they were invited to via the internet as well as individuals that took part in a flash mob with a political cause (PP4) could tick "yes" here. We coded these few cases as instances for our dependent variable "political participation".

To distinguish between online and offline acts of participation, we scrutinized the question wording. In case of wordings that did not explicitly mention whether the activity is online of offline (e.g., "signing a petition"), we coded them as offline. Items that mentioned online as well as offline activities (e.g., "wrote letter/email to a politician") were coded in the "both" category.

For "expressive engagement", we also distinguish between item that measure activities which require some sort of message composition (see "Online Expression" in Table A) and items that tap the sharing and forwarding of information created by others (see "Sharing" in Table A). Previous research varies in its definition of political expression (Gil de Zúñiga et al., 2014; Heiss, 2020; Pingree, 2007). While some scholars consider information sharing (e.g., posting links to articles, "re-tweeting") as expression, others use a narrower definition limited to the expression of opinion, views, or thoughts. Given that message composition is considered to be an activity that fosters expression effects (Pingree, 2007), we chose this additional distinction.

Furthermore, some studies used items that touched whether respondents (a) "liked" political posts or (b) "followed" political actors online / subscribed to political mailing lists (Y. Kim et al., 2013; Lane et al., 2017, 2019; S. Lee & Xenos, 2020; Oeldorf-Hirsch, 2018). Both activities do not necessarily fall into the boundaries of the conceptual map of political participation (Theocharis & van Deth, 2018). However, due to the prominence of these items in the field, we included them as separate moderator categories for additional analyses available in Online Appendix F. Unfortunately, previous research frequently uses double-barreled questions to measures political activities and behaviors. For example, respondents were asked whether they "physically posted or distributed a political sign, banner, button, or bumper sticker" (Kwak et al., 2018, p. 11). However, distributing political signs can be considered as a campaigning activity (PP1/2) while the mere posting of a political sign should be considered as an expressive activity (PP4). Similarly, the item "comment on posts and engage in discussions" (Heiss et al., 2020) also asks about two different activities. The introduction to the question made clear that the item refers to political issues, but "comment on posts" has to be considered as "expressive engagement" while "engage in discussion" clearly depicts "political discussion". We decided to code such double-barreled questions that would fall into two different categories into the higher category. The hierarchy of the dependent variables follows the order in Table E1.

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Table

Dependent variable	Moderator level	Example
Political Participation	Offline	"take part in protests and demonstrations" (Heiss et al., 2020, p. 682) "tried to persuade others how to vote in an election" (S. Lee & Xenos, 2020, p. 8)"
-	Online	"how often they engaged in each of the following activities on the Internet: [] sign a petition" (Yamamoto & Morey, 2019, p. 6)
		"participating in an online question and answer session with a politician" (Lu et al., 2018, p. 377)
	Both	"wrote letter/email to news organization" (Yadamsuren et al., 2012)
Discussion	Offline	"how often they (1) 'talked to others who didn't support the candidate they favored' and (2) 'had a conversation about politics or social issues that involved disagreement' off-line" (Kwak
		et al., 2020, p. 8)
	Online	"participate in online discussions or 'chat' groups about the elections" (Pew Research Center, 2004d)
	Both	"ON ELECTION NIGHT, did you talk about the election returns with anyone who does NOT
		live in your household – either face-to-face, by telephone or email?" (Pew Research Center, 2004d)
Expressive	Offline	"posted a political sign, banner, button or bumper sticker" (Y. Kim et al., 2013, p. 2610)
engagement	Consumerism	"deliberately bought (or avoided buying) a product for political, ethical, or environmental reasons" (S. Lee & Xenos, 2020, p. 8)
	Online Expression	"posting your own thoughts or comments on politics or social issues" (S. Lee & Xenos, 2020, p. 9)
		"posted comments on news website or blog" (Yadamsuren et al., 2012) "write blog posts on the election or candidates" (Yamamoto & Morev. 2019, p. 6)
	Sharing	"like or share political issues on social media" (Heiss et al., 2020, p. 682) "shared or noted a nhoro video or meme related to social issues or nolifics created by someone
		else" (Lane et al., 2019)
	Like (only additional	"clicked 'like' on status updates or links about social issues or politics that were posted by a
	analyses)	friend" (Lane et al., 2019)
	Follow (only additional	"subscribe to a political listserv" (Y. Kim et al., 2013, p. 2610)

			Estimate	for moderator le	lavel		Mode	erator analysis	
	-1		7.	05% CI	5	act	050% CI	tact	
	v	1	17	12/0/01	P	<b>COL</b> .	10/01	1621	μ
			2			1		$\chi^2$ (10) = 341.05	< .001
IE – Online news	62	39	0.41	[0.33, 0.49]	< .001				
IE – Mixed news	6	.04	0.04	[-0.12, 0.21]	.591	-0.36	[-0.53, -0.20]		

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Table F1. Moderator analysis crossing variation in dependent and variation in independent variable

OTHER TE OTHER TOWS	10	2	11.0	11.0 .000	100.				
Online IE – Mixed news	6	.04	0.04	[-0.12, 0.21]	.591	-0.36	[-0.53, -0.20]		
Online IE – Social media news	43	.40	0.43	[0.34, 0.51]	< .001	0.02	[-0.04, 0.08]		
Online IE – Offline news	62	.17	0.17	[0.09, 0.25]	< .001	-0.24	[-0.29, -0.19]		
Social media IE – Online News	38	.28	0.29	[0.20, 0.37]	< .001	-0.12	[-0.20, -0.05]		
Social media IE – Mixed news	20	01	-0.01	[-0.17, 0.14]	.866	-0.42	[-0.58, -0.26]		
Social media IE -Social media news	37	.51	0.56	[0.48, 0.65]	< .001	0.15	[0.08, 0.23]		
Social media IE – Offline news use	69	.19	0.19	[0.11, 0.27]	< .001	-0.22	[-0.29, -0.15]		
Offline IE – Online news	30	.17	0.18	[0.08, 0.27]	< .001	-0.23	[-0.30, -0.17]		
Offline IE – Social media news	30	.19	0.19	[0.10, 0.29]	< .001	-0.21	[-0.28, -0.15]		
Offline IE – Offline news	27	.37	0.39	[0.29, 0.48]	< .001	-0.02	[-0.09, 0.05]		
Political Participation								$\chi^2(3) = 20.78$	< .001
Online IE – Online participation	29	.22	0.22	[0.13, 0.31]	< .001				
Online IE – Offline participation	52	.13	0.13	[0.05, 0.22]	.002	-0.09	[-0.13, -0.05]		
Social media IE – Online participation	44	.14	0.14	[0.06, 0.21]	< .001	-0.09	[-0.19, 0.01]		
Social media IE – Offline participation	95	H.	0.11	[0.05, 0.18]	< .001	-0.11	[-0.21, -0.01]		
Expressive Engagement								$\chi^2(6) = 34.52$	< .001
Online IE – Online expression	30	.13	0.13	[0.04, 0.22]	.003				
Online IE – Offline	б	01	-0.01	[-0.21, 0.19]	.918	-0.14	[-0.34, 0.05]		
Online IE – Sharing	32	.15	0.15	[0.06, 0.24]	< .001	0.02	[-0.06, 0.10]		
Social media IE – Consumerism	4	.17	0.17	[0.01, 0.34]	.036	0.04	[-0.13, 0.21]		
Social media IE – Online expression	53	.31	0.32	[0.24, 0.40]	< .001	0.19	[0.09, 0.28]		
Social media IE – Offline	11	.16	0.16	[0.05, 0.28]	.005	0.03	[-0.10, 0.16]		
Social media IE – Sharing	26	.32	0.33	[0.24, 0.42]	< .001	0.20	[0.10, 0.30]		
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*Note.* k = number of effect sizes; r = correlation (calculated from Zr); Zr = Fisher's Z; 95% CI = 95% confidence interval for Zr; p = p-value; est. = estimate of moderator level in comparison to reference level; 95% CI = 95% confidence interval for estimate;

test = Omnibus test of moderators; p = p-value for omnibus test

14

Moderator analysis including bivariate and semipartial correlations

Below, we present a moderator analysis which includes semipartial and bivariate correlations in one model. The moderator has surveys for which we entered semipartial correlations into the model. Some meta-analysts consider the inclusion of different types of three categories: (1) cross-sectional surveys with bivariate correlations, (2) experiments with bivariate correlations, and (3) panel effect sizes in one meta-analysis as problematic (e.g., Aloe & Thompson, 2013).

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		2 2	Estimate	e for moderator la	evel		Moder	rator analysis	
	k	T	Zr	95% CI	b	est.	95% CI	test	р
News use								$\chi^2(1) = 13.81$	< .001
Cross-sectional	314	.21	0.22	[0.16, 0.27]	< .001				
Panel	356	.07	0.07	[0.01, 0.14]	.020	-0.14	[-0.22, -0.07]		
Political knowledge								$\chi^2(2) = 21.80$	< .001
Cross-sectional	38	.02	0.02	[-0.07, 0.10]	.734				
Panel	54	.04	0.04	[-0.05, 0.13]	.411	0.02	[-0.10, 0.15]		
Experiment	21	.23	0.23	[0.15, 0.31]	< .001	0.22	[0.11, 0.33]		
Political participation								$\chi^2(2) = 5.65$	.059
Cross-sectional	380	.13	0.13	[0.08, 0.18]	< .001				
Panel	109	.05	0.05	[-0.01, 0.11]	.128	-0.08	[-0.16, 0.00]		
Experiment	5	00.	0.00	[-0.14, 0.14]	.986	-0.13	[-0.28, 0.02]		
Expressive engagement								$\chi^2(1) = 8.36$	.004
Cross-sectional	223	.22	0.22	[0.15, 0.30]	<.001				
Panel	87	.07	0.07	[-0.01, 0.14]	.082	-0.16	[-0.26, -0.05]		
Political discussion								$\chi^2(2) = 6.69$	.035
Cross-sectional	78	.22	0.23	[0.16, 0.30]	< .001				
Panel	25	11.	0.11	[0.02, 0.20]	.013	-0.11	[-0.22, -0.01]		
Experiment	9	.04	0.04	[-0.12, 0.21]	.610	-0.18	[-0.37, -0.00]		

Zr; p = p-value; est. = estimate of moderator level in comparison to reference level; 95% CI = 95% confidence interval for estimate; test = Omnibus test of moderators; p = p-value for omnibus test

			Estimate	for moderator leve	el		Moderato	or analysis	
	k	r	Zr	95% CI	р	est.	95% CI	test	р
Expressive engagement		5				8		$\chi^2(5) = 6.46$	.003
Offline	14	60.	0.09	[-0.00, 0.19]	090.				
Consumerism	38	.20	0.20	[0.12, 0.28]	< .001	0.11	[0.03, 0.19]		
Online expression	159	.24	0.24	[0.15, 0.34]	< .001	0.15	[0.07, 0.23]		
Sharing	100	.24	0.25	[0.16, 0.34]	< .001	0.16	[0.08, 0.24]		
Like	28	.26	0.27	[0.15, 0.38]	< .001	0.18	[0.07, 0.28]		
Follow	42	.25	0.26	[0.17, 0.35]	< .001	0.17	[0.08, 0.25]		

Table F3. Moderator analysis for expressive engagement including items measuring "liking" and "following"

Note. k = number of effect sizes; r = correlation (calculated from Zr); Zr = Fisher's Z; 95% CI = 95% confidence interval for Zr; p = p-value; est. = estimate of moderator level in comparison to reference level; 95% CI = 95% confidence interval for estimate; test = Omnibus test of moderators; p = p-value for omnibus test

#### **APPENDIX G: Variables from Pew Datasets**

Two additional Pew datasets featuring an IE measure came up in our search, which were excluded from the meta-analysis. A survey conducted in December 2003 (Pew Research Center, 2004b) was excluded because the IE question was only shown to individuals that indicated that they never seek for news online. Furthermore, a survey conducted in December 2007 (Pew Research Center, 2007) was excluded due to a lack of relevant dependent variables in the questionnaire. Below, we outline which variables were used from each of the surveys.

#### Pew 1996

Correlations for this dataset, used in Tewksbury et al. (2001), were provided by the authors. Please check Tewksbury et al. (2001) for question wordings.

Variable	Wording	Variable name in data
Incidental exposure	When you go online, do you ever encounter or come across news and information on current events, public issues, or politics when you may have been going online for a purpose other than to get the news? Answers: yes, no	V192
Political knowledge	Who is Speaker of the House? CORRECT: Newt Gingrich	V121
News use	Did you get a chance to read a daily newspaper yesterday, or not? Answers: yes, no	V32
	About how much time did you spend reading a daily newspaper yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	V33
News use	Did you watch THE NEWS OR A NEWS PROGRAM on television yesterday, or not?	V34

Pew 1998 April (Pew Research Center, 2015)

	Answers: yes, no	
	About how much time did you spend watching the news or any news programs on TV yesterday?	V35
	Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	
News use	About how much time, if any, did you spend listening to any news on the radio yesterday, or didn't you happen to listen to the news on the radio yesterday?	V36
	Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more, did not listen	
News use	How frequently do you go online to get NEWS?	V168
	Answers: Every day, 3-5 days per week, 1-2 days per week, once every few weeks, less often, no/never	

## Pew 1998 October (Pew Research Center, 1998)

Variable	Wording	Variable
		name in data
Incidental exposure	When you go online, do you ever encounter or come across news and information on current events, public issues, or politics when you may have been going online for a purpose other than to get the news? Answers: yes, no	Card 3 – Column 65
Political knowledge	Do you happen to know which computer software company is involved in an anti-trust dispute with the Justice Department? CORRECT: Microsoft	Card 2 – Column 14
	Do you happen to know which political party has a majority in the U.S. House of Representatives? CORRECT: Republican	Card 2 – Column 16
	Can you name any of the countries that recently exploded nuclear weapons? (probed once) CORRECT: India and Pakistan (0.5 points for each; in line with coding in Tewksbury et al. 2001)	Card 2 – Column 17, 18, and 19
News use	Did you get a chance to read a daily newspaper yesterday, or not? Answers: yes, no	Card 1 – Column 68

	About how much time did you spend reading a daily newspaper yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	Card 1 – Column 69
News use	Did you watch THE NEWS OR A NEWS PROGRAM on television yesterday, or not? Answers: yes, no	Card 1 – Column 70
	About how much time did you spend watching the news or any news programs on TV yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	Card 1 – Column 71
News use	<ul> <li>About how much time, if any, did you spend listening to any news on the radio yesterday, or didn't you happen to listen to the news on the radio yesterday?</li> <li>Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more, did not listen</li> </ul>	Card 1 – Column 72
News use	How frequently do you go online to get NEWS? Answers: Every day, 3-5 days per week, 1-2 days per week, once every few weeks, less often, no/never	Card 3 – Column 14

# Pew 1999 (Pew Research Center, 1999)

Variable	Wording	Variable name in data
Incidental exposure	When you go online do you ever encounter or come across news and information on current events, public issues or politics when you may have been going online for a purpose other than to get the news? Answers: yes, no	Card 2 – Column 70
News use	<ul><li>How frequently do you go online to get NEWSwould you say every day, 3 to 5 days per week, 1 or 2 days per week, once every few weeks, or less often?</li><li>Answers: every day, 3-5 days per week, 1-2 days per week, once every few weeks, less often, no/never</li></ul>	Card 2 – Column 67
Discussion	Is this issue something you've talked about with family, friends, or co-workers, or not? - How to reduce the gap between rich and poor school districts in a fair way	Card 3 – Column 54

Answers: ves. no	
Is this issue something you've talked about with family, friends, or co-workers, or not? - The debate about whether U.S. troops should go into another country to stop the killing of innocent civilians in a civil war Answers: yes, no	Card 3 – Column 58
Is this issue something you've talked about with family, friends, or co-workers, or not? - How to provide health insurance to children and adults who can't afford it Answers: yes, no	Card 3 – Column 62
Is this issue something you've talked about with family, friends, or co-workers, or not? - How to make sure poorer American families get access to computers and the Internet Answers: yes, no	Card 3 – Column 66
Is this issue something you've talked about with family, friends, or co-workers, or not? - Whether the U.S. and other western nations have a greater responsibility than less developed countries to deal with global environmental damage Answers: yes, no	Card 3 – Column 70
Is this issue something you've talked about with family, friends, or co-workers, or not? - Whether to increase premiums or raise the age of eligibility in order to keep Medicare financially sound Answers: yes, no	Card 3 – Column 74
Is this issue something you've talked about with family, friends, or co-workers, or not? - How to reduce the gap between rich people and poor people in this country Answers: yes, no	Card 3 – Column 78
Is this issue something you've talked about with family, friends, or co-workers, or not? - How the international financial system can be changed to make the world economy more stable Answers: yes, no	Card 4 – Column 10
Is this issue something you've talked about with family, friends, or co-workers, or not? - Whether to ban the unlimited campaign contributions that corporations and unions can now make to political parties	Card 4 – Column 14

Answers: yes, no Is this issue something you've talked about with family, friends, or co-workers, or not? - How to make the work place better suit the needs of working parents Answers: yes, no	Card 4 – Column 18
Is this issue something you've talked about with family, friends, or co-workers, or not? - Whether to invest a portion of Social Security funds in the stock market Answers: yes, no	Card 4 – Column 22

## Pew 2000 (Pew Research Center, 2000)

Variable	Wording	Variable
		name in data
Incidental exposure	When you go/went online do/did you ever encounter or come across news and information about the 2000 elections when you may have been going online for a purpose other than to get the news? Answers: yes, no	PR12
News use	Do/Did you ever go online to get news or information about the 2000 elections? (IF YES, ASK: How often do/did you go online to get news about the elections Answers: more than once a day, everyday, 3-5 days per week, 1-2 days per week, less often, no/never	PR1
Discussion	When you go/went online to get information about the ELECTIONS, do/did you ever do any of the following things. - Participate in online discussions or "chat" groups about the elections Answers: yes, no	PR4A
Expressive engagement	<ul><li>When you go/went online to get information about the ELECTIONS, do/did you ever do any of the following things.</li><li>Register your own opinions by participating in an electronic poll.</li><li>Answers: yes, no</li></ul>	PR4B
Political participation	When you go/went online to get information about the ELECTIONS, do/did you ever do any of the following things. - Contribute money to a candidate running for public office	PR4F

through his or her website	
Answers: yes, no	

# Pew 2002 (Pew Research Center, 2015)

Variable	Wording	Variable
		name in
		data
Incidental	When you go online do you ever come across news when you	Q61
exposure	may have been online for a purpose other than to get news?	
	Answers: yes, no	
Political	Next I would like to ask you about some things that have been	Q39A
knowledge	in the news. Not everyone will have heard about them can you	
	tell me the name of the current vice president of the United	
	States?	
	CORRECT: Dishard Changy/Dist Changy/Changy	
	Not everyone will have heard shout them can you tall me the	O20P
	Not everyone will have heard about them can you ten me the	Q39B
	hand of the eartent Secretary of State.	
	CORRECT: Colin Powell/Powell	
	Not everyone will have heard about them can you tell me the	O39C
	name of the current Secretary of Defense?	×
	CORRECT: Donald Rumsfeld/Don Rumsfeld/Rumsfeld	
	Not everyone will have heard about them recently, many	Q39D
	European countries have adopted a new currency. Do you	
	happen to know the name of this new European money?	
	CORRECT: the EURO	00051
	Not everyone will have heard about them do you happen to	Q39E1
	know who Yasser Arafat is?	
	CORRECT: PLO-Palestinian leader	
	Not everyone will have heard about them do you happen to	O39F
	know when the state of Israel was established? Was it	2011
	CORRECT: 1948	
News use	Did you get a chance to read a daily newspaper yesterday, or	Q8
	not?	
	Answers: yes, no	
	About how much time did you spend reading a daily	Q9

	newspaper yesterday?	
	Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	
News use	Did you watch THE NEWS OR A NEWS PROGRAM on television yesterday, or not? Answers: yes, no	Q10
	About how much time did you spend watching the news or any news programs on TV yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	Q11
News use	About how much time, if any, did you spend listening to any news on the radio yesterday, or didn't you happen to listen to the news on the radio yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more, did not listen	Q14
News use	How frequently do you go online to get NEWS? Answers: Every day, 3-5 days per week, 1-2 days per week, once every few weeks, less often, no/never	Q25

## Pew 2004 March (Pew Research Center, 2004c)

Variable	Wording	Variable name in data
Incidental exposure	Do you ever come across campaign news when you may have been going online for a different purpose? Answers: yes, no	IT3
News use	<ul> <li>Have you gone online to get news or information about the 2004 elections? [IF YES, ASK: How often do you go online to get news about the elections more than once a day, every day, three-to-five days per week, one-to-two days per week, or less often?</li> <li>Answers: yes, More than once a day, yes, every day, yes, 3-5 days per week, yes, 1-2 days per week, yes, less often, no/never</li> </ul>	IT1
Discussion	When you go online to get information about the ELECTIONS, do you ever do any of the following things? - Participate in on-line discussions, blogs or "chat" groups	IT6A

about the elections.	
Answers: yes, no	

# Pew 2004 April (Pew Research Center, 2004a)

Variable	Wording	Variable
		name in
Incidental	When you go online do you ever come across news when you	
exposure	may have been going online for a purpose other than to get the news?	q70
Political	Do you happen to know which political party has a majority in	a41
knowledge	the U.S. House of Representatives?	<b>4</b> +1
	Do you know the name of the terrorist organization that is responsible for the September 11th attacks on the United States? CORRECT: Al Oaeda, Osama bin Laden mentioned	q43
	Since the start of military action in Iraq last March, about how many U.S. soldiers have been killed? CORRECT: 500-1,000	q44
News use	Did you get a chance to read a daily newspaper yesterday, or not? Answers: yes, no	q7
	About how much time did you spend reading a daily newspaper yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	q8f1
News use	Did you watch THE NEWS OR A NEWS PROGRAM on television yesterday, or not? Answers: yes, no	q9
	About how much time did you spend watching the news or any news programs on TV yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59	q10f1
	minutes, 1 hour or more	

News use	About how much time, if any, did you spend listening to any news on the radio yesterday, or didn't you happen to listen to the news on the radio yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more, did not listen	q13
News use	Did you get any news ONLINE through the Internet yesterday, or not?/You mentioned reading newspapers on the internet yesterday. Aside from newspaper websites did you get any OTHER news ONLINE through the internet yesterday, or not? Answers: yes, no	q18
	[And again aside from newspaper websites] About how much time did you spend getting news online yesterday? Answers: less than five minutes, five to less than ten minutes, ten to less than 15 minutes, 15 to less than 20 minutes, 20 to less than 30 minutes, 30 minutes to less than one hour, one hour or more	q19f1

## Pew 2004 November (Pew Research Center, 2004d)

Variable	Wording	Variable name in data
Incidental exposure	When you go online, do you ever encounter or come across news and information about the 2004 elections when you may have been going online for a purpose other than to get the news? Answers: yes, no	q39
News use	Now I have a few questions about whether you spent any time reading or watching the NEWS yesterday. Just thinking about YESTERDAY, did you get a chance to read a daily newspaper, or not? Answers: yes, no	q2
News use	Did you watch the news or a news program on television yesterday, or not? Answers: yes, no	q3
News use	Please tell me if you ever do any of the following when you go online. Do you ever Get news online	activ02

	Answers: yes do it no do not do this / yes did this yesterday	
	ves. do this (but NOT vesterday), no. do not do this	
News use	Please tell me if you ever do any of the following when you	activ11
	go online. Do vou ever Look for news or information	
	about politics and the campaign	
	Answers: yes, do it, no do not do this / yes, did this yesterday,	
	yes, do this (but NOT yesterday), no, do not do this	
Political	A lot of people have been telling us they didn't get a chance to	vot02
participation	vote in the elections this year on November 2. How about	
	you did things come up that kept you from voting, or did	
	you happen to vote?	
	Answers: yes, voted, no did not vote	
News use	Did you ever go online to get news or information about the	q19
	2004 elections? [IF YES, ASK: How often do you go online	•
	to get news about the elections more than once a day, every	
	day, three-to-five days per week, one-to-two days per week,	
	or less often?	
	Answers: yes, More than once a day, yes, every day, yes, 3-5	
	days per week, yes, 1-2 days per week, yes, less often,	
	no/never	
Expressive	Have you sent or received e-mails about the candidates or	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations? Answers: yes, no	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations? Answers: yes, no	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations? Answers: yes, no Have you sent emails about the 2004 campaign to groups of family on friends when we not a family are placed.	Q20, Q22
Expressive engagement	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> </ul>	Q20, Q22
Expressive engagement	<ul><li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li><li>Answers: yes, no</li><li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li></ul>	Q20, Q22
Expressive engagement	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations? Answers: yes, no Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?	Q20, Q22
Expressive engagement Political	Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations? Answers: yes, no Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group? Answers: yes, no During this year's election campaigns have you Attended	Q20, Q22
Expressive engagement Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> </ul>	Q20, Q22 q27a
Expressive engagement Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> </ul>	Q20, Q22 q27a
Expressive engagement Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> </ul>	Q20, Q22 q27a
Expressive engagement Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given</li> </ul>	Q20, Q22 q27a q27b
Expressive engagement Political participation Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> </ul>	Q20, Q22 q27a q27b
Expressive engagement Political participation Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> </ul>	Q20, Q22 q27a q27b
Expressive engagement Political participation Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> <li>Answers: yes, no</li> </ul>	Q20, Q22 q27a q27b
Expressive engagement Political participation Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> </ul>	Q20, Q22 q27a q27b q27c
Expressive engagement Political participation Political participation Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Sent emails urging people to get out and vote without reference to a</li> </ul>	Q20, Q22 q27a q27b q27c
Expressive engagement Political participation Political participation Political participation	<ul> <li>Have you sent or received e-mails about the candidates or campaigns, either with personal acquaintances or from groups or political organizations?</li> <li>Answers: yes, no</li> <li>Have you sent emails about the 2004 campaign to groups of family or friends who are part of an email list or online discussion group?</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Attended a campaign rally</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Given money to a political candidate</li> <li>Answers: yes, no</li> <li>During this year's election campaigns, have you Sent emails urging people to get out and vote without reference to a particular candidate</li> </ul>	Q20, Q22 q27a q27b q27c

	Answers: yes, no	
Political participation	During this year's election campaigns, have you Sent emails urging people to vote for a particular candidate Answers: yes, no	q27d
Political participation	During this year's election campaigns, have you Made telephone calls urging people to vote for a particular candidate Answers: yes, no	q27e
Political participation	During this year's election campaigns, have you Visited people at their homes to urge them to vote for a particular candidate Answers: yes, no	q27f
Political participation	During this year's election, did you happen to sign up ONLINE for any VOLUNTEER activities related to the campaign – like helping to organize a rally, register voters, or get people to the polls on election day – or did you not sign up online for any volunteer activities? Answers: yes, no	q28
Discussion	When you went online to get information about the ELECTIONS, did you ever do any of the following? - Participate in online discussions or "chat" groups about the elections Answers: yes, no	q37a
Expressive engagement	When you went online to get information about the ELECTIONS, did you ever do any of the following? - Register your own opinions by participating in an online poll Answers: yes, no	q37b
Political participation	When you went online to get information about the ELECTIONS, did you ever do any of the following? - Contribute money online to a candidate running for public office Answers: yes, no	q37e
Discussion	ON ELECTION NIGHT, did you talk about the election returns with anyone who does NOT live in your household – either face-to-face, by telephone or email? Answers: yes, no	q55

## Pew 2005 (Pew Research Center, 2005)

Variable	Wording	Variable name in data
Incidental exposure	When you go online do you ever come across news when you may have been going online for a purpose other than to get the news? Answers: yes, no	q32
Political knowledge	Since the start of military action in Iraq, about how many U.S. soldiers have been killed? To the best of your knowledge, has it been under 500, 500 to 1000, 1000 to 2000, or more than 2000? CORRECT: 1,000 to 2,000	q25
News use	<ul><li>How frequently do you go online to get NEWS would you say every day, 3 to 5 days per week, 1 or 2 days per week, once every few weeks, or less often?</li><li>Answers: every day, 3-5 days per week, 1-2 days per week, once every few weeks, less often, no/never</li></ul>	q31

## Pew 2006 April (Pew Research Center, 2006a)

Variable	Wording	Variable name in data
Incidental exposure	When you go online do you ever come across news when you may have been going online for a purpose other than to get the news? Answers: yes, no	q49f1
Political knowledge	Do you happen to know which political party has a majority in the U.S. House of Representatives? CORRECT: Republican	q52f1
	Can you tell me the name of the current Secretary of State? CORRECT: Condoleezza Rice/Condi/Rice	q53f1
	Can you tell me the name of the president of Russia? CORRECT: Vladimir Putin/Putin	q54f1
News use	Did you get a chance to read a daily newspaper yesterday, or not?	q9

	Answers: yes, no	
	About how much time did you spend reading a daily	q10f1
	newspaper yesterday?	
	Answers: Less than 15 minutes, 15-29 minutes, 30-59	
	minutes, 1 hour or more	
News use	Did you watch THE NEWS OR A NEWS PROGRAM on	q13f1
	television yesterday, or not?	
	Answers: yes, no	
	About how much time did you spend watching the news or	q14f1
	any news programs on TV yesterday?	<u>^</u>
	Answers: Less than 15 minutes, 15-29 minutes, 30-59	
	minutes, 1 hour or more	
News use	About how much time, if any, did you spend listening to any	q17f1
	news on the radio vesterday, or didn't you happen to listen to	1
	the news on the radio vesterday?	
	Answers: Less than 15 minutes, 15-29 minutes, 30-59	
	minutes 1 hour or more did not listen	
News use	Did you get any news ONLINE through the Internet	a18 a18a
riens use	vesterday or not?/You mentioned reading newspapers on the	<b>q</b> 10, <b>q</b> 10 <b>u</b>
	internet vesterday. Aside from newspaper websites did you	
	get any OTHER news ONLINE through the internet	
	vesterday or not?	
	yesterday, or not:	
	Answers: ves no	
Nows uso	Answers, yes, no	a10f1
Itews use	much time did you spend getting news online vesterday?	qıyıı
	much time did you spend getting news online yesterday?	
	Answers: loss than five minutes five to loss than ten minutes	
	Answers, less than 15 minutes, 15 to less than 20 minutes, 20 to	
	ten to less than 15 minutes, 15 to less than 20 minutes, 20 to	
	hear ar more	
Everessive	How you aver sent a name stary by a mail to a friend or	a51f1
Expressive	nave you ever sent a news story by e-main to a mend of	43111
engagement	associate: [IF YES, ASK: have you done this in the past	
	week ( ]	
	· · · · · · · · · · · · · · · · · · ·	
	Answers: yes ever, yes in past week, no	

# Pew 2006 November (Pew Research Center, 2006b)

Variable	Wording	Variable

		name in data
Incidental exposure	When you use the internet, do you ever come across campaign news and information when you may have been going online for a purpose other than to get the news? Answers: yes, no	q27
Political participation	A lot of people have been telling us they didn't get a chance to vote in the congressional elections this year on November 7. How about you did things come up that kept you from voting, or did you happen to vote?	Vot02
News use	Now I have a few questions about whether you spent any time reading or watching the NEWS yesterday. Just thinking about YESTERDAY, did you get a chance to read a daily newspaper, or not? Answers: yes, no	q17
News use	Did you watch the news or a television news program yesterday, or not? Answers: yes, no	q18
News use	Please tell me if you ever use the internet to do any of the following things. Do you ever Get news online / Did you happen to do this YESTERDAY, or not? Answers: yes, do it, no do not do this / yes, did this yesterday, yes, do this (but NOT yesterday), no, do not do this	act02a, act02b
Political participation	There are many different campaign-related activities a person might do on the internet. I'm going to read a list of things you may or may not have done online in the months leading up to the November elections. Just tell me if you happened to do each one, or not Contribute money online to a candidate running for public office Answers: yes, no	q39a
Expressive engagement	There are many different campaign-related activities a person might do on the internet. I'm going to read a list of things you may or may not have done online in the months leading up to the November elections. Just tell me if you happened to do each one, or not Post your own political commentary or writing to an online news group, website or blog Answers: yes, no	q39g
Expressive engagement	There are many different campaign-related activities a person might do on the internet. I'm going to read a list of things you may or may not have done online in the months leading up to	q39h

	the November elections. Just tell me if you happened to do each one, or not Forward or post someone else's political commentary or writing Answers: yes, no	
Expressive engagement	There are many different campaign-related activities a person might do on the internet. I'm going to read a list of things you may or may not have done online in the months leading up to the November elections. Just tell me if you happened to do each one, or not Create and post your own political audio or video recordings Answers: yes, no	q39i
Expressive engagement	There are many different campaign-related activities a person might do on the internet. I'm going to read a list of things you may or may not have done online in the months leading up to the November elections. Just tell me if you happened to do each one, or not Forward or post someone else's political audio or video recordings Answers: yes, no	q39j

# Pew 2008 (Pew Research Center, 2008)

Variable	Wording	Variable name in data
Incidental exposure	When you go online do you ever come across news when you may have been going online for a purpose other than to get the news? Answers: yes, no	q54f2
Political knowledge	Do you happen to know which political party has a majority in the U.S. House of Representatives? CORRECT: Democrat	q71
	Can you tell me the name of the current Secretary of State? CORRECT: Condoleezza Rice/Condi/Rice	q72
	Who is the current prime minister of Great Britain? Is it? CORRECT: Gordon Brown	q73
News use	Did you get a chance to read a daily newspaper yesterday, or not?	q9

r		
	Answers: yes, no	
	About how much time did you spend reading a daily	q10
	newspaper yesterday?	-
	Answers: Less than 15 minutes, 15-29 minutes, 30-59	
	minutes, 1 hour or more	
News use	Did you watch THE NEWS OR A NEWS PROGRAM on	a13
	television vesterday or not?	1.0
	Answers: ves no	
	About how much time did you spend watching the news or	a14
	any news programs on TV vesterday?	914
	any news programs on 1 v yesterday:	
	Answers: Loss than 15 minutes 15 20 minutes 20 50	
	minutes, 1 hour or more	
News	A have have much time if any did you aroud listoning to any	~17
Inews use	About now much time, if any, did you spend listening to any	q17
	the news on the radio vesterday?	
	the news on the radio yesterday?	
	Answer Less then 15 minutes 15 20 minutes 20 50	
	Answers: Less than 15 minutes, 15-29 minutes, 50-59	
-	minutes, I hour or more, did not listen	10 10
News use	Did you get any news ONLINE through the Internet	q18, q18a
	yesterday, or not?/You mentioned reading newspapers on the	
	internet yesterday. Aside from newspaper websites did you	
	get any OTHER news ONLINE through the internet	
	yesterday, or not?	
	Answers: yes, no	
	[And again aside from newspaper websites] About how	q19f1
	much time did you spend getting news online yesterday?	
	Answers: less than five minutes, five to less than ten minutes,	
	ten to less than 15 minutes, 15 to less than 20 minutes, 20 to	
	less than 30 minutes, 30 minutes to less than one hour, one	
	hour or more	
Expressive	Have you ever sent a news story by e-mail to a friend or	q56
engagement	associate? [IF YES, ASK: Have you done this in the past	
	week?]	
	Answers: yes ever, yes in past week, no	
	Did you do this today or yesterday, or not?	q56a
	Answers: yes, no	
Expressive	How often do you [INSERT ITEM; READ IN ORDER]?	q59e
engagement	READ FOR FIRST ITEM THEN AS NECESSARY: Do you	
	do this regularly, sometimes, hardly ever, or never? - Post	

	comments about news stories online Answers regularly, sometimes, hardly ever, never	
News use	How often do you get information about local, national or international news through social networking pages? Answers regularly, sometimes, hardly ever, never	q64
Expressive engagement	How often do you share information about local, national or international news on your social networking page? Answers regularly, sometimes, hardly ever, never	q65

## Pew 2010 (Pew Research Center, 2010)

Variable	Wording	Variable name in data
Incidental exposure	When you are online, do you ever come across news even when you are online for purposes other than getting news? Answers: yes, no	q45f2
Political knowledge	Do you happen to know which political party has a majority in the U.S. House of Representatives? CORRECT: Democrat	q85
	Do you happen to know who Eric Holder is? Is he CORRECT: The U.S. Attorney General	q87
News use	Did you get a chance to read a daily newspaper yesterday, or not? Answers: yes, no	q9
	About how much time did you spend reading a daily newspaper yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	q10
News use	Did you watch THE NEWS OR A NEWS PROGRAM on television yesterday, or not? Answers: yes, no	q13
	About how much time did you spend watching the news or any news programs on TV yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59	q14

	minutes 1 hour or more	
News use	About how much time if any did you spend listening to a	a17
The wordse	radio news program or any news on the radio vesterday or	<b>q</b> 17
	didn't you happen to listen to the news on the radio vesterday?	
	ulant you happen to listen to the news on the radio yesterday.	
	Answers: Loss than 15 minutes 15 20 minutes 20 50	
	minutes, 1 hour or more did not listen	
Nama	Did you get any news ONI DUE through the Internet	a10 a10a
news use	Did you get any news ONLINE through the Internet	q18, q18a
	yesterday, or not? I ou mentioned reading newspapers on the	
	internet yesterday. Aside from newspaper websites did you	
	get any OTHER news ONLINE through the internet	
	yesterday, or not?	
	Answers: yes, no	100
	[And again aside from newspaper websites] About how	q19f1
	much time did you spend getting news online yesterday?	
	Answers: less than five minutes, five to less than ten minutes,	
	ten to less than 15 minutes, 15 to less than 20 minutes, 20 to	
	less than 30 minutes, 30 minutes to less than one hour, one	
	hour or more	
Expressive	How often, if ever, do you send news or news headlines by	q54
engagement	email?	
	Answers regularly, sometimes, hardly ever, never	
News use	How often, if ever, do you get news or news headlines	q57
	through Twitter?	
	Answers regularly, sometimes, hardly ever, never	
Expressive	How often, if ever, do you get news or news headlines	q61
engagement	through social networking sites?	
	Answers regularly, sometimes, hardly ever, never	
Expressive	How often, if ever, do you send news or news headlines	q58
engagement	through Twitter?	
	Answers regularly, sometimes, hardly ever, never	115752
Expressive	How often, if ever, do you post news or news headlines on	q62
engagement	social networking sites	
	Answers regularly, sometimes, hardly ever, never	

## Pew 2012 (Pew Research Center, 2012)

Variable	Wording	Variable
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		name in data
Incidental exposure	When you are online, do you ever come across news even when you are online for purposes other than getting news? Answers: yes, no	q63f2
Political knowledge	Do you happen to know which political party has a majority in the U.S. House of Representatives? CORRECT: Republican	q95
	Do you happen to know if the national unemployment rate as reported by the government is currently closer to [READ IN ORDER: 5%, 8%, 15%, 21%] CORRECT: 8%	q96
	Is Angela Merkel the leader of [READ AND RANDOMIZE: Germany, France, the International Monetary Fund, NATO]? CORRECT: Germany	q97
	Which person - [RANDOMIZE: Mitt Romney or Barack Obama] - is more supportive of increasing taxes on higher income people? CORRECT: Barack Obama	q98
News use	Did you get a chance to read a daily newspaper yesterday, or not? Answers: yes, no	q9
	About how much time did you spend reading a daily newspaper yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	q10
News use	Did you watch THE NEWS OR A NEWS PROGRAM on television yesterday, or not? Answers: yes, no	q13
	About how much time did you spend watching the news or any news programs on TV yesterday? Answers: Less than 15 minutes, 15-29 minutes, 30-59 minutes, 1 hour or more	q14
News use	About how much time, if any, did you spend listening to a radio news program or any news on the radio yesterday, or didn't you happen to listen to the news on the radio yesterday?	q17

	Answers: Loss than 15 minutes 15 20 minutes 20 50	
	minutes, 1 hour or more did not listen	
Nome	Did you get any news ONLINE yestenday, on not?	~20
Inews use	Did you get any news ONLINE yesterday, or not?	q20
	A norman was no	
	Was the news you get online on on a mahile device vesterday.	~22
	ONLY from the newspan are you montioned earlier or did you	q22
	also get news from OTHER sources?	
	also get news nom OTTER sources?	
	Answers: only from newspapers, also got news from other	
	sources	
News use	[And again aside from newspaper websites ] About how	a23
iteris use	much time did you spend vesterday getting news online on a	925
	computer, tablet, cell phone or other mobile device?	
	······································	
	Answers: less than five minutes, five to less than ten minutes,	
	ten to less than 15 minutes, 15 to less than 20 minutes, 20 to	
	less than 30 minutes, 30 minutes to less than one hour, one	
	hour or more	
Expressive	How often, if ever, do you send news or news headlines by	q72
engagement	email?	
	Answers regularly, sometimes, hardly ever, never	
News use	How often, if ever, do you see news or news headlines on	q74
	Twitter?	
	Answers regularly, sometimes, hardly ever, never	
News use	How often, if ever, do you see news or news headlines on	q81
	social networking sites?	
	A	
<b>F</b> •	Answers regularly, sometimes, hardly ever, never	76
Expressive	How often, if ever, do you tweet or re-tweet news or news	q/6
engagement	headlines through Twitter?	
	A norman name and the compating a handly over never	
Fynressive	How often if ever do you share news or news headlines on	a83
engagement	social networking sites?	405
engagement	social networking sites:	
	Answers regularly sometimes hardly ever never	
	i monero regulariy, comentation, narary ever, never	1

Pew Research Center bears no responsibility for the analyses or interpretations of the

data presented here. The opinions expressed herein, including any implications for policy, are

those of the author and not of Pew Research Center.

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<sup>i</sup> Valeriani and Vaccari (2016) consider this act as political engagement online. However, we categorized this item as offline participation. Even though, this items mentions online mobilization, the political activity itself is offline.

<sup>ii</sup> We consider items tapping the attempt of (a) persuading others how to vote or (b) mobilizing others to cast a ballot as acts of political participation. These two activities very much resemble activities that would be counted as campaigning efforts (i.e., PP1 or PP2) such as door to door canvassing or calling individuals to convince them to vote (for a candidate).

## 6 Study II: Nanz & Matthes (2020)

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## ORIGINAL ARTICLE

# Learning from Incidental Exposure to Political Information in Online Environments

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This article aims to explain learning outcomes of incidental exposure (IE) to political information in online environments. Drawing on the Political Incidental News Exposure Model, we predict learning outcomes by distinguishing between first-level (i.e., scanning of incidentally encountered information) and second-level IE (i.e., effortful processing of incidentally encountered information appraised as relevant). Furthermore, we conceptualize intention-based IE (i.e., while looking for non-political content) and topic-based IE (i.e., while looking for different political content). In a 2x2 experiment (N = 290), we manipulated respondents' initial processing goal (i.e., political or non-political information) and low (i.e., first-level IE) versus high (i.e., second-level IE) relevance of the incidentally encountered information. Results show stronger learning effects for second level than for first-level IE. Learning effects do not differ between topic-based and intention-based IE, but second-level IE decreases learning related to the initial processing goal. Theoretical implications are discussed.

Keywords: Incidental Exposure, Political Knowledge, Learning, Online News, Attention to News

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Democratic theory highlights the importance of knowledgeable citizens (Habermas, 1989). In line with this notion, the rise of the internet has increased the amount of political information available to the public. However, the possibilities to circumvent political news have increased as well. Given the growing amount of media choices, individuals may tend to preselect their media diet in line with their preferences (see Knobloch-Westerwick, Carpentier, Blumhoff, & Nickel, 2005). Thus, citizens that hardly care about politics may tend to avoid political media content (Vraga, Bode, & Troller-Renfree, 2016).

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Learning from Incidental Exposure

Against this background, political communication scholars pointed at the internet's capacities to expose citizens to politics even when they did not intend to see such information. Such so-called incidental exposure (IE) refers to situations in which individuals encounter political content although they did not actively search for it in the first place (Bode, 2016; Lee & Kim, 2017). For instance, numerous online media present political next to non-political information. Especially social network platforms can be considered as the "spaces in which flows combine and intertwine" (Thorson & Wells, 2016, p. 320). As another example, political news is displayed on most of today's login pages of email providers or internet portals.

However, current research on IE sparked some criticism (Kaiser, Keller, & Kleinen-von Königslöw, 2018; Matthes, Nanz, Stubenvoll, & Heiss, 2020; Thorson, 2020; Vraga, Bode, Smithson, & Troller-Renfree, 2019; Weeks & Lane, 2020). First, research often does not distinguish between the mere scanning and subsequent skipping of incidentally encountered content and the intensive processing of relevant information that was encountered incidentally. This distinction is important because the scanning of information and the intensive processing of information may lead to totally different learning outcomes. Second, by primarily focusing on IE while people were explicitly not looking for political information, previous research neglects the possibility that individuals stumble upon political information about a certain topic while they are looking for political information on another topic. This notion is important, because in high-choice media environments, individuals are facing increased possibilities to select those political topics they are most interested in, while other topics can be circumvented or ignored. Yet, IE can explain learning outcomes with respect to topics recipients were not looking for or even avoiding.

In response to these criticisms, we take a more fine-grained approach. Following the Political Incidental News Exposure (PINE) model (Matthes et al., 2020), we define IE as *exposure to information that people encounter without actively seeking for it.* Importantly, we distinguish two levels of IE: *First-level IE*, which is the scanning of incidentally encountered information, and *second-level IE*, defined as the effortful processing of incidentally encountered information. As we will argue in the following, this distinction is crucial to understand the effects of IE. Furthermore, the PINE model recognizes intention-based IE (i.e., IE while looking for non-political content) and topic-based IE (i.e., IE while looking for different political content). The present study is the first to test the PINE model's core assumptions.

## **Incidental Exposure to Political Information**

Numerous studies shed some light on the antecedents and consequences of IE (e.g., Heiss, Knoll, & Matthes, 2019; Heiss & Matthes, 2019; Lee & Kim, 2017; Nanz, Heiss, & Matthes, 2020). Despite these efforts to understand IE's effects on political outcomes, three major criticisms have been expressed in the literature (Kaiser et al., 2018; Matthes et al., 2020; Vraga et al., 2019). First, IE research lacks a clear-cut conceptualization. IE is often used as some kind of umbrella term for a set of diverse

#### Learning from Incidental Exposure

situations that involve exposure to information that respondents were not looking for. On the one hand, briefly glimpsing at an incidentally encountered headline or scrolling past information someone stumbled upon is considered as IE. On the other hand, scholars also denote situations in which individuals read a full article after clicking on an incidentally encountered link as the same phenomenon (e.g., Fletcher & Nielsen, 2018; Tewksbury, Weaver, & Maddex, 2001). Kaiser and colleagues (2018, p. 3) therefore speak of "a lack of differentiation." We argue that effects of IE will differ for situations in which incidentally encountered news are either briefly scanned or processed with full attention. However, this notion has never been put to test.

In line with this, scholars are not clear in their operationalization of what it means to "encounter" or "come across" information incidentally. As Matthes and colleagues (2020) noticed, survey research often leaves the definition of these terms to the respondents. As expressed by Vraga and colleagues (2019, p. 237), "it is unclear to what extent people pay attention to and remember content they do not deliberately choose, rather than ignore or skip over it." Experimental research on IE has similar shortcomings. Most experiments apply forced exposure designs in which they expose participants to mock webpages with political information next to nonpolitical content. Then, after exposure, participants respond to the dependent measures, as for instance recognition. However, hardly any studies assessed what participants are actually doing during exposure (for exceptions see Lee & Kim, 2017; Vraga et al., 2019). That is, participants may read everything carefully, or they may not even notice the IE item. It is also possible that they dedicate full attention only to the IE items while ignoring the information they were exposed to in the first place. Thus, a respondent's behavior during news exposure needs to be taken into account. Exposure alone has limited explanatory power (Matthes et al., 2020).

Second, and closely related, the theoretical foundation of IE research often appears to be underdeveloped. Various studies on IE build their argument on passive learning (e.g., Bode, 2016; Lee & Kim, 2017), which refers to situations with a lack of motivation to learn (Krugman & Hartley, 1970). While this explanation fits when individuals only briefly glance at content, it may not explain other situations in which individuals focus their attention on incidentally encountered content. For example, individuals seeking relaxation may stumble upon a story on the president's latest comment. They may be intrigued to learn what the president said and decide to click on the news story in order to read it. Obviously, this kind of knowledge acquisition cannot be explained by passive learning theory.

Third, previous research focused exclusively on what scholars have called intention-based IE. According to Yadamsuren and Erdelez (2016), such intentionbased IE occurs when individuals see political information while they are using media for non-political purposes. In fact, most surveys asked participants whether they encountered political information while they were "on-line for a purpose other than to get the news" (Tewksbury et al., 2001, p. 548). Similarly, most experiments on

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learning from IE present the political information next to non-political social information (e.g., Bode, 2016; Lee & Kim, 2017).

However, individuals may get incidentally exposed to political information on a certain topic when they look for information on another political topic. This has been called topic-based IE (Yadamsuren & Erdelez, 2016). In a survey by Pew Research Center (2017), online news consumers reported that they happen to encounter news on their main news topic while they get news on other topics on average 24% of the time. Such topic-based IE is important because it can explain learning outcomes regarding information that recipients were not actively looking for or even avoiding. Furthermore, the notion of topic-based IE may explain why individuals may get distracted from political information on a topic they are looking for in the first place. In what follows, we present a theoretical model that addresses these three criticisms.

## The Political Incidental News Exposure (PINE) Model

There are four key assumptions of the PINE model (Matthes et al., 2020). First, individuals possess a processing goal at all times during media reception. With the term processing goal, we refer to the purpose of an individual to cognitively engage with content. However, the term processing goal cannot be equated with generic content selection only. In contrast to uses and gratifications approach's motivations (see Rubin, 2009), processing goals refer to the engagement with the content individuals want to see and not the underlying gratification sought. This distinction is important because a common uses and gratifications motivation like pass time might be fulfilled for some individuals by consuming funny videos while others may pursue it by watching a political debate. Also, motivations as theorized by the uses and gratifications approach can be understood as generic categories that explain content selection, but not information processing. Processing goals, by contrast, refer to the directed engagement with content *during* media use.

Processing goals need to be understood as dynamic, that is, they may constantly change during reception. Also, individuals may pursue multiple goals (e.g., multiple informational needs) at the same time. In such a situation, the dominant goal (i.e., the strongest goal) is considered to be the processing goal. The PINE model distinguishes between specific political processing goals (e.g., seeking information on the president's latest remarks) and non-political processing goals (e.g., looking for entertainment content). For instance, people may have a non-political processing goal at a given time during reception, and may be confronted with political news incidentally.

While processing goals are understood as dynamic, they may also become chronically accessible. A decent share of media use is influenced by habits. Repetition of goal directed behavior is a key determinant of habit formation (Wood & Rünger, 2016). That is, if individuals regularly engage in a non-political processing goal during reception, this may lead to the formation of a habit. In other words,

processing goals can become chronic. Importantly, even if media consumption is habitualized, there is still an underlying processing goal. Also, the pursuit of a chronic goal must not be conscious (Dijksterhuis & Aarts, 2010). Although more general content preferences and media habits may constantly shape individuals' processing goals and subsequently the selection and processing of information, there is evidence that short-term goals influence media use substantially. Karnowski et al.'s results (2017), for instance, show that reading intentions for a news story depend on topical interest and prior knowledge about the topic, while general frequency of news use is not a significant predictor of reading intentions.

Second, the PINE model theorizes that, during reception, individuals constantly engage in a so called *relevance appraisal*. That is, when individuals encounter information online, they permanently check whether the information at hand is relevant. Relevance appraisals do not require substantive amounts of cognitive resources. Individuals may start reading the first few words of the content to decide whether it is worth the effort (see Bode, Vraga, & Troller-Renfree, 2017). Individuals have to engage in this process for every bit of information they encounter in order to determine whether the content fits to the current processing goal or not. It is important to note that fit should be understood as a continuum, rather than a yes-no distinction. That is, a given content may fit a goal to varying degrees. Individuals engage in relevance appraisals because they consider the process of a relevance appraisal as a mean of assessing the fit between processing goal and encountered content.<sup>1</sup> There are three possible outcomes: As a first outcome, the content is in line with the processing goal. One may call this intentional exposure. As a second outcome, the encountered content is not in line with the processing goal and is not appraised as more relevant than the current processing goal. For these two outcomes, there will be no change in processing goals. As the third outcome, the content is not in line with the processing goal but, during the process of checking the relevance of the content, the individual appraises the content as more important than the original processing goal. This would lead to a switch of the processing goal.

Rephrased, in case an individual encounters information that does not fit the current processing goal, it is theorized that the relevance appraisal may lead to a switch of processing goals if incidentally encountered information is regarded as more relevant than the information in line with the initial processing goal. For example, at a certain moment during reception, an individual may be inclined to consume entertaining content but stumble upon an article about the president's recent comments. Importantly, the relevance appraisal is not only driven by the topic. Individuals may consider this article as more relevant for various reasons. For instance, genuine interest in the subject, seeing the name of one's home state in one of the president's remarks, a partisan source cue, or a friend's comment below the article could drive perceived relevance of incidentally encountered information. If this article is considered to be more relevant than the entertainment content, the individual will dedicate time and cognitive effort to process the article. In other words, there is a switch from a non-political processing goal to a specific political

processing goal. This switching process can constantly occur during reception, depending on the current processing goal and the outcome of the relevance appraisal.

Third and in line with the notion of a relevance appraisal, the PINE model distinguishes between first-level IE, which describes the mere scanning of information regarded as irrelevant, and second-level IE, which incorporates the more effortful processing of incidentally encountered information regarded as relevant. Clearly, first-level IE happens under the conditions that (a) individuals encounter content that does not align with their processing goal and (b) that they appraise this content as irrelevant. Thus, because they lack a motivational driver they opt for scanning content with low engagement. The PINE model assumes that this mere exposure to incidentally encountered information should only lead to passive learning (Krugman & Hartley, 1970), and therefore, marginal knowledge gains. In contrast, second-level IE occurs only when individuals regard incidentally encountered information as relevant. In that case, individuals shift their cognitive resources toward incidentally encountered information.

Fourth, the PINE model accounts for intention-based as well as topic-based IE. For topic-based IE, individuals may be exposed to political information incidentally while they are looking for other political information. In line with Reinemann, Stanyer, Scherr, and Legnante (2012), we consider information to be political if any of the following four aspects is mentioned: (a) societal actors, (b) decision-making authorities, (c) activities of planning, deciding or realizing programs related to issues important to society, and (d) information about groups concerned with political decisions. As argued by Matthes et al. (2020, p. 1037), "[t]opic-based IE may have the same effects as intention-based IE. The reason is that the incidentally encountered information is processed in very similar ways." However, this notion has never been put to test.

## Testing the Political Incidental News Exposure Model

## Negative Relevance Appraisal: First-Level IE

In online news reception, individuals are typically exposed to a headline and a short teaser consisting of two or three sentences, conveying some information about the content. In line with the PINE model's notion of continuous and fast relevance appraisals during reception, individuals briefly scan these chunks of information to determine whether they want to have a closer look. Often individuals may keep moving on to the next piece of content after encountering political content incidentally. The PINE model posits that such first-level IE may lead to learning effects. That is, in case individuals see information incidentally but appraise this information as irrelevant, the information is still processed with minimal amounts of attention. Yet such processing may leave memory traces. The theoretical mechanism behind this effect is passive learning (e.g., Bode, 2016; Tewksbury et al., 2001).

Passive learning refers to a process of information acquisition when recipients are not interested in gaining knowledge, so their attention is not directed toward a stimulus (Krugman & Hartley, 1970). For instance, in an experiment by Lee and Kim (2017), even respondents who did not click on an incidentally encountered news banner were able to recognize that they saw such a news story while recall was dependent on clicking on the news banner. Their results suggest that the mere scanning of incidentally encountered information (i.e., first-level IE) may leave memory traces. Based on this reasoning, we expect that individuals may process the information transmitted by a headline, even though they regard the headline and the story behind it as irrelevant.

Taken together, in cases when several headlines are presented, first-level IE would predict that an incidentally encountered headline would still yield some amount of recognition. However, there is a certain likelihood that respondents report recognition simply by chance. Should first-level IE occur, PINE predicts that the recognition of the incidentally encountered information should be higher than by chance. In our study, first-level IE is manipulated with low relevance of the incidentally encountered information. Thus:

H1: The headline recognition rate of respondents in the low relevance condition should be higher than recognition rates by chance.

## Positive Relevance Appraisal: Second-Level IE

The PINE model argues that incidentally encountered information can be appraised as relevant. While scanning headlines and teasers, individuals may react by dedicating increased cognitive effort to relevant content. In line with this notion, an eyetracking study by Bode and colleagues (2017) suggests that those with high political interest are less likely to skip political social media posts the earlier political words occur in the posts. In other words, while political words can serve as cues that lead to a negative relevance appraisal for those with low interest, attention of those with high political interest sticks to content with political words for a longer amount of time. Similarly, factors like partisan slant or topical interest may alter the likelihood of a positive relevance appraisal (Bakshy, Messing, & Adamic, 2015; Karnowski et al., 2017). In case the relevance appraisal is positive, individuals engage in what the PINE model calls second-level IE. That is, the incidentally encountered content receives more attention during the reception process. In the case of online information environments, second-level IE has consequences in terms of *clicking behavior* and learning. It can be assumed that second-level IE increases the likelihood that recipients click on a headline. They do so because they have appraised the incidentally encountered information as relevant. It follows:

H2: Respondents in the high relevance condition are more likely to click on incidentally encountered content than those in the low relevance condition.

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The PINE model postulates that second-level IE should also lead to learning. To reiterate, one of the PINE model's main arguments is that first-level IE and secondlevel IE differ regarding outcomes. While the brief scanning of irrelevant information may leave memory traces (e.g., via priming; see Knoll, Matthes, & Heiss, 2020), incidentally encountered information appraised as relevant should increase learning. In other words, knowledge gains should primarily occur for second-level IE. The abundance of the information available online forces individuals not only to be selective in their exposure (i.e., clicking only on interesting stories) but also in their processing of information. Even for TV news, it has been shown that viewers are by far not able to recall all news stories they saw (Neuman, 1976). Clearly, because "not all perceived information can be processed (i.e., behaviorally utilized or stored for later retrieval and behavioral utilization), processing also entails selection" (Zillmann & Bryant, 1985, p. 1). Various scholars stressed that although exposure to political information is a precondition for learning, "it alone does not determine how much will be learned or how well" (Eveland, 2001, p. 588). Following this argument, we theorize that incidentally encountered information appraised as relevant is more likely to be processed thoroughly and subsequently leads to increased knowledge compared to non-relevant information.

More specifically, we look at three different learning outcomes: (a) headline recognition, (b) content recognition, and (c) story recall. IE research often stressed that exposure to headlines and teasers may lead to learning (Fletcher & Nielsen, 2018; Tewksbury et al., 2001). However, the full story is often hidden behind a link. Thus, we can assess learning outcomes with respect to the headline and the content of the full story, in case respondents clicked on that content. Furthermore, research on learning typically differentiates between recognition and recall. Lang (2000) highlights that recognition indicates that a bit of information was encoded (e.g., while scanning) while recall may serve "as an index of how thoroughly a specific bit of information was stored" (p. 56). Taken together, we theorize that incidentally encountered political information appraised as relevant should have a positive effect on headline recognition and recall.

H3: Respondents in the high relevance condition score higher on (a) headline recognition, and (b) story recall of incidentally encountered political information than those in the low relevance condition.

Although headlines and teasers often contain important information, much of the information is only given in the full text behind the link. To learn and subsequently recognize such information, individuals have to be exposed to this additional information by clicking on the link. This is the reason, why we do not expect a direct effect of a positive relevance appraisal on the third learning outcome, content recognition. However, we may expect a mediated effect of a positive relevance appraisal on learning outcomes through clicking on IE content for two reasons. First, reading the full story fosters processing of information that was given in the headline or teaser. The content behind the link often reiterates and contextualizes

the headline. By reading the story, individuals process more information which is closely related to the headline. According to Lang (2000), storage of information is improved by additional links to related information in memory. Subsequently, retrieval (i.e., recognition and recall) should be easier the better the information was stored. Thus, we expect a partially mediated effect of a positive relevance appraisal on headline recognition and recall through clicking on IE content.

Second, clicking on IE content exposes individuals to new information. Headlines and teasers transport the most important part of a story while they omit details and context. However, the information hidden behind the link can be crucial for understanding. For example, a headline saying "Government spends 1 billion on employment measures" does not reveal anything about the measures itself. Typically, specifics which may also help individuals to form an opinion are discussed behind the link. Thus, exposure to this additional information allows individuals to learn information which they could not access without clicking on the IE content. Because exposure to information is a non-negligible precondition of knowledge acquisition, we expect a fully mediated effect of a positive relevance appraisal on content recognition through clicking on IE content. Taken together, effects on all three learning outcomes should be strengthened by clicking and being exposed to the actual content of the story.

H4: The effects of the relevance manipulation on (a) headline recognition, (b) story recall, and (c) content recognition are mediated through clicking on the IE content.

## Learning Outcomes with Respect to the Original Processing Goal

So far, we discussed learning of incidentally encountered information. Yet the PINE model also postulates that IE can affect outcomes related to the initial processing goal. This may be negligible for political communication scholars, if IE is intentionbased. However, topic-based IE may also concern political learning outcomes. A positive relevance appraisal will lead the attention away from the original content to the incidentally encountered content. Individuals may skip the information that is unrelated to a new salient goal. For example, individuals may look for the latest news on presidential candidates but stumble upon information on foreign politics. In case they appraise news on foreign politics as relevant, they will shift their attention away from information about the candidates. Thus, learning outcomes regarding the candidates may be diminished. This effect can be explained by the Limited Capacity Model (Lang, 2000). Because cognitive resources are limited, an attention shift away from any original content will deteriorate the processing of the original content. Therefore, we assume that second-level IE should hinder individuals from achieving their initial processing goal. Regarding political outcomes, this is crucial because individuals may get distracted by IE while they were looking for the political information in which they were interested in the first place.

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H5: Clicking on incidentally encountered information decreases the recognition of content related to the initial processing goal.

## Intention-based versus Topic-based IE

Intention-based IE refers to incidentally encountered political information while individuals had the goal to process non-political information. In contrast, topicbased IE means that people's original goal was to process a specific political topic. In both cases, the incidentally encountered content was not searched for in the first place. However, the original processing goal is different. We theorize that incidentally encountered political information leads to stronger knowledge outcomes if the original processing goal was also related to political content (i.e., topic-based IE). In that case, the incidentally encountered information is *congruent* to the original processing goal. One reason to expect such a congruency effect is that political information needs might often origin from similar higher-level goals (e.g., surveillance, watching for possible threats, acquiring political information for later use in discussions). According to goal systems theory, subgoals and higher-level goals are linked in a hierarchical network (Kruglanski et al., 2002). For example, the higher-level goal which drives individuals to inform themselves about an upcoming election might be more similar to the higher-level goal which motivates an individual to attend to information about foreign policy than the higher-level goal which drives exposure to a funny video. In other words, incidentally encountered information similar to an existing higher-level goal is more relevant than incidentally encountered information unrelated to a higher level goal. Due to the larger amount of links between two political processing goals compared to political processing goals and non-political processing goals, spread of activation and, subsequently, goal pursuit (e.g., cognitive processing, or reading) is more likely. Congruency to the original processing goal will thus lead to increased processing of the IE content, and therefore, enhance knowledge outcomes. It follows:

H6: Topic-based IE leads to stronger effects on (a) headline recognition, (b) story recall, and (c) content recognition than intention-based IE.

### Method

## **Design and Sample**

In a  $2 \times 2$  online experiment, we manipulated the processing goal (intention-based vs. topic-based), and the relevance appraisal (high relevance, i.e., second-level IE vs. low relevance, i.e., first-level IE). After the study, participants were thoroughly debriefed. Based on representative quotas for gender, age, and education, 341 respondents were recruited from a German online panel by Dynata. Out of the raw data, 51 respondents were excluded because they deactivated JavaScript, reported zip codes and states did not match, took less than 7 minutes, or more than 30

minutes for the study, leaving N = 290 respondents. All analyses including the omitted cases yielded the same results. Participants were 51% female and M = 47.74 years old (35.52% less than a high school, 12.41% high school, and 52.07% above high school).

## Manipulation and Stimulus Material

Each participant saw two webpages in random order (see Figure 1, Online Supporting Materials document). Each displayed seven headlines. Webpages consisted of four articles about the processing goal topic, two articles regarding regional politics and one filler (about the British royals). The regional articles were fourth and sixth in one version and in the other version sixth and seventh from top. We informed respondents that clicking on a headline revealed the full article. Exposure to multiple articles at the same time was impossible.

Processing goal manipulation: Prior to exposure to the webpages, we told them to inform themselves about a political or non-political topic while hinting that they will take a quiz at the end of the study. Respondents in the intention-based group were advised to dedicate their attention to "news from Hollywood and cinema" and "news from sports." We chose these two topics because we consider them to be non-political. Respondents in the topic-based group were asked to inform themselves about "US trade war" and "rent, housing, and living conditions in Germany." We consider these two topics to be political. While articles for the topic-based group stressed the political dimension of the topic, none of the articles for the intentionbased group mentioned any political implications of the article's subject. Each webpage displayed four articles about the topic the respondents should inform themselves about. For example, a webpage for the intention-based group included four articles about rent, housing, and living conditions. The articles shown on the webpage matched the processing goal respondents were advised to pursue. Articles were based on real newspaper articles and of similar length (M = 151.06 words, SD =8.47).

*Relevance appraisal manipulation:* We altered the regional articles (from here on we call them *IE articles*) based on the respondent's initially measured zip code. The high relevance group incidentally encountered three IE articles that mentioned cities and villages close to their place of living and one that mentioned the state they were living in. Respondents in the low relevance group received the very same articles including names of places far away from their place of living (see Knobloch-Westerwick et al., 2005, for a similar procedure). We believe that manipulating relevance via geographical proximity is a reasonable choice to test the framework for the first time. In contrast to other manipulations (e.g., issue salience), this manipulation is hardly confounded with political variables. Prior to the study, we matched each zip code in Germany (approximately 8,300) with its state and three villages or cities close to it. These places were shown to participants in the high relevance group. We decided to show respondents living in large cities like Berlin or Munich

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their own city. Participants in the low relevance group received a set of places that were located in a state that did not border the state they were living in. None of the low relevance cities was a nationally important city (like Berlin). The content of the article was identical, only the place varied.

*IE articles*: Four IE articles about regional politics were drafted. Each headline mentioned the city or state in which the story took place. In the "fraud story," it was reported that a former state legislator was convicted of fraud in a *city*. The "construction story" warned that a road construction will lead to massive traffic jam close to a *city*. The "tax story" reported that a *state* has to pay back its citizens. In the "water story," the tap water of a *city* was discolored and unhealthy. In all four stories, politicians and/or officials were cited and the political dimension of the topic was stressed. Articles were of similar length (M = 150 words, SD = 4.69).

#### Measures

*IE article clicked*: We tracked whether respondents clicked on the IE articles by implementing JavaScript code into the web questionnaire. On average, respondents clicked on M = 1.30 (SD = 1.45) of the four IE articles.

Number of processing goal articles clicked: Similarly, the number of clicks on processing goal-related articles was tracked, i.e., how many of the articles about sports (U.S. trade war) and Hollywood and cinema (rent, housing, and living conditions in Germany) a respondent clicked on. On average, respondents clicked on M = 4.59 (SD = 2.93,  $\alpha = .89$ ) of eight articles.

Story recall: Participants indicated whether they recognized any story. Those who recognized a story were asked to recall all details (per story, 1 = story recall, 0 = no story recall). An author and a student assistant coded all responses (N = 758, Krippendorff's  $\alpha = 0.95$ ).

*Headline recognition*: Respondents were asked to identify the headline they just saw from a list of four. Respondents were advised to take the "do not know"-option if they were not able to recognize the correct answer. We ensured that all response options were rather similar. We recoded responses to a dichotomous variable (1 = correct headline recognition). Across all four articles, respondents correctly identified an average of M = 38.44% (SD = 0.31) headlines. Our operationalization actually probes for recognition. In studies by Bode (2016) and Lee and Kim (2017), respondents reported whether "they remember seeing" (Bode, 2016, p. 34) or "have seen" (Lee & Kim, 2017, p. 1010) IE content by ticking yes or no (Bode, 2016, also offered "don't know"). These measures are prone to generate false positives—for example, because of social desirability. In comparison, our measure was a multiple choice question that offered four similar headlines and a "don't know" option. Respondents had to choose one of the answers.

IE content recognition and processing goal content recognition: Respondents received a randomized list including two statements (one true, one false) for each of the four IE articles and each of the eight processing goal articles, totaling 24

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statements. While the statements for the processing goal articles differed depending on the processing goal (topic-based or intention-based), recognition of the IE articles was assessed identically in all groups. Respondents indicated whether they thought the statement was true or false according to the information they saw before. Importantly, statements included information that was not conveyed by the headline itself. Thus, respondents must have read the articles to rate the statements correctly. Respondents were advised to tick "do not know" if they did not remember. We summed the scores (correct = 1, wrong and DK = 0) for each IE article and for all processing goal articles. With respect to *IE content recognition*, respondents were able to identify M = 0.41 (SD = 0.62) of two statement related to the IE article on average. Regarding the *processing goal content recognition*, the intentionbased group correctly identified M = 5.65 (SD = 3.81,  $\alpha = .82$ ) while the topicbased group correctly recognized M = 5.58 ( $SD = 3.63 \alpha = .79$ ) of 16 possible statements.

*Manipulation check*: Participants rated the distance of their place of living to each place mentioned in the stimuli on a 7-point scale from "far away" (1) to "very close" (7) (M = 3.81, SD = 2.73). Respondents indicating that they did not know the name of the city were recoded as 1.<sup>2</sup> We asked respondents about the topics they focused on "while they saw the two websites with news articles." For each of the three sets of articles (i.e., national politics, non-political, and regional), we asked two statements on a 7-point scale from "completely disagree" (1) to "completely agree" (7): "My attention was focused on articles about [national political topics/non-political topics/regional incidents]," "I spent the most time reading articles about [national political topics/non-political topics/regional incidents]." We created three mean scales: focus on national political topics (M = 3.95, SD = 1.93,  $\alpha = .92$ , r = .85), non-political topics (M = 3.96, SD = 1.92,  $\alpha = .94$ , r = .88), and regional incidents (M = 3.75, SD = 1.89,  $\alpha = .93$ , r = .86).

## Analysis

We had data for clicking behavior and knowledge questions for each IE articles separately. This allowed us to rearrange the data so that we had multiple observations per respondent. Therefore, we turned to multilevel logistic regression models for H2, H3a, H3b, H6a, and H6b and multilevel Poisson regression for H6c (both are applications of generalized linear mixed models, GLMM).<sup>3</sup> In our models, four observations for the IE articles were nested within each of the 290 respondents. We replicated hypothesis tests with simpler models as well (i.e., non-hierarchical Poisson regression model).<sup>4</sup> Direction of coefficients and their significance remained the same for all hypotheses. Additionally, we checked whether results differed for the four articles. Direction of coefficients remained the same across all tests. We used the "mediation" package for R (Tingley, Yamamoto, Hirose, Keele, & Imai, 2014) to estimate the mediation proposed in H4. For the analysis of H4c, IE content recognition was dichotomized.<sup>5</sup> Multilevel mediation can potentially lead to

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confounded estimates when within-group effects differ from between-group effects (Zhang, Zyphur, & Preacher, 2009). Therefore, we checked the robustness of our results with non-hierarchical mediation models.<sup>6</sup> Direction of coefficients and their significance remained the same for H4a, H4b, and H4c. The results were robust.

## Results

First of all, we checked whether the pairing of places and zip codes worked. The high relevance condition (M = 6.44, SD = 0.8) reported to live closer to the stimuli cities than the low relevance group (M = 1.13, SD = 0.58), t(267) = -64.59 (Welch–Satterthwaite), p < .001.<sup>7</sup> Hence, matching respondents' zip codes with cities close to their place of living worked.

Then we ran three ordinary least squares (OLS) regressions predicting focus on national political topics, focus on non-political topics, and focus on regional incidents with dummies for relevance manipulation, processing goal manipulation, and an interaction term as predictors. As intended, only the coefficient for the processing goal variable was significant when it came to predicting focus on national political topics (b = -1.72, p < .001) and focus on non-political topics (b = 2.20, p < .001). Thus, the processing goal manipulation worked. Similarly, only the relevance manipulation was a significant predictor for focus on regional incidents (b = 0.68, p < .05), with no significant interaction terms. Hence, our relevance manipulation worked.

In H1, we hypothesized that respondents in the low relevance group (i.e., firstlevel IE) would be able to recognize the headlines correctly at a level better than chance. If respondents would choose one of the five answer options (three wrong headlines, one right headline and one "do not know"-option) at random, we would expect a mean of .2 correct answers (by chance, respondents would pick the right answer for 20% of the questions). Respondents had to select the correct headline for each of the four IE articles which leads us to expect .8 as mean for randomly responding respondents. A one-sample *t*-test revealed that respondents in the low relevance group (N = 143; M = 1.13, SD = 1.19) recognized statistically significant more than .8 headlines on average, t(142) = 3.35 (Welch–Satterthwaite), p < .01, supporting H1.

In H2, we expected that participants are more likely to click on incidentally encountered political information (i.e., regional IE news articles) if appraised as relevant. Model 1 in Table 1 shows a multilevel logistic regression with the dichotomous clicking variable as dependent. The coefficient for the relevance manipulation was positive and significant (b = 0.98, p < .05). Holding all other predictors at fixed values, our model expected a 166% increase in the odds of clicking when the IE articles named cities close to respondents. Thus, H2 is supported.

We then looked at headline recognition (H3a). In Model 2 in Table 1, we regressed correct headline recognition on a set of predictors. We added a variable indicating whether participants clicked on the article (i.e., the dependent variable of

Table 1 Multilevel Logistic and Multileve           Content Recognition	el Poisson Regressions to	Predict Clicks on IE Ar	ticles, Headline Recogniti	on, Story Recall, and IE
	Clicking on IE article Model 1 <sup>a</sup> (H2)	Headline recognition Model 2 <sup>a</sup> (H3a, H6a)	Story recall Model 3 <sup>a</sup> (H3b, H6b)	IE content recognition Model 4 <sup>b</sup> (H6c)
(Intercept) Relevance Manipulation (REL)	$-1.94 (0.37)^{***}$ 0.98 (0.48) <sup>*</sup>	-1.39 (0.19) *** 0.78 (0.24) **	$-3.66 (0.34)^{***}$ 1.76 (0.36) <sup>***</sup>	$-1.44 (0.14)^{***}$ 0.07 (0.16)
(0 = low relevance) Processing Goal Manipulation (PROC) (0 - toxic broad IF)	-0.03 (0.50)	-0.17 (0.25)	0.41 (0.38)	-0.20 (0.17)
REL × PROC IE article clicked	0.16 (0.69)	0.27 (0.35) 1.27 (0.17)***	$0.22 \ (0.48) \\ 2.45 \ (0.24)^{***}$	$0.23 (0.23) \\ 0.92 (0.11)^{***}$
No. of observations No. of respondents	1,160 290	1,160 290	1,160 290	1,160 290
Note. Unstandardized coefficients. Stanc	dard errors in parentheses	A total of 1,160 observa	tions clustered in 290 resl	ondents. IE =
Incidental Exposure. <sup>a</sup> Multilevel logistic regression.				
<sup>o</sup> Multilevel Poisson regression. *** $p < .001$ ,				
$p_{p}^{**} < .01,$				

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 Table 2 Direct and Indirect Effects of Relevance on Headline Recognition, Story Recall, and IE Content Recognition

	Headline recognition (H4a)	Story recall (H4b)	IE content recognition (H4c)
Indirect effect of relevance via clicking	0.04**	0.05**	0.04**
(95% CIs) Direct effect of relevance	[0.01, 0.06]	[0.02, 0.08]	[0.01, 0.07]
(95% CIs)	[0.11, 0.24]	[0.17, 0.29]	[-0.003, 0.15]

*Note.* 1160 observations clustered in 290 respondents. Results based on 5,000 quasi-Bayesian simulations. IE = Incidental Exposure.

 $p^{***}p < .001,$  $p^{**}p < .01,$ 

\*p < .05.

Model 1 in Table 1). The coefficient for clicking was positive and significant (b = 1.27, p < .001), indicating that respondents who clicked on the article were 3.55 times more likely to correctly recognize the headline than respondents that did not click on the article. Importantly, the relevance manipulation was also a significant and a positive predictor of headline recognition (b = 0.78, p < .01). Respondents in the high relevance group were more likely (118% increase) to recognize the headline correctly even after controlling for the effect of actual exposure to the full article. Hence, H3a is supported. H3b predicted that participants in the high relevance condition would have higher story recall than those in the low relevance condition. Results of a multilevel logistic regression are shown in Model 3 in Table 1. Similar to H3a, we decided to include a dummy indicating whether respondents clicked on the article. Again, actual exposure to the article (i.e., clicking) led to increased story recall (b = 2.45, p < .001). Importantly, even when we control for clicking, the relevance manipulation remained a significant predictor of story recall (b = 1.76, p < .001). All else equal, the likelihood of recalling an IE articles increased by 483% in the high compared to the low relevance condition, supporting H<sub>3b</sub>.

We then tested whether the relevance manipulation's effect on headline recognition, story recall, and IE content recognition was mediated through actual exposure to the full article (i.e., clicking on the article). To test H4, we estimated three multilevel mediation models with quasi-Bayesian confidence intervals based on 5,000 simulations. Our analysis yielded that effects of the relevance manipulation were significantly mediated through clicking on IE content for (a) headline recognition (indirect effect = 0.04, 95% CIs = [0.01, 0.06], p < .01), (b) story recall (indirect

 Table 3 Ordinary Least Squares Regression Predicting Processing Goal Content Recognition

	Model 1 (H5)
(Intercept)	3.55 (0.52)***
Relevance Manipulation (REL) $(0 = low relevance)$	0.61 (0.55)
Processing Goal Manipulation (PROC) (0 = topic-based IE)	-0.26 (0.56)
Number of processing goal articles clicked	$0.58  \left( 0.07 \right)^{***}$
Number of IE articles clicked	$-0.73  \left(0.14 ight)^{***}$
REL x PROC	0.75 (0.78)
Adjusted R <sup>2</sup>	.20
N	290

*Note.* Unstandardized coefficients. Standard errors in parentheses. IE = Incidental Exposure. \*\*\*p < .001,

\*\*p < .01,

$$*p < .05$$

effect = 0.05, 95% CIs = [0.02, 0.08], p < .01, and (c) IE content recognition (indirect effect = 0.04, 95% CIs = [0.01, 0.07], p < .01). H4 is supported (Table 2).

In H5, we expected that clicking on incidentally encountered articles should decrease learning related to the initial processing goal. In Model 1 of Table 3, our dependent variable indicates how many of the 16 statements about the processing goal articles respondents classified correctly. We included an interaction term for our manipulations into the non-hierarchical OLS regression model. The number of processing goal articles a person clicked on was a highly significant predictor (b =0.58, p < .001). In line with H5, we found a negative and significant effect of clicking on IE content on processing goal content recognition (b = -0.73, p < .001). Finally, in H6 we expected that topic-based IE leads to more learning of incidentally encountered information than intention-based IE. Results are reported in Model 2, Model 3, and Model 4 of Table 1. We did not find any difference between the two processing goals when it came to learning of IE content. All three interaction coefficients—for (a) headline recognition (b = 0.27, *n.s.*), for (b) story recall (b = 0.22, n.s.), and for (c) IE content recognition (b = 0.23, n.s.)—were not significant. We conclude that people learn from incidentally encountered political information regarded as relevant in a similar way regardless whether IE was topic-based or intention-based. H6 is rejected.

### Discussion

We found that second-level IE leads to fundamentally different learning effects as compared to first-level IE. In particular, there are three main theoretical contributions of this study. First, we find unambiguous support for the notion that

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individuals will not only attend to, but also process incidentally encountered information more thoroughly if information is appraised as relevant. Second-level IE therefore leads to learning in online environments via two paths: First, memory for the presented information itself is increased. That is, when individuals read information snippets and headlines and appraise them as relevant, this information will stick to memory because it is processed more effortfully. Second, compared to firstlevel IE, second-level IE leads individuals to click on incidentally encountered content. This subsequently increases knowledge gains by exposing individuals to further information. Rephrased, there are two paths to learning from second-level IE: One is selective attention. Individuals will allocate attention to incidentally encountered information they appraise as relevant. So even without clicking on any additional information, learning processes are fostered by second-level IE. This insight is relevant because clicking on incidentally encountered information requires more resources (e.g., time) and cognitive capacities than processing short information snippets. Yet in today's media environments, individuals might often lack the capacities or resources to click on information they encounter incidentally, even if the information is deemed as important (Costera Meijer & Groot Kormelink, 2015). Nevertheless, our results suggest that substantial learning from incidentally encountered teasers, headlines, and snippets might still occur under the condition of second-level IE. In conceptual terms, these insights suggest that clicking on information cannot be treated as a measure of second-level IE because second-level IE can also occur when individuals do not click on the information that is appraised as relevant. As a second path to learning, second-level IE leads individuals to selectively expose themselves to additional content. This is arguably very important in terms of learning effects because such additional content typically contains new information that individuals most likely would never see under first-level IE conditions.

As the second contribution, we looked at the differences between intentionbased and topic-based IE. Previous research only considered situations in which individuals looked for non-political content and stumbled upon something political. However, our findings suggest that whether individuals encounter political information incidentally while they are looking for non-political content or political content does not affect learning through IE at all. According to our findings, intentionbased and topic-based IE do not differ in terms of processes and effects. Nevertheless, we argue that neglecting topic-based IE is like turning a blind eye on a large share of the phenomenon (Pew Research Center, 2017). In fact, there is a myriad of research questions on topic-based IE worth to explore. For instance, according to the PINE model, recipients may constantly switch their processing goals during reception in online environments. For topic-based IE, they may switch between incidentally encountered topics and the original topic, back and forth. The more people switch, the more they get distracted from either topic, leading to a decrease in learning outcomes. As another example, the thematic, evaluative, and emotional congruence between the original topic and the incidentally encountered

topics may matter for second-level IE. This could be tested in experimental research varying topical congruence.

Third, this study sets the stage for a new branch of research by highlighting distraction effects of IE. We found that second-level IE to political information harms learning of information related to the initial processing goal. Clearly, second-level IE requires cognitive resources. From a normative democratic perspective, this might hardly be troubling for situations in which citizens pursue non-political processing goals. However, when people actively search for a political topic, second-level IE to other political information can distract individuals and subsequently decrease knowledge gains related to the topic they were originally searching for. We can also ask the question whether IE to non-political information may lead to distraction from political processing goals (Matthes et al., 2020). For example, individuals may search for information on an upcoming election but stumble upon entertainment content they regard as more relevant than the political processing goal. That is, in order to understand IE, not only the content and effects of IE need to be taken into account, but also the content and effects of the original information under the condition of IE.

Beyond these three contributions, our findings provide some evidence that firstlevel IE can lead to learning. That is, even when the presented information was not appraised as relevant, memory traces were higher than by chance. Although this is in line with previous research (Bode, 2016; Lee & Kim, 2017), better designs are needed to corroborate this claim, considering that we did not have a proper control group. Thus, this finding should be interpreted with caution. We find that memory traces from first-level IE cannot be compared to the more substantive learning outcomes generated by second-level IE. Nevertheless, especially in online environments and given a large share of audiences is uninterested in politics, first-level IE may explain why the politically uninvolved, who tune out of politics, are still connected to political news.

Prior to concluding remarks, it is important to stress the study's limitations. First, we did not explore the reasons for a positive relevance appraisal. By manipulating the geographical proximity of news events, we altered relevance based on the perceived utility of the information (Knobloch-Westerwick et al., 2005). Information on events far away from one's place of living are less important because it may less likely touch one's own life. However, in most online environments a range of competing cues can drive one's relevance appraisal (e.g., recommendations, content types ranging from text to videos, partisan cues). Future studies should replicate our findings and manipulate the relevance appraisal in more diverse ways (for further examples, see Kaiser et al., 2018) and should test the model by using inherently political manipulations like partisan cues. Second, we did not examine boundary conditions for entering second-level IE. Future studies should consider possible hindrances of engaging in deeper processing (i.e., second-level IE) of relevant information (e.g., time constraints, cognitive fatigue, Matthes et al., 2020; see also Weeks & Lane, 2020). Third, we used a processing goal manipulation that does not represent the variety of processing goals that may occur. Specifically, characteristics of the processing goal may influence the depth of first-level IE. For example, the

#### Learning from Incidental Exposure

### A. Nanz & J. Matthes

amount of information an individual has to process to determine relevance may differ between processing goals. Similarly, processing goal characteristics may influence the likelihood of engaging in second-level IE. For instance, individuals pursuing a very strong processing goal may not engage in second-level IE at all. Future research should try to manipulate more characteristics of the processing goal. Additionally, we induced processing goals by telling respondents to focus on certain content. However, most individuals may also have more stable processing goals. In an additional post-hoc analysis, we thus probed for an interaction between the relevance manipulation and general political interest. We did not find a significant interaction effect on any of the learning outcomes. Future studies may consider more stable processing goals. Fourth, our design did not include a control group. Thus, in contrast to previous studies (Bode, 2016; Lee & Kim, 2017), we cannot show that respondents incidentally exposed to information learn more than respondents that did not see such information. Rather, we compared the low relevance group's recognition score with randomly responding individuals. A control group would allow a more robust test of the effects of first-level IE. Fifth, our experiment uses journalistic news articles as stimuli and we suggest that future research may use more diverse information environments. Sixth, the PINE model was explicitly designed for IE in social media environments. Our experiment employed a mock webpage (see also Lee & Kim, 2017). User behavior and reception situations may differ for social media sites. However, we are rather confident that the basic mechanisms should be the same regardless of the specific online information environment. Finally, the diachronic processes theorized in the PINE model were not fully taken into account in the present study. In fact, all current processing goals and relevance appraisals are shaped by preceding goals and appraisals. Future research should employ truly diachronic designs in order to trace the temporal dynamics theorized in PINE. Different methodological approaches, such as eye-tracking (King, Bol, Cummins, & John, 2019) or mobile experience sampling (Naab, Karnowski & Schlütz, 2019), may improve our understanding of IE phenomena (for a discussion of methodological implications, see Matthes et al., 2020).

### **Broader Implications for the Field**

While this article primarily discusses IE to political information, our findings have significant implications for other areas of communication research. In online environments, the notion of IE is relevant to any kind of information, no matter if related to, for instance, health, risk, advertising, science, or the environment. Whatever the specific content is, we theorize that individuals have a processing goal and they constantly engage in relevance appraisals. That is, whenever individuals incidentally stumble upon information, they check this information for relevance. For example, multiple studies have investigated learning through IE to health information on the internet (e.g., Tian & Robinson, 2009). However, this strand of research typically does not consider first- and second-level IE. If individuals appraise incidental health information

#### Learning from Incidental Exposure

as relevant, the effects on all health-related outcomes such as learning, health-related behavior, or attitudes will be larger compared to a negative relevance appraisal. Likewise, in advertising research, click-through rates of banner ads can be conceptualized as second-level IE, and the PINE model can be used to predict clicking on banner ads as well as learning from banners appraised as irrelevant (see Yoo, 2009). Yet the PINE model would not conceptualize ad clicking as a static behavior (i.e., clicked or not) but conceptualize exposure to ads diachronically. The notion of constant relevance appraisals helps to better understand the dynamics of attention allocation to ads during reception. That is, individuals may click on a banner ad leading them to new content, yet this content will also be automatically appraised for its relevance, leading to effortful processing or the skipping of that content.

Beyond learning from incidentally encountered information, our research has also implications for the notion of distraction from content related to the initial processing goal. In most areas of the field, survey researchers ask respondents about the perception of media content (i.e., late-night comedy; climate change information, advertising, etc.), and such perceptions are typically correlated with outcome variables such as cognitions, affects, or behaviors. Yet exposure to incidentally encountered information unrelated to the initial processing goal is mostly ignored. We would argue that, especially in online information environments, there is always the possibility of distraction from the content related to the initial processing goal, and such effects need to be taken into account. For instance, when asking individuals how often they see political content on social media in order to explain political participation, scholars typically ignore (incidentally encountered) non-political content (e.g., Heiss & Matthes, 2019). Such non-political content, however, can lead to the opposite effects as compared to political content (i.e., dampening participation). Again, this logic does not only apply to political content, but to any content that individuals are exposed to. Ultimately, incorporating distraction effects by IE may help research in other subfields to get a more fine-grained picture of media effects.

Finally, our research may also be relevant selective exposure research (see Knobloch-Westerwick et al., 2005). Selective exposure research primarily refers to the selection (or avoidance) of content categories, such as a particular channel or webpage. PINE, in contrast, takes a diachronic perspective and focuses on the reception process, arguing that people may continuously switch between processing goals during reception. Yet selective exposure scholars could adapt the logic of PINE by theoretically distinguishing between processing goals, and what one could call consistency appraisals (i.e., is the content consistent with my ideology). In case of a negative consistency appraisal, one would expect selective avoidance (see Bode et al., 2017).

## Conclusion

We conclude that IE is more nuanced and leads to more complex learning effects than previously assumed. The mere scanning of incidentally encountered political information is by far less substantial compared to the processing of incidentally

encountered content appraised as relevant. IE exposure to political information can deteriorate the learning outcomes of the information that was in line with the original processing goal. Understood as a dynamic concept, IE can thus explain various learning outcomes spanning attention and exposure processes, calling for a diachronic theoretical and methodological perspective.

## **Supporting Information**

Additional Supporting Information may be found in the online version of this article.

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## **Conflict of interest**

On behalf of all authors, the corresponding author states that there is no conflict of interest.

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#### Notes

- 1. We thank an anonymous reviewer who coined this wording.
- 2. As noted by a reviewer, "not knowing" a place and believing that it is "far away" may not be the same. However, with regard to the goal of our manipulation this difference is negligible. We did not aim to manipulate the perceived geographical distance between one's place of living and the cities in the IE articles. Rather, we intended to manipulate the relevance of the articles. We assume that information about a city a respondent does not know is not relevant to the respondent.
- 3. Additional statistical information about the models is available in the Online Supplementary Materials document.
- 4. We summed all first-level variables per respondent (e.g., calculated a variable indicating how many of the four IE articles a participant clicked on) and ran regressions with participants instead of IE articles as unit of observation. Yet, we would like to stress that GLMM are superior because they can (a) account for variance within participants, and (b) are more precise when it comes to causality. Simpler models cannot incorporate that it is impossible for participants to learn about the "fraud" story when they clicked only on the "water" story. With GLMM, we can link first level predictors (e.g., click on article) with dependent variables measured on the first level (e.g., story recall of a certain IE article).

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- Respondents answering at least one of the two IE content recognition items correctly received the value 1.
- 6. We summed all first-level variables per respondent and ran a mediation analysis with participants instead of IE articles as unit of observation.
- 7. Even if we excluded respondents indicating that they "do not know" the place, the mean difference between groups remained highly significant.

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## 6.1 Appendix for Study II

## Supplemental Materials Document

Figures



Figure 1. Screenshot of a webpage stimulus (in German).

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	Clicking on I	IE article	Headline reco	gnition	Story recall		IE content rec	ognition
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						model		
ICC		.62		.19		.32		.18
AIC	1236.1	1232.5	1499.2	1410.7	1250.3	1030.6	1876.9	1804.6
BIC	1246.2	1257.7	1509.3	1441.0	1260.4	1061.0	1887.0	1834.9
Log	-616.0	-611.2*	-747.6	-699.3***	-623.1	-509.3***	-936.4	-896.3***
Likelihood								

*Note.* ICC = Intraclass Correlation Coefficient for Generalized linear mixed model. \*\*\* p < .001, \*p < .01, \*p < .05

## 7 Study III: Nanz & Matthes (2022b)

Nanz, A., & Matthes, J. (2022). Seeing political information online incidentally. Effects of first- and second-level incidental exposure on democratic outcomes. *Computers in Human Behavior*, 133, 107285. doi:<u>10.1016/j.chb.2022.107285</u>
Computers in Human Behavior 133 (2022) 107285



# Seeing political information online incidentally. Effects of first- and second-level incidental exposure on democratic outcomes



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#### ARTICLE INFO ABSTRACT Keywords: Today, the internet and particularly social media offer lots of opportunities to encounter political information Incidental exposure incidentally. Motivated by conflicting findings regarding the effects of incidental exposure (IE) on political Political participation outcomes, researchers recently developed new theoretical models. Building on the Political Incidental News Political knowledge Exposure (PINE) model, we distinguish two levels of IE to political information, first-level (i.e., mere scanning of Social media IE content) and second-level (i.e., effortful processing of IE content). In one cross-sectional ( $N_1 = 1660$ ) and three panel surveys ( $N_2 = 450$ , $N_3 = 524$ , $N_4 = 901$ ), we measure the two levels of IE and investigate their effect on Political expression multiple political outcomes. We find null effects on political knowledge for both levels. However, across all three panel studies, second-level IE affects online political participation positively. In Study 4, we find that secondlevel IE also affects social media use for political information and political expression positively. Implications are discussed.

With the rise of interactive technologies, the Internet – and particularly social media – has become a place where individuals can encounter, read, discuss, or share political information. Yet a substantial share of the population in democratic systems across various countries might not be particularly interested in following the political processes. The phenomenon of incidental exposure (IE) brought new life to the debate of the Internet's and social media's potential to foster democratic processes such as learning or political engagement.

The concept of IE refers to situations in which individuals encounter political information even though they did not look for it (e.g., Fletcher & Nielsen, 2018; Nanz & Matthes, 2022). Previous research reveals mixed results for various political outcomes. While some studies attribute a positive effect to IE in regard to news use, political knowledge gain, and participation (Bode, 2016; Kim et al., 2013; Strauß et al., 2020; Valeriani & Vaccari, 2016), others could not replicate such findings (Heiss & Matthes, 2019; Oeldorf-Hirsch, 2018). These inconsistencies might, among other reasons, occur due to the lack of clear conceptualization and operationalization of IE (Matthes et al., 2020). While some scholars consider quickly glimpsing at political content as IE, others focus on incidental encounters that lead to intensive engagement with the content, and still others subsume both types of information encounters under the phenomenon of IE. Thus, even though scholars consider information processing strategies during exposure to IE content as part of the phenomenon, their effect on political outcomes is hardly explicated directly. Similarly, survey respondents may differ in their interpretation of IE, amplifying the potential confusion about what most items may measure.

We aim to advance the current literature on IE in two ways: First. building on the Political Incidental News Exposure (PINE) model (Matthes et al., 2020), we present a new measurement of IE covering two key dimensions which have been described, but not operationalized in previous studies. We distinguish between "[f]irst-level IE, which is the scanning of incidentally encountered information, and second-level IE, defined as the effortful processing of incidentally encountered information" (Nanz & Matthes, 2020, p. 770). This distinction is crucial because previous research (J. K. Lee & Kim, 2017; Nanz & Matthes, 2020) suggest that the effects originating from the two levels strongly diverge. However, this distinction has never been put to test in survey research. We fill this gap with four studies. Second, it complements cross-sectional with longitudinal evidence. We investigate the effects of first- and second-level IE with three two-wave panel surveys. In Studies 2 and 3, we look at political knowledge and online as well as offline political participation as they have been the main outcomes of previous IE research. Study 4 replicates the other studies but adds social media

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use for political information and political expression as additional outcomes.

### 1. Incidental exposure research

The term incidental exposure has been used to describe encounters with political information and news which recipients did not seek for. However, this conceptualization has been criticized recently as showing a "lack of differentiation" (Kaiser et al., 2021, p. 79) and being used as "some kind of umbrella term" (Nanz & Matthes, 2020, p. 770). We will first review evidence from previous research, before defining IE for this study.

The bulk of research on IE has been growing substantially over the past decade. While some scholars dedicated their attention to effects on news use and the role of political expression (Strauß et al., 2020; Yamamoto & Morey, 2019), the majority of research focuses on mobilizing or learning effects (e.g., S. Lee et al., 2022, Oeldorf-Hirsch, 2018; Tewksbury et al., 2001). Often scholars refer to passive learning theory (Krugman & Hartley, 1970) as the mechanism behind effects of IE. Research on participation also frequently points towards the positive association between knowledge and participation (Kim et al., 2013; Valeriani & Vaccari, 2016).

When it comes to effects of IE, the current literature reports mixed findings. For example, Kim et al. (2013) and Valeriani and Vaccari (2016) both found positive and significant effects of stumbling upon news online on participation. However, while the latter study concluded that gaps between individuals with low political interest will most likely shrink, Kim et al. (2013) argued that IE "may contribute to widening citizens' online political participation between people who use the Internet more for entertainment and people who prefer news" (p. 2611). Heiss and Matthes (2019) replicated Valeriani and Vaccari's (2016) study with longitudinal data. Although they found the same patterns in a cross-sectional analysis, these results did not emerge in a panel analysis – rendering the robustness of previous findings questionable.

Turning now to political knowledge as outcome variable, the findings are similarly mixed. In a study with cross-sectional surveys from 1996 to 1998, Tewksbury et al. (2001) found only in the latter survey a positive effect of IE on public affairs knowledge. In another cross-sectional survey, Oeldorf-Hirsch (2018) did not find any evidence that citizens learn through IE on social media. Others found effects contingent on reactance towards IE content (Marcinkowski & Došenović, 2020). Nonetheless, a few experimental studies in the field supported the notion that citizens can learn from IE (e.g., J. K. Lee & Kim, 2017; Nanz & Matthes, 2020).

Considering the mixed findings, it may be useful to reconsider some of the current research's main assumption. We will now briefly echo two aspects of recent research on IE that have been criticized and accounted with potentially explaining the mixed findings in the field (see e.g., Kaiser et al., 2021; Matthes et al., 2020; Nanz & Matthes, 2020).

First, as mentioned above, the field lacks a clear conceptualization of IE. Most scholars vaguely describe IE as situations in which individuals stumble upon political content they did not intend to see. However, very different situations have been considered as IE. Scholars argued that citizens may passively glance at headlines and theorized that exposure to headlines and teasers clearly has to be considered as exposure because these information snippets may already convey substantial political information (Fletcher & Nielsen, 2018). On the other hand, researchers also highlighted that individuals may "register a headline and perhaps click and read the accompanying story" (Tewksbury et al., 2001, p. 536). The notion that the brief scanning as well as the effortful processing of IE content are part of the phenomenon of IE has been voiced by various scholars and theoretical models (e.g., Chen et al., 2021; Kaiser et al., 2021; J. K. Lee & Kim, 2017; Matthes et al., 2020; Wieland & Kleinen-von Königslöw, 2020). Thus, quite different information processing strategies are prevalent in the situations that have been described as IE in the literature. In response to this ambiguity, it has

been stressed that glimpsing at a headline or the first sentence of a social media post should be considered to be different than attentively reading the full story (Matthes et al., 2020).

Second, and closely related, research often remains rather vague when it comes to the mechanisms explaining the effects of IE on political variables. Research on IE's effects on political knowledge often cites passive learning (Krugman & Hartley, 1970) to explain learning (e.g., Bode, 2016; Tewksbury et al., 2001). Most research that analyzes effects of IE on political participation takes a similar perspective by highlighting political knowledge as a driver for political participation (e.g., Kim et al., 2013). Thus, individuals passively consume incidentally encountered political information and – especially through repetition – they may gain knowledge as a "by-product". While this may be applicable for some situation that are considered as IE (e.g., scanning and skipping of incidentally encountered information), passive learning fails to explain knowledge effects when individuals allocate their attention at processing incidentally encountered information (e.g., follow an incidentally encountered link and read a story).

### 2. First- and second-level incidental exposure

In response to this criticism, Matthes et al. (2020) proposed the Political Incidental News Exposure (PINE) model. Following this line of research. IE can be considered as "exposure to information that people encounter without actively seeking for it. Importantly, we distinguish two levels of IE: First-level IE, which is the scanning of incidentally encountered information, and second-level IE, defined as the effortful processing of incidentally encountered information" (Nanz & Matthes, 2020, p. 770). According to the PINE model, every time individuals encounter information, they instantly engage in a process called the relevance appraisal. That is, individuals constantly and automatically scan their newsfeeds or a website for cues which suggest that the content contains information that requires further attention (Knoll et al., 2020). For example, recipients may start reading the first words, glimpse at an accompanying picture or evaluate the source of the content to determine whether they want to have a closer look at the information at hand. According to the PINE model, in case of IE, various characteristics of content (e.g., source, key words, credibility) can lead to the decision that the IE content (i.e., content that is not in line with the processing goal) is appraised as relevant. For example, individuals may visit a social media platform to chat with friends but stumble upon a breaking news headline.

By placing the relevance appraisal at the center of the theory, the PINE model separates two distinct forms of IE which differ both conceptually and in their realization: first-level IE describes a situation in which individuals encounter political content but do not appraise it as relevant. After processing the IE information superficially, recipients continue their search for the content they initially wanted to see. In contrast, second-level IE takes place when individuals appraise IE content as relevant. As mentioned above, this appraisal subsequently initiates a shift of cognitive resources. Individuals redirect their attention to the new piece of information and engage in a deeper processing of the message.

Although not explicitly mentioned, both levels of IE are mirrored in the theoretical conceptualization in previous research (see e.g., Fletcher & Nielsen, 2018; Tewksbury et al., 2001). However, they have not been reflected in the operationalization. In fact, most survey research on IE relies on items slightly adapted from Tewksbury and colleagues' (2001) study that asks respondents whether they "are [...] ever exposed to news and information on current events, public issues, or political when [they] may have been going on-line for a purpose other than to get the news" (p. 548; see e.g., Kim et al., 2013; Valeriani & Vaccari, 2016). As we have outlined above, "*being exposed*" may mean different things for different scholars. This may also apply to respondents who have to make up their own mind about what *exposure* implies for them. Indeed, when Yadamsuren and Erdelez (2016) asked their interviewees to define IE

they received different interpretations. Thus, it is not clear what the commonly used items for IE measure. Are people reporting how often they briefly scan and skip political information they encountered incidentally (i.e., first-level IE) or are they indicating how often they stumble upon political information that they investigate more closely (i. e., second-level IE)? Thus, this study advances previous research of IE by empirically testing two different levels of IE which differ in their negative (first-level IE) and positive (second-level IE) relevance appraisal. Thus, we propose:

H1: IE is a two dimensional construct, with a "first-level IE" and a "second-level IE" dimension.

### 2.1. Related theoretical approaches

Readers may wonder how the definition of first- and second-level IE is related to other theoretical approaches. The literature stemming from library and information science offers multiple frameworks and models to study IE, such as Bates (2002) approach of classifying information seeking behaviors. However, these models often do not formulate predictions regarding the effect of different information processing strategies during IE, rendering them insufficient for studying the impact of the phenomenon of IE on various political outcomes.

The cognitive mediation model (Eveland, 2001) is a widely cited theoretical model to explain effects of news use on knowledge. Building upon uses and gratifications approach, the model argues that individuals seeking for surveillance gratifications will consume news intentionally. Importantly, it puts special emphasis on the information processing occurring during and after news exposure by highlighting that individuals have to elaborate on political news to learn from it. The cognitive mediation model stresses that "individuals must want to learn from the news" (Eveland, 2001, p. 571). In short, the model argues that news use is driven by rather broad surveillance motivations and knowledge effects are mediated by attention and elaboration.

In contrast, the PINE model conceptualizes IE to political information as a *dynamic* phenomenon that is driven by *non-political* goals. Most researchers conceptualize IE as situations in which individuals are exposed to political information even though they pursued non-political goals. While this perspective is not without its issues (e.g., neglecting IE while looking for other political topics or IE to non-political information; see Matthes et al., 2020; Yadamsuren & Erdelez, 2016), it shows that the scholarly attention directed at IE is (at least partially) founded in the prospect that IE may foster normatively desirable outcomes such as knowledge or participation even for citizens that do not actively follow the political discourse (i.e., individuals with limited or no surveillance gratification seeking, e.g., J. K. Lee & Kim, 2017; Valeriani & Vaccari, 2016).

Additionally, we must stress that second-level IE and cognitive elaboration should not be used synonymously. The PINE model conceptualizes second-level IE (as well as first-level IE) as something that happens during exposure. However, news elaboration, as conceptualized in the cognitive mediation model, does not make this assumption explicitly. In fact, elaboration can refer to all kinds of (non-incidentally encountered) contents, happens after exposure, and is thus a rather broad term. Notably, most measures for elaboration also indicate that elaboration is happening after the exposure situation (e.g., "News stories often come to have a broader meaning after I've had a chance to think about them", see Eveland, 2001, p. 594). Similarly, previous research on IE conceptualizes elaboration as a consequence of IE (e.g., Oeldorf--Hirsch, 2018), and not as a characteristic of IE.

Furthermore, conceptualizing IE as a dynamic phenomenon means that broad motivations such as surveillance gratifications do not align with recipients' capacities of changing processing goals instantly (see Nanz & Matthes, 2020 for a discussion). During a reception situation in new media environments, individuals constantly switch between processing information related to the initial processing goal, first-, and second-level IE. In short, "processing goals refer to the engagement with the content individuals want to see and not the underlying gratification sought" (Nanz & Matthes, 2020, p. 772) during media exposure.

### 2.2. Assessing construct validity

In a next step, to assess convergent validity, we will investigate whether the two dimensions of IE are correlated with theoretically related constructs. It has been argued that particularly highly interested individuals engage with incidentally encountered political information (Ktimpel, 2020). Furthermore, individuals with low political interest may be less inclined to engage with IE content. Bode et al. (2017) showed that individuals with low political interest disregard political information faster on social media. Thus, we expect to find a negative correlation between political interest and first-level IE but a positive one for second-level IE.

The perception of one's own political sophistication should also affect whether individuals attend to IE content. Specifically, those who consider themselves knowledgeable may be more inclined to attend to incidentally encountered political information given that attentive information consumption aligns with their self-perception. Subjective knowledge has also been shown to drive engagement in social media environments (S. Lee et al., 2021). Individuals reporting low levels of subjective knowledge should be less inclined to engage with political IE content but will be more likely to skip or overlook such content (i.e., first-level IE).

Another related concept is the "news finds me" perception (Gil de Zúñiga et al., 2017). Previous research has documented that a part of the public expects that the most important news will be catered to them by their network. We expect this perception to be related to a rather low motivation to engage actively with political information. Furthermore, individuals that tend to believe that important stories will show up in their news feed may also be more likely to stick to headline snacking and superficially processing of political information.

In a similar vein, intentional news avoidance should be negatively related with second-level IE but positively related to first-level IE. Some citizens may have a range of reasons why they avoid the news (e.g., mood management, overload; Skovsgaard & Andersen, 2020). Given that incidentally encountered political information is often related to current news, we expect that intentional news avoiders are more likely to divert their attention from IE content after categorizing it as news (i. e., first-level IE). Furthermore, the same motivations that drive news avoidance are expected to reduce second-level IE given that IE content frequently bears news-like characteristics. We formalize our expectations in the following hypotheses.

H2: First-level IE is negatively correlated with (a) political interest and (b) subjective knowledge but positively correlated with (c) "news finds me" perception and (d) intentional news avoidance.

H3: Second-level IE is positively correlated with (a) political interest and (b) subjective knowledge but negatively correlated with (c) "news finds me" perception and (d) intentional news avoidance.

### 3. Study 1

#### 3.1. Measurement strategy

Building upon the PINE model and the findings of interview and focus group studies, we developed items to measure first- and second-level IE. The two levels of IE are clearly represented in qualitative research in the field. For example, interviewees reported that they skimmed the headlines but sometimes – in case something interesting came up – took a closer look at content they saw incidentally (Bocz-kowski et al., 2018). This also extends to clicking behavior: "So if I'm like going through [my Twitter feed] and something comes up that looks interesting I'll click on it" (Antunovic et al., 2018, p. 639f.). But not only citizens report these two levels of IE, some previous work also considers them implicitly (e.g., Tewksbury et al., 2001) or explicitly (e.

g., Chen et al., 2021; Nanz & Matthes, 2020; Oeldorf-Hirsch, 2018). We developed survey items to assess these two levels of IE. In line with previous survey research scrutinizing information processing during exposure (e.g., Eveland, 2001), we ask respondents to provide a summary tally that spans across "several exposure episodes over several weeks" (Schemer et al., 2008, p. 202f.). The question introduction and items were drafted accordingly. In other words, we are not aiming to collect information about a single reception situation but an aggregated score detailing the frequency of first- and second-level IE situations in the last couple of weeks.

### 3.2. Method

We conducted a cross-sectional survey (N = 1660) in December 2019. The sample was recruited via Dynata based on representative quotas for age, region, and gender for the Austrian population between 18 and 65 years. The sample's mean age was M = 42.85 (SD = 13.39) and 43.92% were male, 55.72% female, and six individuals ticked "other" (44.4% less than a high school diploma, 28.98% high school diploma, and 25.12% higher than high school diploma).

#### 3.2.1. Measures

Data, full wordings, descriptives, and analysis scripts are available online (see Online Appendix and https://osf.io/reugy/). All items to assess first- and second-level IE reflect both components of IE: (a) the incidental nature of the information encounter, and (b) the result of the relevance appraisal. The six items used in Study 1 are presented in Table 1 with means and standard deviations. We asked respondents to rate how often the listed situations happened in the past weeks. Answers ranged on a seven-point scale from "never" (1) to "very often" (7). From the three items per level, we calculated mean scales for first- ( $\alpha = 0.80$ , M = 3.83, SD = 1.47) and second-level IE ( $\alpha = 0.90, M = 3.81, SD =$ 1.56). Political interest was assessed with one item ("Generally speaking, how interested are you in politics?") on a seven-point scale ranging from "not at all interested" (1) to "very interested" (7) (M =4.80, SD = 1.68). To measure subjective knowledge, we asked respondents to what extent they agreed with the following item: "Compared to most people, I know a lot about political issues" on a seven-point scale from "I strongly disagree" (1) to "I strongly agree" (7) (M = 4.15, SD = 1.64). Based on previous work (Gil de Zúñiga et al., 2017), three items were used to assess the "news finds me" perception on a ten-point scale ranging from "do not agree at all" (1) to "agree

completely" (10) (wording in Online Appendix B,  $\alpha = 0.68$ , M = 5.55, SD = 2.08). Intentional news avoidance was measured by asking respondents how often they "actively [try] to avoid news these days" on a scale with six answer categories ("daily," "5–6 days a week," "3–4 days a week," "1–2 days a week," "more rarely," and "never"). Higher scores on the variable denote more intentional news avoidance (M = 1.34, SD = 1.49).

### 3.3. Results

We used confirmatory factor analysis (CFA) with maximum likelihood estimation to test H1. Thereby, we compare a two-factor model (see Table 1 for the assignment of indicators to the factors) against a single-factor model. Additional details (e.g., model fit) are available in the Online Appendix. We calculated Pearson correlations to test H2 and H3.

The fit indices revealed an acceptable fit for the CFA with three items per level (CFI = 0.98, TLI = 0.96,  $\chi^2/df = 13.82$ , p < .001, RMSEA = 0.088, GFI = 0.98, AGFI = 0.94). The two-factor model fitted significantly better than the one-factor model ( $\Delta\chi^2$  (1, N = 1660) = 2966.14, p < .001). H1 was supported. In line with H2, we found that first-level IE was negatively correlated with political interest (r (1658) = -0.22, p < .001), and subjective knowledge (r (1658) = -0.22, p < .001) and subjective knowledge (r (1658) = -0.22, p < .001), but positively correlated with "news finds me" perception (r (1658) = 0.19, p < .001). H1 was supported. For H3, we found that second-level IE was positively correlated with political interest (r (1658) = 0.49, p < .001) and subjective knowledge (r (1658) = 0.49, p < .001) and subjective knowledge (r (1658) = 0.47, p < .001), but negatively correlated with news finds m° perception (r (1658) = -0.17, p < .001) and intentional news avoidance (r (1658) = -0.17, p < .001) and intentional news avoidance (r (1658) = -0.17, p < .001) and intentional news avoidance (r (1658) = -0.17, p < .001) and intentional news avoidance (r (1658) = -0.19, p < .001). Thus, H3 was supported.

#### 3.4. Discussion

In Study 1, we find some initial support for structural and convergent validity of our measures for first- and second-level IE. A CFA supported a two-factor solution. The two levels of IE are correlated with related constructs as expected. In the next part, we discuss potential effects of IE and the importance of distinguishing between the two levels to approach the phenomenon of IE more comprehensively.

### Table 1

Descriptives and wording for items in the first- and second-level IE scales.

		Study 1		Study 2		Study 3		Study 4	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
First-Level IE	I incidentally saw political information [on social media] that I did not really look at."	3.78	1.72	3.66	1.96			3.46	1.91
First-Level IE	I stumbled upon political content [on social media incidentally] but did not really engage with it.	3.80	1.71	3.54	1.99			3.44	1.89
First-Level IE	When I was shown political posts but wanted to see something different I kept on scrolling.			4.18	2.12	4.16	1.81	3.69	2.03
First-Level IE	I skipped the political content that I came across incidentally [on social media].	3.90	1.80	3.88	2.06	4.19	1.75	3.56	1.97
First-Level IE	I saw political posts [on social media] which I ignored.					4.06	1.78	3.51	1.97
First-Level IE	I kept on scrolling when I saw political posts incidentally on social media.							3.66	2.00
Second-Level IE	I saw political content incidentally and then looked at it more thoroughly	3.75	1.70						
Second-Level	I found political content on social media which I dedicated attention to - even though I did not search for it initially.			3.11	1.83			3.09	1.86
Second-Level IE	Political content was incidentally shown to me on social media and I took a closer look.			3.01	1.79	3.47	1.72	3.03	1.83
Second-Level IE	I stumbled upon political information [on social media] that caught my attention.	3.87	1.72	2.92	1.81	3.52	1.69	3.02	1.86
Second-Level IE	After I saw political content incidentally [on social media], I took a closer look.	3.80	1.73	3.09	1.84			3.09	1.82
Second-Level IE	I looked attentively at political posts, which were shown incidentally to me [on social media].					3.33	1.71	2.97	1.77

Note. IE = Incidental exposure.

<sup>a</sup> This item was excluded in the analyses for Study 2 and Study 4.

## 4. Effects of incidental exposure on political knowledge and political participation

One of the reoccurring questions in IE research is whether individuals learn political information from IE (e.g., Bode, 2016; Tewksbury et al., 2001). Scholars have argued that individuals can stumble upon political information that they would not encounter without social media or the Internet. Thus, the Internet is an additional path to political information by providing exposure that would not occur otherwise. However, as noted above, current research on IE does not discern firstand second-level IE. This is problematic because, according to the PINE model, fundamentally different mechanisms are at work.

A large share of research on IE points towards passive learning (Krugman & Hartley, 1970) as the mechanism behind learning effects via IE (e.g., Bode, 2016; J. K. Lee & Kim, 2017). Specifically, it has been argued that knowledge acquisition from media must not be intentional but can also occur passively and effortlessly if individuals lack resistance to the information (Krugman & Hartley, 1970). The process of scanning information for its relevance (i.e., relevance appraisal) forces individuals to process chunks of the information but might be accompanied by indifference towards the content itself. First-level IE may not lead to large knowledge gains. Rather, shreds of information may be stored in memory. Thus, passive learning theory is suitable to describe learning via first-level IE (Matthes et al., 2020).

However, second-level IE is assumed to work through substantially different mechanisms. The process underlying learning via second-level IE, which is the thorough processing of IE content that was appraised as relevant, is assumed to be more similar to intentional learning than to passive learning. After appraising IE content as relevant, individuals redirect their attention and mental capacities toward the information. For example, after appraising a headline as relevant, individuals may read information hidden behind a "read more" button, watch a video, or even read a story after clicking on a link. According to previous research on the PINE model (see Nanz & Matthes, 2020), there are two paths leading to knowledge gains: First, individuals process IE content appraised as relevant more attentively and subsequently learn more. Their mental resources will shift from encoding information towards storing information in memory (Lang, 2000). Second, appraising IE content as relevant motivates individuals to access or look at related information (e.g., click on a link). Such subsequent exposure leads to additional opportunities for political learning that would not be available otherwise. In sum, given that the cognitive processes during second-level IE are more similar to those of intentional consumption of political information than the processes during first-level IE, we expect that second-level IE has much more pronounced effects on knowledge than first-level IE.

Findings from previous survey research – not distinguishing first- and second-level IE – are mixed (e.g., Marcinkowski & Došenović, 2020; Oeldorf-Hirsch, 2018; Weeks et al., 2021). Additionally, experimental research suggests that the two levels of IE lead to distinct effects on knowledge. Lee and Kim's results (2017) demonstrated that only exposure to additional content after IE increases recall. Nanz and Matthes (2020) showed that second-level IE has stronger effects on knowledge measures than first-level IE. Based on this, we hypothesize: H4: (a) First- and (b) second-level IE increase political knowledge

over time. A large share of studies on IE is also concerned with the potentially

mobilizing effect of IE (e.g., Heiss & Matthes, 2019; Kim et al., 2013). The argument of this strand of research strongly builds on previous research regarding the relationship between political knowledge and participation opportunities (e.g., Delli Carpini & Keeter, 1996). Through knowledge, individuals may know how they can engage in politics and get a feeling of agency. However, given the sparse and conflicted evidence regarding the effect of IE on political knowledge, other mechanisms may be at work as well. First-level IE may increase participation not only via factual knowledge. It has been argued that goal-priming might explain effects on participation (Knoll et al., 2020). For example, repeated exposure to a political campaign such as scrolling past campaign messages may increase the accessibility of related political goals. In turn, a primed goal might be more likely to get activated if the individual encounters an opportunity to pursue this goal. Furthermore, awareness of political issues may be increased even if individuals just briefly glimpse at related IE content (Feezell, 2018). Similarly, repeated exposure to political advertising can increase awareness of the advertised issue and motivate volunteering for the cause (Miller, 1976).

We expect stronger effects for second-level IE due to individual's engagement with IE content. Although previous research suggests that measures of (political) news exposure are related to political participation, it has been documented that this relationship becomes even stronger for individuals that elaborate on and reflect upon encountering political information (e.g., Cho et al., 2009). Thus, similar to the theorizing above about the effects of second-level IE on knowledge (Lang, 2000), we expect that the additional cognitive resources directed toward IE content appraised as relevant should strengthen effects on participation.

In this study, we distinguish between online and offline participation. Today's internet and particularly social media platforms offer a variety of ways to become engaged in politics. Particularly, low-effort acts of participation such as signing political petitions or joining an online group in support of a political cause are relatively easy to pursue today and must not necessarily develop from intensive preceding elaboration or decision-making (Heiss & Matthes, 2019). Furthermore, experiencing IE online often goes hand in hand with multiple opportunities for online participation (e.g., contacting or direct messaging a politician). Thus, individuals often can perform online participation without leaving the situational context of IE. Given that we expect limited impact of first-level IE on individuals' knowledge, attitudes, and behavioral intentions, effects to first-level IE are likely to be limited to such acts of online participation. In contrast, allocating a larger share of one's cognitive resources to content as it is expected to happen during second-level IE should also affect attitudinal and cognitive factors as well as behavioral intentions related to the incidentally encountered information much stronger. These effects may also swap over into different contexts (i.e., offline environments). Thus, we expect:

H5: (a) First- and (b) second-level IE increase online political participation over time.

H6: Second-level IE increases offline political participation over time.

One of the main arguments of the PINE model is that first-level and second-level IE should have distinct effects on political outcomes. The PINE model points toward the cognitive effort involved in the processing of IE content to explain this difference. As discussed above, previous research (e.g., Cho et al., 2009; Eveland, 2001; Lang, 2000) supports the notion that the attentive and active processing of political information as it is expected to happened during second-level IE leads to stronger effects. Experimental research concerned with the effects of IE reports similar findings (e.g., J. K. Lee & Kim, 2017). Nanz and Matthes (2020) show that individuals are much more likely to click on and learn from relevant IE content (second-level IE) than from mere scanning of IE content (first-level IE). We derive the following hypothesis.

H7: Effects of second-level IE are larger than effects of first-level IE on (a) political knowledge, (b) online political participation, and (c) offline political participation.

#### 5. Study 2

#### 5.1. Method

5

We conducted a two-wave online panel survey (N = 450) during the campaign of the Austrian national election 2019. Dynata recruited

participants based on representative quotas for age, gender, and education. In W1 (July 24 to August 6), 1206 participants started our online survey with 1105 finishing. In W2 (September 13 to September 21), 564 of 609 participants that followed the invitation finished the survey. We excluded 40 participants that took less than 10 min for the 25 min long survey in W1 (i.e., speeders; for additional information see Online Appendix C). We sampled out 74 cases because respondents indicated that they did not use social media, leaving N = 450 participants for our analyses. Respondents were on average M = 47.88 years old (SD = 15.44), 51.78% were female, and slightly higher educated than the general public (41.78% less than a high school diploma, 13.78% high school diploma).

### 5.1.1. Measures

Eight items for first- and second-level IE were included in Study 2's questionnaire. Respondents were asked to rate how often such situations happened within the last six weeks on a seven-point scale from "never" (1) to "very often" (7). Item wording, means and standard deviations are presented in Table 1. One item was not used for reasons we outline below. Thus, the mean scale for first-level IE ( $\alpha = 0.83$ , M = 3.86, SD = 1.78) is based on three items, while second-level IE ( $\alpha = 0.93$ , M = 3.03,

#### Table 2

Autoregressive regression results from Study 2 and 3.

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SD = 1.66) depicts the mean across four items.

We use two measures for political knowledge which differ on a temporal dimension (Barabas et al., 2014). For our more "static" measure, we asked the very same questions in W1 and W2 which allows for a stringent autoregressive test of our hypotheses. Our "surveillance" measure of political knowledge refers to current political events and newly uttered policy stances. Static knowledge was measured with two questions regarding structural knowledge (i.e., age of voting, parliamentary threshold) and four questions about the party affiliation of prominent politicians ( $\alpha_{W1} = 0.76$ ,  $M_{W1} = 3.69$ ,  $SD_{W1} = 1.89$ ;  $\alpha_{W2} = 0.78$ ,  $M_{W2} = 3.87$ ,  $SD_{W2} = 1.91$ ). Additionally, we measured surveillance knowledge in W2 (13 items;  $\alpha = 0.82$ , M = 6.63, SD = 3.45; e.g., policy positions, involvement in scandals, donations, campaign slogans). The questions referred to news coverage and party statements in between W1 and W2.

We asked respondents whether they engaged in political participation activities in the last six weeks. Online political participation was assessed with six items such as "signing an online petition related to a political issue" while offline political participation included six items such as "taking part in a demonstration or protest related to a political issue" (response options: yes, no). We created sum scores for online ( $\alpha_{W1}$ 

	Study 2				Study 3			
	Knowledge (static) (W2) <sup>a</sup>	Knowledge (surveillance) (W2)ª	Online PP (W2) <sup>b</sup>	Offline PP (W2) <sup>b</sup>	Knowledge (static) (W2) <sup>a</sup>	Knowledge (surveillance) (W2)ª	Online PP (W2) <sup>c</sup>	Offline PP (W2) <sup>c</sup>
(Intercept)	0.06 (0.29)	-0.05 (0.65)	-1.90 (0.30)***	-2.65 (0.36)***	2.06 (0.29)***	-0.00 (0.38)	-2.38 (0.38)***	-1.87 (0.43)***
First-level IE	-0.01 (0.03)	0.07 (0.07)	0.01 (0.03)	0.04 (0.04)	-0.03 (0.03)	0.03 (0.04)	0.08 (0.04)*	0.07 (0.04)
Second-level IE	-0.05 (0.04)	0.09 (0.10)	0.11 (0.04)**	0.04 (0.04)	-0.03 (0.03)	0.03 (0.04)	0.08 (0.04)*	0.10 (0.04)*
Autoregressive Effects								
Online PP	0.00 (0.05)	-0.01 (0.12)	0.43 (0.04)***	0.09 (0.04)*	-0.10 (0.04)**	0.02 (0.05)	0.35 (0.04)***	0.05 (0.05)
Offline PP	-0.05 (0.06)	0.06 (0.13)	0.00 (0.04)	0.37	-0.02 (0.04)	-0.04 (0.05)	0.04 (0.04)	0.29
Knowledge (static)	0.71 (0.03)***	0.81 (0.08)***	0.02 (0.04)	0.11 (0.04)*	0.56 (0.04)***	0.24 (0.05)***	-0.08	-0.03
Knowledge (surveillance)				(0.0.1)	0.04 (0.03)	0.26 (0.05)***	-0.05	-0.09
Control variables							(0.04)	(0.00)
Age	0.00 (0.00)	-0.01 (0.01)	-0.00	-0.00	-0.00 (0.00)	-0.00 (0.01)	-0.00	-0.01
Gender (1 $=$ male)	0.04 (0.12)	0.63 (0.26)*	0.03 (0.11)	-0.08	-0.21 (0.09)*	0.11 (0.12)	-0.10 (0.10)	0.11 (0.12)
Education: Highschool (ref.: no highschool)	0.07 (0.13)	0.15 (0.29)	0.16 (0.12)	0.08 (0.14)	0.15 (0.13)	0.00 (0.17)	0.00 (0.15)	-0.21 (0.18)
Education: More than highschool (ref.: no Highschool)	0.35 (0.15)*	0.79 (0.33)*	0.02 (0.14)	-0.00 (0.16)	0.11 (0.10)	0.00 (0.14)	0.11 (0.12)	0.09 (0.14)
Political interest	0.02 (0.05)	0.27 (0.12)*	0.13 (0.06)*	0.11 (0.07)	0.06 (0.04)	0.07 (0.05)	0.05 (0.05)	0.03 (0.06)
Internal political efficacy <sup>x</sup>	0.21 (0.06)***	0.32 (0.13)*	-0.01 (0.06)	0.06 (0.07)	0.05 (0.04)	0.15 (0.05)**	0.12 (0.05)*	0.17
Trad. media: Broadsheet <sup>x</sup>	0.02 (0.02)	-0.06 (0.06)	0.04 (0.02)	0.00 (0.03)	-0.02 (0.02)	-0.02 (0.02)	0.04 (0.02)*	0.01 (0.02)
Trad. media: Tabloid <sup>x</sup>	0.00 (0.03)	0.10 (0.06)	-0.07 (0.03)**	-0.04	-0.05 (0.02)**	0.04 (0.02)	0.00 (0.02)	-0.03
Trad. media: Kronen Zeitung	-0.01 (0.03)	-0.09 (0.06)	0.06 (0.02)**	0.08 (0.02)***				()
Trad. media: Public broadcasting	0.01 (0.03)	0.10 (0.06)	-0.04	-0.01				
Political discussion frequency <sup>x</sup>			,	,	0.03 (0.03)	0.06 (0.04)	0.13 (0.03)***	0.10 (0.04)*
Adi, R <sup>2</sup>	0.64	0.45			0.49	0.33	9 <del></del>	
N of respondents	450	450	450	450	524	524	524	524

Note. IE = Incidental exposure. PP = Political participation. Trad. media = Traditional media. If not otherwise specified, all predictor variables were collected in W1. \*This variable was collected in W2 for Study 3.

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<sup>a</sup> OLS regression.

<sup>b</sup> Poisson regression. <sup>c</sup> Negative binomial regression. \*\*\*p < .001, \*\*p < .01, \*p < .05.

= 0.77,  $M_{W1}$  = 1.04,  $SD_{W1}$  = 1.48;  $\alpha_{W2}$  = 0.74,  $M_{W2}$  = 0.89,  $SD_{W2}$  = 1.35) and offline participation ( $\alpha_{W1}$  = 0.73,  $M_{W1}$  = 0.74,  $SD_{W1}$  = 1.24;  $\alpha_{W2}$  = 0.73,  $M_{W2}$  = 0.68,  $SD_{W2}$  = 1.19). We controlled for age, gender, education, political interest, internal political efficacy, traditional media use (online and offline), and the other dependent variables from W1. Controlling for online and offline news use is crucial because previous research found that intentional and incidental news use are related (e.g., Oeldorf-Hirsch, 2018). In Online Appendix A, based on a CFA, we provide additional evidence that our measures for first- and second-level IE are empirical distinct from intentional political information consumption.

### 5.2. Results

In Table 2, we present two ordinary least squares (OLS) regressions predicting both static knowledge measures. We do not have a measure for surveillance knowledge in W1 equivalent to surveillance knowledge in W2. We estimated two Poisson regression models to predict online and offline political participation. To test H5, we estimated a model in which we added the constraint of equal coefficients for first- and second-level IE. Then, we ran a likelihood-ratio test to compare the model fit of the unconstrained with the constrained model.

A CFA with all eight items did not fit the data sufficiently. We inspected the modification indices and excluded one item, leading to acceptable fit on most fit indicators (CFI = 0.97, TLI = 0.96,  $\chi^2/df = 5.27$ , p < .001, RMSEA = 0.097, GFI = 0.96, AGFI = 0.91). Model comparison shows that the two-factor model fits the data significantly better than the single-factor model with seven indicators ( $\Delta\chi^2$  (1, N = 450) = 541.35, p < .001). H1 was supported.

First-level IE did not affect political knowledge (static knowledge: b = -0.01, p = .682; surveillance knowledge: b = 0.07, p = .353), online (b = 0.01, p = .758) or offline political participation (b = 0.04, p = .241). Second-level IE affected only online political participation positively (b = 0.11, p = .005) but not political knowledge (static knowledge: b = -0.05, p = .222; surveillance knowledge: b = 0.09, p = .353) or offline participation (b = 0.04, p = .370). H4, H5a, and H6 were rejected, while we found support for H5b. Second-level IE did not affect political knowledge (static knowledge:  $\chi^2$  (1) = 0.48, p = .489; surveillance knowledge:  $\chi^2$  (1) = 0.03, p = .859), online ( $\chi^2$  (1) = 3.25, p = .071) or offline participation ( $\chi^2$  (1) = 0.01, p = .943) stronger than first-level IE. H7 was rejected.

### 5.3. Discussion

The results from Study 2 boost our confidence in the findings from Study 1 and again supports the theoretical argument that the phenomenon of IE has two distinct dimensions: first- and second-level IE. We then conducted analyses to investigate learning through IE. However, neither first- nor second-level IE increased political knowledge, fueling doubt whether individuals can learn about politics from IE on social media. A variety of reasons may explain this null finding - including that social media may lack substantial and factual correct information from which individuals could learn. Turning to the relationship between political participation and IE, we found that second-level IE increases online participation over time but not offline participation. Additionally, first-level IE did not increase or decrease participation at all. This finding may dampen optimistic voices arguing that IE can increase engagement (Valeriani & Vaccari, 2016) but also does not back up previous findings that even suggested negative effects (Heiss & Matthes, 2019). That is, the mere scanning of information with first-level IE did not lead to any effects, but effortful processing of information in case of second-level IE predicted online participation, confirming the need for distinguishing both levels. To draw these conclusions, we need a replication with additional data. Also, as Study 2 dealt with IE on social media only, we need to test the effects of online IE in general.

### 6. Study 3

### 6.1. Method

We fielded a two-wave panel study (N = 524) during the Viennese state election campaign in 2020. The sample with quotas for age, gender, and education was provided by Dynata and included only individuals in voting age and with residence in Vienna. Eight hundred and two of 1465 respondents that started W1 (August 7 to August 24) finished the survey. In W2 (October 1 to October 10), 593 started while 524 finished the survey. Respondents taking less than 10 min for the 25 min long survey in W1 were excluded (i.e., speeders). Respondents were on average M = 45.05 years old (SD = 12.97) and 50.95% were female. The education quota was not fully met (36.07% less than high school diploma, 17.37% high school diploma, 46.56% more high school diploma).

### 6.1.1. Measures

We asked individuals to rate how often situations depicting first- and second-level IE occurred in the last two months in the internet. In contrast to Study 2, the items refer to online IE and not specifically to IE on social media. Three items each tapped first- ( $\alpha = 0.83$ , M = 4.14, SD = 1.54) and second-level IE ( $\alpha$  = 0.87, *M* = 3.44, *SD* = 1.52; see Table 1). The static political knowledge measure was assessed by asking respondents to match five politicians with their parties. We used the same items in W1 ( $\alpha_{W1}$  = 0.79,  $\textit{M}_{W1}$  = 3.54,  $\textit{SD}_{W1}$  = 1.58) and W2 ( $\alpha_{W2}$  = 0.83,  $M_{W2} = 4.21$ ,  $SD_{W2} = 1.35$ ) and summed the number of correct responses. Six questions about the campaign (e.g., party stances) were asked for the surveillance measure. The items in W2 intentionally referred to events happening during W1 and W2 to tap learning during the campaign. We summed up the correct answers ( $\alpha_{W1} = 0.42$ ,  $M_{W1} =$ 3,  $SD_{W1} = 1.47$ ;  $\alpha_{W2} = 0.51$ ,  $M_{W2} = 3.14$ ,  $SD_{W2} = 1.55$ ). We used the same items as in Study 2 with a timeframe of two months to gauge online  $(\alpha_{W1} = 0.71, M_{W1} = 1.16, SD_{W1} = 1.44; \alpha_{W2} = 0.73, M_{W2} = 1.11, SD_{W2}$ = 1.47) and offline participation ( $\alpha_{W1} = 0.76, M_{W1} = 0.89, SD_{W1} = 1.39;$  $\alpha_{W2} = 0.74$ ,  $M_{W2} = 0.96$ ,  $SD_{W2} = 1.4$ ). We used similar controls as in Study 2 but added political discussion frequency.

### 6.2. Results

We followed the same procedure as described for Study 2 (see Table 2). However, we estimated two negative binomial regressions to predict online and offline participation after a check for overdispersion yielded significant results. A CFA with three items per level yielded acceptable model fit (CFI = 0.98, TLI = 0.97,  $\chi^2/df = 3.82$ , p < .001, RMSEA = 0.073, GFI = 0.98, AGFI = 0.95). The two-factor model fitted the data better than the single-factor model ( $\Delta \gamma^2$  (1, N = 524) = 689.95, p < .001), supporting H1. The coefficient for first-level IE was not significant in the models predicting political knowledge (static knowledge: b = -0.03, p = .338; surveillance knowledge: b = 0.03, p = .486) and offline political participation (b = 0.07, p = .070). However, first-level IE affected online participation positively (b = 0.08, p = .031). Secondlevel IE did not affect political knowledge (static knowledge: b = -0.03, p = .375; surveillance knowledge: b = 0.03, p = .433) but had a positive effect on online (b = 0.08, p = .026) as well as offline participation (b = 0.1, p = .020). H4 was rejected. We found support for H5 and H6. Likelihood-ratio tests showed that second-level IE did not affect any of the outcomes stronger than first-level IE (static knowledge:  $\chi^2(1) = 0$ , p = .995; surveillance knowledge:  $\chi^2$  (1) = 0.01, p = .912; online participation:  $\chi^2$  (1) = 0, p = .947; offline participation:  $\chi^2$  (1) = 0.19, p= .660). H7 was rejected.

#### 6.3. Discussion

We aimed to replicate the findings of Study 2 for IE on social media with Study 3 but for the online information environment. Importantly,

we were able to show with a new independent sample that our items are also capable to distinguish between first- and second-level IE in the Internet. We found the same pattern of null findings for political knowledge across both levels of IE, rendering the conclusions drawn from Study 2 more robust. However, for political participation, we found a different picture supporting most of our theory-driven hypotheses. First- and second-level IE both led to more online participation over time and second-level IE both led to more online participation over time second-level IE did not affect online political participation stronger than first-level IE, our analysis suggests that both levels have an independent effect on online participation given that we controlled for the other level in our analysis. That means, individuals that sometimes elaborate on IE content will participate online even more than individuals that stick mainly to first-level IE. Yet more evidence and additional outcomes are needed to fully understand the effects of IE.

## 7. Social media use for political information and political expression

Besides political knowledge and participation, IE may also affect other outcomes, most importantly (social) media use for political information and political expression. It has been hypothesized that IE and political participation and knowledge are linked by news consumption (e.g., Yamamoto & Morey, 2019). A positive effect of IE on intentional forms of information consumption might be the "missing link" (Strauß et al., 2020, p. 2) that may also explain the null findings for knowledge in Study 1 and 2.

First-level IE may increase media use for political information because individuals become more aware of political topics (Feezell, 2018). During the relevance appraisal, individuals have to scan political information to check content for relevance which may make political words, phrases, and events more accessible in memory. Heightened accessibility may make it more likely to look for orientation in case of subsequent contact with a stimulus. Previous research suggests that exposure to political ads, which usually occurs incidentally, can stimulate individuals' political information seeking behavior (Cho et al., 2009). Furthermore, as reported by citizens in interviews (Antunovic et al., 2018), scanning of political information may excavate gaps in knowledge about current events that individuals might want to fill afterwards by looking for additional information. The path from second-level IE to additional intentional media use for political information is straight-forward. A positive relevance appraisal implies at least the situational goal to process political information. Research suggests that political information motivations are related to political information behavior (Nanz et al., 2022). Post-exposure elaboration, as it may happen after second-level IE, could additionally strengthen the goal to seek out more information. Thus, both levels of IE may predict intentional consumption.

H8: (a) First-level and (b) second-level IE increase social media use for political information over time.

On another note, political expression has been highlighted as a central catalyst for political engagement in the online sphere (Gil de Zúñiga et al., 2014). The theoretical significance of political expression as a democratic outcome arises from the increased elaboration during formulating a thought or elevated attitude strength after opinion expression (Pingree, 2007). Additionally, today, political expression can easily spread on social media and its potential audience is hardly limited.

Two main mechanisms lead us to expect that IE increases political expression. First, IE provides individuals with content to express themselves about. It has been argued that a share of political expression may not arise from political motivations but from more general expression and communication needs (Yu, 2016). In short, users post and discuss politics because they feel the need to post and discuss. IE can provide individuals with topics and knowledge for political discussions and expressive action. Our argument is also backed up by research on

political discussion which suggests that the selection of discussion topics and amount of discussion relates to media content (Mondak, 1995). In other words, a potentially superficial awareness of current topics should be considered as a "by-product" of IE which can fuel political expression. Furthermore, today's online environments invite users constantly to express their opinions and thoughts (e.g., comment sections, social media). Most of the time, sharing or liking of content needs only one click. Thus, individuals stumbling upon political information online often face a variety of opportunities to express themselves politically with very low thresholds.

The second mechanism comes into effect during second-level IE: political motivations stimulated by second-level IE may increase political expression. Individuals engaging in second-level IE have already developed the goal to process political information in a given situation. Research has shown that such political motivations lead to more political expression (Gil de Zúniga et al., 2014). Thus, an increase of IE – and particularly, an increase in elaboration upon encountering political content incidentally – leads to more political expression.

H9: (a) First-level and (b) second-level IE increase political expression over time.

Again, extending H7, we expect stronger effects for second- than for first-level IE for (d) social media use for political information and (e) political expression.

#### 8. Study 4

#### 8.1. Method

We conducted a two-wave panel survey (N = 901) with quotas for age, gender, and education in Germany during an off-election period with Dynata. Due to the focus of the survey, only individuals between 18 and 65 that use social media were targeted. In W1 (February 20 to March 2, 2020), 3199 interviews were started and 2208 respondents finished. We deleted interviews taking less than 10 min for the 25 min questionnaire. The W2 (September 24 to October 10, 2020) questionnaire was started by 1039 respondents and 905 finished the survey. Four cases could not be matched, leaving us with N = 901 cases for the analysis. Respondents were on average M = 48.07 years old (SD = 11.29) and 49.83% were female. The sample's education background was heterogeneous (15.32% only compulsory school, 15.87% finished higher education).

#### 8.1.1. Measures

The questionnaire included eleven items tapping the frequency of first- and second-level IE. The very same item excluded in Study 2 was also excluded in Study 4, leaving us with five items per level. We created mean scales for first- ( $\alpha = 0.91, M = 3.57, SD = 1.7$ ) and second-level IE  $(\alpha = 0.97, M = 3.04, SD = 1.71, \text{ see Table 1})$ . Static political knowledge was measured with the same eight questions in W1 ( $\alpha_{W1} = 0.79$ ,  $M_{W1} =$ 4.68,  $SD_{W1} = 2.35$ ) and W2 ( $\alpha_{W2} = 0.81$ ,  $M_{W2} = 4.56$ ,  $SD_{W2} = 2.45$ ). We asked respondents to classify twelve statements about political events as right or wrong (third response option: don't know) per Wave to assess surveillance knowledge. For W2, we selected events that happened in between W1 and W2 to tap knowledge gains (sum of correct answers,  $\alpha_{W1} = 0.71, M_{W1} = 4.76, SD_{W1} = 2.58, \alpha_{W2} = 0.79, M_{W2} = 5.77, SD_{W2} = 5.77,$ 3.19). For political participation, we used the same measures as in Study 2 and 3 with a timeframe of three months (online:  $\alpha_{W1} = 0.74$ ,  $M_{W1}$ 0.87,  $SD_{W1} = 1.36$ ,  $\alpha_{W2} = 0.77$ ,  $M_{W2} = 0.9$ ,  $SD_{W2} = 1.41$ ; offline:  $\alpha_{W1} = 0.9$  $0.78, M_{W1} = 0.7, SD_{W1} = 1.31, \alpha_{W2} = 0.78, M_{W2} = 0.61, SD_{W2} = 1.23$ . We assessed social media use for political information with three items with respect to the last three months (e.g., "I actively looked for political information on social media",  $\alpha_{W1} = 0.94$ ,  $M_{W1} = 2.59$ ,  $SD_{W1} = 1.69$ ,  $\alpha_{W2}=0.94, M_{W2}=2.73, SD_{W2}=1.71)$  To gauge political expression, we asked respondents how often it had happened in the last three months that they had (1) "posted [their] political opinion," (2) "shared [their] attitudes towards a political topic," and (3) "represented [their] position

in a political discussion." ( $\alpha_{W1} = 0.95$ ,  $M_{W1} = 2.42$ ,  $SD_{W1} = 1.7$ ,  $\alpha_{W2} = 0.95$ ,  $M_{W2} = 2.55$ ,  $SD_{W2} = 1.7$ ). We controlled demographics, political variables, and media use.

### 8.2. Results

Results from Study 4 are presented in Table 3. For H1 and H7, we followed the same procedure as in Study 2 and 3. We turned to OLS regressions to predict knowledge, social media use for political information, and political expression. We estimated negative binomial regression models for online and offline participation due to significant tests for overdispersion.

A first CFA with all eleven items did not fit the data. Based on modification indices and in line with the procedure in Study 2, we excluded one item. In the final CFA, we have five indicators for each level of IE (CFI = 0.98, TLI = 0.98,  $\chi^2/df = 5.11$ , p < .001, RMSEA = 0.068, GFI = 0.96, AGFI = 0.94). Nested model comparison between a single-factor model and the two-factor model yields support for H1 ( $\Delta\chi^2$  (1, N = 901) = 2370.8, p < .001).

Replicating the null findings from Study 2 and 3, there were no significant effects of first- (static knowledge: b = -0.01, p = .841; surveillance knowledge: b = -0.04, p = .473; surveillance knowledge: b = -0.01, p = .864) on political knowledge. H4 was rejected. First-level IE had a significant and positive effect on online (b = 0.07, p = .045) and offline participation (b = 0.13, p = .002), while the coefficient for second-level IE was significant in the model for online (b = 0.18, p < .001) but not for offline participation (b = 0.05, p = .467). H5 was supported, while H6 was

#### Table 3

Autoregressive regression results from Study 4

rejected.

We found that first-level IE did not significantly affect social media use for political information (b = -0.01, p = .821) or political expression (b = 0.03, p = .306). However, second-level IE led to more social media use for political information (b = 0.2, p < .001) and political expression (b = 0.16, p < .001) over time. Thus, we found support for H8b and H9b while H8a and H9a were rejected. Also, we found that second-level IE had a larger coefficient than first-level IE in the models for social media use for political information ( $\chi^2$  (1) = 11.77, p < .001) and political expression ( $\chi^2$  (1) = 4.72, p = .030). In the other models, the coefficients for first- and second-level IE did not differ significantly (static knowledge;  $\chi^2$  (1) = 0.23, p = .630, surveillance knowledge;  $\chi^2$  (1) = 0.01, p = .920, online participation:  $\chi^2$  (1) = 2.74, p = .098, offline participation:  $\chi^2$  (1) = 0.69, p = .406). H7de were supported, while H7abc were rejected.

### 8.3. Discussion

Study 4's value is rooted in three striking differences to Study 2 and 3: (a) we used a much wider time interval between waves, (b) we turned to a non-election context, and – most importantly – (c) we scrutinize two additional outcomes. Results regarding our survey measurement and political knowledge are marked by consistency. We find, again, support that our scale can discern first- and second-level IE across contexts. In line with Study 2 and 3, we found no effects on political knowledge by either of the two levels of IE. These consistent null findings in surveys are at odds with previous experimental research (Nanz & Matthes, 2020).

	Knowledge (static) (W2) <sup>a</sup>	Knowledge (surveillance) (W2) <sup>a</sup>	Online PP (W2) <sup>b</sup>	Offline PP (W2) <sup>b</sup>	Social Media Use for Political Information (W2) <sup>a</sup>	Political Expression (W2) <sup>a</sup>
(Intercept)	0.46 (0.31)	-0.22 (0.46)	-2.27	-3.32	1.54 (0.27)***	1.34 (0.26)***
			(0.33)***	(0.45)***		
First-level IE	-0.01 (0.03)	-0.00 (0.05)	0.07 (0.03)*	0.13 (0.04)**	-0.01 (0.03)	0.03 (0.03)
Second-level IE	-0.04 (0.06)	-0.01 (0.08)	0.18 (0.05)***	0.05 (0.07)	0.20 (0.05)***	0.16 (0.05)***
Autoregressive Effects						
Online PP	0.07 (0.06)	0.00 (0.08)	0.32 (0.04)***	0.01 (0.06)	-0.07 (0.05)	0.14 (0.05)**
Offline PP	-0.13 (0.05)*	0.08 (0.08)	0.04 (0.04)	0.37 (0.05)***	0.09 (0.04)*	-0.03 (0.04)
Knowledge (static)	0.64 (0.03)***	0.24 (0.04)***	0.01 (0.03)	0.02 (0.04)	-0.02 (0.02)	-0.05 (0.02)*
Knowledge (surveillance)	0.11 (0.03)***	0.59 (0.04)***	0.03 (0.02)	0.01 (0.03)	0.02 (0.02)	0.01 (0.02)
Social media use for political information	-0.00 (0.06)	-0.11 (0.09)	-0.09 (0.05)	0.02 (0.07)	0.28 (0.05)***	0.05 (0.05)
Political Expression	-0.03 (0.05)	0.03 (0.07)	-0.00 (0.04)	0.03 (0.06)	0.09 (0.04)*	0.34 (0.04)***
Control variables				station contraction	Denses - Concer-	
Age	-0.01 (0.00)*	0.01 (0.01)	-0.00 (0.00)	0.01 (0.01)	-0.01 (0.00)***	-0.01 (0.00)**
Gender $(1 = male)$	0.26 (0.10)*	0.59 (0.15)***	0.02 (0.10)	0.14 (0.14)	0.25 (0.09)**	0.27 (0.09)**
Education: medium (ref.: low)	0.11 (0.14)	0.14 (0.21)	-0.05 (0.15)	-0.31 (0.19)	-0.25 (0.12)*	-0.02 (0.12)
Education: high (ref.: low)	0.26 (0.19)	0.48 (0.28)	-0.06 (0.18)	-0.11 (0.24)	-0.14 (0.16)	0.04 (0.16)
Political interest	0.08 (0.06)	0.17 (0.08)*	0.04 (0.06)	-0.00 (0.08)	0.14 (0.05)**	0.04 (0.05)
Internal political efficacy	0.13 (0.06)*	0.08 (0.09)	0.10 (0.06)	0.14 (0.08)	-0.07 (0.05)	0.04 (0.05)
Trad. media: Public	0.05 (0.02)*	0.01 (0.03)	-0.05	-0.02 (0.03)	-0.05 (0.02)**	-0.04 (0.02)*
broadcasting			(0.02)*			
Trad. media: Broadsheet	0.03 (0.03)	0.01 (0.04)	0.01 (0.03)	-0.01 (0.03)	0.03 (0.02)	0.01 (0.02)
Trad. media: Private TV	-0.04 (0.02)	-0.06 (0.03)*	0.01 (0.02)	-0.03 (0.03)	0.00 (0.02)	-0.01(0.02)
Trad. media: Tabloid	-0.01 (0.03)	0.00 (0.04)	-0.03 (0.03)	0.05 (0.04)	0.02 (0.02)	0.00 (0.02)
Political discussion frequency (offline)	0.03 (0.03)	0.07 (0.04)	0.03 (0.03)	0.08 (0.04)*	-0.03 (0.03)	-0.05 (0.03)*
Political discussion frequency (online)	-0.06 (0.04)	-0.01 (0.06)	0.12 (0.03)***	0.10 (0.04)*	0.15 (0.03)***	0.14 (0.03)***
Adj. R <sup>2</sup>	0.66	0.57			0.49	0.52
N of respondents	901	901	901	901	901	901

Note. IE = Incidental exposure. PP = Political participation. Trad. media = Traditional media use. All predictor variables were collected in W1.

<sup>a</sup> OLS regression.

 $^{\rm b}$  Negative binomial regression. \*\*\*<br/> p < .001, \*\*p < .01, \*<br/> p < .05.

When we turn to participation, we find that both levels of IE increase online participation but first-level IE also led to more offline participation. This is somewhat surprising. Previous research has argued that IE might be the entry to more intentional forms of information and news consumption. We found that this is only true for second-level IE. In short, only individuals that attend to IE content will also increasingly look actively for political information. The mere scanning of IE content to check its relevance is not sufficient to motivate individuals to seek out news. We find the same pattern for political expression. Only individuals that also redirect their cognitive resources toward IE content are more likely to express themselves.

### 9. General discussion

In 2001, Tewksbury and colleagues stated that "incidental exposure [...] is a phenomenon worthy of further investigation" (p. 545). Twenty years and a myriad of studies investigating this claim later, our study supports this statement. However, by distinguishing between first- (i.e., the superficial scanning of IE content) and second-level IE (i.e. more intensive processing of relevant IE content), we find a much more nuanced picture than most of the previous studies. While second-level IE has less pronounced effects than we might have expected based on the previous literature, experimental research, and theoretical models, we found hardly any impact of first-level IE on democratic outcomes.

The majority of studies cites passive learning theory (Krugman & Hartley, 1970) as explanation why IE might influence democratic outcomes (for a notable exception: Oeldorf-Hirsch, 2018) – this is not only the case for studies investigating learning effects (e.g., Bode, 2016; Marcinkowski & Došenović, 2020) but also for those scrutinizing the relationship with participation (e.g., Nanz et al., 2022; Valeriani & Vaccari, 2016). In three panel surveys, we find hardly any evidence for passive learning. By large, the mere scanning of incidentally encountered political information does not seem to affect any outcomes. However, second-level IE does lead to normatively desirable outcomes such as online participation, expression, and political information seeking. Clearly, these effects cannot be attributed to passive learning. Thus, future research on IE must depart from referring to passive learning as the main driver and consider alternative theoretical approaches.

Our findings do not only suggest that it is crucial to distinguish between first- and second-level IE but we also provide a tool for future research with our scale. In all four studies, we were able to discern empirically between first- and second-level IE. This is a major improvement in comparison to earlier studies that put the burden of interpreting what the terms *incidental* and *exposure* mean onto the respondents. Even though, previous research implicitly acknowledged the existence of two levels of IE in the literature part – for example, Tewksbury et al. (2001) consider "headlines flash[ing] into consciousness" (p. 535) as well as the reading of stories that aroused interest as IE (p. 536; see also Fletcher & Nielsen, 2018) – it failed to operationalize these arguably distinct types of incidental information encounters.

The empirical grounding of our conclusions is strong. First, we tested our assumptions across different contexts. We incorporate evidence from two countries (Austria and Germany), consider different stages in the political cycle (i.e., election studies as well as off-election periods), and measure IE in the Internet in general (Study 3) but also on social media particularly (Study 2 and 4). Second, we collected longitudinal data which allowed us to run more stringent analyses tapping into explaining not just scores but changes in knowledge, participation, expression and informational use. This is particularly important because a lot of research on the effects of social media employs cross-sectional data (Boulianne, 2015) which always come with the concern that correlation must not imply causation. Furthermore, our multi-study approach allowed us to somewhat circumvent the typical trade-off detisions regarding panel attrition, causal inference, and increasing the time-lag between panel waves (Gil de Zúñiga et al., 2014). Our three studies do not only offer variation in the context but also with respect to the time differences between W1 and W2, which again bolsters our confidence in the findings.

Nonetheless, this study faces some limitations. First, despite having multiple studies, we only tested our scale and hypotheses in a European context. Second, our conclusions carry the burden of being built upon self-report. We are aware that this is a limitation given that individuals may not or incorrectly remember their behavior retrospectively. We recommend the replication with experimental designs, non-reactive data, and mobile experience sampling. Particularly, the combination of trace data (e.g., browser logs) and mobile experience sampling may fruitfully bridge the problem of assessing exposure, initial intentions, and information processing more accurately. Third, and relatedly, even though we provide evidence for convergent, structural, and predictive validity, future research should also investigate discriminant validity. Fourth, we were not able to explain all differences between our studies. Differences might be due to the varying contexts in which the studies were conducted. A lot of findings in communication research have been proven to be context-sensitive - IE is not an exception and our paper sheds light on this aspect. While this can be seen as a limitation, we believe that this is also a strength of this paper given that the main message of second-level being responsible for effects of IE crystallizes in all three studies. Fifth, we were limited to collect two-wave panel data making it difficult to investigate more complex models (e.g., mediators).

Despite these limitations, our study contributes to the field substantially and indicates multiple paths to explore for future research. First, we do not find any effects of IE on political knowledge and thereby once again highlight the discrepancy between empirical findings from experiments and surveys (e.g., Bode, 2016; J. K. Lee & Kim, 2017; Nanz & Matthes, 2020; Oeldorf-Hirsch, 2018). We approached the question of learning via IE with two measures. On the one hand, we operationalized static knowledge by asking the same questions in W1 and W2 as a very stringent approach which would, if significant effects were found, provide very convincing evidence. On the other hand, a surveillance knowledge measure tapping the current political events during waves offered more leeway for variance being explained by media exposure (Barabas et al., 2014). Importantly, change in both knowledge measures was not attributable to IE, leading us to the conclusion that individuals seemingly do not learn about politics via IE. One potential explanation is that today's online and social media environments do not offer enough substantial and factually correct information for users to learn from IE in most contexts. However, future IE research may investigate whether there are conditions in which IE can lead to learning. For example, individuals may learn about important breaking news or critical events through IE, not because these environments are particularly well-suited for learning but due to the large amount of time individuals spent on these sites in comparison to traditional news consumption. Besides, field experiments during ubiquitous events may allow researchers to tap into the learning potential via IE. Additionally, future research may consider further news elaboration - a process that happens after exposure - as a mediator that acts as the missing link between second-level IE and knowledge.

Overall, we found evidence that the mere scanning of IE content is not sufficient for IE to unfold positive effects on democratic outcomes. Individuals have to appraise IE content as relevant to benefit. Thus, it is crucial to investigate in which situations individuals will appraise content as relevant. What does it need for individuals to follow-up, click on, or read the full story after encountering it incidentally? Thereby, scholars should not focus solely on content characteristics (e.g., source, visual cues; but see Kaiser et al., 2021) but investigate individual traits and situational circumstances leading to more second-level IE (Matthes et al., 2020). In this study, we looked at multiple outcomes but did not have the chance to scrutinize potential interdependencies. From previous research, we know that political expression and intentional information consumption can affect participation positively (Cho et al., 2009). It might be the case that second-level IE boosts political

participation even more than we found in our studies because it also increases political expression as well as information seeking at the same time.

### 10. Conclusion

This study offers a new survey measure that differentiates between first- and second-level IE. Based on this novel measurement, we find a much more nuanced picture of IE effects than previously assumed. The mere scanning of IE content (first-level IE) hardly affects democratic outcomes while the attentive processing of IE content appraised as relevant (second-level IE) can increase online participation, information seeking, and political expression over time.

### Credit author statement

Andreas Nanz: Conceptualization, Methodology, Investigation, Formal Analysis, Writing - Original Draft, Writing - Review & Editing. Jörg Matthes: Conceptualization, Methodology, Review & Editing, Supervision, Funding acquisition.

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#### Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi. org/10.1016/j.chb.2022.107285.

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### 7.1 Appendix for Study III

Appendix – Seeing Political Information Online Incidentally. Effects of First- and Second-Level Incidental Exposure on Democratic Outcomes

### **Appendix A: Additional Analyses**

### **Additional Test for Validity**

In an additional analysis with the data from Study 4, we showed that our items for (a) first-, (b) second-level IE, and (c) social media use for political information can be separated. We compared a three-factor model (first-level IE, second-level IE, social media use for political information) against (a) a single-factor model (all 13 items as one factor;  $\Delta \chi^2(3, N = 901) = 3080.86$ , p < .001), (b) a two-factor model (all IE items as one factor and the social media use for political information items as a second factor;  $\Delta \chi^2(2, N = 901) = 2386.35$ , p < .001), (c) a two-factor model (first-level IE items and social media use for political information items as one factor and the second-level IE items as a second factor;  $\Delta \chi^2(2, N = 901) = 3206.57$ , p < .001), and (d) a two-factor model (second-level IE items and social media use for political information items as one factor and the first -level IE items as a second factor;  $\Delta \chi^2(2, N = 901) = 3206.57$ , p < .001), and (d) a two-factor model (second-level IE items and social media use for political information items as one factor and the first -level IE items as a second factor;  $\Delta \chi^2(2, N = 901) = 677.58$ , p < .001). The three-factor model had the best fit of the five models. Model fit indices for all five models are available in Table A1.

	T٤	ıble	e A1
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Model	$\chi^2$	df	CFI	TLI	RMSEA	GFI	AGFI
Three-factor model	229.285	62	0.986	0.983	0.055	0.961	0.943
Single factor model (a)	3310.141	65	0.738	0.686	0.235	0.555	0.377
Two-factor model (b)	2615.632	64	0.794	0.749	0.210	0.606	0.440
Two-factor model (c)	3435.858	64	0.728	0.668	0.242	0.573	0.393
Two-factor model (d)	906.86	64	0.932	0.917	0.121	0.84	0.773

### **Appendix B: Study 1:**

Data and analysis scripts are available online (see https://osf.io/reugy/).

## Study 1 – Additional Details about the Analysis

A single-factor model with six indicators (CFI = .34, TLI = 0,  $\chi^2/df$  = 341.86, p < .001, RMSEA = .453, GFI = .63, AGFI = .13) was a significantly worse fit for the data than the final model presented in the paper ( $\Delta \chi^2(1, N = 1660) = 2966.14, p < .001$ ).

## Study 1 – Data Quality

The survey used an attention check at the very beginning of the survey to filter out inattentive participants.

### **Study 1 – Questionnaire**

### Table B1

Measure	Wording (translated)	Variable name(s) in dataset
Age	In what year were you born? (OPEN RESPONSE, NUMBERS ONLY)	F5
Gender	What is your gender? (SINGLE CHOICE)	F48
	1. male	
	2. female	
	3. other (coded as missing)	
Education	What is the highest level of education you have successfully completed?	F50
	(SINGLE CHOICE)	
	1. No degree completed	
	2. Volksschulabschluss (4. Schulstufe)	
	3. Abschluss einer Hauptschule, Neuen Mittelschule oder	
	Volksschuloberstufe (8. Schulstufe)	
	4. Abschluss der Polytechnischen Schule bzw. einer einjährigen	
	mittleren Schule (9. Schulstufe)	
	5. Abschluss der AHS-Unterstufe (8. Schulstufe an einem	
	Gymnasium)	
	6. Lehrabschluss (Lehrabschlussprüfung)	
	7. Abschluss einer Berufsbildenden mittleren Schule (min. 2-jährige,	
	z.B. Handelsschule, Fachschule)	
	8. AHS-Matura (Gymnasium, inkl. Sonderform oder	
	Studienberechtigungsprüfung	
	9. Diplom in Gesundheits- und Krankenpflege oder im medizinisch-	
	technischen Fachdienst	
	10. BHS-Matura (HAK, HTL, HLW, BAKIP, inkl. Sonderformen und	
	Berufsreifeprüfung)	
	11. Kolleg-Diplom, Meister-Prüfung (Werkmeister, Bauhandwerker),	
	12. Abschluss eines Universitätslehrgangs	
	13. Diplom an pädagogischer Akademie, medizinischer Akademie,	
	Sozialakademie	
	14. Bachelor/Bakkalaureat an einer Fachhochschule oder	
	pädagogischen Hochschule	
	15. Bachelor/Bakkalaureat-Abschluss an einer Universität	
	16. Diplomstudienabschluss/Master an einer Fachhochschule	
	17. Diplomstudienabschluss/Master an einer Universität (inkl.	
	Doktorat als Erstabschluss)	
	18. Postgraduale Universitätslehrgänge (aufbauend auf	
	Diplomstudienabschluss, z.B. MBA)	

		1
	19. Abschluss mit Doktorat (aufbauend auf Diplomstudienabschluss:	
	Dr., PhD	
	20. Other (fill in:)	
	21. refused	
	22. don't know	
Political Interest	Generally speaking, how interested are you in politics? (RESPONSE	E6
	OPTIONS: Scale from 1 – "not at all interested" to 7 – "very interested")	
Subjective	Please indicate to which extent you agree or disagree with the following	E7
Political	statement: Compared to most people, I know a lot about political issues.	
Knowledge	(RESPONSE OPTIONS: Scale from 1 – "I strongly disagree" to 7 – "I	
	strongly agree")	
"News finds	To what extent do you agree with the following statements? (RESPONSE	B18_1
me" Perception	OPTIONS: Scale from 1 "Do not agree at all" to 7 – "Agree completely")	B18_2
_	• I rely on my friends to tell me what's important when news	B18_3
	happens	
	• I can be well informed even when I don't actively follow the news	
	• I don't worry about keeping up with the news because I know	
	news will find me	
Intentional	In a typical week, how often do you find yourself actively trying to avoid news	B19
News	these days? (RESPONSE OPTIONS: "Daily", "5-6 days a week", "3-4 days a	
Avoidance	week", "1-2 days a week", "more rarely", "never")	
First- and	People often use television, internet, the radio, or the smartphone for purposes	B17 1
Second-Level	other than to get information about politics. In the past weeks, how often did	B17 <sup>2</sup>
Incidental	the following situations occur when you were using media for purposes other	B17 <sup>3</sup>
Exposure	than to get political information?	B17 <sup>4</sup>
		B17 <sup>5</sup>
	For wording, see Table 1 in the manuscript.	B17_6

### **Study 1 – Descriptives**

### Table B2

Variable Name	Mean	SD
First-level IE	3.83	1.47
Second-level IE	3.81	1.56
Age	42.85	13.39
Gender (male $= 1$ )	0.44	0.5
Political Interest	4.8	1.68
Subjective Political Knowledge	4.15	1.64
'News finds me' Perception	5.55	2.08
Intentional News Avoidance	1.34	1.49

## Appendix C: Study 2

## Study 2 - Additional Details about the Analysis

We first estimated a CFA with all eight items which did not fit the data (CFI = .94, TLI = .92,  $\chi^2/df$  = 8.08, p < .001, RMSEA = .125, GFI = .92, AGFI = .84). The inspection of modification indices suggested that the first item from Table 1 was to a large extent responsible for

the misfit. The model presented in the paper fit the data much better (CFI = .97, TLI = .96,  $\chi^2/df = 5.27$ , p < .001, RMSEA = .097, GFI = .96, AGFI = .91). A single-factor model with seven indicators (CFI = .72, TLI = .57,  $\chi^2/df = 43.56$ , p < .001, RMSEA = .308, GFI = .73, AGFI = .46) was a significantly worse fit for the data than the final model presented in the paper ( $\Delta\chi^2$  (1, N = 450) = 541.35, p < .001).

### Study 2 – Exclusion of Speeders

The time a respondent took for a survey can be a meaningful indicator for careless responding (Leiner, 2019). We therefore excluded respondents that took less than 10 minutes in W1 for the survey of 25 minute. Completing the survey in less than 10 minutes indicates that respondents did not read items and instructions of most questions. Respondents with long response times were not excluded. Potentially, individuals clicked on the link provided by the survey company but did not immediately start taking the survey. Thus, a long response time must not indicate carelessness. For the same procedure see Stubenvoll and Matthes (2021).

### Study 2 – Questionnaire

### Table C1

Measure	Wording (translated)	Variable name(s) in dataset
Age	How old are you? (OPEN RESPONSE, NUMBERS ONLY)	W1 age
Gender	You are (SINGLE CHOICE)	W1_gender_1male
	1. male	
	2. female	
Education	What is you highest level of education? (SINGLE CHOICE)	W1_education
	1. Compulsory school	
	2. Vocational school/apprentice training	
	3. Vocational middle school (HAS, agricultural college etc.)	
	4. General secondary school Matura, e.g., AHS, Realgymnasium,	
	Gymnasium	
	5. Vocational high school Matura, e.g., HAK, HTL, HLW etc.	
	6. University e.g., university or technical college	
	7. No degree completed	
Political	Please mark how strongly you agree with the following statements. Answer	W1_disposition_4,
Interest	on a scale from 1 – "I do not agree at all" to 7 – "I fully agree."	W1_disposition_5
	• I am very interested in politics.	
	<ul> <li>Politics is an exciting topic for me.</li> </ul>	
Internal	Please mark how strongly you agree with the following statements. Answer	W1_pol_trust_eff_4,
Political	on a scale from $1 - $ "I do not agree at all" to $7 - $ "I fully agree.	W1_pol_trust_eff_5,
	• I understand and can evaluate important political issues well.	W1 pol trust eff 6

Efficacy (Craig	• I think that I am at least as good informed shout political tonics as	
et al 1000	• I think that I all at least as good informed about pointeal topics as	
et al., 1990)	most people.	
	• I consider myself to be well qualified to participate in politics.	
Traditional	Think about an average week. How many days a week do you use the	W1_polmedia_use_1,
Media Use	following media online or offline to inform yourself about political topics? -	W1 polmedia use 2,
	Please answer on a scale ranging from "0" to "7 days."	W1 polmedia use 3.
	• Daily newspaper on- and offline (e.g. der Standard/derstandard at	W1 polmedia use 4
	dia Pressa/dianrassa com dia Salzburgar	WI_pointeata_use_1
	Na shuishtau (sal-hanna sama)	
	Nachrichten/saizburg.com,)	
	• Free tabloid newspapers on- and offline (heute, Osterreich,	
	oe24.at, heute.at)	
	<ul> <li>Kronen Zeitung on- and offline (largest tabloid in Austria)</li> </ul>	
	• News by ORF (public broadcasting)	
First- and	Sometimes it can happen on social media that one is confronted with	W1 incidental news 1
Second-Level	political information or tonics even though one did not look for it. How often	W1_incidental_news_2
Just dental	did the following situations accur in the last six weaks? (DESDONSE	W1_incidental_news_2,
Incidental	and the following situations occur in the last six weeks? (RESPONSE	w1_incidental_news_5,
Exposure	OPTIONS: scale ranging from 1 "never" to 7 "very often")	W1_incidental_news_4,
		W1_incidental_news_5,
	For wording, see Table 1 in the manuscript.	W1 incidental news 6,
		W1 incidental news 7.
		W1_incidental_news_8
Dolition1	Defere we some to the final questions, there is now a short quiz on Austrian	
	before we come to the final questions, there is now a short quiz on Austran	
Knowledge	politics.	W1_knowledge1_1_1EX1,
(static)	You are not expected to know all the answers. If you are not sure, you can	W2_knowledge1_1_TEXT,
	choose the "don't know" option.	W1_knowledge2.0,
		W2 knowledge2,
	At what age can one vote in Austrian national elections? (OPEN RESPONSE,	W1_knowledge3_1.
	don't know: CORRECT: 16 years)	W1_knowledge3_2
	don't know, CORRECT. To years)	W1_knowledge5_2,
		w1_knowledge5_5,
	What percentage of votes does a party need to get seats in the national	W1_knowledge3_4,
	parliament [Nationalrat]? 3%, 4%, 5%, or something else? (SINGLE	W2_knowledge3_1,
	CHOICE)	W2_knowledge3_2,
	1. 3 %	W2 knowledge3 3,
	2. 4% (CORRECT)	W2 knowledge3 4
	3 5%	
	1. Something also	
	4. Sometning else	
	5. Don't know	
	To which parties do the following politicians belong? (RESPONSE	
	OPTIONS: ÖVP, SPÖ, FPÖ, Grüne, NEOS, don't know)	
	Hans Peter Doskozil (CORRECT: SPÖ)	
	• Gernot Blümel (CORRECT: ÖVP)	
	Ingrid Foling (COPPECT: Criing)	
	$\frac{1}{1} \frac{1}{1} \frac{1}$	
77 1 1	• naraid vilimsky (COKKECT: FPO)	
Knowledge	Before we come to the final questions, there is now a short quiz on Austrian	W2_camp_know1_1,
(surveillance)	politics.	W2_camp_know1_2,
	You are not expected to know all the answers. If you are not sure, you can	W2 camp know1 3,
	choose the "don't know" option.	W2 camp know1 4,
	•	W2 camp know1 5
	How do the following parties position themselves in regard to a $CO2$ -tax?	$W_2 \operatorname{camp} \operatorname{know}^2$
	(DESDONSE ODTIONS: Dro contro don't know)	$W_2 \text{ comp } know_2$
	(RESIDENSE OF HORS. FID, collica, doin t know) $\ddot{O}VD$ (CODDECT. C. ()	$W^2_{\text{camp_knows_1}}$
	• OVP (CORRECT: Contra)	$w_2$ _camp_know3_2,
	• SPO (CORRECT: Pro)	W2_camp_know3_3,
	FPO (CORRECT: Contra)	W2_camp_know4_1,
	Grüne (CORRECT: Pro)	W2_camp_know4_2,
	NEOS (CORRECT: Pro)	W2 camp know4 3.
		$W_2 \text{ camp know} 4$
	Which party was involved in the so called "Schradderoffäre?" (SINCLE	cump_know+_+
	CHOICE)	
	1. $OVP$ (CORRECT)	
	2. SPO	
	3. FPÖ	
1	4 Grüne	

	5 NEOS	
	J. NEOS	
	During the election campaign, the issue of party donations was heavily debated. For which party did the following people donate large sums of money? (RESPONSE OPTIONS: ÖVP, SPÖ, FPÖ, Grüne, NEOS, don't	
	Hans Peter Haselsteiner (CORRECT: NEOS)	
	Heidi Horten (CORRECT: ÖVP)	
	Klaus Ortner (CORRECT: ÖVP)	
	Parties use different campaign slogans on election posters. Please assign the following slogans to the correct party: (RESPONSE OPTIONS: ÖVP, SPÖ, FPÖ, Grüne, NEOS, don't know) • "One who speaks our language." ("Einer, der unsere Sprache	
	spricht."; CORRECT: ÖVP)	
	"Who would decency choose?" ("Wen würde der Anstand wählen?": CORRECT: Grüne)	
	• With security/certainty for Austria. ("Mit Sicherheit für	
	Österreich."; CORRECT: FPÖ)	
	• Humanity prevails. (Menschlichkeit siegt. ; CORRECT: SPO)	
	NOTE: This variable was assessed only in W2.	
Online Political	Citizens have a variety of opportunities to have an impact on politics. We	W1_participation_1,
Participation	listed some of these opportunities below.	W1_participation_2,
(Heiss &	Have you performed any of the following activities in the last six weeks?	W1_participation_3,
Matthes, 2019;	(RESPONSE OPTIONS: Yes, no)	W1_participation_/,
Nanz et al.,	• liking or sharing a political post on Social Media	W1_participation_8,
2020)	• adding a short comment to a political post on Social Media	W2 norticipation_9,
	• signing an online petition related to a political issue	W2_participation_1,
	• Writing a longer pointical comment online e.g., Pacebook message, Email Blog entry to convince others with their arguments	W2_participation_2,
	• contacting a politician or journalist via Email or Social Media to	W2_participation_5,
	increase awareness of political issues	W2_participation_7,
	• creating a political group online e.g. WhatsApp Facebook in	W2_participation_0,
	order to increase awareness of political issues	w2_participation_9
	NOTE: Online and offline participation were assessed on one questionnaire page.	
Offline Political	Citizens have a variety of opportunities to have an impact on politics. We	W1_participation_4,
Participation	listed some of these opportunities below.	W1_participation_5,
Matthes 2010	(DESDONSE ODTIONS: Veg. no)	W1_participation_0,
Nanz et al	• taking part in a demonstration or protect related to a political issue	W1_participation_10,
2020)	<ul> <li>taking part in a political assembly to discuss political topics e g</li> </ul>	W1 participation 12
	community or school assembly	W2 participation 4
	• working for a political organization political party, NGO, school	W2 participation 5,
	organization	W2 participation 6,
	• reminding others of a political event or engagement opportunity	W2_participation 10,
	e.g., voting, signing a petition etc.	W2_participation_11,
	• using a campaign sticker, pen, bag or similar of a political party	W2_participation_12
	• signing a petition in the street	
	NOTE: Online and offline participation were assessed on one questionnaire	
	page.	

# Study 2 – Descriptives

## Table C2

Variable Name	Mean	SD
First-level IE (W1)	3.86	1.78

Second-level IE (W1)	3.03	1.66
Online Political Participation (W1)	1.04	1.48
Online Political Participation (W2)	0.89	1.35
Offline Political Participation (W1)	0.74	1.24
Offline Political Participation (W2)	0.68	1.19
Political Knowledge (static) (W1)	3.69	1.89
Political Knowledge (static) (W2)	3.87	1.91
Political Knowledge (surveillance) (W2)	6.63	3.45
Age (W1)	47.88	15.44
Gender (male = 1) (W1)	0.48	0.5
Political Interest (W1)	4.56	1.9
Internal Political Efficacy (W1)	4.46	1.54
Traditional Media Use: Broadsheet Newspaper (W1)	4.56	2.7
Traditional Media Use: Free Tabloid (W1)	3.11	2.26
Traditional Media Use: Krone (W1)	2.98	2.49
Traditional Media Use: Public Broadcasting ORF (W1)	5.01	2.49

## **Appendix D: Study 3**

## Study 3 - Additional Details about the Analysis

A single-factor model with six indicators (CFI = .53, TLI = .21,  $\chi^2/df = 80.06$ , p < .001,

RMSEA = .388, GFI = .67, AGFI = .23) was a significantly worse fit for the data than the final

model presented in the paper ( $\Delta \chi^2(1, N = 524) = 689.95, p < .001$ ).

## **Study 3 – Exclusion of Speeders**

We followed the same procedure we used for Study 2.

## Study 3 – Questionnaire

### Table D1

Measure	Wording (translated)	Variable name(s) in
		dataset
Age	How old are you? (OPEN RESPONSE, NUMBERS ONLY)	W1_age
Gender	You are (SINGLE CHOICE)	W1_gender_1male
	l. male	
	2. female	
Education	What is you highest level of education? (SINGLE CHOICE)	W1_education
	1. Compulsory school	
	2. Vocational school/apprentice training	
	3. Vocational middle school HAS, agricultural college etc.	
	4. General secondary school Matura, e.g., AHS, Realgymnasium,	
	Gymnasium	
	5. Vocational high school Matura, e.g., HAK, HTL, HLW etc.	
	6. University e.g., university or technical college	
	7. No degree completed	
Political Interest	How interested are you in (RESPONSE OPTIONS: Scale from 1 "not at all	W1 pol int 1,
	interested" to "7" very interested")	W1 pol int 2
	•politics in general.	
	• the Viennese state election on 11th of October 2020.	
Internal Political	The following questions are about political attitudes. Answer on a scale from 1 –	W2 pol traits 5.
Efficacy (Craig	"I do not agree at all" to 7 – "I fully agree."	W2 pol traits 6.
et al., 1990)	• I understand and can evaluate important political issues well.	W2 pol traits 7
,,	• I think that I am at least as good informed about political topics as	
	most neonle.	
	• I consider myself to be well qualified to participate actively in a	
	discussion about politics	
	discussion about pointes.	
	NOTE: This variable was assessed in W2.	
Traditional	Next, we come to media usage. Think about an average week. How many days a	W2_pol_med_use_1,
Media Use	week do you use the following media online or offline to inform yourself about	W2_pol_med_use_2
	political topics? - Please answer on a scale ranging from "0" to "7 days."	
	• Broadsheet newspaper on- and offline e.g., der	
	Standard/derstandard.at, die Presse/diepresse.com,	
	• Tabloid newspapers on- and offline e.g., Kronenzeitung, heute.	
	Österreich, oe24.at	
	NOTE: This variable was assessed in W2	

Political Discussion Frequency	How often did you discuss politics online or offline with others in the last two months? (RESPONSE OPTIONS: scale ranging from 1 "never" to 7 "very often")	W2_PolDiscussionFreq
Trequency	NOTE: This variable was assessed in W2.	
First- and Second-Level Incidental Exposure	In the Internet, it can sometimes happen that one is confronted with political information or topics even though one did not look for it. How often did the following situations occur in the last two months? (RESPONSE OPTIONS: scale ranging from 1 "never" to 7 "very often") For wording, see Table 1 in the manuscript.	W1_pine_std_1, W1_pine_std_2, W1_pine_std_3, W1_pine_std_4, W1_pine_std_5, W1_pine_std_6
Political Knowledge (static)	<ul> <li>To which party do the following politicians belong? (RESPONSE OPTIONS: SPÖ, ÖVP, FPÖ, Grüne, NEOS, Team HC Strache, don't know)</li> <li>Michael Ludwig (CORRECT: SPÖ)</li> <li>Dominik Nepp (CORRECT: FPÖ)</li> <li>Gernot Blümel (CORRECT: ÖVP)</li> <li>Christoph Wiederkehr (CORRECT: NEOS)</li> <li>Birgit Hebein (CORRECT: Grüne)</li> </ul>	W1_camp_know_1_1, W1_camp_know_1_2, W1_camp_know_1_3, W1_camp_know_1_4, W1_camp_know_1_5, W2_camp_know_1_1, W2_camp_know_1_2, W2_camp_know_1_3, W2_camp_know_1_4, W2_camp_know_1_5
Political Knowledge (surveillance)	<ul> <li>Which of the following statements are correct or false? No one expects you to know all the answers. If you are not sure, you can choose the "don't know"-option. Please do not forget to press the "next"-button before the time ends.</li> <li>You have 15 seconds to answer the questions. After 15 seconds you will be redirected to the next page. (RESPONSE OPTIONS: right, wrong, don't know)</li> <li>W1: <ul> <li>The party "Change" has issued an exposition of facts against Heinz-Christian Strache for violation of the registration law. (RIGHT)</li> <li>Harald Mahrer was voted at the state convention of the ÖVP to the</li> </ul> </li> </ul>	W1_camp_know_2, W1_camp_know_3, W1_camp_know_4, W1_camp_know_5, W1_camp_know_6, W1_camp_know_7 W2_camp_know_2, W2_camp_know_3, W2_camp_know_4, W2_camp_know_5, W2_camp_know_6,
	<ul> <li>frontrunner for the state election. (WRONG)</li> <li>The Mayor of Vienna, Michael Ludwig, instructed the public transport services with running the citybike hiring service. (RIGHT)</li> <li>The chairperson of the Green Party of Vienna was pied by a protester at a campaign rally in August 2020. (WRONG)</li> <li>The political parties in the Vienna city council have announced to develop a uniform parking ticket model after the election. (RIGHT)</li> <li>The City of Vienna has issued vouchers worth of € 25 to all Viennese households. (WRONG)</li> </ul>	W2_camp_know_7
	<ul> <li>The former Mayor of Vienna, Michael Häupl, has called to end the continuation of the governing coalition between the SPÖ and the Greens after the election. (WRONG)</li> <li>The Vienna City Council has decided by majority to receive 100 refugee children. (RIGHT)</li> <li>The frontrunner of the ÖVP, Gernot Blümel, has precluded a coalition with the SPÖ after the election. (WRONG)</li> </ul>	
	<ul> <li>The NEOS of Vienna have claimed to enshrine German and English in the state constitution. (WRONG)</li> <li>The mayor, Michael Ludwig, is against a right to vote for non- Austrian citizens in the state election. (RIGHT)</li> <li>The Green Party of Vienna has proposed that the Viennese police,</li> </ul>	
	except for special forces, should not carry a service weapon in service. (RIGHT)	
Online Political Participation (Heiss & Matthes, 2019:	Citizens have a variety of opportunities to have an impact on politics. We listed some of these opportunities below. Have you performed any of the following activities in the last two months?	W1_pol_part_1, W1_pol_part_2, W1_pol_part_3, W1_pol_part_7.
Nanz et al., 2020)	<ul> <li>(RESPONSE OPTIONS: Yes, no)</li> <li>liking or sharing a political post on Social Media</li> <li>adding a short comment to a political post on Social Media</li> </ul>	W1_pol_part_8, W1_pol_part_9, W2_pol_part_1,
	signing an online petition related to a political issue	W2_pol_part_2,

	<ul> <li>writing a longer political comment online e.g., Facebook message, Email, Blog entry to convince others with their arguments</li> <li>contacting a politician or journalist via Email or Social Media to increase awareness of political issues</li> <li>creating a political group online e.g., WhatsApp, Facebook in order to increase awareness of political issues</li> </ul>	W2_pol_part_3, W2_pol_part_7, W2_pol_part_8, W2_pol_part_9
	NOTE: Online and offline participation were assessed on one questionnaire page.	
Offline Political	Citizens have a variety of opportunities to have an impact on politics. We listed	W1 pol part 4,
Participation	some of these opportunities below.	W1 pol part 5,
(Heiss &		W1 pol part 6,
Matthes, 2019;	Have you performed any of the following activities in the last two months?	W1 pol part 10,
Nanz et al.,	(RESPONSE OPTIONS: Yes, no)	W1 pol part 11,
2020)	• taking part in a demonstration or protest related to a political issue	W1 pol part 12,
,	• taking part in a political assembly to discuss political topics e.g.,	W2 pol part 4,
	community or school assembly	W2 pol part 5,
	<ul> <li>working for a political organization political party, NGO, school</li> </ul>	W2 pol part 6,
	organization	W2 pol part 10,
	• reminding others of a political event or engagement opportunity e.g.,	W2 pol part 11,
	voting, signing a petition etc.	W2 pol part 12
	• using a campaign sticker, pen, bag or similar of a political party	
	• signing a petition in the street	
	NOTE: Online and offline participation were assessed on one questionnaire page.	

# Study 3 – Descriptives

## Table D2

Variable Name	Mean	SD
First-level IE (W1)	4.14	1.54
Second-level IE (W1)	3.44	1.52
Online Political Participation (W1)	1.16	1.44
Online Political Participation (W2)	1.11	1.47
Offline Political Participation (W1)	0.89	1.39
Offline Political Participation (W2)	0.96	1.4
Political Knowledge (static) (W1)	3.54	1.58
Political Knowledge (static) (W2)	4.21	1.35
Political Knowledge (surveillance) (W1)	3	1.47
Political Knowledge (surveillance) (W2)	3.14	1.55
Age (W1)	45.05	12.97
Gender (male = 1) (W1)	0.49	0.5
Political Interest (W1)	5.28	1.51
Internal Political Efficacy (W2)	5	1.35
Traditional Media Use: Broadsheet (W2)	4.13	2.98
Traditional Media Use: Tabloid (W2)	4.01	2.96
Political Discussion Frequency (W2)	4.32	1.88

### **Appendix E: Study 4**

### Study 4 - Additional Details about the Analysis

We first estimated a CFA with all eleven items which did not fit the data (CFI = .97, TLI = .96,  $\chi^2/df = 7.48$ , p < .001, RMSEA = .085, GFI = .93, AGFI = .89). The inspection of modification indices suggested that the first item from Table 1 was to a large extent responsible for the misfit. The model presented in the paper fit the data much better (CFI = .98, TLI = .98,  $\chi^2/df = 5.11$ , p < .001, RMSEA = .068, GFI = .96, AGFI = .94). A single-factor model with seven indicators (CFI = .71, TLI = .63,  $\chi^2/df = 72.7$ , p < .001, RMSEA = .282, GFI = .55, AGFI = .29) was a significantly worse fit for the data than the final model presented in the paper ( $\Delta\chi^2(1, N = 901) = 2370.8$ , p < .001).

### Study 4 – Exclusion of Speeders

We followed the same procedure we used for Study 2 and 3.

### **Study 4 - Questionnaire**

### Table E1

Measure	Wording (translated)	Variable name(s) in dataset
Age	How old are you? (OPEN RESPONSE, NUMBERS ONLY)	W1 age
Gender	You are (SINGLE CHOICE)	W1_gender_r
	1. male	
	2. female	
Education	What is you highest level of education? (SINGLE CHOICE)	W1_edu
	1. No degree completed	
	2. Compulsory school (Haupt-/Volksschule)	
	3. Secondary school level I certificate (mittlere Reife/Realschule)	
	4. Vocational school (Fachoberschule, Fachschule, Berufsschule)	
	5. General secondary school (Abitur/Fachabitur)	
	6. Technical college/cooperative education	
	(Fachhochschule/Berufsakademie)	
	7. University	
Political Interest	How strongly do you agree with the following statements? (RESPONSE	W1_pol_various_1,
	OPTIONS: Scale from 1 "I do not agree at all" to "7" I fully agree")	W1 pol various 2
	<ul> <li>I am very interested in current political events/proceedings.</li> </ul>	
	• I follow information about German politics and the government	
	very closely.	
Internal Political	How strongly do you agree with the following statements? (RESPONSE	W1_pol_various_8,
Efficacy (Craig	OPTIONS: Scale from 1 "I do not agree at all" to "7" I fully agree")	W1_pol_various_9,
et al., 1990)	• I understand and can evaluate important political issues well.	W1 pol various 10

	• I think that I am at least as good informed about political topics as	
	most people.	
Traditional	• I consider myself to be well qualified to participate in politics.	W1 modiance 1
Media Use	inform yourself about political topics? - Please answer on a scale ranging	W1_mediause_1,
Wedia Obe	from "0" to "7 days."	W1_mediause_2, W1_mediause_3,
	• Public broadcasting TV (ARD, ZDF; tagesschau.de,)	W1_mediause_4
	so-called quality media (die Zeit, Süddeutsche, Frankfurter	
	Allgemeine)	
	<ul> <li>so-called tabloid media (Bild, tz, B.Z)</li> </ul>	
Online and	How often did you discuss politics with others in the last three months?	W1 discfreq offline
Offline Political	(RESPONSE OPTIONS: scale ranging from 1 "never" to 7 "very often")	W1_discfreq_online
Discussion	• personally or via phone	
Frequency	In the Internet e.g., via chat groups, Facebook, WhatsApp, e-mail, Social Media	
First- and	Sometimes it can happen on social media that one is confronted with	W1_pinescale_1,
Second-Level Incidental	political information or topics even though one did not look for it. How often did the following situations occur in the last three months?	W1_pinescale_2, W1_pinescale_3
Exposure	(RESPONSE OPTIONS: scale ranging from 1 "never" to 7 "very often")	W1_pinescale_5, W1_pinescale_4,
•		W1_pinescale_5,
	For wording, see Table 1 in the manuscript.	W1_pinescale_6,
		W1_pinescale_7, W1_pinescale_8
		W1_pinescale_0, W1_pinescale_9.
		W1_pinescale_10,
		W1_pinescale_11
Political	We now come to a short quiz about German politics. Nobody expects you to	W1_polknow1_1_TEXT,
(static)	ontion.	W1_polknow2,
()	-F	W1_polknow4_1,
	What percentage of votes does a party need to send representatives to the	W1_polknow4_2,
	national parliament [Bundestag] for sure? (OPEN RESPONSE, don't know)	W1_polknow4_3,
	How is it during national elections [Bundestagswahlen] which vote is crucial	W1_polknow4_4,
	for the distribution of seats in the national parliament [Bundestag]? (SINGLE	W2 polknow1 1 TEXT,
	CHOICE)	W2_polknow2,
	1. First vote [Erststimme]	W2_polknow3,
	2. Second vote [Zweitstimme] (CORRECT) 3. Both are equally important	$W2_polknow4_1,$ $W2_polknow4_2$
	4. Don't know	W2_polknow4_2, W2_polknow4_3,
		W2_polknow4_4,
	Who votes the German Chancellor in the Federal Republic of Germany?	W2_polknow4_5
	[SINGLE CHUICE] 1 Bundesrat	
	2. Bundesversammlung	
	3. Bundestag (CORRECT)	
	4. The people	
	5. Don't know	
	To which party do the following politicians belong? (RESPONSE OPTIONS: CDU_CSU_SPD_EDP_Bündnis 90/Die Grünen_Die Linke AfD_don't	
	know)	
	Horst Seehofer (CORRECT: CSU)	
	Björn Höcke (CORRECT: AfD)	
	Annaiena Baerbock (UUKKEU1: Bundnis 90/Die Grunen)     Angela Merkel (CORRECT: CDI)	
	Katja Kipping (CORRECT: die Linke)	
Knowledge	Next up is a short quiz about current news events. Nobody expects you to	W1_curraff_1,
(surveillance)	know all the answers. If you are not sure, you can choose the "don't know"-	W1_curraff_2,
	option.	w1_curraff_4
		W1_curraff_5,

<ul> <li>You have 15 seconds to answer the questions. After 15 seconds you will be redirected to the next page. (RESPONSE OPTIONS: right, wrong, don't know)</li> <li>W1: <ul> <li>This year the annual security conference in February took place in Hamburg (WRONG).</li> <li>The AfD politician Alice Weidel was elected to be the chairman of the party in Baden-Württemberg (RIGHT).</li> <li>Annegret Kramp-Karrenbauer announced that she is not available to be the next chancellor candidate for the Union (CDU/CSU) (RIGHT).</li> <li>Chancellor Angela Merkel criticized the CDU-party in Thüringen because they voted with the AfD in the election for the Ministerpräsidenten (RIGHT).</li> <li>Friedrich Merz was confirmed to be the next CDU-chairman by the Bundestagsfraktion (WRONG).</li> <li>Investigators cannot investigate the accusation of tax evasion against the AfD politician Alexander Gauland because the Bundestag rejected lifting the immunity (WRONG).</li> <li>On the 75<sup>th</sup> anniversary of the liberation of Auschwitz, President Walter Steinmeier spoke in English and not German out of respect towards the survivors (RIGHT).</li> <li>The Green's chairman Robert Habeck was attacked with a cake on an event for climate change in Dortmund (WRONG).</li> <li>After criticism regarding the election of the Ministerpräsidenten of Thüringen, CDU-chairman Mike Mohring announced his resignation in May (RIGHT).</li> <li>CDU-undersceretary of state Günter Krings voiced support for a policy that forced users to reveal their real name online (WRONG).</li> <li>Sin Féin, a party which had ties to the terror organization IRA during the Irish parliamentary election (RIGHT).</li> <li>More than thousand people are trapped in the luxury cruise shin</li> </ul> </li> </ul>	W1_curraff_6, W1_curraff_7, W1_curraff_7, W1_curraff_9, W1_curraff_10, W1_curraff_11, W1_curraff_12 W2_curraff_1, W2_curraff_2, W2_curraff_3, W2_curraff_4, W2_curraff_6, W2_curraff_7, W2_curraff_7, W2_curraff_9, W2_curraff_10, W2_curraff_11, W2_curraff_12
"Diamond Princess" because Singapore does not allow the ship to enter the harbor due to the corona epidemic (WRONG). W2:	
<ul> <li>The SPD's party executive Olaf Scholar was nominated as front- runner for the next national election (RIGHT).</li> </ul>	
<ul> <li>The British governments considers to pass a law that annuls the Withdrawal Agreement with the European Union (RIGHT).</li> <li>After the courts decided that the exclusion of Andreas Kalbitz from the AfD was unlawful, he plans to run for chairman of the parliamentary group in Brandenburg (WRONG).</li> </ul>	
<ul> <li>In the beginning of September, finance minister Olaf Scholar was questioned regarding two financial scandals (Wirecard and Cum-Ex) (RIGHT).</li> <li>Katia Kipping announced that she will not run for the position of</li> </ul>	
<ul> <li>Marga Ripping aniounced that she will not turn for the position of party leader of the LINKE again (RIGHT).</li> <li>More than 35 million Germans downloaded the Corona-Warning-</li> </ul>	
<ul> <li>App recommended by the government (WRONG).</li> <li>After Robert Habeck attacked the Bavarian Ministerpräsident Markus Söder verbally, Söder expressed his opposition regarding a coalition with the Greens after the national election (WRONG).</li> </ul>	
<ul> <li>The Berlin administrative court ruled against an order by the city that prohibited a demonstration against restrictions related to COVID-19 (RIGHT)</li> <li>The US-Democrats nominated Senator Corv Booker from New</li> </ul>	
Jersey as running mate (WRONG).	

Online Political Participation (Heiss & Matthes, 2019; Nanz et al., 2020)	<ul> <li>CDU parliamentarian Philipp Amthor withdrew his candidacy for the state chairman position of the CDU in Mecklenburg- Vorpommern in summer (RIGHT).</li> <li>While the SPD wants to take approximately 1500 refugees from the camp in Moria that burned down, secretary of the interior Horst Seehofer opposed such action (WRONG).</li> <li>Secretary of transportation Andreas Scheuer called for the abolishing financial benefits for cars with combustion engines previous to the car summit (WRONG).</li> <li>Citizens have a variety of opportunities to have an impact on politics. We listed some of these opportunities below.</li> <li>Have you performed any of the following activities in the last three months? (RESPONSE OPTIONS: Yes, no)         <ul> <li>liking or sharing a political post on Social Media</li> <li>adding a short comment to a political post on Social Media</li> <li>signing an online petition related to a political issue</li> <li>writing a longer political comment online e.g., Facebook message,</li> </ul> </li> </ul>	W1_polpar_1, W1_polpar_2, W1_polpar_3, W1_polpar_7, W1_polpar_8, W1_polpar_9, W2_polpar_1, W2_polpar_2, W2_polpar_3,
	Email, Blog entry to convince others with their arguments	W2 polpar 7.
	• contacting a politician or journalist via Email or Social Media to	W2 polpar 8,
	increase awareness of political issues	W2_polpar_9
	• creating a political group online e.g., WhatsApp, Facebook in	
	order to increase awareness of political issues	
	NOTE: Online and offline participation were assessed on one questionnaire page.	
Offline Political	Citizens have a variety of opportunities to have an impact on politics. We	W1_polpar_4,
Participation	listed some of these opportunities below.	W1_polpar_5,
(Heiss &		W1_polpar_6,
Matthes, 2019;	Have you performed any of the following activities in the last three months?	W1_polpar_10,
Nanz et al.,	(RESPONSE OPTIONS: Yes, no)	W1_polpar_11,
2020)	<ul> <li>taking part in a demonstration of protest related to a political issue</li> <li>taking part in a political assembly to discuss political topics a g</li> </ul>	W2_polpar_12,
	community or school assembly	$W^2_polpar_4,$ W2 polpar_5
	<ul> <li>working for a political organization political party, NGO, school</li> </ul>	W2_polpar_5, W2_polpar_6.
	organization	W2 polpar 10,
	• reminding others of a political event or engagement opportunity	W2_polpar_11,
	e.g., voting, signing a petition etc.	W2_polpar_12
	• using a campaign sticker, pen, bag or similar of a political party	
	• signing a petition in the street	
	NOTE: Online and offline participation were assessed on one questionnaire page.	
Social Media	Sometimes it can happen on social media that one is confronted with political	W1_intentional_1,
Use for Political	information or topics even though one did not look for it. How often did the	W1_intentional_2,
Information	tollowing situations occur in the last three months? (RESPONSE OPTIONS:	W1_intentional_3,
	• I actively looked for political information on social media	$W_2$ intentional 1, $W_2$ intentional 2
	I actively noticed for pointical information on social media	W2_intentional_2,
	I intentionally headed towards political content on social media.	
Political	In the last three months, how often did it happen on social media that I	W1 pineswitch polexp 4.
Expression	(RESPONSE OPTIONS: scale ranging from 1 "never" to 7 "very often")	W1 pineswitch polexp 5,
	• posted my political opinion.	W1_pineswitch_polexp_6,
	• shared my attitudes towards a political topic.	W2_pineswitch_polexp_4,
	• represented my position in a political discussion.	W2_pineswitch_polexp_5,
		W2_pineswitch_polexp_6

# Study 4 – Descriptives

Table E2

Variable Name Mean SD

First-level IE (W1)	3.57	1.7
Second-level IE (W1)	3.04	1.71
Online Political Participation (W1)	0.87	1.36
Online Political Participation (W2)	0.9	1.41
Offline Political Participation (W1)	0.7	1.31
Offline Political Participation (W2)	0.61	1.23
Political Knowledge (static) (W1)	4.68	2.35
Political Knowledge (static) (W2)	4.56	2.45
Political Knowledge (surveillance) (W1)	4.76	2.58
Political Knowledge (surveillance) (W2)	5.77	3.19
Social Media Use for Political Information (W1)	2.59	1.69
Social Media Use for Political Information (W2)		1.71
Political Expression (W1)		1.7
Political Expression (W2)		1.7
Age (W1)		11.29
Gender (male = 1) (W1)		0.5
Political Interest (W1)		1.68
Internal Political Efficacy (W1)	4.63	1.38
Traditional Media Use: Public Broadcasting (W1)	4.93	2.6
Traditional Media Use: Broadsheet (W1)	2.63	2.15
Traditional Media Use: Private TV (W1)		2.49
Traditional Media Use: Tabloid (W1)	2.22	1.88
Political Discussion Frequency (Offline) (W1)		2
Political Discussion Frequency (Online) (W1)	2.27	1.77

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## 8 Study IV: Nanz, Kaskeleviciute, Stubenvoll & Matthes (submitted)

Nanz, A., Kaskeleviciute, R., Stubenvoll, M., & Matthes, J. (submitted). Scanning vs. thorough processing the news: Antecedents of first- and second-level incidental exposure and the role of the relevance appraisal.

# Scanning vs. Thorough Processing the News: Antecedents of First- and Second-level Incidental Exposure and the Role of the Relevance Appraisal

### Abstract

The Internet and particularly social media offer opportunities for exposure to political information even when individuals were not looking for such information. This phenomenon, is called incidental exposure to news (IE). However, whether individuals thoroughly process such incidentally encountered information (second-level IE) or whether they just skim and skip such information online (first-level IE) is theorized to affect political outcomes differently. In this study, we investigate how crucial political predispositions (i.e., political interest and intentional news avoidance) as well as characteristics of IE content predict the two levels of IE. We conducted two two-wave panel surveys ( $N_1 = 524$ ,  $N_2 = 897$ ). Across both studies, we found that political interest increases second-level IE over time while intentional news avoidance did not affect the two levels. In Study 2, we found that personal relevance of IE content boosts second-level IE while cross-cutting IE fosters first-level IE. Implications are discussed.

*Keywords*: incidental exposure, antecedents, news consumption, social media, news avoidance, political interest

In today's media environment, individuals must not – and some of them also do not – actively visit (digital) news outlets to get the news of the day. Particularly, with the rise of social media, news consumption practices have changed substantially (e.g., Bergström & Jervelycke Belfrage, 2018; Kümpel, 2019). With the emergence of the Internet and social media, the debate around the opportunities that these web platforms provide for potential increases in political knowledge and, in turn, politically informed citizens arose. Social media provides a space for various types of content, including political information. Although the primary goal of the usage of social media is not for political purposes nor reading news, social media users may incidentally encounter political content without actively seeking for it (e.g., Jae Kook Lee & Kim, 2017). This notion has sparked the scholarly attention surrounding incidental exposure (IE) to news and other political content. IE on social media can act as a gateway to more intentional news consumption (Strauß et al., 2020). Research has also shown that IE can have various political outcomes, such as increasing political participation (Valeriani & Vaccari, 2016), knowledge (Nanz & Matthes, 2020), and discussion (Nanz & Matthes, 2022a). At the same time, concerns about the increase of the knowledge gap, due to, for instance, algorithmic curation or political predispositions, between politically interested citizens and the ones with low interest, have been raised (Kümpel, 2020).

Less research hitherto has been dedicated to studying antecedents of IE. That is, what are individual characteristics that explain IE to political information. Some survey studies looked into predictors of IE revealing that political ideology, discussion, and trust in information on social media are related to the levels of IE that individuals experience (Goyanes, 2020; Jae Kook Lee & Kim, 2017; Lu & Lee, 2019). Further looking into specific social media network characteristics research found associations with IE (Ahmadi & Wohn, 2018; Jae Kook Lee &

Kim, 2017). Moreover, media use (Scheffauer et al., 2021) and motivation for usage (Nanz et al., 2022) are linked to IE. However, these studies have been mostly cross-sectional (but see Lu & Lee, 2019; Nanz et al., 2022) which poses limitations on investigating the direction of a relationship and points to the need of longitudinal panel designs.

Furthermore, existing research on IE has been criticized for treating IE as a rather unidimensional construct. That is, most research does not differentiate between the pure scanning of information that individuals stumble upon incidentally and the effortful processing of incidentally encountered content. Against this criticism, the present study builds on the Political Incidental News Exposure model (PINE, Matthes et al., 2020), which suggests a distinction between first- (i.e., scanning of IE content) and second-level IE (i.e., thorough processing of IE content). As research has revealed that first- and second-level IE can lead to different political outcomes (Nanz & Matthes, 2020, 2022b), it is important to study which factors predict individuals' scanning or further processing of the encountered content in the first place. The present study focuses on key antecedents, namely political interest, news avoidance, and content characteristics that lead to a positive relevance appraisal, of first- and second-level IE. With an aim to fill the pressing research gaps, we conducted two two-wave panel surveys: 1) during an election period in Austria and 2) in a non-election context in Germany.

### **Antecedents of Incidental Exposure**

Due to the proliferation of the Internet and social media platforms, interest in the phenomenon of IE has increased. One particular question in the field is concerned with the antecedents of IE. Who experiences IE in the contemporary media environment and which factors shape this exposure? Thereby, scholars discussed structural as well as individual influences (e.g., Kümpel, 2020; Matthes et al., 2020; Weeks & Lane, 2020). The former

encompasses, for instance, the technological structure, algorithmic curation and various features of the social network individuals are embedded in, while the latter includes personality traits, individual's (political) interests as well as situational factors. However, it has been argued that structural as well as individual factors are closely intertwined (Sangwon Lee et al., 2022; Weeks & Lane, 2020). For example, previous research suggests that individuals will select social media platforms with specific technological affordances based on their needs (Hughes et al., 2012).

Even though, a variety of antecedents of IE have been mentioned in the current bulk of literature, there is limited empirical work investigating predictors of IE. Survey studies found that political characteristics such as ideology, discussion, and trust in information on social media (Goyanes, 2020; Jae Kook Lee & Kim, 2017; Lu & Lee, 2019) as well as network characteristics, such as the prominence of weak ties and diversity in one's network (Ahmadi & Wohn, 2018; Jae Kook Lee & Kim, 2017) are related to the amount of IE individuals experience. Additionally, general media usage (Scheffauer et al., 2021) and using social media for entertainment purposes (Nanz et al., 2022) are related to IE. Most of the research on antecedents of IE relies on cross-sectional surveys (for an exception, see Lu & Lee, 2019; Nanz et al., 2022) which impede the conclusion whether these variables are actual antecedents or purely correlated with IE.

Furthermore, most previous research relies on a conceptualization of IE that has been criticized (Kaiser et al., 2021; Matthes et al., 2020). Specifically, most research subsumes very different incidental information encounters under the term IE. On the one hand, individuals may briefly scan political information they encounter incidentally quickly before they move on to other information they are more interested in. On the other hand, sometimes incidentally encountered political information may spark interest that leads individuals to dedicate their

attention and cognitive resources towards the IE content. Previous research on the antecedents of IE did not distinguish between these distinct types of IE. However, theoretical models and experimental research suggest that these IE situations affect political outcomes such as learning differently (Matthes et al., 2020; Nanz & Matthes, 2020).

Closely related, most research on the antecedents of IE rely on survey items that ask respondents to rate the frequency of IE (e.g., "how often do you come across news when you are online, even if you are not looking for news"; see Jae Kook Lee & Kim, 2017, p. 1015). Such survey measures do not deliver any insights whether individuals engaged with or attended to IE content. However, it is likely that the thorough processing of incidentally encountered political content is predicted by other variables (e.g., prior political interest; see e.g., Kümpel, 2020) than the mere scanning of IE content.

### Distinguishing between First- and Second-Level Incidental Exposure

This study draws from the Political Incidental News Exposure model (PINE, Matthes et al., 2020). The PINE model aims to address multiple lines of criticism directed at previous research on IE and provides a theoretical framework outlining the phenomenon of IE. IE is defined "as exposure to information that people encounter without actively seeking for it. Importantly, we distinguish two levels of IE: First-level IE, which is the scanning of incidentally encountered information, and second-level IE, defined as the effortful processing of incidentally encountered information" (Nanz & Matthes, 2020, p. 770). Previous research testing the PINE model suggests that first-level IE affects political outcomes less substantially than second-level IE (Nanz & Matthes, 2020).

A process, called the *relevance appraisal*, is located at the center of the PINE model: the model assumes that, every time individuals encounter information, they have to scan the

information in front of them to determine whether the information is relevant (Knoll et al., 2020). When experiencing IE - i.e., exposure to content that is not related to individuals' current goal during media reception – individuals still have to scan this information to determine its relevance (i.e., first-level IE). Notably, sometimes IE content might be more relevant (e.g., breaking news alert, articles about one's own community) than the content individuals were looking for. In these cases, we speak of a positive relevance appraisal. A positive relevance appraisal, in turn, makes it more likely that individuals dedicate their attention towards the IE content and start processing the information more thoroughly. In other words, a positive relevance appraisal can lead to second-level IE. Sometimes situational factors may still hinder individuals to engage in second-level IE. For example, occasionally time or other situational constraints may make it difficult to attend to IE content appraised as relevant. Apart from situational factors, message factors (including source cues), individual factors (i.e., characteristics of the recipient), and their interplay may influence whether the relevance appraisal turns out positive (Matthes et al., 2020). In the next section, we will discuss two individual-level factors, political interest and news avoidance, that may affect the relevance appraisal and, in turn, first- and second-level IE.

### Political Predispositions and First- and Second-Level Incidental Exposure

Political interest, defined as "an evaluative statement or judgment about how appealing the realm of politics is for the respondent" (Boulianne, 2011, p. 52), is a key indicator of political involvement and a vital component of a healthy democracy. In fact, political interest has been found to be positively related to the selection and processing of news (Strömbäck & Shehata, 2019). This, first and foremost, involves intentional exposure. Using panel data, Strömbäck and Shehata (2019), for instance, observed that political interest predicted both attention to political news and news media exposure over time (see also Boulianne, 2011; Skovsgaard et al., 2016).

Similarly, there is evidence that individuals who are interested in politics dwell on political posts longer than those less interested (Bode et al., 2017).

When it comes to IE, political interest may also matter as a predictor. Arguably, when political interest is high, it is likely that individuals will appraise the content they encounter incidentally as relevant (Matthes et al., 2020; see also Kim et al., 2013; Knoll et al., 2020), leading to effortful processing. Thus, political interest should be positively related to second-level IE. In fact, there is some first evidence that individuals high in political interest engage in further reading of incidentally encountered news articles (Karnowski et al., 2017; Weeks et al., 2017).

When it comes to first-level IE, the oppositive prediction can be made, that is, first-level IE becomes less likely with rising political interest. As Kümpel (2020) argued, incidentally encountered political content is unlikely to motivate uninterested users to enagage with news. In terms of the PINE model, those who are not interested in politics may perceive any incidentally encountered political content as a distraction or annoyment, thus decreasing the likelihood of a positive relevant appraisal of that content (Heiss & Matthes, 2019). In other words, those who score low in political interest may prefer to seek other content online, such as entertainment or sports. As a consequence, political information may be perceived as particularly irrelevant, fostering first-level IE. By contrast, those who are already interested are likely to intentionally seek out the news, decreasing the general liklihood to stumble over political information not regarded as relevant. Thus, political interest should be positively related to second- and negatively related to first-level IE.

H1: Higher political interest (a) positively affects second-level IE and (b) negatively affects first-level IE.
Not only an electorate with high levels of political interest is considered to foster normatively desirable outcomes, but also a citizenry that actively follows the news. However, in recent years, scholars voiced concerns over the growing number of individuals that opt out of news consumption, a process that might threaten information equality and increase knowledge gaps in the population (Kalogeropoulos, 2017; Prior, 2007). Prior literature investigating the phenomenon distinguishes two forms of news avoidance: Intentional and unintentional news avoidance (Skovsgaard & Andersen, 2020). Intentional news avoidance refers to individuals' deliberate decision to avert news, often based on a dislike for specific kinds of news. Due to news being overly negative (Kalogeropoulos, 2017; Villi et al., 2021; but also see Edgerly, 2021), not trustworthy (Kalogeropoulos, 2017; Toff & Kalogeropoulos, 2020), overburdening (Song et al., 2017; Villi et al., 2021), or not relevant to the specific needs of audiences (Edgerly, 2021), individuals might make the decision to actively tune out of news. In their qualitative study, Villi and colleagues (2021) show that the decision to abstain from news can be temporarily limited and even occur for individuals that show a high interest in politics. Consequently, intentional news avoidance is not synonymous with low levels of news consumption. Instead, even regular news consumers might attend to specific kinds of news and political information, while avoiding news that induce a negative mood or are seen as unreliable (Skovsgaard & Andersen, 2020).

In contrast, unintentional news avoidance is characterized by low levels of news consumption due to a relative preference for other forms of content (Skovsgaard & Andersen, 2020). In a high-choice media environment, content of all sorts is abundant, giving individuals with low interest in politics countless options to seek out entertainment (Prior, 2007). According to Prior (2007), the preference for entertainment content can displace news consumption almost

entirely for those who relatively favor entertainment over politics, since they self-select themselves away from the news. This displacement effect might be amplified by algorithmic selection and curation without individuals' conscious decision to avoid news (Merten, 2021).

Scholars have theorized that IE to political content on social media holds out as a possibility to engage news avoiders with politics, spur interest, or fill in knowledge gaps (e.g., Valeriani & Vaccari, 2016). To date, there is still a lack of research in regard to intentional news avoidance (see also Kümpel, 2020). Since low levels of engagement with content critically limits the positive effects of IE (Kümpel, 2020; Matthes et al., 2020), it is especially relevant to see to which degree intentional news avoiders engage in second-level as opposed to first-level IE.

Individuals' tendency to intentionally avoid the news might affect how they engage with IE content. Specifically, the motivations that drive individuals to actively avoid the news might also guide their selective attention to chance encounters with political information (see also Villi et al., 2021). If individuals avoid the news because of feelings of fatigue and overload with political information, political IE content is more likely to be passed by in order to reduce the emotional burden of exposure (Park, 2019). In addition, both, common message features and the dominant sources of IE mirror the message features that drive news avoiders away from consuming news in general: Social media users report that incidental news is often especially dramatic, since emotional content is more likely to be shared (Goyanes & Demeter, 2020). Therefore, those who try to circumvent negativity by avoiding the news will also be less likely to pay attention to content of IE. Similarly, IE predominantly features news from traditional media (Goyanes & Demeter, 2020), which news avoiders frequently find unreliable.

As research on advertising shows, skipping content and withdrawing one's attention is an important strategy to avoid unwanted content when exposure is forced (Baek & Morimoto, 2012;

Cho & Cheon, 2004). Consequently, when intentional news avoiders experience IE, they might quickly scroll past the content without further engaging with it. While news avoiders might not be able to shut out IE from their social media entirely, for instance because close ties share it, they are more likely to engage in first-level IE and less likely to turn to second-level IE:

H2: Higher news avoidance (a) negatively affects second-level IE and (b) positively affects first-level IE.

#### Study 1

#### Method

Study 1 relies on a two-wave online panel survey conducted during the Viennese state election campaign. The study was approved by the Institutional Review Board of the Department of Communication at the University of Vienna. This sample is also used in a study about the effects of first- and second-level IE (Nanz & Matthes, 2022b). Based on a quota for gender, age, and education, respondents were recruited from a pool of registered online participants provided by Dynata. Only individuals eligible to vote in the Viennese state election were sampled. Data for W1 were collected between August 7 and August 24, 2020 (802 of 1465 respondents that started the questionnaire finished W1). W2 was administered between October 1 and October 10, 2020 (524 of 593 respondents that started the questionnaire finished W2). We excluded respondents taking less than 10 minutes for the 25-minute-long survey. The final sample (N = 524) has a mean age of M = 45.05 (SD = 12.97) years, 50.95% were female. The education quota was not fully met (36.07% less than high school diploma, 17.37% high school diploma, 46.56% more high school diploma). All independent and control variables were assessed in W1, if not noted otherwise.

#### Measures

**Dependent Variables**. First- and second-level IE were measured with three items each. We asked respondents to rate how often they experienced situations describing first-, respectively, second-level IE during the last two months in the Internet on a seven-point-scale ranging from "1 - never" to "7 - very often." Item wording, means, and standard deviations are presented in Table 1. Principal axis factoring (Kaiser-Guttman criterion for extraction, oblimin rotation) for the six items suggested two factors, first- and second-level IE. All factor loadings were above 0.70 (W2 = 0.77), and all cross-loadings were below 0.13 (W2 = 0.09). We constructed mean scales for first-level IE ( $M_{W1} = 4.14$ ,  $SD_{W1} = 1.54$ ,  $\alpha_{W1} = .83$ ;  $M_{W2} = 4.53$ ,  $SD_{W2} = 1.56$ ,  $\alpha_{W2} = .85$ ) and second-level IE ( $M_{W1} = 3.44$ ,  $SD_{W1} = 1.52$ ,  $\alpha_{W1} = .87$ ;  $M_{W2} = 3.25$ ,  $SD_{W2} = 1.50$ ,  $\alpha_{W2} = .87$ ).

*Independent Variables.* To assess political interest, we asked respondents how interested they are in "politics in general" and "the Viennese state election" on a seven-point-scale ranging from "1 - not at all interested" to "7 - very interested." The two items were averaged (M = 5.23, SD = 1.60, r = .70).

Our measure for news avoidance consisting of two items ("I purposefully avoid news about the Vienna election" and "I avoid dealing with news about the Vienna election") is based on previous research (Skovsgaard & Andersen, 2020). The items were assessed on a seven-point-scale ranging from "1 - I do not agree at all" to "7 - I fully agree" and averaged (M = 2.82, SD = 1.64, r = .74).

*Control Variables.* We control for age, gender, education, political ideology, and general social media use. Political ideology was assessed only in W2 by asking respondents to rate their political attitudes on a left-right scale ranging from "0 - left" to "10 - right" ( $M_{W2} = 4.50$ ,  $SD_{W2} =$ 

2.26). To measure general social media use, we asked respondents how much time they spend on social media (e.g., Facebook, Twitter, Instagram, YouTube) on a 7-point-scale from "1 - no time" to "7 - very much time" (M = 3.79, SD = 1.77).

#### Results

We ran two ordinary least squares (OLS) regressions that control for the dependent variable's score from W1 (i.e., autoregressive models) to test H1 and H2. Results are presented in Table 2. In H1, we argued that political interest should affect second-level IE positively (H1a) but first-level IE negatively (H1b). Indeed, political interest led to more second-level IE (b = 0.15, p < .001) but decreased first-level IE (b = -0.11, p = .025). H1 was supported. H2 expected that news avoidance should lead to less second- but more first-level IE over time. We found no significant effect of news avoidance on first- (b = 0.02, p = .689) or second-level IE (b = -0.05, p = .210). H2 was rejected.

#### Discussion

The findings of Study 1 offer some insights in the relationship between two trait-like variables, namely political interest and news avoidance, and the two levels of IE. First, we found a positive effect of political interest on second-level IE and a negative effect on first-level IE. This finding is very much in line with previous eye-tracking research (Bode et al., 2017). Given that previous research showed that second-level IE is the main driver of positive effects of IE on various political outcome variables (Nanz & Matthes, 2020, 2022a), these findings also elevate the concerns that primarily highly-interested segments profit from IE (Kümpel, 2020) because they are the ones who attend to and thoroughly process political IE content.

Second, in our two-wave panel survey, news avoidance did not affect first- or secondlevel IE. This is surprising because it suggests that even intentional news avoiders do not utilize

cues signaling that the content in front of them is of political nature (e.g., political words) to filter out political information from incidentally encountered content. Therefore, individuals that intentionally avoid political news can still be reached by IE to the same extent as individuals without such a predisposition are reached. Importantly, whether individuals scan and dismiss (i.e., first-level IE) or thoroughly process (i.e., second-level IE) incidentally encountered political information does not increase or decrease due to the level of intentional news avoidance. However, the study leaves a substantial question open. According to the PINE model, characteristics of the content individuals encounter incidentally is expected to influence the outcome of the relevance appraisal substantially. We will now attend to the role of message characteristics as antecedents of the relevance appraisal's outcome.

#### Message Characteristics and First- and Second-Level Incidental Exposure

Study 1 showed that a political predisposition such as political interest influences whether individuals attend to political content they encounter incidentally on the Internet. According to the PINE model, next to situational and individual factors, message factors play a crucial role for the relevance appraisal (Matthes et al., 2020). To reiterate, the PINE model assumes that individuals use a process called the relevance appraisal to determine whether the content they are momentarily exposed to is relevant for them. Sometimes this information is appraised as more relevant than their current goal, which subsequently can lead to second-level IE.

Previous research suggests that individuals turn to media to acquire information that has utility for their personal life (e.g., helps to solve a personal problem; Atkin, 1973; Knobloch-Westerwick, 2014). Given that this is a common goal of intentional media consumption, we assume that individuals will turn to media content which triggers such a goal (i.e., is considered to have utility) even in reception situation where they do not pursue a goal related to instrumental

utility. This also aligns with previous research on the PINE model. In a first experimental test of the PINE model, Nanz and Matthes (2020) matched individuals either with headlines mentioning places close to the respondent's place of living or with places that were far away from the respondent's place of living. They argued that geographical proximity of a news event is related to the perceived personal relevance. Their findings suggest that the geographic proximity increases the likelihood of clicking on as well as reading the news article thoroughly. Against this background, we hypothesize:

H3: Higher IE to content perceived as personally relevant (a) positively affects secondlevel IE and (b) negatively affects first-level IE.

The personal relevance of IE content is not the only content characteristic that influences the relevance appraisal's outcome. A notable share of news research is concerned with individuals' behavior upon encountering political information that is in line with (i.e., like-minded) or challenges individuals' opinions (i.e., cross-cutting). According to selective exposure theory, people tend to select information which confirms and avoid information that challenges pre-existing views. A meta-analysis finds support for this notion, even beyond the boundaries of political information consumption (Hart et al., 2009). From a normative perspective, avoiding cross-cutting and favoring like-minded political information can be problematic. For example, it may hinder citizens to consider other perspectives and lead to more fragmentation in a society (Garrett, 2009).

It should be noted that previous IE research highlighted that, even though most people may not deliberately seek for cross-cutting information, they may still encounter such information via IE (Weeks et al., 2017). While a few studies investigate the relationship between cross-cutting and like-minded information and political behaviors such as news sharing or

participation (e.g., Lu, 2019; Lu & Lee, 2019; Weeks et al., 2017), it remains unclear how individuals react to and process such IE content (for a notable exception, see Chen et al., 2022).

We argue that general tendencies of information selection described by selective exposure theory will also shape individuals' selection decisions and allocation of attention in situation when they experience IE. It has been argued that individuals aim to minimize cognitive dissonance that can occur from exposure to counter-attitudinal information by avoiding exposure or deeper engagement with such information (Festinger, 1957). Combining insights from the PINE model and selective exposure research suggests that individuals may not be inclined to thoroughly process cross-cutting IE. More likely, individuals will dismiss incidentally encountered information that seems to challenge prior views as not relevant during the scanning of the IE content. Thus, individuals that experience cross-cutting IE are more likely to remain in first-level IE and less likely to engage with the IE content (i.e., second-level IE).

In contrast, individuals that encounter information incidentally that is in line with their previous views might be more likely to appraise such information as relevant. Like-minded information can help individuals to reaffirm their views and supplies them with arguments against opposing views (Garrett, 2009). Thus, we assume that individuals that encounter more like-minded information incidentally will be more likely to attend to this content (i.e., second-level IE). Similarly, they will be less likely to briefly scan and then dismiss such content. In sum, we state the following hypotheses.

H4: Higher IE to like-minded content (a) positively affects second-level IE and (b) negatively affects first-level IE.

H5: Higher IE to cross-cutting content (a) negatively affects second-level IE and (b) positively affects first-level IE.

#### Study 2

#### Method

Study 2 utilizes a two-wave online panel survey during an off-election period in Germany. The study was approved by the Institutional Review Board of the Department of Communication at the University of Vienna. This survey is also featured in a paper about the effects of first- and second-level IE (Nanz & Matthes, 2022b). Based on age, gender, and education quotas for the population living in Germany between 18 and 65 years, respondents were recruited from an online panel provided by Dynata. Only social media users were sampled. W1 was conducted between February 20 and March 2, 2020 (2208 of 3199 respondents that started the questionnaire finished W1). W2 was fielded between September 24 and October 10, 2020 (905 of 1039 respondents that started the questionnaire finished W2). Eight cases were removed because we were not able to match the two waves or because of missings, leaving us with N = 897 cases. The sample has a mean age of M = 48.05 (SD = 11.30) years, 49.83% were female (15.27% only compulsory school, 15.94% finished higher education). All independent and control variables were assessed in W1.

#### Measures

*Dependent Variables.* We used eleven items to assess first- (6) and second-level IE (5). The items asked respondents to rate on a seven-point scale from "1 - never" to "7 - very often" how often they experienced first- and second-level IE on social media. Item wordings are presented in Table 1. One item for first-level IE was excluded due to mediocre loadings in the exploratory factor analysis (see also Nanz & Matthes, 2022b), leaving us with five items per level. Principal axis factoring (Kaiser-Guttman criterion for extraction, oblimin rotation) suggested two factors: first- and second-level IE. All factor loadings were above 0.71 (W2 =

0.72), and all cross-loadings were not larger than 0.20 (W2 = 0.21). We computed mean scales for first- ( $M_{W1} = 3.56$ ,  $SD_{W1} = 1.69$ ,  $\alpha_{W1} = .91$ ;  $M_{W2} = 3.71$ ,  $SD_{W2} = 1.69$ ,  $\alpha_{W2} = .92$ ) and secondlevel IE ( $M_{W1} = 3.05$ ,  $SD_{W1} = 1.71$ ,  $\alpha_{W1} = .89$ ;  $M_{W2} = 3.14$ ,  $SD_{W2} = 1.66$ ,  $\alpha_{W2} = .88$ ).

*Independent Variables.* Political interest was measured with two items. On a seven-point scale ranging from "1 - I do not agree at all" to "7 - I fully agree" respondents rated the following two statements: "I am very interested in current political events/proceedings" and "I follow information about German politics and the government very closely." The items were averaged (M = 4.71, SD = 1.68, r = .83).

News avoidance was assessed with three items (based on Skovsgaard & Andersen (2020): "I purposefully avoid political news," "I try to read or watch as little political news as possible," and "I avoid dealing with political news." Participants answered on a seven-point scale ranging from "1 - I do not agree at all" to "7 - I fully agree." We computed a mean scale (M = 2.79, SD = 1.66,  $\alpha = .90$ ).

We asked respondents how they perceived political content they encountered incidentally on social media on a seven-point scale ranging from "1 - I do not agree at all" to "7 - I fully agree." To assess *IE to personally relevant content*, we asked respondents to what degree the IE content they saw "… has affected [them] personally" and "… was relevant for [their] life." The responses were averaged (M = 2.76, SD = 1.62, r = .71). Similarly, we used two items to assess *cross-cutting IE* ("… have contradicted my political opinion" and "… were not consistent with my political views") and *like-minded IE* ("… have confirmed my own political opinion" and "… corresponded to my own political opinion"). We computed mean scales for cross-cutting IE (M =3.42, SD = 1.66, r = .70) and like-minded IE (M = 3.34, SD = 1.70, r = .82). *Control Variables.* We control for age, gender, education, political ideology, general social media use, social media network size, and trust in political information on social media. Political ideology was measured on an eleven-point scale ranging from "0 - left" to "10 - right" (M = 4.84, SD = 1.86). We asked respondents how much time they spend on Facebook (M = 3.43, SD = 2.03), YouTube (M = 3.62, SD = 1.84), Twitter (M = 1.79, SD = 1.53), and Instagram (M = 2.25, SD = 1.91) on a seven-point scale ranging from "1 - no time" to "7 - very much time." Social media network size was measured by asking respondents to estimate the number of "Friends" and contacts they have on social media sites such as Twitter, Facebook or Instagram (M = 247.76, SD = 1300.47). Trust in political information on social media was assessed by averaging two items (M = 2.94, SD = 1.52, r = .82): "The political information I receive on social media."

#### Results

We estimated two OLS regressions controlling for the dependent variable's score from W1. Results are presented in Table 3. Turning to H1, we found that political interest leads to more second-level IE (b = 0.09, p = .004) but does not affect first-level IE (b = 0, p = .919). H1a is supported while H1b is rejected. Similar to the findings from Study 1 for H2, we found that news avoidance neither affects first- (b = 0.04, p = .371) nor second-level IE (b = -0.02, p = .591). H2 was rejected.

H3, H4, and H5 were concerned with characteristics of the content individuals encounter incidentally and how these characteristics impact first- and second-level IE. We found that individuals who encounter IE content perceived as personally relevant are more likely to experience second-level IE (b = 0.09, p = .027) while it did not affect the level or first-level IE (b = -0.05, p = .305). H3a was supported. H3b was rejected. Turning to H4, the findings suggest

that cross-cutting IE content increases first- (b = 0.17, p < .001) but does not affect second-level IE (b = 0.02, p = .469). H4b was supported and H4a was rejected. Finally, we do not find any effect of IE to like-minded content on first- (b = -0.01, p = .815) or second-level IE (b = -0.02, p = .544). H5 was rejected.

#### Discussion

Study 2 offers additional insights into the antecedents of first- and second-level IE. But, at first, we noted support for most of the findings from Study 1. For the two trait-like predictors (i.e., political interest, news avoidance), we find similar but not identical patterns as in Study 1. Again, we do not find any effect of news avoidance on first- or second-level IE. Similar to Study 1, we also found that highly interested individuals are more prone to process incidentally encountered political information more thoroughly. However, in contrast to Study 1, political interest did not affect whether people scan political IE content and move on without further engagement with the content.

In Study 2, we also investigated how the characteristics of incidentally encountered political content affect whether people remain in first- or engage in second-level IE. Specifically, we considered perceived personal relevance and attitude-congruency as antecedents of the two levels of IE. In line with previous experimental research (Nanz & Matthes, 2020), individuals that encountered political information relevant for their personal life were more likely to attend to IE content (i.e., second-level IE). However, IE to personally relevant information did not influence first-level IE.

Furthermore, cross-cutting IE led to an increase of first-level IE: Thus, particularly individuals that experience IE encounters which are perceived as challenging prior views are more likely to move on after scanning information they encountered incidentally. Though, cross-

cutting IE does not reduce second-level IE and encountering like-minded information incidentally does not seem to affect any of the levels of IE.

#### **General Discussion**

A requirement for a well-functioning democracy is that citizens have, at least, a basic understanding of core themes prevalent in the political discourse. While a share of the audience is not interested in politics, scholars have expressed the hope that IE to political information can help to secure and maintain an informed public (Matthes et al., 2020). Despite the relevance of the notion of IE to the study of political news reception, hardly any research has looked at the drivers of IE. Thereby, it is particularly important to understand what predicts the two levels of IE, that is, the mere scanning of incidentally encountered information on the one hand (i.e., first level IE) and the deeper processing of incidentally encountered information appraised as relevant (i.e., second level IE) on the other. Across two panel studies, we found a positive effect of political interest on second-level IE. In other words, political interest as a general predisposition increases the likelihood that incidentally encountered information is regarded as relevant. In other words, the IE content matches with the information needs of the politically interested audience. This, in turn, implies that IE fosters rather than attenuates existing gaps between those interested in political information and those not. That is, those who are not interested in politics, are less likely to devote full attention to IE content, potentially widening already existing knowledge gaps. Moreover, in Study 1, we even observed a negative relationship between interest and first-level IE, which may further increase existing knowledge gaps. However, since this relationship was not found in Study 2, more empirical evidence is needed.

Interestingly, individuals that intentionally avoid the news do not significantly differ from the average social media user in their first- and second-level IE to political content across both

studies. Contrary to this finding, we would have expected that news avoiders withdraw from political content more strongly when they encounter it in their social media feeds, expressed in higher levels of first-level IE and lower levels of second-level IE. One potential reason behind this null-finding might be that either their own curation practices or news avoiders' networks filter out the specific types of content that trigger avoidance – such as negative content or overburdening content (Kalogeropoulos, 2017; Villi et al., 2021; but also see Edgerly, 2021), or content that is untrustworthy (Kalogeropoulos, 2017; Toff & Kalogeropoulos, 2020), or lacks personal relevance (Edgerly, 2021). Thus, the specific characteristics of news that cause news avoidance might not apply to political content on social media, which is likely more carefully pre-selected and align with individuals' content preferences.

Against the background of the potential benefits of second-level IE for an informed citizenry, this is an encouraging finding: News avoiders might still engage with political content online and therefore gain knowledge about politics; at the very least, their online practices do not further reduce the amount of political information they encounter as compared to the general population. Future studies could investigate differences in intentional and unintentional news avoidance more closely by studying potential differences in their curation practices, their networks, or in the algorithmic selection of content that they encounter.

Turning now to the role content characteristics play for predicting first- and second-level IE, we first found support for previous research (see e.g., Nanz & Matthes, 2020): Encountering personally relevant information incidentally leads to more second-level IE. However, for most political news it may often not be immediately evident how the information relates to one's individual life. For example, news about new unemployment measures might not be perceived as personally relevant if the individuals and their social circle have an employment. Contrary to

expectations, we did not find that individuals that hardly experience IE to personally relevant information are more likely to skip IE content. Thus, IE content's personal relevance may lead individuals to engage with it but does not automatically cause them to scan and dismiss the information at hand.

Additionally, we investigated whether the perceived political congruence between the IE content and recipients' political attitudes matters for first- and second-level IE. In Study 2, we found that IE to cross-cutting information leads to an increase in first-level IE but does not affect second-level IE. Furthermore, IE to likeminded information did not affect the two levels. The non-significant relationships for likeminded IE and the two levels of IE are somewhat surprising, given that previous research suggests that individuals have a tendency of approaching and engaging with likeminded information (e.g., Garrett, 2009). Future experimental research using cue words that signal the partisan slant of the IE content (see e.g., Lu & Lee, 2019) could investigate the mechanisms underlying this surprising finding.

From a normative perspective, it is concerning that cross-cutting IE fosters first-level IE. Thereby, individuals perhaps do not further entertain political thoughts that challenge their attitudes and political identity. However, this is a requirement for a well-functioning political discourse, according to theories of deliberative democracy (see e.g., Dahlgren, 2005). Furthermore, the positive effect of cross-cutting IE on first-level IE is concerning given that previous research found that cross-cutting IE prompts citizens with strong party affiliation to seek out more likeminded content, which, in turn, further diminishes the opportunity of engaging with information contesting one's own attitudes (Weeks et al., 2017). Future research must investigate whether first-level IE in response to cross-cutting information can foster similar patterns.

This study is not without limitations. First, we rely on self-report data for this study. Thus, for example, limited recall ability, socially desirable answer patters or false recall are wellknown limitations of survey data. Second, the PINE model conceptualizes IE as a dynamic phenomenon. Thereby, individuals may switch between first- and second-level IE multiple times during one media usage situation. Retrospective survey measures somewhat limit the possibility to model such a diachronic perspective. Thus, future experimental research should aim to replicate our findings. Third, this study focusses on a limited set of factors that are expected to affect the relevance appraisal. However, boundary conditions (e.g., network characteristics), situational factors (e.g., time-constraints in IE situations) or other content characteristics (e.g., source cues, negativity) may also be crucial predictors for first- and second-level IE.

Notwithstanding these limitations, this study contributes to the growing body of literature on IE and more specifically sheds light on predictors of IE in manifold ways. Given that the evidence on antecedents of IE is limited and mostly based on cross-sectional surveys, the present study with its two-wave panel design adds to the methodological variety of existing studies by studying relationships over time. Our findings also raise interesting questions for future research. Next to individual influences, such as political interest, which we found to affect second-level IE, future studies should closely investigate structural factors, specific social network infrastructures that individuals are part of as well as algorithmic curation. Social media is a multifaceted environment whereby individuals may encounter political information differently depending on the technological affordances and the purpose that specific platforms are used for. We also showed that the personal relevance and cross-cutting nature of IE content affect the two levels of IE differently. The study thus further contributes to our conceptual understanding of IE

as a construct by distinguishing between first- and second-level IE as well as provides important insights on the drivers of these two levels.

#### Conclusion

Individuals may incidentally encounter news on social media. Considering that IE to political content can have positive political outcomes, it is crucial to understand based on which political predispositions and content related characteristics individuals engage in thorough processing of encountered information (second-level IE) or simply scan this content (first-level IE). The findings of two panel surveys showed that political interest leads to an increase in second-level IE over time, but intentional political news avoidance does not affect second- or first-level IE. The findings of Study 2 revealed that when IE content is deemed to be of personal relevance, it increases second-level IE over time. Individuals' IE to cross-cutting information increases first-level IE over time. These findings are relevant for scholars and journalists alike. Since we found that political interest is a predictor of second-level IE, this raises questions on how to draw the attention of less interested citizens to political content. Our findings, however, further indicate that not only political predispositions, but the specific characteristics of IE content play a role in whether individuals thoroughly process political information or scan and skip this information. Scholars should strive to better understand various characteristics of the relevance appraisal as these can affect the two levels of IE differently.

#### **Disclosure Statement**

The authors report there are no competing interests to declare.

#### **Data Availability Statement**

The data are available on OSF, see

https://osf.io/b5ze4/?view\_only=59f7f182640c44238b45c41d6e6abf56.

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# Table 1

Descriptives and Wording for Items measuring First- and Second-Level IE.

			Stu	dy 1			Stuc	dy 2	
		M	-	M	2	W	1	M	2
	•	Mean	SD	Mean	SD	Mean	SD	Mean	SD
First-Level IE	I incidentally saw political information on social media that					3.46	1.91	3.61	1.89
First-Level IF.	I did not really look at. I stumbled unon nolitical content on social media					3.43	1.88	3.60	1.89
	incidentally but did not really engage with it.					2			
First-Level IE	When I was shown political posts but wanted to see	4.16	1.81	4.58	1.77	3.68	2.02	3.89	2.00
	something different I kept on scrolling.								
First-Level IE	I skipped the political content that I came across	4.19	1.75	4.60	1.77	3.55	1.96	3.73	1.92
	incidentally [on social media].								
First-Level IE	I saw political posts [on social media] which I ignored.	4.06	1.78	4.41	1.80	3.51	1.96	3.59	1.90
First-Level IE	I kept on scrolling when I saw political posts incidentally					3.64	1.99	3.76	1.93
	on social media.								
Second-Level IE	I found political content on social media which I dedicated					3.10	1.86	3.23	1.83
	attention to - even though I did not search for it initially.								
Second-Level IE	Political content was incidentally shown to me on social	3.47	1.72	3.33	1.70	3.03	1.83	3.14	1.77
	media and I took a closer look.								
Second-Level IE	I stumbled upon political information [on social media] that	3.52	1.69	3.32	1.69	3.03	1.86	3.07	1.75
	caught my attention.								
Second-Level IE	After I saw political content incidentally on social media, I					3.10	1.82	3.17	1.77
	took a closer look.								
Second-Level IE	I looked attentively at political posts, which were shown	3.33	1.71	3.11	1.65	2.98	1.77	3.08	1.77
	incidentally to me [on social media].								
Note. $IE =$	Incidental exposure. <sup>1</sup> This item was excluded in the analyses fe	or Study	2.						

analyses for Study 2. Ξ sure. odva Incine

## Table 2

	First-Level IE	Second-Level IE
Intercept	3.86 (0.53)***	1.23 (0.47)**
First-level IE	0.32 (0.04)***	-0.06 (0.04)
Second-level IE	-0.12 (0.04)**	$0.38 (0.04)^{***}$
Political interest	-0.11 (0.05)*	$0.15 (0.05)^{***}$
News avoidance	0.02 (0.05)	-0.05 (0.04)
Age	-0.00 (0.01)	0.00 (0.01)
Gender (Ref. = female)	0.12 (0.13)	-0.06 (0.12)
Intermediate education (Ref. = low education)	0.14 (0.19)	0.07 (0.17)
High education (Ref. = low education)	$0.33 (0.15)^{*}$	-0.30 (0.14)*
Political ideology (W2)	-0.01 (0.03)	0.01 (0.03)
General social media use	0.04 (0.04)	$0.09~{(0.04)}^{*}$
$\mathbb{R}^2$	0.18	0.27
Adj. R <sup>2</sup>	0.16	0.26
Num. obs.	524	524

*Note.* Ordinary Least Squares regression, standard errors in parentheses, IE = Incidental exposure, all predictor variables were assessed in W1 if not indicated otherwise, \*\*\* p < 0.001; \*\* p < 0.01; \* p < 0.05

## Table 3

## OLS Regression Results from Study 2

	First-Level IE	Second-Level IE
Intercept	1.82 (0.41)***	$0.75 (0.31)^{*}$
First-level IE	0.32 (0.04)***	0.01 (0.03)
Second-level IE	-0.02 (0.05)	$0.45 (0.04)^{***}$
Political interest	0.00 (0.04)	0.09 (0.03)**
News avoidance	0.04 (0.04)	-0.02 (0.03)
IE to personally relevant content	-0.05 (0.05)	$0.09~(0.04)^{*}$
IE to like-minded content	-0.01 (0.05)	-0.02 (0.04)
IE to cross-cutting content	0.17 (0.04)***	0.02 (0.03)
Age	-0.01 (0.01)	-0.01 (0.00)*
Gender (Ref. = female)	0.04 (0.11)	0.03 (0.08)
Intermediate education (Ref. = low education)	0.07 (0.14)	-0.13 (0.11)
High education (Ref. = low education)	0.14 (0.19)	-0.00 (0.14)
Political ideology	0.03 (0.03)	0.00 (0.02)
General Facebook use	0.10 (0.03)***	0.11 (0.02)***
General YouTube use	-0.03 (0.03)	0.05 (0.02)
General Twitter use	0.02 (0.04)	0.04 (0.03)
General Instagram use	0.01 (0.04)	-0.03 (0.03)
Social media network size	0.00 (0.00)	0.00 (0.00)
Trust in political information on social media	0.04 (0.04)	0.11 (0.03)***
$\mathbb{R}^2$	0.25	0.55
Adj. R <sup>2</sup>	0.23	0.54
Num. obs.	897	897

*Note.* Ordinary Least Squares regression, standard errors in parentheses, IE = Incidental exposure, all predictor variables were assessed in W1, \*\*\* p < 0.001; \*\* p < 0.01; \* p < 0.05

## 9 Study V: Nanz & Matthes (submitted)

Nanz, A., & Matthes, J. (submitted). Let me entertain you: Distracted from political learning due to incidental exposure to entertainment content.

## Let me Entertain You: Distracted from Political Learning due to Incidental Exposure to Entertainment Content

#### Abstract

Incidental exposure has become a central concept in political communication research. Scholars have argued that – due to the mixing of political information with non-political information – individuals may learn about politics even without intending to do so. However, scholars solely focused on political information and ignored that individuals can also encounter non-political information incidentally. Incidental exposure to non-political content (IENP) may distract from political information. We distinguish between first- (scanning incidentally encountered content) and second-level IENP (effortful processing of incidentally encountered content). In an online experiment, respondents (N = 329) were instructed to intentionally learn about political news. We manipulated high (second-level IENP) vs. low (first-level IENP) relevance of incidentally encountered non-political information. The control group experienced no IENP. Findings suggest that (a) first-level IENP reduces selection of and time spent with political news, and (b) second-level IENP deteriorates political learning when individuals attend to the non-political content. Implications are discussed.

Keywords: incidental exposure, political knowledge, attention, learning, online news

In today's new media environment, individuals rarely encounter situations in which they see one single message without being exposed to another content simultaneously. Social media platforms display social updates from social contacts right next to political opinions. Also, portal sites and landing pages of service providers (e.g., e-mail services) present visitors a selection of breaking political news alongside lightweight entertainment stories (Kobayashi et al., 2020). Political communication scholars have pointed out that the increased blending of non-political information and political information could have positive effects on democratic outcomes (e.g., Baum, 2006; Dahlgren, 2009; Kim et al., 2013). Specifically, it has been argued that individuals looking for non-political content (e.g., entertainment) may stumble upon political information and thus learn about politics or are more motivated to engage in or discuss about politics (e.g., Kim et al., 2013; Tewksbury et al., 2001). This phenomenon has been described as incidental exposure (e.g., Matthes et al., 2020). Sometimes individuals will scroll past or briefly glance at political information they encountered incidentally. On other occasions, individuals may regard incidentally encountered content as relevant and attend to it - even though they initially did not intend to consume such information.

Research on incidental exposure underlines the potential benefits of the diffusion of nonpolitical and political content on the Internet, and therefore examines democratically relevant outcomes, such as political knowledge, participation, or subsequent intentional political news use (e.g., Kümpel, 2020; S. Lee et al., 2022; Matthes et al., 2020; Tewksbury et al., 2001). However, from a theoretical perspective, the phenomenon of incidental exposure cannot only occur in situations in which individuals stumble upon political information while they were looking for non-political content on social media (i.e., relationship-oriented content, sports, movies, celebrities). Particularly in online contexts, incidental exposure also refers to situations in which individuals process political news, but then incidentally see non-political content. Surprisingly,

however, hardly any research considers that the presence of non-political right next to political information may distract individuals from consuming and learning political information. Yet given that today's new media are frequently and intentionally used to receive information about politics, scholarship has to acknowledge that non-political information may divert attention away from political information and thus may also hinder learning. Particularly non-political information for the non-political information.

To tackle this research gap, we conducted an online experiment in which we investigate whether non-political information can distract individuals when their goal is to learn about political information. Building on the Political Incidental News Exposure model (PINE; Matthes et al., 2020), we distinguish between two levels of incidental exposure to non-political information (IENP): *First-level IENP* is the brief scanning of non-political information while looking for political information. That is, individuals may only process the non-political information in passing. By contrast, *second-level IENP* describes situations in which individuals choose to process non-political information thoroughly even though they were looking for political information in the first place. In this case, individuals direct their attention away from the political to the non-political content. Overall, our study demonstrates that learning of political information they appraised as relevant.

#### **Entertainment as a Potential Distraction**

In recent decades, political communication scholars have become increasingly interested in reception settings where political and non-political information mix. Some have focused on television programming and the circumstance that entertainment-oriented programming has "piggybacked" political information from which individuals may learn (Baum, 2006). More

recently, the Internet, and particularly social media, have become the center of attention (e.g., S. Lee & Xenos, 2019). Particularly the personalization and algorithmic curation in today's Internet have fueled this discussion. While some scholars voiced more optimistic perspectives whether such mixing of non-political with political information can help to improve the electorate's political knowledge and engagement (e.g., Baum, 2006; Kim et al., 2013), others were more critical in their assessment and expected a more nuanced impact (e.g., only highly interested individuals profit; see Kümpel, 2020; Prior, 2007; Thorson et al., 2021). Despite these diverging assessments, most previous research is mainly concerned with political information in spaces which individuals use for non-political motivations. This firm focus on the political content may unintentionally mask some of the more nuanced and unanticipated consequences of new media environments.

Notably, today, individuals use media that feature a manifold mix of non-political and political content to stay informed or learn about politics. A few decades ago, interested citizens might have primarily turned to print newspaper or TV news to learn about the political world. Today, substantial share of the population uses new media to learn about politics or stay informed. A Pew poll (2021) reports that 86% of Americans get news from a digital device such as a computer, smartphone or tablet. Furthermore, more than half reports that they often or sometimes receive news via social media. However, hardly any research considered the potential impact of exposure to non-political information while individuals *want* to consume political information. Despite this blind spot in the current literature, it is likely that individuals looking for updates on political events on social media platforms such as Twitter are exposed to non-political updates by social contacts. Similarly, users of portal websites may get non-political entertainment stories recommended while they read about national politics. In short, individuals are constantly confronted with a mix of non-political and political information on the Internet, but

previous research is mainly concerned with the political content while neglecting effects stemming from non-political content. There are a few exceptions. A few studies scrutinize how (non-political) humor can foster reflection, information seeking, or elaboration in some contexts (e.g., Bartsch & Schneider, 2014; Heiss & Matthes, 2021). Others investigated how advertising banners can affect the reception of online news articles (Wojdynski & Bang, 2016). However, to our knowledge, no one has investigated how the presence – and particularly, the relevance – of non-political content can affect active political learning.

#### The Political Incidental News Exposure (PINE) Model

For this study, we build upon the Political Incidental News Exposure model (PINE; Matthes et al., 2020). Similar to previous research on incidental exposure, the PINE model is mainly concerned with the potentially positives effects of stumbling upon political information while pursuing a goal unrelated to the incidental exposure content (e.g., looking for entertainment). However, the model also acknowledges the possibility that individuals encounter non-political content while they are looking for political information – a situation which the model calls "incidental exposure to non-political information" (Matthes et al., 2020, p. 1038). Before deriving the hypotheses from the PINE model, we will briefly summarize some of the PINE model's core assumptions.

First, the PINE model assumes that individuals have a political or a non-political processing goal during a reception situation. With the term processing goal, the PINE model "refer[s] to the purpose of an individual to cognitively engage with content" (Nanz & Matthes, 2020, p. 772). Sometimes individuals may pursue multiple goals at the same time. The processing goal refers to the most dominant goal at a given point in time (i.e., the one an individual will choose to pursue if forced to decide). Additionally, the processing goal is considered to be dynamic, so that, "individuals can switch their processing goals from non-political to political,

and vice versa" (Matthes et al., 2020, p. 1036). Individuals may switch processing goals multiple times in a given reception setting (e.g., a browsing session).

Second, according to the PINE model, individuals continuously engage in a process which is called the relevance appraisal. Thereby, every time individuals are confronted with a piece of information, they quickly scan the content in front of them to determine whether it is relevant (Knoll et al., 2020).

Third, the PINE model distinguishes between two levels of incidental exposure (Matthes et al., 2020). Building upon Nanz and Matthes (2020), we distinguish between *first-level IENP* which is the brief "scanning of incidentally encountered" (p. 770) non-political information while individuals were looking for political information (i.e., pursued a political processing goal) and *second-level IENP*, which is the "effortful processing of incidentally encountered" (p. 770) non-political information while individuals were looking for political second se

## Exposure to Political Processing Goal Content and Potentially Distracting

#### **Entertainment Content**

In today's Internet, users are often confronted with a large set of very diverse content from which they can choose. Sometimes the news article or social media post presented to them at the very top of the website may not be about something they are willing to dwell on at a given moment in time. In other words, individuals will occasionally – if not frequently – stumble upon content unrelated to their processing goal. Situations in which individuals pursue a political goal (e.g., inform themselves about an upcoming election) and stumble upon non-political content are instances of IENP.

According to the PINE model (2020), individuals, nonetheless, have to scan such content briefly to determine whether it is relevant or not. Individuals may use cue words or other heuristics to identify information (not) relevant to them (Marewski et al., 2009). Eye-tracking studies in new media environments such as social media suggest that users eyeball core features of a post before they move on (e.g., Bode et al., 2017; Vergara et al., 2021). The process of skimming an incidentally encountered non-political headline or scanning an accompanying picture – which we call first-level IENP – requires a certain amount of attention. Previous research on incidental exposure to political information showed that individuals can recognize information they briefly saw to some extent (J. K. Lee & Kim, 2017; Nanz & Matthes, 2020) which suggests that some of the scanned information is stored in memory. Given that cognitive resources are limited (Lang, 2000), individuals might not be able to use resources occupied with the relevance appraisal to pursue the political processing goal. In turn, this could make it more probable that individuals miss cues indicating that a certain headline or post is in line with their political processing goal (e.g., collecting information about the upcoming election). Thus, individuals that experience first-level IENP while looking for political content may, in the end, have less exposure to political content than individuals that are exposed only to political information in line with their processing goal (i.e., experiencing no IENP).

On the other hand, unambiguous cues in the headline that immediately indicate what to expect from an article may enable individuals to use heuristics for the relevance appraisal so effectively that pursuing the political processing goal is not affected by the set of articles they can chose from. Particularly, for news headlines this is not unlikely given that journalists are taught to feature the most important aspects of a story in the headline. Previous research suggests that individuals are capable of using cues rather efficiently. For example, Bode et al. (2017) conducted an eye-tracking study with social media posts of which some featured political words.

Particularly less interested participants spent less time with a post if the first political word (i.e., a cue) occurred earlier than if the political word came later in the post. Interestingly, the number of political words in the post did not affect the time spent with the post. The authors concluded that "people are relatively effective at identifying a political post by its first political cue" (Bode et al., 2017, p. 4). Given the conflicting previous evidence, we state the following research question.

*RQ1*: Compared to no IENP, does first-level IENP affect (*a*) the number of clicks on and (*b*) the time spent with articles related to the initial political processing goal?

We expect that it should be more difficult to pursue the initial political processing goal if respondents are exposed to and engage with relevant non-political information (i.e., second-level IENP). In other words, not only the mere presence of non-political choices but also their relevance could affect exposure to political content.

Individuals may feel a duty to stay informed (e.g., McCombs & Poindexter, 1983), have the goal to cast a "correct" vote in an upcoming election (e.g., Lau & Redlawsk, 1997), or be asked by researchers to learn about politics (e.g., in our experiment). If placed in an environment that – as many new media platforms do – features political content next to non-political content, individuals have to weight between options. The cost of not attending to other options enters the equation of each selection decision (Kurzban et al., 2013). In case, the non-political information is perceived as more relevant than seeking political information, individuals will end their search for or consumption of political information.

We will now render this observation in the terminology of the PINE model. Keep in mind that, according to the PINE model, individuals may switch their processing goal during a reception situation. When individuals scan incidentally encountered information that they perceive as more important than their current processing goal, a switch of the processing goal is likely to occur (Nanz & Matthes, 2020). For example, while individuals look for political
information, long-awaited pictures of a close friend's wedding may incidentally appear on one's social media. Subsequently, individuals will pursue a non-political processing goal (e.g., feel the need to click through the friend's photo album). Thereby, they shift their attention toward the non-political content. Individuals will then spend time with or click on the non-political information they want to read and process this information more thoroughly (i.e., second-level IENP). Clearly, this can reduce exposure to content related to the initial political processing goal, given that they spend their time with non-political information instead of political information.

To reiterate, after a positive relevance appraisal, individuals may attend to the nonpolitical content (second-level IENP) if such content is appraised as more relevant than the political processing goal. This can decrease exposure to political content dramatically. Based on this reasoning, we state the following hypothesis:

*H1:* Compared to first-level IENP, second-level IENP will decrease (a) the number of clicks on and (b) the time spent with articles related to the initial political processing goal.

From the perspective of political communication research, exposure to political information is a key variable due to being an antecedent of a lot of democratically relevant outcomes. However, as the PINE model argues (Matthes et al., 2020), we also have to turn our attention to exposure to non-political information to fully understand the implications interactive new media environments can have on political outcomes.

As mentioned above, stumbling upon non-political information appraised as relevant can lead to a switch of processing goal. For example, individuals may go online to inform themselves about on-going political discussions but incidentally encounter social updates by friends or entertainment content that captures their attention. In such instances of second-level IENP, individuals attend to the non-political information. In the online world, this can mean that individuals spend time with the content, read it thoroughly, or click on a link that brings them to

even more information. In general, previous research suggests that a variety of factors related to the relevance appraisal such as perceived utility (e.g., Knobloch-Westerwick, 2015) or credibility (e.g., Kaiser et al., 2021) can affect the likelihood of content selection. In an experimental study, Nanz and Matthes (2020) found that people click on incidentally encountered political information more often if it is appraised as relevant. We expect the same effect for non-political information. It follows:

H2: Compared to first-level IENP, second-level IENP will increase (a) the number of clicks on and (b) the time spent with incidentally encountered non-political articles.

## Learning of Political Processing Goal Content

The PINE model (Matthes et al., 2020) argues that IENP can have negative effects on political learning. Specifically, when individuals use media environments that present political and non-political content next to each other, IENP is likely to happen and, thus, individuals may get distracted while getting political updates.

We discussed the possibility that identifying content related to their processing goal requires more cognitive resources if individuals are confronted with a set of choices that includes content unrelated to the processing goal. In case, the relevance appraisal consumes a substantial share of cognitive resources, we expect that individuals have less resources freely available to direct them at their political processing goal (Lang, 2000). In other words, having to skim through non-political content might make it more difficult to gain knowledge from the political information in between. Thus, due to first-level IENP, individuals may learn less about the political topics they wanted to learn about. On the other hand, if the media content features clear cues (e.g., headlines that leave no doubt about the article's content), the relevance appraisal can sort out non-political content in a frugal and effective manner. In this case, the presence of non-political content may not affect knowledge gains.

We will now briefly turn to the question of assessing knowledge related to political news articles. Building upon previous research (e.g., Eveland & Dunwoody, 2001; Lang, 2000; Nanz & Matthes, 2020), we consider three learning outcomes: headline recognition, content recognition, and recall of details. Distinguishing between these three outcomes is important for two reasons. First, in online media, individuals may receive a lot of opportunities to expose themselves to further content (e.g., click a link, start a video) but do not always seize these opportunities. Even without clicking on content, individual could learn from skimming headlines (Fletcher & Nielsen, 2018). Second, Lang (2000) argued that recall and recognition can be indicative for related but different aspects of information processing. While recognition is mainly seen as a measure of encoding of information, asking individuals to recall details of a story taps whether individuals are able to retrieve information and whether information was stored thoroughly (see also Eveland & Dunwoody, 2001). Thus, we state the following research question for three learning outcomes:

RQ2: Compared to no IENP, does first-level IENP affect scores on (a) headline recognition, (b) content recognition, and (c) recall of details related to the initial political processing goal?

We argued that individuals which appraise incidentally encountered non-political information as relevant will get distracted from their initial political processing goal. To reiterate, individuals confronted with non-political content may appraise such content as relevant. A positive relevance appraisal makes a switch of processing goals likely. Individuals will then pursue a non-political processing goal by focusing on the non-political content (second-level IENP). Given that such a switch of processing goals may happen immediately after scanning the incidentally encountered information, they will attend to less political information related to their initial political processing goal. Consequently, appraising non-political content as relevant should

deteriorate learning outcomes related to the initial political processing goal. Thus, we state the following hypothesis.

H3: Compared to first-level IENP, second-level IENP will decrease scores on (a) headline recognition, (b) content recognition, and (c) recall of details related to the initial political processing goal.

#### **Exposure to Non-Political Content as Mediator**

At this point, we want to come to the potential impact of exposure to non-political information on political knowledge acquisition. In H3, we expect that the presence of highly relevant non-political content distracts from learning political information. This effect should become even more pronounced, the more individuals are exposed to non-political content they appraised as relevant. This is because appraising content as relevant will lead to more second-level IENP.

According to the PINE model (Matthes et al., 2020), in case of second-level IENP individuals redirect their attention toward the incidental encountered non-political content. Subsequently, individuals will attend to this information – for example by clicking on a link, watching a video, dwelling on a post, or thoroughly reading an article. Given that individuals are now motivated to process the non-political information they face (i.e., they now pursue a non-political processing goal), they will not only try to encode this information but will also try to store this information more thoroughly in their memory because they may anticipate the need for retrieval at a later point in time (Lang, 2000). Engaging in this subprocess of information processing is expected to occupy even more cognitive resources than the rather superficial scanning of information during first-level IENP which mainly requires encoding of information. With increased selection of and duration of exposure to non-political information, individuals are likely to process non-political content more intensively which occupies resources. In line with

this, previous research suggests that exposure to incidental exposure content can reduce learning related to the initial processing goal (Nanz & Matthes, 2020).

*H4: The effects proposed in H3 are mediated through (a) the number of clicks on and (b) the time spent with incidentally encountered non-political articles.* 

## Method

#### **Design and Sample**

We conducted an online experiment with three groups: (a) one group (control) was not shown any non-political content (no IENP), (b) the low relevance group was shown non-political content that was not relevant for them (first-level IENP), and (c) the high relevance group saw non-political content that was relevant for them (second-level IENP). Below, we outline the procedure and manipulations. This study was approved by the Institutional Review Board at [BLINDED] on September 15, 2020. We recruited 369 respondents from a German online panel provided by Dynata based on representative quotas for age, education, and gender. The experiment was fielded in October 2020. We excluded 40 cases due to problems with JavaScript, because the reported zip code did not match with the reported state or a response time exceeding 30 minutes, leaving us with 329 cases.<sup>i</sup> The sample consisted of 48% male respondents and was on average M = 42.91 years old (SD = 13.08). The education quota was not fully met (12.16% low, 59.88% middle, 27.96% high formal education).

## Manipulation, Procedure, and Stimulus Material

We showed two webpages in random order to each participant (screenshots available in Online Appendix B; see Nanz & Matthes, 2020 for a similar procedure). Respondents were informed that they can click on headlines to read the full articles and that they have to stay at least 105 seconds on the webpage.<sup>ii</sup> It was not possible to read multiple articles at the same time. Prior to seeing the first webpage, individuals were instructed to dedicate their attention to a

specific political topic (i.e., a processing goal). Participants were informed that they will take part in a quiz about this topic at the end of the survey. For one webpage, respondents were asked to inform themselves about current debates surrounding the electoral franchise. For the other webpage, participants were instructed to dedicate their attention to the Mediterranean conflict between Turkey and Greece.<sup>iii</sup> In between the two webpages, individuals were instructed regarding the respective processing goal. After these instructions, the control group (i.e., no IENP) saw a webpage with four political articles, all related to the processing goal. Participants in the two other groups (i.e., low relevance group and high relevance group) were shown eight articles per webpage. Four articles concerned the political topic and four articles were nonpolitical articles with entertainment topics. The order of articles was fully randomized on each webpage. The political articles were based on actual news articles, of similar length, and identical across all conditions (M = 156.12 words, SD = 8.74). We made sure that each headline clearly signaled the topic of the article (see Online Appendix A). After seeing both webpages, respondents received the manipulation check questions and the knowledge questions. At the end of the experiment, participants were thoroughly debriefed.

The non-political articles and their headlines (only shown to the low and high relevance group) were fabricated for this study. At the very beginning of the survey, respondents were asked for their zip code. Based on the zip code, we matched cities and places close to, respectively far away from, the respondent's place of living (see Nanz & Matthes, 2020 for this procedure; but see also Knobloch-Westerwick et al., 2005). The four non-political articles for the high relevance group featured places close to the respondent's zip code. Participants in the low relevance group saw articles mentioning places far away from their place of living. Importantly, all headlines featured the place. Articles were of similar length (M = 149.88 words, SD = 3.64). Respondents in the high relevance group living in very large cities like Berlin saw their own city.

The non-political articles were identical in both conditions except for the place. The non-political headlines featured celebrities, TV shows, and other popular culture related themes (e.g., "Honey from [PLACE]: Brad Pitt orders his honey from the region"; "Real Picasso soon to be seen in [PLACE]"). All headlines are listed in Online Appendix A.

#### Measures

## Number of Political Articles Clicked

We used JavaScript code to detect whether participants clicked on the political articles related to the political processing goal. Respondents clicked on M = 5.16 (SD = 2.81) of the eight political articles.

### Time Spent on Political Articles

Additionally, we tracked the time individuals spent with each political article in seconds. We summed the time for all eight political articles related to the political processing goal (M = 182.57, SD = 151.84).

## Number of Non-political Articles Clicked

We also measured how many of the eight non-political articles each participant clicked on

(M = 2.20, SD = 2.58). Given that only participants in the low and high relevance group saw

these articles, we have this measure only for these two groups but not for the control group.

### Time Spent on Non-political Articles

The time spent with the non-political articles was also assessed in seconds (M = 48.08, SD

= 80.62). This measure is only available for the low and high relevance group.

### Headline Recognition

For every political article, we asked participants to identify the headline they saw on the webpages. Four similar headlines and a "do not know"-option were provided as answer

# categories. We summed the correct responses (M = 3.11, SD = 2.27).

## **Content Recognition**

For a list with 16 statements, respondents were asked to tick whether the statement is true or false according to the political articles about the political processing goal. We used two statements per political article (one correct, one incorrect). The facts in the statements referred to information mentioned in the article but not in the headline (e.g., "The Greek Navy has about 21,000 soldiers plus about 6,000 reservists"). Correct answers were summed (M = 4.59, SD = 3.63).

## **Recall of Details**

We used eight open questions to assess recall of details for the political articles. Each question referred to a detail mentioned in the article but not in the headline ("According to the article, what is the reason that the CDU/CSU and SPD have now put together a reform after a long stalemate?"). The first author and a student assistant coded all responses (Krippendorff's  $\alpha$  = .88, N = 1218). We summed the correct responses across all eight articles (M = 0.76, SD = 1.26). We did not assess any knowledge outcomes for the non-political articles.

## **Manipulation Checks**

We asked respondents in the low and the high relevance groups to rate the distance to each of the places mentioned in the stimuli articles on a scale from "far away" (1) to "very close" (7) (M = 3.78, SD = 2.50). Respondents reporting that they did not know a certain place were recoded as 1. Additionally, we asked to what extent respondents agree with the following statement: "The cities and towns mentioned in the headlines of some articles are close to where I live" (M = 3.50, SD = 2.26).

Furthermore, we asked respondents in the two relevance groups what they focused on while they were exposed to the webpages. We assessed their agreement with the following two statements on a seven-point scale from "1 - completely disagree" to "7 - completely agree": (a)

"My attention was with the non-political articles," and (b) "I spent some time reading non-political content." The items were averaged (M = 3.16, SD = 1.72, Pearson's r = .85).

#### Results

We start with the manipulation checks. Individuals in the low relevance group (M = 1.57, SD = 1.30) rated the places mentioned in the articles as further away than individuals in the high relevance group (M = 5.95, SD = 1.09, t(212) = -27.14 (Welch-Satterthwaite), p < .001). The high relevance group (M = 5.43, SD = 1.79) also agreed more with the statement that "cities and towns mentioned in the headlines of some articles are close to where I live" than the low relevance group (M = 2.55, SD = 1.81, t(220) = -11.95 (Welch-Satterthwaite), p < .001). As a third manipulation check, we asked individuals whether their attention was directed at the non-political articles with two items. The high relevance group (M = 3.38, SD = 1.89) reported that they attended to the non-political articles more than the low relevance group (M = 2.75, SD = 1.70, t(218) = -2.64 (Welch-Satterthwaite), p = .009).

In RQ1, we asked whether exposure to political articles differs between the low relevance and the control condition (i.e., no IENP). To test this, we estimated two OLS regressions in which we regressed the two variables measuring exposure to political articles - number of clicks and time spent with - on the group variable. To correct for multiple comparisons, we report Tukey adjusted p-values. The control group clicked on more political articles (M = 6.02, SD = 2.49) and spend more time with them (M = 236.92, SD = 166.83) than the low relevance group (clicks: M =4.77, SD = 2.92, t(326) = 3.34, p = .003; time: M = 166.58, SD = 136.50, t(326) = 3.52, p = .001). Regarding RQ1, our results suggest that adding articles unrelated to the processing goal that are not appraised as relevant to the choice set leads to less exposure to processing goal content. In short, even irrelevant non-political articles can distract individuals from political information they are looking for.

H1 expected that the high relevance condition will click less often and spend less time with political articles than the low relevance condition. The number of clicks (M = 4.71, SD = 2.82) and the time spent with political articles (M = 146.36, SD = 137.21) in the high relevance group did not differ from the low relevance group (clicks: t(326) = 0.18, p = .982, time: t(326) = 1.02, p = .563). H1 was rejected. Additionally, we investigated whether the high relevance group differs from the control group: Indeed, the high relevance group clicked on less and spent less time with processing goal articles than the control condition (clicks: t(326) = 3.53, p = .001, time: t(326) = 4.55, p < .001).

In H2, we argued that individuals in the high relevance group will click on more and spend more time with the non-political articles than the low relevance group. We ran two t-tests, one for each dependent variable. Individuals in the high relevance group clicked on more non-political articles (M = 2.62, SD = 2.65) than those in the low relevance group (M = 1.78, SD = 2.45, t(219) = -2.44 (Welch-Satterthwaite), p = .016). Similarly, the high relevance group spend more time on non-political articles (M = 65.35, SD = 100.96) than the low relevance group (M = 30.51, SD = 46.70, t(157) = -3.31 (Welch-Satterthwaite), p = .001). H2 was supported.

Turning to the knowledge outcomes, we estimated three OLS regressions. The knowledge outcome was regressed on the group variable. We report Tukey adjusted p-values due to the multiple comparisons. There was no difference between the control group and the low relevance group for headline recognition (control: M = 3.10, SD = 2.34, low relevance: M = 3.13, SD = 2.25, t(326) = -0.08, p = .997), content recognition (control: M = 4.11, SD = 3.61, low relevance: M = 4.96, SD = 3.64, t(326) = -1.73, p = .196), and recall of details (control: M = 0.71, SD = 1.12, low relevance: M = 0.83, SD = 1.45, t(326) = -0.68, p = .774). Thus, in response to RQ2, there is no evidence that first-level IENP leads to less learning of information related to the initial political processing goal.

Turning to H3, we do not find any differences between the high relevance and the low relevance group for headline recognition (high relevance: M = 3.11, SD = 2.25, t(326) = 0.07, p = .998), content recognition (high relevance: M = 4.67, SD = 3.63, t(326) = 0.6, p = .818), or recall of details (high relevance: M = 0.75, SD = 1.19, t(326) = 0.46, p = .892). H3 was rejected. We also tested whether knowledge scores of the high relevance group differ from scores in the control group. There was no difference (headline recognition: t(326) = -0.01, p = 1.000; content recognition: t(326) = -1.14, p = .492; recall of details: t(326) = -0.23, p = .971).

In H4, we hypothesized that the negative effect on knowledge about the political topics which we proposed in H3 should be mediated by exposure to the non-political articles (clicks and time). We used the mediation package (Tingley et al., 2014) for R to estimate two mediation models - one with the number of clicks on non-political articles and one with the time spent on non-political articles as mediator – for each of the three knowledge outcomes. We included the corresponding variable measuring exposure to the political articles (clicks or time) as a control into the model, given that it is associated with (a) the variable measuring exposure to nonpolitical articles and (b) to the outcome measure. Results are presented in Table 1. We find support for H4 in five of the six mediation models. The negative relationship between the relevance manipulation and headline recognition (indirect effect = -0.25, p = .010), content recognition (indirect effect = -0.23, p = .012), and recall of details (indirect effect = -0.16, p =.010) was fully mediated by the number of clicks on the non-political articles. We found significant indirect effects when we used the time spent on non-political articles as mediator for headline recognition (indirect effect = -0.17, p = .002) and recall of details (indirect effect = -0.17, p = .002) 0.07, p < .001) but not for content recognition (indirect effect = .04, p = .612).<sup>iv</sup> In sum, we find support for H4 - even though not for content recognition if the time variable is used as mediator. Respondents in the high relevance group had higher exposure to non-political articles and

subsequently learned less information related to the political topics (i.e., their initial political processing goal).

#### Discussion

Our study sheds light on the manifold role that non-political content can play in settings where non-political and political content commingle. The main take away is that IENP clearly matters. A more nuanced discussion of this observation will show that the contribution of this study is threefold. First, our results suggest that first-level IENP can affect exposure to political content. We found that individuals who were exposed to additional non-political headlines were less likely to click on and spend time with political news articles than individuals who only saw the four political headlines. Interestingly, whether the non-political headlines were relevant or not did not matter for this finding. Critics may argue that this effect simply stems from the size of the choice set. But essentially, individuals that have additional non-political choices unrelated to their political processing goal are experiencing IENP. One of the main consequences of new media environments is that individuals have to struggle through massive streams of information (Thorson & Wells, 2016). In our experiment, the choice set in both groups is with four articles in the control group, respectively eight in the other two groups, limited in a way that individuals should have been able to scan all headlines. Previous research suggests that, in comparison to large choice sets with, for example, 30 choices, individuals tend to evaluate each option in a small choice set (see e.g., Iyengar & Lepper, 2000; Panek, 2016). Nonetheless, our findings clearly suggest that those experiencing first-level IENP are less likely to access the political content they were initially looking for. This also has important implications for practice, such as journalists, publishers, and political actors. If it can be expected that individuals access a certain webpage actively to search for specific information, it can be detrimental for learning outcomes to place references (e.g., links) to content unrelated to the information individuals are looking for.

However, in practice this is often done. For example, a lot of news webpages present "most-read" or "highlights" next to their articles. From an economic standpoint this might be reasonable because it might increase time spent on the webpage (and, subsequently, boosts ad revenue). From a normative standpoint, such practices may be harmful, given that they hinder learning.

Second, in line with previous research (Nanz & Matthes, 2020), the distinction between first- and second-level incidental exposure proves to be crucial to understand the significance of the phenomenon in today's media environments. This study shows that such a distinction also plays a crucial role when it comes to distracting effect of IENP. We found that individuals exposed to non-political content they appraised as relevant were more likely to click and dwell on such content than individuals presented with non-political choices that were not appraised as relevant. Even more important, individuals that attend to incidentally encountered non-political content will learn less about the political topic they visited the webpage for. From a normative perspective, this can be problematic because it may impede reaching the goal of a well-informed electorate. For examples, citizens looking for information about an upcoming election may get drawn away from information about candidates by non-political content. Given that a lot of online media and social media are heavily personalized today, we have to expect that a substantial share of non-political content individuals encounter online is relevant for them. This will foster exposure to non-political content which, in turn, will decrease political learning.

Third, our study highlights the importance of incidental exposure to *non*-political information in today's media environments. To our knowledge, the entire body of political communication research on incidental exposure is exclusively concerned with incidental exposure to political information (e.g., Kim et al., 2013; J. K. Lee & Kim, 2017; Tewksbury et al., 2001). However, our study shows that studying the phenomenon of incidental exposure cannot be done comprehensively if non-political content is omitted from theoretical and empirical

accounts. This also relates to a much bigger question in political communication research: How does the non-political world interact with the comparably insignificant part in most citizen's lives that is occupied by the political sphere? The act of following the very latest developments in the political sphere which sometimes seemingly tend to change minute-by-minute does definitively not rank among the most urgent concerns in the everyday life of the vast majority of citizens. In fact, most of the time individuals spent on the internet is not occupied with looking for political information. But to fully understand the instances in which citizens actually use the Internet to inform themselves about the political world, we also have to consider all the non-political information available online. While exposure to political information has been identified as a crucial antecedent of many political outcomes such as learning or participation, exposure to nonpolitical information has been widely neglected, even though it is quite common in media environments where political and non-political information commingle in one space.

Despite these insights, our study also comes with limitations. First, our experiment uses news articles as stimuli. However, a lot of content in today's new media environments come in other formats such as videos, posts by layperson users or even games. IENP to visual content or information comes with much more ambiguous cues (e.g., profile pictures, source cues, social recommendations) may be even more complex than what we studied. Second, we observed rather low means on our knowledge measures which might indicate that the knowledge questions were rather difficult. Questions that are too difficult for a large share of the sample may reduce the variance which can be explained by the experimental manipulation, leading us to the rejection of hypotheses. Third, our manipulation of the relevance appraisal does not reflect the variety of aspects that affect the relevance appraisal in complex media environments. Future studies should replicate the experiment with more diverse relevance manipulations (e.g., content credibility, source cues...). Fourth, in real life settings, a positive relevance appraisal may not always lead to

second-level IENP, given that other factors such as time constraints or individuals' mood may prevent them from engaging with content appraised as relevant (Matthes et al., 2020). Future studies should investigate such factors. Finally, the PINE model proposes to take a diachronic perspective on incidental exposure. While we can observe processes (e.g., clicks) very well, we are clearly not able to track all processes that are at work in a more complex media environment.

## Conclusion

This study clearly highlights that the phenomenon of incidental exposure, as it has been discussed in political communication research for the last twenty years, has to be studied with a wider perspective that also includes IENP. Although our study clearly proposes to apprehend incidental exposure more holistically, we further back previous research calling for a more nuanced and theoretically-grounded conceptualization of incidental exposure that separates first-(i.e., scanning incidentally encountered content) and second-level incidental exposure (i.e., the effortful processing of incidentally encountered content). When we acknowledge the role of IENP, we see that incidental exposure can also deteriorate political learning and, thus, have normatively undesirable consequences.

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# Table 1

<i>Mediation</i>	models	for	knowlea	lge	outcomes
				(n -	

	Mediated by number of non- political articles clicked (H4a)			Mediated by time spent on non- political articles (H4b)			
	Headline recognition	Content recognition	Recall of details	Headline recognition	Content recognition	Recall of details	
Indirect effect of the relevance manipulation via exposure	-0.25*	-0.23*	-0.16*	-0.17**	0.04	-0.07***	
(95% CIs)	[-0.466, - 0.051]	[-0.511, - 0.036]	[-0.302, - 0.036]	[-0.311, - 0.056]	[-0.115, 0.225]	[-0.124, - 0.028]	
Direct effect of the relevance manipulation	0.25	-0.03	0.10	0.28	-0.11	0.08	
(95% CIs)	[-0.243, 0.764]	[-0.927, 0.823]	[-0.177, 0.387]	[-0.251, 0.841]	[-1.009, 0.766]	[-0.232, 0.399]	

*Note.* N = 222, confidence intervals based on 5,000 nonparametric bootstraps. \*\*\* p < 0.001; \*\* p < 0.01; \* p < 0.05

<sup>i</sup> We replicated all analyses with the full sample of 369 respondents as a robustness check. Findings for the three manipulation checks, RQ1a, H1, H2, RQ2, H3, and H4 were fully replicated. The analysis for RQ1b which involves the time variables measuring exposure to processing goal articles changed. The time spent on processing goal articles did not differ between the low relevance group and the control group. However, this discrepancy should be dismissed given that the dependent variable (time in seconds) features extreme outliers in the low relevance group. Specifically, the low relevance group features a case that spent more than two and a half hours with one processing goal article.

<sup>ii</sup> It is unlikely that individuals were able to read all the articles in this time frame. Even for fast readers (e.g., more than 300 words per minute) in the control group it would have been difficult to read all processing goal articles within 105 seconds. Participants were free to stay longer than 105 seconds on the webpage.

<sup>iii</sup> During the field phase, both topics received some but limited attention from German media outlets. The topic "current debates surrounding the electoral franchise" referred to an electoral law reform in Germany that was just passed with the governmental parties' votes in the German Bundestag. The reform aimed to reduce the number of seats in the national parliament. According to some experts and the opposition parties it failed to achieve this goal. The second topic was about a "Mediterranean conflict between Turkey and Greece". News media reported that a Turkish research vessel conducted seismic research in an area in the Mediterranean which is claimed by Greece. Turkey refused to stop the endeavour which led to a lengthy diplomatic dispute between the two countries.

<sup>iv</sup> We replicated all analyses that included time variables one more time with log-transformed time variables. All hypothesis tests remained the same except for H4b. With a log-transformed time variable as mediator, all three indirect effect of the relevance manipulation on the knowledge outcomes were negative and statistically significant. In other words, with log-transformed time variables, we find support for H4 in all six mediation models.

#### 9.1 Appendix for Study V

## Online Appendix - Let me Entertain You: Distracted from Political Learning due to

## **Incidental Exposure to Entertainment Content**

## **Appendix A: Headlines (Translated from German)**

## Newsfeed 1

Experts criticize government's electoral law reform

Electoral law reform: who got their way? The panic.

Voting at 16? Following in Willy Brandt's footsteps

Electoral law reform: Not smaller, but even bigger

British actor dies in fatal crash by [PLACE]

"Wetten, dass ...?" comes to [PLACE]

Exotic animals spotted in [PLACE]

How four astronauts practiced in [PLACE] for their trip to the moon

## Newsfeed 2

Conflict in the Aegean: Greece has military advantage

Conflict with Turkey: Greece arms up

Greece and Turkey agree on mediation mechanism

Greece-Turkey conflict: a historic threat of war

Honey from [PLACE]: Brad Pitt orders his honey from the region

[PLACE]: Two US movie stars become sponsors of children's home

Real Picasso soon to be seen in [PLACE]

20 years ago: Pierce Brosnan tours homes close to [PLACE]

# **Appendix B: Screenshot of Webpages**

Ahrensburg: Zwei US-Filmstars werden Paten von Kinderheim	Sachverständige kritisieren Wahlrechtsreform der Regierung
Konflikt in der Ägäis: Griechenland bei Militär im Vorteil	Wahlrechtsreform: Wer hat sich durchgesetzt? Die Panik.
Honig aus Hoisdorf: Brad Pitt bestellt seinen Honig aus der Region	Wahlrechtsreform: Nicht kleiner, sondern sogar noch größer
Echter Picasso bald in Todendorf zu sehen	Wählen ab 162 Auf Willy Brandts Spuren
Vor 20 Jahren: Pierce Brosnan besichtigt Häuser bei Hammoor	Exoten in Delingsdorf gesichtet
Griechenland-Türkei-Konflikt: eine historische Kriegsgefahr	Britischer Schauspieler bei Großhansdorf tödlich verunglückt
Griechenland und Türkei vereinbaren	"Wetten, dass?" kommt nach Siek
Schlichtungsmechanismus	Wie vier Astronauten in Lütjensee für ihre Reise
Konflikt mit der Türkei: Griechenland rüstet auf	zum Mond übten
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	© 2020

#### 10 Key results

In the next section, I will reiterate the key results of the five studies that are part of this dissertation. Thereby, special emphasis is put on the connection of the studies to the research gaps mentioned in the introduction and the literature review of this dissertation.

Study I (Nanz & Matthes, 2022a) is the first systematic analysis of previous quantitative research on incidental exposure. Previously, scholars have often highlighted that the field is characterized by competing and contradicting findings (e.g., Kaiser et al., 2021; Matthes et al., 2020). In response, the paper's main aim was to deliver empirical insights into the recurring question whether incidental exposure actually affects political outcomes. The meta-analysis investigated five democratic outcomes frequently studied in the area: political participation, political knowledge, expressive engagement, news use, and political discussion. Building upon data from 106 samples that, in sum, encompass more than 100,000 respondents, Study I showed that incidental exposure is significantly and positively related to all five investigated outcomes. Even the analysis with semipartial correlations calculated from panel survey data supported the conclusion that incidental exposure is related to all five outcomes. Though, the strength of these relationships was smaller in comparison to the analysis with cross-sectional correlations. Moderator analyses revealed that the relationship between incidental exposure and political outcomes was stronger in cases where the exposure setting (i.e., traditional incidental exposure, online incidental exposure, and social media incidental exposure) aligned with the outcome setting (e.g., online participation). Furthermore, findings suggested that the relationship between incidental exposure and online political participation was stronger than the relationship between incidental exposure and offline participation.

Building upon the PINE model (Matthes et al., 2020), Study II to Study V tackle the remaining research gaps. In Study II (Nanz & Matthes, 2020), my co-author and I investigated the effects of first- and second-level incidental exposure on political learning. In an online experiment, we manipulated the relevance of political news articles on a mock news website. We found that participants were more likely to (a) click on and (b) learn from political information appraised as relevant. We identified two paths from second-level incidental exposure to learning: Individuals allocated *attention* to incidentally encountered information that was appraised as relevant. But they also *exposed* themselves to additional information by clicking on articles that were appraised as relevant, as it was suggested by a significant indirect effect of the relevance manipulation on learning via clicking. These findings clearly show that previous conceptualizations of the

phenomenon of incidental exposure are much too simplistic. The experiment also shows that previous reliance on passive learning as a theoretical mechanism to explain learning effects from incidental exposure is hardly justifiable.

Furthermore, Study II investigated whether topic- and intention-based incidental exposure to political information leads to different learning outcomes. The experiment did not reveal significant knowledge differences between individuals that were asked to pursue a political processing goal (i.e., topic-based incidental exposure) and those with an entertainment-related processing goal (i.e., intention-based incidental exposure). This shows that research which neglects topic-based incidental exposure fails to account for the full complexity of the phenomenon of incidental exposure.

Moreover, Study II provides some initial evidence for distraction effects through incidental exposure. Individuals that clicked on the incidental exposure articles had lower scores on the knowledge questions related to their initial processing goal.

Study III (Nanz & Matthes, 2022b) extended findings from Study II with data from one cross-sectional and three two-wave panel surveys. First, the study developed a scale to assess firstand second-level incidental exposure in a survey. With the cross-sectional dataset, construct validity was assessed. In a next step, the three panel surveys offer additional evidence regarding the relationship between first- and second-level incidental exposure and multiple democratic outcomes. In contrast to the findings from Study I and II, neither first- nor second-level incidental exposure was related to changes in political knowledge in any of the three panel surveys. For political participation, the picture looks different. Second-level incidental exposure was related to changes in online political participation across all three surveys, but only in one of the surveys second-level incidental exposure also affected offline political participation. We also found evidence that first-level incidental exposure can affect political participation. Turning to two additional outcomes that Study I identified as highly relevant for this research area, the third panel survey from Study III also investigated the changes in social media use for political information and political expression. Second-level incidental exposure was significantly related to changes in social media use for political information and political expression, while first-level incidental exposure was not. The findings from Study III are complementary to those from Study II and support the conclusion that previous conceptualizations of incidental exposure do not account for the complexity of the phenomenon.

In Study IV, my co-authors (Ruta Kaskeleviciute, Marlis Stubenvoll, and Jörg Matthes) and I turned to the antecedents of first- and second-level incidental exposure. Building upon the scale developed in Study III assessing the two levels of incidental exposure and two of the panel datasets from Study III, we investigated predictors of first- and second-level incidental exposure. Specifically, we considered rather stable individual factors such as political interest or intentional news avoidance as well as content-related characteristics of incidental exposure content (i.e., personally relevant, cross-cutting, and like-minded content). Results showed that political interest was positively related to changes in second-level incidental exposure and negatively related to firstlevel incidental exposure in one of the two panel datasets. Across both studies, we did not find any significant relationships between intentional news avoidance and first- or second-level incidental exposure. With the data from the second panel survey, we scrutinized the impact of characteristics of incidental exposure content. Individuals exposed to more personally relevant incidental exposure content were more likely to engage in second-level incidental exposure, while incidental exposure to cross-cutting content was positively related to changes in first-level incidental exposure. Incidental exposure to like-minded information was not significantly related to the two levels of incidental exposure.

In contrast to the first four studies, Study V shifted the focus from incidental exposure to political information to incidental exposure to *non-political* information. My co-author (Jörg Matthes) and I conducted an online experiment to investigate whether first- and/or second-level incidental exposure to non-political information can distract individuals that aim to learn about politics. First, we found that – regardless of relevance – the presence of non-political incidental exposure to information individuals were instructed to learn about. Second, our analyses revealed that exposure to incidentally encountered non-political content appraised as relevant can reduce learning of information related to the initial political processing goal. Thus, second-level incidental exposure to non-political information can deteriorate political learning.

### 11 Discussion

This dissertation has studied the phenomenon of incidental exposure in the online world. It offers a detailed depiction of previous research, antecedents, and consequences of incidental exposure. The studies addressed multiple crucial research gaps. Furthermore, the dissertation features the very first empirical tests of the PINE model. In this final section of the dissertation, I will outline implications of the findings, limitations of the five studies, and I will offer an outline for future research.

#### **11.1** Normative and theoretical implications

A range of normative and theoretical implications can be derived from the studies in this dissertation. Previous research on incidental exposure revealed mixed findings. Scholars reported positive, negative, null findings or relationships contingent on other variables. The field was full of competing findings. This dissertation set out to conduct the very first meta-analytic inquiry of the bulk of quantitative empirical research on incidental exposure. Indeed, the meta-analysis indicated that incidental exposure is positively related to all five investigated democratic outcomes (i.e., political participation, political knowledge, expressive engagement, political discussion, and news use). The findings clearly suggest that incidental exposure matters. At first sight, this looks very promising from a normative perspective. One may conclude that incidental exposure ensures the thriving of democracies. However, this perspective might be a bit simplistic or even naïve. While the meta-analysis reported positive relationships, the normative implications of these findings are more complex, as I will outline in the next two paragraphs.

It remains unanswered whether incidental exposure reinforces existing gaps between highly interested and informed citizens and those with little interest in and knowledge about politics. Scholars have argued that particularly individuals that are already well-versed in navigating the political sphere make the most out of today's information environment (e.g., Kümpel, 2020; Prior, 2007). In other words, they may profit from the vast variety of political information offered to them the most – regardless whether exposure is intentional or incidental. From a normative perspective, the assessment whether incidental exposure can help to improve democratic processes may depend on this question. While investigating this issue was beyond the scope of the meta-analysis, the other studies in this dissertation were able to shed some light on this question. Though, the picture is not conclusive. Shedding some light on the previously neglected antecedents of incidental exposure, Study IV found that political interest was positively related to changes in second-level incidental exposure. This would mean that particularly individuals that are already interested in politics engage in thorough processing of incidentally encountered information and, subsequently, gain from incidental exposure. However, Study III also found that – even when controlling for political interest – second-level incidental exposure was positively related to changes in political participation, political expression, and social media use for political information. Findings in Study II suggested that content characteristics of incidentally encountered political information which were completely unrelated to political variables (i.e., geographic proximity) still increased political learning. According to a post-hoc analysis, the relationship was also not moderated by political interest. Future research should further investigate which parts of the population particularly profit from incidental exposure.

Furthermore, the normative implications of this dissertation might be heavily contingent on the normative perspective one takes. In other words, to some extent, the normative implications lie in the eye of the beholder. Earlier studies investigating the relationship between incidental exposure to political information and political participation mainly argued that mobilization effects stem from learning of new political information (e.g., Kim et al., 2013). However, according to Study I, the relationship between incidental exposure and political participation was quite substantial in previous studies on incidental exposure while the relationship between incidental exposure and political knowledge was much smaller. Furthermore, Study III did not find a significant change in political knowledge that could be attributed to first- or second-level incidental exposure across three two-wave panel surveys. To some extent, this may cast doubts on whether incidental exposure mobilizes individuals by informing them about the current political discourse. While this dissertation cannot offer a definitive answer to this question, one may even speculate whether incidental exposure fosters rather uninformed forms of political participation. This also aligns with the observation uttered in related research on the relationship between social media and political participation that factual political knowledge may not be predictive of participation (e.g., S. Lee, Diehl, et al., 2022). Furthermore, incidental exposure may also increase participation via different paths, such as emotions. For example, affective reactions, such as anger (e.g., Valentino et al., 2011), triggered by incidentally encountered content could motivate individuals to get involved in politics. Whether uninformed or emotion-driven political participation is normatively desirable depends very much on the normative perspective one refers to (Ferree et al., 2002). Given that theories of deliberative democracy (e.g., Dahlberg, 2001; Dahlgren, 2005; Habermas, 2015) are quite frequently cited in the literature concerned with the internet's and social media's effect on democracy, the prospect of propelling rather uninformed forms of participation with incidental exposure is - at best - ambivalent. It can be argued that citizens need at least some knowledge about a given topic (e.g., arguments and competing arguments) to contribute to the discourse in a meaningful way. Thus, if incidental exposure mainly boosts engagement in the public sphere but does not contribute to individuals' understanding of a political issue, the quality of the discourse may remain doubtful.

Moving away from the normative to the theoretical implications for the field of incidental exposure research, this dissertation's findings suggest that more comprehensive theorizing might be beneficial. First, the findings from Study I (Nanz & Matthes, 2022a) suggested that additional theorizing - going beyond the PINE model - is needed. The PINE model mainly focuses its predictions on the micro level. But the effects of incidental exposure are, of course, also influenced by other factors, such as curation practices, affordances, the media system, or the political system. For example, in the moderator analysis, we found that the "congruence between the exposure setting and the outcome setting" (Nanz & Matthes, 2022a, p. 365) matters. I would even go beyond this statement and argue that not only the congruence but also in general the exposure setting and the outcome setting appear to be relevant. In another paper I co-authored (S. Lee, Nanz, et al., 2022), results from a two-wave panel survey suggested that the relationships between incidental exposure and political participation as well as political knowledge differ across social media platforms. Affordances as well as user habits, and the mix of political content available on the respective platforms may influence the effects of incidental exposure. These aspects are not explicitly theorized in the PINE model, even though their influence is acknowledged (Matthes et al., 2020). Thus, more comprehensive models that consider influences on the meso and macro level are needed. For example, this dissertation's approach is quite blind with regard to the algorithmic curation logics prominent in today's internet. As discussed in the first part of this dissertation, there are theoretical approaches that highlight meso and macro level factors such as, for instance, the PINGS framework (Kümpel, 2022) or the ecological model of incidental exposure (Weeks & Lane, 2020). However, while these models discuss the relevance of various aspects, they also tend to refrain from stating testable hypotheses how these aspects affect the effect of incidental exposure on democratic outcomes. Thus, while the PINE model can guide theorizing on the micro level, future studies still have to rely heavily on additional theorizing beyond the field of incidental exposure to form predictions depending on the given context. For example, social media platforms differ regarding the content users encounter there. Some platforms primarily feature pictures (e.g., Instagram) or videos (e.g., YouTube), while others are more text-based (e.g., Twitter). Such content features might be related to the informational and affective value incidentally encountered information may exert. Similarly, algorithmic curation plays an influential role in content selection on today's internet (e.g., Thorson & Wells, 2016). It has been debated whether algorithmic selection suppresses counter-attitudinal information (e.g., Bakshy et al., 2015; Flaxman et al., 2016; Sunstein, 2017). This is important, given that, as shown in Study IV, individuals may process incidentally encountered information that does not align with their political views differently. Summarizing, it is crucial that previous research on technical affordances (e.g., Bossetta, 2018) or algorithms (e.g., DeVito, 2017) further guides future research investigating the boundary conditions of the micro processes studied in this dissertation.

Second, another path for future theoretical development must be concerned with the interdependencies between different outcomes. As documented in the meta-analysis (Study I, Nanz & Matthes, 2022a), the research field investigates the relationship between incidental exposure and a variety of democratic outcomes, such as political knowledge, political discussion or political participation. However, the relationships between these outcomes are rarely investigated (but see, e.g., Yamamoto & Morey, 2019) – even though it might be fruitful. For example, Strauß et al. (2020) argued that news use might be the "missing link" (Strauß et al., 2020, p. 1182) between incidental exposure and democratic behaviours such as participation. Unfortunately, due to being limited to two-wave panel data, I was not able to investigate relationships between the different outcomes in Study III (Nanz & Matthes, 2022b) in a more comprehensive way. Future research could conduct panel surveys with more waves "to examine the interdependencies between the various outcomes of [incidental exposure] more carefully" (Study I, Nanz & Matthes, 2022a, p. 364). Thereby, scholars could also tackle the previously mentioned question whether incidental exposure increases participation by providing individuals with additional information they learn from.

Third, turning to the processes on the micro level related to incidental exposure, this dissertation found support for core predictions of the PINE model. Thereby, this dissertation substantially advances the conceptualization of incidental exposure and lays out a clear theoretical foundation for future effects research. Using survey as well as experimental methods, Study II, III, and V unequivocally showed that the distinction between first- and second-level incidental exposure is crucial when effects of incidental exposure are investigated. Next to the empirical support in this dissertation, other recent theoretical models and approaches outlined the need to distinguish between different incidental exposure situations that strongly vary with respect to information processing (e.g., Chen et al., 2022; Kaiser et al., 2021; Kümpel, 2020; Wieland & Kleinen-von Königslöw, 2020). Taken together, future incidental exposure research must incorporate these insights into its theoretical and methodological approach. In other words, it is crucial to "distinguish two levels of [incidental exposure]: First-level [incidental exposure], which is the scanning of incidentally encountered information, and second-level [incidental exposure].

defined as the effortful processing of incidentally encountered information" (Study II, Nanz & Matthes, 2020, p. 770). Using compound measures that do not distinguish between first- and second-level incidental exposure are insufficient. Given that Study IV showed that first- and second-level incidental exposure have different antecedents, commonly used single item compound measures may not only be inaccurate but also introduce bias and cover heterogeneity of effects (e.g., highly interested individuals may profit more from incidental exposure; Kümpel, 2020). Additionally, the strong reliance on passive learning theory in the field of incidental exposure research is – at best – unsubstantiated and – at worst – misleading. While passive learning may occur during first-level incidental exposure, the processes described in passive learning theory are most likely not the processes that make the phenomenon of incidental exposure politically encountered information that was appraised as relevant is responsible for much more substantial effect on political outcomes than passive learning during first-level incidental exposure.

Relatedly, in future studies, the refined conceptualization of incidental exposure provided in this dissertation may also help to study the reasons for the some of the competing findings and conclusions drawn in previous studies which the meta-analysis could not uncover. The impact of incidental exposure depends strongly on the information processing individuals engage in while they experience incidental exposure. If studies do not assess first- and second-level incidental exposure separately, they may come to contradicting conclusions depending on whether individuals primarily engaged in first- or second-level incidental exposure.

Fourth, topic-based incidental exposure should receive more attention in future research. In previous research, scholars mainly focused on intention-based incidental exposure (i.e., incidental exposure to political information while individuals were looking for non-political information). It has been proposed that individuals may also be incidentally exposed to a political information when they were looking for political information on another topic (Matthes et al., 2020; Yadamsuren & Erdelez, 2016). Such instances of topic-based incidental exposure have been documented in descriptive survey research (Pew, 2017). Importantly, Study II showed that learning effects stemming from incidental exposure do not differ regardless whether incidental exposure was intention- or topic-based. Currently – and this, unfortunately, also applies to Study I, III, and IV –, research completely neglects topic-based incidental exposure to political information. This is particularly unfortunate given that incorporating topic-based incidental exposure in theoretical considerations could open up new research questions. For example, Barberá et al.'s (2022) content

analysis of politicians' social media posts suggests that leaders tend to mention foreign policy on social media more frequently when they face domestic unrest. By acknowledging topic-based incidental exposure, scholars could investigate whether such strategies actually distract citizens from the domestic crisis. In other words, do citizens divert their attention away from domestic problems when they stumble upon news about a foreign policy crisis? Such research projects may not only focus on knowledge about the domestic and foreign topic but could also investigate whether such distraction strategies affect governmental support, attitudes or voting (intentions).

Fifth, with Study V, this dissertation highlights another ignored domain: incidental exposure to non-political information. Citizens can not only be distracted by strategic communication of elites, as discussed in the previous paragraph, but incidental exposure to nonpolitical information may also consume cognitive resources more generally. The internet and particularly social media are information environments in which political and non-political information commingle. Given that politicians, news organizations, journalists, and other politically relevant actors use the internet and social media to communicate and reach their audiences and voters (e.g., Bossetta, 2018; Kruikemeier, 2014; Molyneux et al., 2018), citizens may also consider these platforms as sources for political information. In fact, surveys document that a substantial share of citizens use the internet and social media actively to stay informed about politics (e.g., Pew, 2021; Shehata & Strömbäck, 2021; van Erkel & Van Aelst, 2021). However, whenever individuals are looking for political information on social media or the internet, they may also stumble upon non-political information that – if appraised as relevant – takes away cognitive resources from the information they were looking for. Study V found support for such distraction processes. Indeed, incidental exposure to non-political information can distract from political goals. Based on this observation, future research has to dedicate more attention to the role of non-political information in today's new media environments. Currently, a large share of research investigates whether and why individuals see little political information on the internet (e.g., Naderer et al., 2020; Ohme et al., 2018; Thorson et al., 2021). Thereby, the amount and characteristics of political information receive a lot of attention. While these clearly are crucial questions, focussing almost exclusively on the political information in the mix of political and non-political content on the internet and social media may disguise the role non-political information plays in these information environments.

#### 11.2 Limitations and methodological implications

Despite these theoretical contributions to the literature, this dissertation has some limitations that should be considered when interpreting findings and drawing conclusions. In the next section, I will outline limitations of the five studies and discuss methodological implications for future research.

Starting with Study I (Nanz & Matthes, 2022a), there are two aspects that deserve some additional attention beyond what is discussed in the published manuscript. First, the limitations of the primary research also rest on the conclusions drawn from the meta-analysis. Below, I will address the issue of self-report data, which is also a concern that applies to the meta-analysis, given that the majority of included studies used survey methods. However, first I want to focus on the "almost alarming degree of variation in the labeling and measurement of some of the core outcomes in the field" (Nanz & Matthes, 2022a, p. 363). This applies particularly to measures of political participation and expressive engagement, but also to some extent to political discussion. We observed that "the field uses similar items to measure different concepts, but simultaneously uses similar items to measure variables that are then labeled differently" (Nanz & Matthes, 2022a, p. 363). To conduct the meta-analysis, I coded every item according to a coding scheme that was based on the theoretical framework by Theocharis and van Deth (2018). Details are outlined in the paper and its online appendix. With this approach, I was able to ensure some level of face validity of the dependent variables. However, whether the measures can also be divided into these categories and dependent variables from an empirical perspective, remains an open question. The data to test this were not available. It is crucial that future research separates different dependent variables related to political behaviour more clearly. This methodological implication goes well beyond the literature on incidental exposure as it has been documented by others (Ruess et al., 2021).

Second, during the review process of Study I, the inclusion criteria used in the meta-analysis were criticized. It was criticized that some highly cited studies, such as Baum's studies (e.g., 2002, 2003) or Alcott et al.'s experiment (2020), that discuss incidental exposure were not included. I believe that both studies are good examples to showcase the reasoning behind the meta-analysis' inclusion criteria. As acknowledged in this dissertation's introduction, Baum's seminal papers are field-shaping contributions in that they built the theoretical fundament of a lot of research in this area. However, the operationalization did not measure incidental exposure. Specifically, Baum's (2002) main independent variable is an "entertainment news interest index" featuring items such

as "read tabloid newspapers", "watch daytime talk shows", "watch MTV" or "watch tabloid news programs". The items do not allow any conclusion about (a) the intention during consumption (e.g., some people may read tabloid newspaper also to learn about politics) and (b) the exposure to political information (e.g., did people encounter political information while they were watching MTV?). Furthermore, if I had included Baum's studies, I would have been forced to include all studies and surveys measuring exposure to "daytime talk shows", "tabloid newspapers", "MTV" and so on. This is because the narrative does not matter for the inclusion in a meta-analysis but only the methods (this is also a major advantage of a meta-analysis in comparison to a narrative review). Including all these other studies is hardly feasible and – much more importantly – in no way compatible with the meta-analysis' research interest.

Turning to Allcott et al.'s (2020) experiment, I came to a similar conclusion (for a similar case, see Theocharis & Lowe, 2016). The researchers asked individuals to deactivate their Facebook account for a certain time period prior to the election while another group continued using Facebook during the experiment. Clearly, Allcott et al. (2020) did not manipulate (the amount of) incidental exposure but general social media use. All the other uses and consequences of social media use (e.g., relationship maintenance, entertainment, considerations about the opportunity cost of spending time on Facebook) were affected as well. Thus, there is no way of knowing whether the relationships found by Allcott et al. (2020) should be attributed to incidental exposure or any of the other consequences of using Facebook (e.g., strong tie network structure that fosters mobilization; see Valenzuela et al., 2018).

Given that Study I reported relationships that are similar (i.e., positive) to those found for general social media use and political participation (e.g., Boulianne, 2020) or intentional news use and democratic outcomes (e.g., Dimitrova et al., 2014; J. M. McLeod et al., 1999), one may ask how the relationship between incidental exposure and democratic outcomes compares to the relationship between intentional news consumption and democratic outcomes. Even though this was not the research gap Study I aimed to tackle, it is an intriguing question for future research. Thus, future research may compare the effect of incidental exposure to the effects of intentional exposure explicitly. For example, scholars could compare knowledge effects stemming from intentional processing of political information to learning from first- and second-level incidental exposure. Given that it is documented that incidental and intentional news use are correlated (Oeldorf-Hirsch, 2018; Thorson, 2020), experimental research might be the first step to clearly separate effects from first- and second-level incidental exposure.

Turning now to the limitations of Study III and IV, the most severe problem is that the conclusions rely on self-report data. Previous research showcased that commonly used self-report measures for media use have limited accuracy and are prone to overreporting (e.g., Araujo et al., 2017; Boase & Ling, 2013; Prior, 2009; Scharkow, 2016; Wonneberger & Irazoqui, 2017). For example, Scharkow's study of log data suggested that "self-report measures of Internet use are rarely accurate and their convergent validity with client log files is rather weak" (2016, p. 22). Similar concerns have also been voiced about news exposure measures (e.g., Guess et al., 2018; Prior, 2009; Vraga & Tully, 2020). In short, it is well-documented that self-report measures for media use are flawed. Still, the vast majority of research in the field – as documented by the amount of survey studies included in Study I and also by this dissertation – builds upon self-report measures in surveys.

There are multiple explanations for the rather low accuracy of self-report to measure behaviour. When reporting their (past) behaviour, individuals engage in multiple steps: they try to (1) understand the survey question, (2) recall the behaviour, (3) estimate the frequency of the behaviour, and (4) translate their estimation into the provided response categories. Furthermore, they may (5) adjust their answer due to social desirability (Schwarz & Oyserman, 2001). All these steps are potential sources of bias or error. For the field of incidental exposure research, the third step (i.e., recalling the behaviour accurately) might be a major problem. Per definition, individuals did not initially intend to see incidental exposure content. Particularly in the case of first-level incidental exposure, such exposure may not be particularly memorable. Thus, assessing (first-level) incidental exposure with survey items might be severely constrained by individuals' limited recall abilities. Of course, this limitation also concerns every compound survey measure for incidental exposure that does not distinguish between first- and second-level incidental exposure. It stipulates the question whether survey methods are an appropriate method to study incidental exposure. Nonetheless, the survey designs used in this dissertation do not stand by themselves and should be considered as offering complementary evidence to the other methods in the other three studies. Thus, considering the full picture of this dissertation with the two experimental designs that experimentally manipulated the two levels of incidental exposure and rely on behavioural data (i.e., clicking, time variables), the core conclusions drawn in the dissertation may not be severely harmed by the reliance on self-report data in Study III and IV. In short, the methodological pluralism soothes these concerns.
The experimental studies (Study II and V) in this dissertation also share some limitations which are, however, situated differently from those of the survey studies. One concern regarding the experiments is their ecological validity. Both experiments utilize rather simple information environments that do not entirely mirror today's real-world information environments. First, the number of choices presented is quite small in comparison to today's social media that typically feature an almost never-ending newsfeed. Previous research suggests that the number of choices can affect information processing strategies (e.g., Panek, 2016; Pearson, 2021). Second, the experimental designs did not really incorporate the linked structure of online information. Typically, online news articles include web links and social media posts that direct to related information. Though, linking between information may affect information processing (e.g., Eveland & Dunwoody, 2001; Kruikemeier et al., 2018). Third, the newsfeeds in the experiments featured a quite small number of cues in comparison to actual websites. For example, typically social endorsements, source cues, audio or visual cues are presented next to information online. These cues may affect content selection (e.g., Anspach, 2017; Messing & Westwood, 2014) and could cancel out or interact with each other. Relatedly, the manipulation of relevance in the two experimental studies relies exclusively on geographic proximity, even though the relevance appraisal is most likely also affected by many other factors. The main reason for this rather narrow and apolitical manipulation of relevance is that it is unlikely to be confounded with other political variables that may affect political learning about specific political topics. For example, manipulating the relevance appraisal in a "more political" way such as showing different topics (e.g., coronavirus for high relevance and development aid in the low relevance condition) is somewhat problematic given that issue salience is also fundamentally confounded with other political variables (e.g., political ideology, political knowledge, partisan media use). Thus, for the very first empirical test of the PINE model, my co-author and I opted for a relevance manipulation that we believed should be less controversial. Nonetheless, future experimental research should aim to manipulate the relevance appraisal in more diverse (e.g., Knobloch-Westerwick & Westerwick, 2021) and ecologically valid ways (e.g., Kaiser et al., 2021; Karnowski et al., 2017; Ohme & Mothes, 2020).

Similar to most experiments in today's communication science literature (but see e.g., Chong & Druckman, 2010; Feezell & Ortiz, 2021; Leeper, 2020), the two experiments in this dissertation expose individuals to the stimulus and assess outcomes in quite close temporal proximity. Therefore, it remains unclear how long the effect of first- and second-level incidental

exposure endures. Given that the information processing strategies during first- and second-level incidental exposure differ from each other, the decay of effects may also differ. Individuals may mainly engage in encoding of information during first-level incidental exposure. Through passive learning, chunks of information may stick to the memory, which, however, might be forgotten quite quickly due to the amount of information individuals have to appraise during social media use. During second-level incidental exposure, individuals may not only encode information but also engage in storage tasks and retrieve related information from memory. Thereby, activation may spread further and be longer lasting. In other words, even if two individuals were able to recall the very same piece of information right after the experiment (e.g., correctly identify a headline), the respondent who engaged in second-level incidental exposure might still be able to recall it for a longer period of time than the respondent who engaged in first-level incidental exposure. With the experimental designs used in this dissertation, the longevity of effects cannot be studied. Future experimental research should utilize more longitudinal designs to fill this gap.

Building upon the insights from this dissertation, additional methodological implications going beyond the methods used in the five studies can be put forward. It has been suggested that mobile experience sampling studies may soothe some of the issues of standard survey research (e.g., Karnowski, 2013; Pejovic et al., 2016). For example, by asking respondents about behaviour they engaged in within the last couple of hours, the cognitive burden of recall might be reduced in comparison to typical survey questions that often tap behaviour spanning across a longer period of time. Still, studying incidental exposure to political information might be difficult. At the very beginning of this dissertation, I tried to conduct a mobile experience sampling study with pupils (age 14-21) to investigate effects of incidental exposure to political information. Twice a day, respondents were asked whether they encountered any political information on social media in the last two hours. However, my colleagues and I decided to terminate the study prior to completion due to very low rate of political encounters (approximately 6%). Recent studies using behavioural web tracking data also found "that news accounted for only a small proportion of online activity" (Stier et al., 2022, p. 770; see also Wojcieszak et al., 2021). As stated in this dissertation's introduction, following politics may not play a major role in citizens' daily life. In other words, the incidence of political (incidental) exposure might be quite low, making mobile experience sampling studies not always viable. It must be noted that the mobile experience sampling study we attempted to conduct targeted a group that may exhibit limited political interest. Furthermore, the data collection was during a non-election period were political information may be sparser on social

media than during an election campaign. Thus, under some circumstances, studying incidental exposure to political information with mobile experience sampling methods may still be a fruitful endeavour, given that tapping processing goals and self-reported exposure might be more accurately in such a research design than with traditional survey methods.

Using a combination of mobile experience sampling and trace data could offer additional benefits (Otto et al., 2022; Stier et al., 2020). Even though mobile experience sampling represents less of a cognitive burden than traditional survey methods, it still might be difficult for respondents to recall incidental encounters which were not appraised as relevant. Frequent social media users may scan hundreds of posts a day which makes it hardly possible that they can accurately recall details (e.g., topic, source) about the information they scanned very briefly. Digital trace data may help to fill this gap. Utilizing trace data on its own is, of course, not sufficient to study incidental exposure, given that it is difficult to infer individuals' processing goals from such data. Future research could also use browser extensions that prompt individuals about their processing goal when they visit a specific domain (e.g., social media platform). Another challenge for using trace data is rooted in the architecture behind social media platforms. While news websites often have separate URLs for articles, social media users can see an almost infinite number of posts without visiting a different URL. Thus, collecting the domains of websites respondents visited is not sufficient to measure content exposure. This is particularly relevant given that videos or snippets of news articles presented on social media platforms arguably can also constitute instances of (incidental) exposure (Fletcher & Nielsen, 2018). Furthermore, on mobile devices, social media use is often happening within apps that make it difficult to track individual's exposure. To tackle these issues, future research could rely on screen capture or custom software (see e.g., Haim et al., 2021; Yang et al., 2019). Importantly, such studies must be planned with great caution given they are accompanied by considerable ethical and legal challenges.

Next to combining trace data and survey methods, eye-tracking could offer additional insights. Eye-tracking studies have been used to study how individuals allocate attention to content on social media (e.g., Vergara et al., 2021; Vraga et al., 2019). Eye-tracking data may offer additional insights into the inner-workings of the relevance appraisal. Thereby, scholars can more closely follow the process in which content is appraised. For example, one could track in a more dynamic way which cues (e.g., source, pictures) receive the most attention prior to clicking on a link or commenting. In doing so, scholars can also study in which sequence respondents consider different options in a choice set. This is important, given that depending on factors such as the size

of the choice set some individuals may compare all available options while others take the first one that fits their processing goal to a reasonable degree (see Panek, 2016).

## **11.3 Broader implications and outlook**

This dissertation comprehensively studied the phenomenon of incidental exposure and its impact on society and democracy. It systematically analysed previous quantitative research in the area. Furthermore, the very first empirical test of the PINE model has been conducted with this dissertation. At the very end of this dissertation, I want to highlight two final points.

First, the insights from this dissertation have implications for the broader field of communication research going well beyond political news consumption research. The processes studied here might be more pervasive than the dissertation itself describes them to be. Even though the "P" in PINE model stands for "political" and the "N" abbreviates "news", the processes described by the PINE model are not limited to political news. I would argue that the PINE model's predictions are almost agnostic to the specific topic of the processing goal or the topic of the incidental exposure content. In Study II's discussion I tried to emphasis this: "In online environments, the notion of [incidental exposure] is relevant to any kind of information, no matter if related to, for instance, health, risk, advertising, science, or the environment" (Nanz & Matthes, 2020, p. 778). The relevance appraisal as well as the two levels of incidental exposure might be helpful to study any unintentional encounter with content, regardless of the topical domain.

Thus, the insights from this dissertation could be integrated in health communication research. Previous studies investigated unintended exposure to health information (e.g., Niederdeppe et al., 2007). While this line of research considers scanning of incidentally encountered health information, it does not consider instances in which individuals may thoroughly process such information. A variety of predictors (e.g., diseases of family members and friends, engaging in behaviours that cause certain diseases, such as smoking, general attitudes to prevention) may predict whether individuals are inclined to attend to incidentally encountered health information. Incorporating the distinction between first- and second-level incidental exposure in health communication research could help to explain gaps of health knowledge and prevention behaviour across the population.

Furthermore, individuals may turn to websites that specialize on providing health information (e.g., health portals) to seek information on a given question (e.g., current symptoms, preventive medical care). Typically, these health portals also provide a wide range of information that is unrelated to individuals' current processing goal. Scholars may investigate whether

incidental exposure to such unrelated information distracts them from their previous goal. For example, featuring an article with an eye-catching headline about the Zika virus (i.e., a virus that normally causes mild symptoms but is extremely dangerous for a pregnant woman's baby) in a "most-read" section next to other articles may distract individuals from their initial question. After appraising the article about the Zika virus as relevant, they may even click on it. However, the article might be – from a perspective focused on individuals' personal health outcomes – completely irrelevant. Nonetheless, it may divert cognitive resources from the processing goal.

The findings presented in this dissertation may also guide future research in library and information science. Currently, a large share of research in this area focusses on "user's memorable experiences of accidental discovery of useful and interesting news when engaged in various activities online" (Yadamsuren & Erdelez, 2016, p. 43; see also Heinström, 2006). However, as shown in this dissertation, first-level incidental exposure can have small effects on recognition. By focussing on incidental exposure content that was appraised as relevant, a substantial part of the phenomenon is neglected.

Furthemore, with respect to other domains studied in library and information science, such as academic work, the PINE model could also guide future research. For example, students and scholars searching for literature related to their current research project may scan dozens of titles of scientific articles to find information related to their processing goal (e.g., "what does survey research find about the relationship between social media and political participation?"). During this scanning process, they have to encode the meaning of the titles for the relevance appraisal, which may leave traces in memory. If they later in the process stumble upon another question they have to answer (e.g., "what are methods are used to study the relationship between social media and political participation?"; i.e., a new processing goal), they can rely on these chunks of information stored in memory during first-level incidental exposure. In other words, the PINE model may also applicable in the area of library and information science and could shed some light on less researched areas of the phenomenon of incidental exposure.

Moreover, the insights from this dissertation are also relevant for selective exposure research. Very recently, scholars in this area suggested to distinguish between two types of selective exposure, naming them even very similar to the PINE model: first-level and second-level selective exposure (Ohme & Mothes, 2020). They operationalized first-level selective exposure via the seconds a social media post was visible on the participant's screen and second-level selective exposure by assessing clicking and measuring the time spend with the article. While there are

parallel developments in the literature like this one, selective exposure research may also benefit from incorporating other aspects discussed in this dissertation and the PINE model. For example, considering the dynamic nature of processing goals could spark future studies in selective exposure research. Individuals may use media for different tasks over the course of the day and, even more importantly, may switch their processing goal during the media reception situation. Thus, in selective exposure research, processing goals should be considered from a diachronic perspective.

Furthermore, advertising research may apply some of the findings. Researchers could operationalize contact with ads in the online environment with the help of the PINE model. Thereby, research may want to consider the role of the initial processing goal of individuals that encounter ads on engagement and attention to the ad. For example, individuals that look for very specific information under time-pressure might be less inclined to click on an ad than individuals with less pressing processing goals. Moreover, the PINE model conceptualizes ad exposure as dynamic instead of static. "The notion of constant relevance appraisals helps to better understand the dynamics of attention allocation to ads during reception" (Study II, Nanz & Matthes, 2020, p. 789). Insights may help advertisers and content producers to comprehend audiences' reactions to and interaction with ads. As argued in this last section, the implications of this dissertation are not limited to political communication research but could be applied in a wide variety of domains. While I outlined some of them here, these examples are by far not exhaustive but should just give a glimpse into other areas that could apply the findings of this dissertation.

Second, and returning to the narrower domain of incidental exposure research, this dissertation provides crucial insights about the micro processes related to the phenomenon of incidental exposure. However, in a highly complex world where a lot of information environments are convoluted, difficult to understand and to study for researchers, and also rely on network logics, this dissertation can only be the first step. It can be the foundation for future research that investigates the boundary conditions of the micro level processes documented in the studies of this dissertation.

# 12 References

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#### 13 Abstract

# 13.1 Abstract

On the internet, individuals are sometimes exposed to information that they did not intend to be exposed to. With the term incidental exposure, scholars have described situations in which citizens get exposed to political information in this way. With a mix of quantitative methods including meta-analysis, surveys, and experiments, this dissertation investigated, with five separate studies, the phenomenon of incidental exposure in the online world. Study I synthesized previous quantitative research on incidental exposure to political information and found positive relationships with multiple democratically relevant outcomes, such as political participation and knowledge. The other four studies set out to test the Political Incidental News Exposure model (PINE model, Matthes et al., 2020), which is a recent theoretical framework to study incidental exposure. Focussing on political learning, findings from an online experiment in Study II suggested that it is crucial to distinguish between first-level (i.e., scanning of incidentally encountered information) and second-level incidental exposure (i.e., effortful processing of incidentally encountered information appraised as relevant). Complementary to that, Study III developed survey items to assess the two levels. Three panel surveys were used to investigate the relationships between these two levels and political participation and political knowledge. The third panel survey also studied the impact on political expression, and social media use for political information. Particularly for the latter two outcomes, the findings suggested that second- had much more substantial effects than first-level incidental exposure. In Study IV, the antecedents of first- and second-level incidental exposure to political information were studied with survey methods. Political interest was positively related to second-level incidental exposure while intentional news avoidance was not related to either of the two levels. Content characteristics also mattered. Namely, incidental exposure to personally relevant content increased second-, while incidental exposure to cross-cutting content increased first-level incidental exposure. Study V flipped the typical logic of incidental exposure research and investigated how incidental exposure to non-political information affects political knowledge acquisition in situations where individuals want to inform themselves about politics. Incidental exposure to relevant non-political information can deteriorate political learning via clicking and spending time with the incidentally encountered non-political information. Overall, the dissertation showed that incidental exposure matters but is much more nuanced than previously assumed. Implications are discussed.

## 13.2 Zusammenfassung

Im Internet stolpert man manchmal über Information, die man zunächst nicht gesucht hat. Der Begriff incidental exposure wird verwendet, um solch zufälligen Kontakt mit politischer Information zu beschreiben. Mithilfe von quantitativen Methoden, wie Meta-Analyse, Umfragen und Experimenten, untersucht die vorliegende Dissertation in fünf separaten Studien das Phänomen incidental exposure in der Welt des Internets. Studie I analysiert die bisherige Forschung zu incidental exposure zu politischer Information und findet positive Zusammenhänge mit mehreren demokratiepolitisch relevanten Variablen, wie politische Partizipation oder Wissen. Die anderen vier Studien testen das Political Incidental News Exposure Model (PINE Modell, Matthes et al., 2020), welches einen theoretischen Rahmen für die Erforschung von incidental exposure bietet. Die Ergebnisse des Online-Experiments in Studie II, welches sich auf politisches Lernen konzentriert hat, deuten darauf hin, dass es entscheidend ist, zwischen first-level (d.h. dem Scannen von zufällig gefundenen Inhalten) und second-level incidental exposure (d.h. der intensiveren Verarbeitung von zufällig gefundenen Informationen, die als relevant eingestuft wurden) zu unterscheiden. Ergänzend dazu wurde in der Studie III ein Umfrageinstrument entwickelt, um die beiden Levels zu messen. Mit drei Panelbefragungen wurden die Beziehungen zwischen den beiden Levels von incidental exposure und politischer Partizipation und politischem Wissen untersucht. Die dritten Panelstudie erforschte auch den Einfluss auf politischer Meinungsäußerung und die Nutzung von sozialen Medien für politischen Informationskonsum. Besonders für die beiden letztgenannten Variablen zeigt sich in den Ergebnissen ein deutlich stärkerer Zusammenhang mit second- als mit first-level incidental exposure. Studie IV untersucht die Prädiktoren von first- und second-level incidental exposure mit Umfragemethoden. Politisches Interesse hing mit second-level incidental exposure zusammen, während die absichtliche Vermeidung von Nachrichten weder mit first- noch mit second-level incidental exposure in Zusammenhang stand. Auch Merkmale der Inhalte spielten eine Rolle. Das Stolpern über Inhalte, die für das eigene Leben relevant waren, hing positiv mit second-level incidental exposure zusammen, während das Stolpern über Inhalte, die der eigenen politischen Meinung widersprachen, zu first-level incidental exposure führte. Studie V drehte die für dieses Feld typische Logik der Forschung um und untersuchte, wie sich incidental exposure mit nicht-politischen Inhalten auf den Erwerb von politischem Wissen in Situationen auswirkt, in denen Personen sich über Politik informieren wollen. Second-level incidental exposure zu relevanten nicht-politischen Informationen kann das politische Lernen vermindern, wenn Personen die nicht-politischen Inhalte
anklicken oder Zeit mit ihnen verbringen. Insgesamt hat diese Dissertation gezeigt, dass incidental exposure relevant für die Erforschung von politischer Kommunikation ist, aber auch, dass das Phänomen deutlich nuancierter ist als zuvor angenommen. Die Schlussfolgerungen für zukünftige Forschung werden diskutiert.