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Incidental Exposure and News Engagement: Testing Temporal Order and the Role of Political Interest

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ABSTRACT
In the contemporary media environment, and particularly on social media platforms, people are embedded in multiple, inter-secting flows of political information generated by a wide range of curating actors, and two sets of predictions have emerged in the literature to explain these dynamics of political information exposure and engagement. Theory on incidental exposure sug-gests that it will lead to news engagement, particularly among the least politically interested individuals. Meanwhile, research on news algorithms suggests the reverse temporal ordering and an antecedent role for political interest. The goals of this study are to (a) theoretically integrate these claims into the 'curated flows' framework, (b) to test orthogonal predictions about temporal ordering and the role of political interest, and (c) to compare models by testing cross-lagged relationships between incidental exposure and news sharing. Analysing a two-wave online survey of adult internet users in the United States, results show support for both sets of predictions; however, results also show key differ-ences in the role played by political interest. Results are discussed in light of their implications for theory about news exposure and engagement in the contemporary media environment.

Social media environments embed individuals in multiple, overlapping flows of news and political information, and examining various influences on this content is critical for understanding the dynamics of political information and its audiences in contem-porary democratic societies (Thorson and Wells 2016). Researchers have offered a var-iety of theoretical approaches for studying these dynamics, and scholarship emphasizes the importance of incidental exposure as a prevalent modality of news use on social media platforms (Kligler-Vilenchik et al. 2020). But recent research on the role of algorithms as news intermediaries poses important theoretical challenges to our understanding of incidental exposure (Thorson 2020), and this article aims to articulate those challenges and test their implications.

The literature treats news engagement as key outcome of incidental exposure (Karnowski et al. 2017; Oeldorf-Hirsch 2018; Weeks et al. 2017), and based on theory

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about the societal effects of media choice on news engagement (Strömbäck, Djerf-Pierre, and Shehata 2013), incidental exposure has the potential to fill the historical engagement gap created by increased levels of media choice facilitated by digital media technologies. Social media, the argument goes, have the potential to fill this gap by exposing less politically interested individuals to news and political content, thereby engaging those who would otherwise not be engaged. While findings regarding this theoretical claim have been mixed (e.g. Heiss and Matthes 2019; Valeriani and Vaccari 2016), it implies that the effects of incidental exposure on engagement should be strongest among the least politically interested.

But recent research on the algorithms that shape social media users' news feeds makes very different theoretical predictions regarding the temporal ordering of variables and the role of political interest (Thorson et al. 2021). This research suggests that engagement drives subsequent exposure, rather than the other way around, because engagement informs the algorithms that categorize individual users based on their interests and influences what appears in users' news feeds. These algorithms treat engagement with particular types of content as an expression of an individual's interests, and, motivated by revenue models based on maximizing engagement, social media companies use these algorithms to curate the content to which people are subsequently exposed (Cotter, Cho, and Rader 2017; DeVito 2017; Rieder 2017). Political interest is an antecedent to this process rather than a moderator, in that it motivates engagement. According to this logic, political interest should have an indirect effect on exposure to political content, mediated through engagement and the algorithms that make machine-driven decisions about which content to include in users' news feeds (Gillespie 2014). This model leads to a very different prediction regarding the compensatory effects of exposure: Rather than closing engagement gaps, social media platforms should exacerbate them by creating a 'rich-get-richer' dynamic, or, as one study calls it, a 'Matthew Effect' on exposure (Kümpel 2020).

The current study has three goals: First, it aims to synthesize and integrate claims regarding incidental exposure and algorithms into the 'curated flows' framework, an overarching theoretical approach outlined by Thorson and Wells (2016) that foregrounds the problem of multiple influences on information flows in order to better understand exposure in social media environments. This theoretical integration is necessary because it provides a basis for understanding the importance of key variables, including incidental exposure (Boczkowski, Eugenia Mitchelstein, and Matassi 2018) and news sharing (Kümpel, Karnowski, and Till 2015), which are central to political information dynamics on social media. Second, in light of competing claims about incidental exposure and algorithmic curation, the paper tests orthogonal predictions about the relationship between incidental exposure and news engagement. It problematizes and analyzes the temporal ordering of dependent and independent variables, as well as the role of political interest. Finally, the third goal is to determine which temporal ordering is predominant. The question of predominance was posed by Thorson and Wells (2016) in their germinal piece on curated flows, and examining the dynamics of intersecting and interrelated curation processes remains important for understanding political content exposure and engagement on social media platforms.

The study relies on a two-wave, online survey of adult internet users in the United States, collected just before and after the 2018 U.S. Midterm Elections, which reflects the

underlying population of interest. The study examines the longitudinal, cross-lagged relationships between incidental exposure and news sharing, and it also tests the moderating and indirect effects of political interest. Results are discussed in light of their implications for the curated flows framework, theory about incidental exposure and algorithms, and the broader political information environments in democratic societies worldwide.

Curated Flows

On social media platforms, information exposure and engagement are shaped by content curation, which involves the selection, posting, and annotation of media content by a range of different actors, including not just media elites, but also social contacts and algorithms (Thorson and Wells 2016). This insight into social media platforms, which play an outsized role in shaping news and information flows in today's media environment, provides the foundation for an overarching theoretical framework for understanding the fragmented media environment characterized by conditions of high media choice and information overload. The central idea is that 'curated flows' are generated by a variety of curating actors—traditional and non-traditional, elite and non-elite, human and computer—and, thus, individual social media users are situated among multiple, intersecting content flows created by these actors. Therefore, one critical area of research implied by the curated flows framework is a comparison of the various processes that shape information exposure and engagement.

   This article focuses on the relationship incidental news exposure and news engagement, both of which manifest from intersecting and interrelated news curation processes that arise from both social and algorithmic factors. Social curation (Thorson and Wells 2016) refers to information we encounter because it is posted by our social contacts (see also Anspach 2017), and, thus, it is influenced and shaped by the composition of our social networks. Meanwhile, algorithmic curation refers to information exposure driven by the algorithms that social media platforms employ to select and highlight particular pieces of informational content over others with the goal of maximizing user engagement and advertising revenue (Rieder 2017). These forms of curation are not independent, but rather complement one another and play a large role in shaping the news and political content to which individuals are exposed on social media platforms. Algorithms select content posted by a range of other curating actors, including users' social contacts, and the makeup of and interactions with one's social network influence the likelihood that the news algorithm selects content posted by specific individuals (Rieder 2017). Thus, these two types of curating actors are intertwined in the same curation processes, and examining them sheds light on the ways in which individuals navigate various influences on their news exposure on social media platforms other than their own direct selection of media content.

News Engagement

The operationalization of news engagement in prior literature varies, but most literature conceptualizes it as a set of news-related behaviours including clicking an article; liking, commenting on, or sharing a post; or seeking out additional information about a story or topic (Fletcher and Nielsen 2018; Karnowski et al. 2017; Oeldorf-Hirsch

2018). These behaviours contribute to curation processes that facilitate the dissemination of news on social media platforms (Karnowski et al. 2017). While engagement is a product of curation processes, it is also an act of curation, as engagement behaviours are used as criteria in news algorithms (Cotter, Cho, and Rader 2017; DeVito 2017). Thus, the more people engage with a particular news story in these ways, the more likely others are to also see that story. Additionally, news engagement implies a deeper level of attention than mere exposure (Matthes et al. 2020; Vraga et al. 2019). The dimension of attention is often implied in incidental exposure studies, as Tewksbury, Weaver, and Maddex (2001) exemplify: "On occasion, their [audience members'] interest is aroused long enough for them to register a headline and perhaps click and read the accompanying story" (536). This claim implicitly links attention and behaviour, a link that is important because theory suggests that cognitive involvement with a news story is more likely to affect knowledge retention and learning (Matthes et al. 2020), cognitive elaboration (Oeldorf-Hirsch 2018), and habitual political engagement (Karnowski et al. 2017; Lee and Kim 2017).

Incidental Exposure and News Engagement

Incidental exposure refers to unintentional encounters with news or public affairs content (Tewksbury, Weaver, and Maddex 2001). The affordances of social media platforms promote this kind of information exposure, as much of users' exposure to news and political content in social media environments occurs while they are using these platforms for other purposes (Boczkowski, Eugenia Mitchelstein, and Matassi 2018; Fletcher and Nielsen 2018), or because the individual-level choices that shape news flows are indirect, that is, they are targeted at something other than specific news content (Mitchelstein et al. 2020). Recent scholarship documents the prevalence of incidental exposure on social media platforms (Ahmadi and Donghee Yvette 2018; Bergström and Jervelycke Belfrage 2018; Boczkowski, Eugenia Mitchelstein, and Matassi 2018; Bode 2016; Karnowski et al. 2017; Lu and Lee 2019), and the increasing prominence of these platforms as sources of news means that incidental exposure contributes a substantial amount of people's news exposure (Antunovic, Parsons, and Cooke 2018).

Incidental exposure can be seen as a by-product of several types of interrelated curation processes, but in particular social curation and algorithmic curation (Thorson and Wells 2016). The role of individual choice in these curation processes is indirect; that is, choice is not directly related to specific news content. Rather, individuals choose to connect with particular social contacts and engage in certain news-related behaviours, and these choices indirectly shape news exposure. Thus, exposure under these circumstances is incidental, in that users' intention or choice pertains not to the news content itself, but rather to antecedent factors that shape news content. This insight overlaps with two ideas in the incidental exposure literature. First, Bode (2016) argues that social media users exercise 'partial choice' over the content that appears in their news feeds. Direct selection of content occurs, but much of the content that users' see is selected by someone or something else. Second, scholars have pointed to a 'continuum' of 'incidentality' (Mitchelstein et al. 2020)—wherein the locus of users'

choice along the continuum can vary, but is often targeted at something other than specific news content. Some people may choose to construct social networks comprised of news organizations and individuals who follow and post about news (Thorson 2020; Weeks and Lane 2020), or they may choose to engage with news content once it is encountered (Matthes et al. 2020; Wieland and Kleinen-von Königslöw 2020). Importantly, theory does not suggest that individuals exercise no choice at all, or that news exposure is completely random. Rather, users' choices are focussed on stages of news curation processes that either precede or follow exposure itself (Mitchelstein et al. 2020; Thorson 2020; Weeks and Lane 2020).

Incidental exposure has long held an important place in the study of news audiences and political communication. For example, Downs (1957) conceptualized it as a by-product of non-political activity, and argued that it is a rational approach to informing oneself in a democratic society because individuals' attention resources are scarce. The concept has gained renewed attention in recent years due to its potential to reach and engage politically disinterested individuals with news and political information (Fletcher and Nielsen 2018), thereby filling historical engagement gaps created by the rise of digital media technologies, such as cable television and the internet, and the increased number of choices they facilitate (Prior 2007). Whereas news was more or less unavoidable in the 'high-modern' era between the 1950s and 1970s, the expanding availability of different kinds of media content encouraged a sizeable portion of the public to avoid news in favour of entertainment content. But social media, which emerged and became increasingly popular during the 2000s, have the potential to expose these 'news avoiders' to public affairs information despite their preferences, and, the thinking goes, unintentional exposure might encourage people to engage with news and politics, not unlike television viewers with low-to-moderate political interest in a low-choice media environment. While evidence regarding political learning is mixed, with some studies showing effects on learning (e.g. Bode 2016; Lee and Kim 2017; Lu and Lee 2019) and others not (Oeldorf-Hirsch 2018; Shehata and Strömbäck 2021), recent research shows that incidental exposure is related to news engagement (Karnowski et al. 2017; Oeldorf-Hirsch 2018; Weeks et al. 2017; Yamamoto and Morey 2019), and political participation (Kim, Chen, and Gil de Zúñiga 2013; Valeriani and Vaccari 2016).

News sharing is thought to be one of the most important engagement indicators resulting from incidental exposure (Karnowski et al. 2017; Weeks et al. 2017), and this kind of engagement is facilitated by the affordances of social media platforms (Kümpel, Karnowski, and Till 2015). Technology companies consider sharing to be the 'gold standard' form of engagement and a critical part of engagement metrics (Dwyer and Martin 2017; Khuntia, Sun, and Yim 2016) because it requires high levels of motivation (Lee and Ma 2012), and it is associated with social interaction and communication with social ties on social media platforms (Duffy and Ling 2020; Duffy, Tandoc, and Ling 2020; Ihm and Kim 2018; Picone, De Wolf, and Robijt 2016). Within the framework of curated flows, news sharing on social media can be viewed as both an act of curation and a product of it. To the former point, news sharing involves the selection, annotation, and reciprocal exchange of news and information with one's social network (Goh et al. 2019; Kümpel, Karnowski, and Till 2015), placing news sharers at the

centre of 'social curation' processes for others in their social networks. To the latter point, news sharing is itself influenced by the composition of social media networks, as research shows that it is more likely in social networks that are heterogeneous (Beam et al. 2018), and this heterogeneity facilitates incidental exposure. Either way, the literature suggests that incidental exposure should lead to news sharing, as people are both embedded in and engage with socially curated flows of news and information. Based on this predicted association, the following hypothesis is presented:

H1: Incidental exposure at Wave 1 will be positively related to news sharing at Wave 2.

The literature on incidental exposure assigns an important role to political interest, suggesting that engagement effects should be strongest among the least politically interested (Fletcher and Nielsen 2018). This compensatory (i.e. equalizing) effect should occur because individuals with high levels of political interest experience a ceiling; that is highly politically interested individuals are already engaged and do not need to rely on incidental exposure as a stimulus for engagement. Despite this strong claim, evidence supporting it is mixed. While this study examines news engagement, which is theoretically and behaviourally distinct from political attitudes or behaviour, prior research on these related outcomes is useful for assessing the balance of evidence. Research shows that the effects of incidental exposure on perceived issue importance are strongest among the least politically interested (Feezell 2018). Likewise, some work on political behaviour shows that incidental exposure is most strongly related to political participation among people with lower political interest (Valeriani and Vaccari 2016). However, other work in this area shows evidence of the opposite pattern—that is, rather than showing equalizing effects, these studies show evidence of reinforcing effects in which the relationship between incidental exposure and participation is strongest among the *most* politically interested individuals. For example, Heiss and Matthes (2019) find these effects for high-effort participation, and Lee and Xenos (2020) find evidence of reciprocal effects—that is, the relationship between incidental exposure and participation goes both ways, which suggests a reinforcing spiral of exposure and political engagement and implies that the compensatory effects hypothesized by Strömbäck and colleagues (2013) may not occur. Based on these theoretical claims, the study analyzes the moderating role of political interest, and this theoretical relationship is illustrated in Figure 1. However, because of the mixed findings from prior research, a research question is posed rather than a hypothesis.

RQ1: Will the relationship between incidental exposure (Wave 1) and news sharing (Wave 2) vary by individuals' level of political interest (Wave 1)?

Theoretical Implications of News Algorithms

Recent research highlights the role that algorithms play in mediating news exposure social media platforms, as they convert digital trace data on user engagement into criteria that shape subsequent exposure (Thorson et al. 2021). With algorithms as an intermediary, individuals' choices do not always have a direct influence on what they
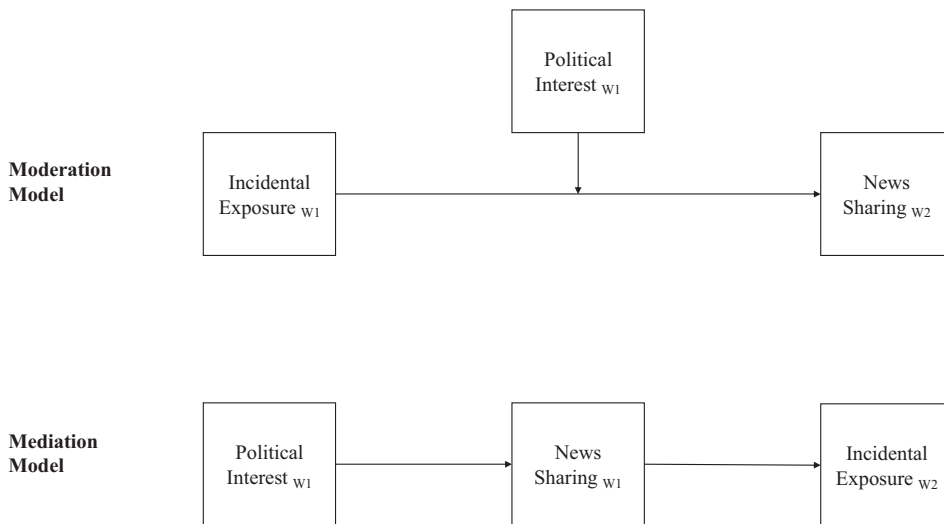
Figure 1. Comparison of the moderation and mediation models.

see (Gillespie 2014), but rather they have an indirect influence by informing a platform's algorithm.

The goal of inferring users' interests is fundamental to the revenue models of social media platforms (Cotter, Cho, and Rader 2017; DeVito 2017), which seek to maximize engagement by showing users content that will keep them engaged (Rieder 2017). To this end, social media companies have developed machine learning techniques to infer interest in probabilistic manner, rather than by asking users themselves about their interests (Flyverbom and Murray 2018). As Thorson and colleagues (2021) describe it, 'digital traces of user behaviour are translated into probabilistic categories that can be used [...] by newsfeed ranking algorithms to ensure that users see 'relevant' content' (2). Relevancy is determined based on user engagement with content (Rieder 2017), and news sharing is the 'gold standard' of engagement (Dwyer and Martin 2017; Khuntia, Sun, and Yim 2016). Therefore, news sharing and other behavioural indicators of engagement with content influence the categorization schemes employed by social media platforms that train newsfeed algorithms to show users content with which they are more likely to engage (Thorson et al. 2021).

The recent focus on algorithms has important theoretical implications for models of incidental exposure and engagement with news content. Whereas prior literature suggests that incidental exposure leads to news engagement (e.g. Karnowski et al. 2017), new considerations regarding algorithmic intermediation imply that the temporal order between incidental exposure and news sharing also may run in the other direction. In other words, engagement with news and political information also may shape subsequent exposure. These theoretical insights about algorithmic intermediation lead me to propose the following hypothesis, which reverses the temporal order from H1:

H2: News sharing at Wave 1 will be positively related to incidental exposure at Wave 2.

Recent findings about the role of algorithms also have theoretical implications for the role that political interest plays in processes of news exposure and engagement.

Prior research has considered political interest to be a moderator: The engagement effects of incidental exposure are predicted to be the highest among those with the lowest political interest (Fletcher and Nielsen 2018; but see Heiss and Matthes 2019). But algorithmic curation implies an antecedent role for political interest, rather than a moderating role. Through its antecedent relationship with engagement, political interest should have an indirect effect on exposure (Thorson et al. 2021). That is, political interest is a background variable that motivates engagement, and, based on that engagement, algorithms categorize users and select subsequent content in order to maximize future engagement. Therefore, algorithmic categorization can be inferred based on the over-time relationship between news sharing and incidental exposure, and indirect links with political interest can be established via its influence on that relationship. Based on this logic, this current study expects to find an indirect relationship between political interest and incidental exposure, which is mediated by news sharing. However, because there is limited prior research about this indirect relationship, a research question is posed rather than a hypothesis.

RQ2: Will the relationship between political interest (Wave 1) and incidental exposure (Wave 2) be mediated by news sharing (Wave 1)?

Cross-Lagged Relationships

One key question posed by Thorson and Wells (2016) in their germinal article on curated flows concerns the relative predominance of various processes of news and content curation. Answering this question is key for understanding how people navigate influences on social media, interact with technology and platforms, and inform themselves about and engage with politics in the contemporary media environment. This study takes on this challenge by comparing the cross-lagged relationships between incidental exposure and news sharing. Determining which temporal ordering displays the stronger relationship will shed some light on the dynamics of curating processes. It is not my contention that one pathway occurs while the other does not; rather, the goal of this study is to test which process, on average, carries more weight in terms of shaping exposure to and engagement with news and political content on social media platforms.

RQ3: Which temporal ordering of incidental exposure and news sharing exhibits a stronger relationship?

Methods

Sample and Data

This study relies on a two-wave online panel survey of adult internet users who reside in the United States. The first wave was collected between September 19-29, 2018, six weeks before the 2018 U.S. Midterm Elections, and the second wave was collected during the month after the elections, between November 7 and December 5, 2018. The survey was administered by a private survey firm, Survey Sampling International (SSI)/ Research Now (now called Dynata), which uses a 'sample matching' procedure to

randomly select subjects from an online panel using quotas to match a population of interest (Callegaro et al. 2014). Quotas for age, gender, race, and census region were used to match adult population demographics as measured in the U.S. Census Bureau's 2016 American Community Survey (ACS).

The sample is reflective of the ACS (see Online Supplemental Appendix). The median age is 49 (as compared to 48 in the ACS), and the majority of respondents are women (51% vs. 50.8% in the ACS) and white (76.8% vs. 76% in the ACS). The average respondent attended some college or has a two-year degree ($M = 4.38$, $SD = 1.71$, where $1 =$ Some high school and $7 =$ Post-graduate degree), and has an annual household income between $45,001 and $75,000 per year ($M = 4.84$, $SD = 2.14$, where $1 =$ Less than $15,000 and $8 =$ More than $150,000). The survey overrepresents people with college and graduate degrees, and it underrepresents people with a high school diploma or less. The survey also underrepresents people living in households making less than $15,000 per year. Therefore, the data were weighted by income and education. Comparisons between the present data and the ACS for these demographics are available in the Online Supplemental Appendix, along with specific values used to create the survey weights.

The first wave has a sample size of $N = 1,493$ and a cooperation rate of 70% (AAPOR 2016; CR3), which is an appropriate metric to report for online panel samples when population lists underlying panel invitations are unknown (Callegaro et al. 2014). The second survey wave has a sample size of $N = 576$, for a 39% retention rate. Missing cases were removed listwise, leaving 562 cases in Wave 2. Descriptive statistics reported below are for the unweighted subset of Wave 2 complete cases.

Measures

Incidental Exposure
Incidental exposure is one of two key outcome variables in the study, and it was measured in both survey waves. The question wording was taken directly from prior research (Kim, Chen, and Gil de Zúñiga 2013). Respondents were asked how often they 'encounter or come across news,' where $1 =$ Never and $7 =$ Very often, on the following types of social media platforms (all of which fit boyd and Ellison's (2007) definition of social media): (1) online message boards or mobile apps (e.g. Reddit); (2) social networking sites or apps (e.g. Facebook); (3) microblogging sites or apps (e.g. Twitter); (4) photo-sharing sites or apps (e.g. Instagram); (5) video-sharing sites or apps (e.g. YouTube); and (6) mobile messaging apps (e.g. Snapchat). Responses were averaged to create a scale (Cronbach's alpha $= .90$ for Wave 1 and .91 for Wave 2), and the logged to normalize the distribution. The Wave 1 variable has a mean of .73 ($SD = .58$), and the Wave 2 variable has a mean of .79 ($SD = .61$).

News Sharing
The *news sharing* variable was also measured in both survey waves, and it is based on prior literature (Lane et al. 2019). Five questionnaire items (per wave) ask respondents how often they 'post or share' content related to current events or politics, including (1) news stories, (2) personal experiences, (3) thoughts, and (4) original content (e.g.

photos, videos, memes, or gifs), and (5) content created by others. These items were averaged for each respondent, then unobtrusively logged to normalize the distribution (Wave 1: Cronbach's alpha = .96, $M = .65$, $SD = .67$; Wave 2: Cronbach's alpha = .96, $M = .68$, $SD = .69$).

Political Interest

Political interest is a key factor motivating news consumption (Strömbäck, Djerf-Pierre, and Shehata 2013), and it also features as an intervening variable in both the incidental engagement model (Fletcher and Nielsen 2018) and the algorithmic exposure model (Thorson et al. 2021). Respondents were asked to rate their political interest, where 1 = Not at all interested and 7 = Very interested, in local or regional politics, national politics, and international politics. These items were averaged for each respondent (Cronbach's alpha = .89, $M = 4.44$, $SD = 1.75$).

Control Variables

The analysis controls for demographics including *age, education, annual household income,* and *gender.* The average respondent in the social media subsample is 49 or 50 years old ($M = 49.62$, $SD = 15.90$), attended some college or has a two-year degree ($M = 4.22$, $SD = 1.71$, where 1 = Some high school and 7 = Post-graduate degree), and has an annual household income between $45,001 and $75,000 ($M = 4.51$, $SD = 2.15$, where 1 = Less than $15,000 and 8 = More than $150,000). More than half of the subsample (57%) is female. The analysis also controls *strength of party identity* and *purposeful news use.* The former variable was measured using three survey items borrowed from the American National Election Studies 2016 Election Survey, which asked respondents about (a) their party identity, (b) [if a party was identified] the strength of that identity (Strong or Not that strong), and (c) [if a party was not identified] which party they lean towards. These questions were used to create a 7-point scale (-3 = Strong Democrat, 0 = Nonpartisan, 3 = Strong Republican), which was then folded so that 0 = Non-partisan and 3 = Strong partisan ($M = 1.96$, $SD = 1.08$). The latter variable was measured in terms of platform (Bakker and De Vreese 2011), and thirteen questions asked respondent how often (1 = Never, 7 = Several times a day), they use newspapers, news magazines, radio, television, online news, and social media news. The thirteen items were averaged for each respondent (Cronbach's alpha = .97, $M = 2.89$, $SD = 1.09$).

Results

H1 predicts that incidental exposure at Wave 1 will be positively related to news sharing at Wave 2, controlling for news sharing at Wave 1. Meanwhile, H3 predicts that news sharing at Wave 1 will be positively related to incidental exposure at Wave 2, controlling for incidental exposure at Wave 1. Finally, RQ3 asks which of these relationships is stronger. These two hypotheses and one research question makeup a classic 'cross-lagged' research problem, and a path model fit in the structural equation modelling (SEM) framework was used to test it. The endogenous and exogenous variables were residualized on the set of controls, which include age, gender, education,

Table 1. Correlation matrix used in structural models.

Variable	1.	2.	3.	4.
1. Incidental Exposure $_{W1}$	—			
2. Incidental Exposure $_{W2}$	.783	—		
3. News Sharing $_{W1}$	.618	**.615**	—	
4. News Sharing $_{W2}$	**.602**	.717	.790	—

Notes. Cell entries are zero-order Pearson's correlation coefficients. Cross-lagged coefficients are in bold. $N = 564$. All coefficients are statistically significant with $p < .001$.

income, strength of party identity, and news use. The correlation matrix of these residualized variables is reported in Table 1.

To identify the model (i.e. to ensure the model has fewer parameters to estimate than observed pieces of information), the covariance between the Wave 2 variables is constrained to .055 (unstandardized), an estimate obtained through preliminary regression analysis. Results are shown in Figure 1. The model is a good fit to the data based on widely accepted criteria for model fit in SEM (Hu and Bentler 1999). The chi-square statistic is non-significant (χ^2 (1) = 1.283, $p = .257$), and adjusted chi-square indices are equal to or close to 1.000 (CFI = 1.000; GFI = 1.000; TLI = .998). Additionally, error-based indices are close to zero (RMSEA = .022, $p = .531$; SRMR = .011). Results show that both 'cross-lagged' coefficients are positive and statistically significant, in support of H1 and H2. The completely standardized coefficient for the path, news sharing to incidental exposure ($\beta = .258$, $p < .001$), is about two-and-a-half times larger than the coefficient for the reverse path ($\beta = .102$, $p < .05$). However, a Wald test reveals that these coefficients are not statistically different from one another (W (1) = .688, $p = .407$). Therefore, the answer RQ3 is 'neither': One path is not stronger than the other.

RQ1 and RQ2 ask whether political interest plays different roles for the two 'cross-lagged' paths. RQ1 asks whether the path from incidental exposure to news sharing will be moderated by political interest, whereas RQ2 asks if the path from news sharing to incidental exposure will be catalysed by political interest such that news sharing mediates the relationship between political interest and exposure. Moderation and mediation tests were conducted in the same modelling framework as above, using separate models. In the moderation model, an interaction term was included for the relationship described in RQ1, incidental exposure (W1) to news sharing (W2) by political interest (W1). To ensure that political interest doesn't moderate both 'cross-lagged' paths, an interaction term for political interest (W1) was also included for the path from news sharing (W1) to incidental exposure (W2). Results, which are reported in Table 2, show that the former interaction term is statistically significant ($\beta = .166$, $p < .01$), whereas the latter interaction term is not ($\beta = -.034$, $p = .724$). The significant interaction was re-estimated in the ordinary least squares (OLS) framework, and a Johnson-Neyman test was performed to determine the point(s) at which the effect becomes statistically significant. The test reveals that the relationship is statistically significant among those scoring at least 3.55 on political interest (see Figure 2). This result indicates that, rather than a ceiling effect in which the relationship is stronger among individuals with low levels of political interest, a 'rich-get-richer' pattern is observed in which the relationship is stronger among people with high levels of political interest. Thus, while political interest moderates the over-time relationship

Table 2. Conditional and indirect relationships.

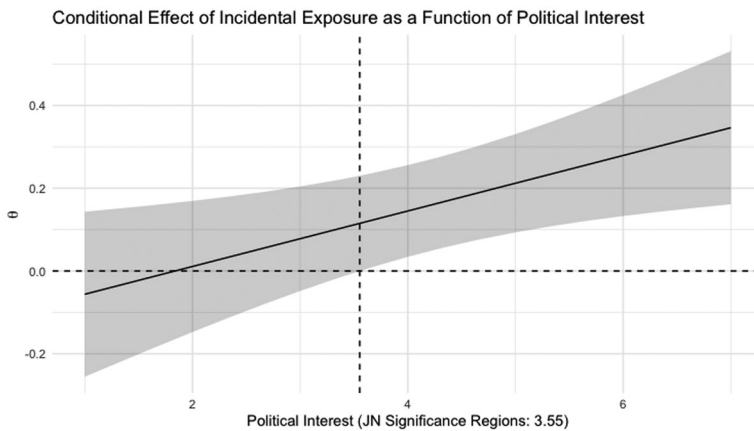| Moderation	News Sharing $_{w2}$	Incidental Exposure $_{w2}$
X1: Incidental Exposure $_{w1}$	–.048	.480***
X2: News Sharing $_{w1}$	.627***	.269**
W: Political Interest $_{w1}$	.080	.086*
X1*W	**.166****	—
X2*W	—	**-.034**
Mediation	News Sharing $_{w2}$	Incidental Exposure $_{w2}$
Direct (W)	.067	.093*
Indirect (W➡X1)	**.016**	—
Total (W➡X1)	.083	—
Indirect (W➡X2)	—	**.063*****
Total (W➡X2)	—	.156**

Notes. Moderated and mediated relationships estimated from separate path analyses fit in the structural equation modelling (SEM) framework. $N = 562$. *$p < .05$, **$p < .01$, ***$p < .001$. Completely standardized estimates (β) reported. Full model results available upon request.
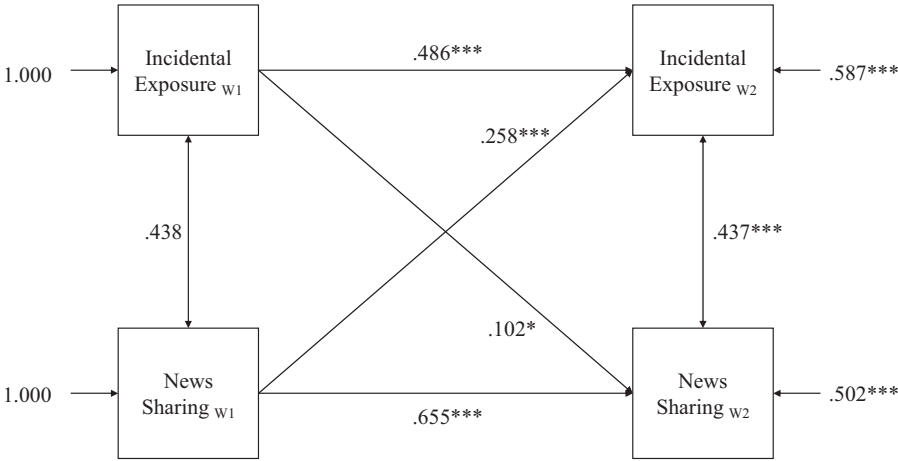
Figure 2. Cross-lagged path model estimated in the structural equation modelling (SEM) framework. χ^2 (1) = 1.283, $p = .257$; CFI = 1.000; GFI = 1.000; TLI = .998; RMSEA = .022, $p = .531$; SRMR = .011. $N = 562$. *$p < .05$, **$p < .01$, ***$p < .001$. Completely standardized estimates (β) are reported. All variables are residualized on the controls, which include age, gender (1 = female), education, income, strength of party identity, and news use. In order to identify the model, the covariance between the Wave 2 variables is constrained to .055 (unstandardized). Although they appear to differ in magnitude, a Wald test shows that the cross-lagged paths are not statistically different from one another W (1) = .688, $p = .407$.

between incidental exposure and news sharing, the observed pattern of moderation is opposite from what is asked by RQ1 (Figure 3).

In the mediation model, indirect paths were included for the indirect mediation relationship described in RQ2, political interest (W1) to news sharing (W1) to incidental exposure (W2). To ensure that political interest doesn't display indirect relationships through both 'cross-lagged' paths, an indirect path was also included for political interest (W1) to incidental exposure (W1) to news sharing (W2). Results, which also are presented in Table 2, show that the former indirect path is statistically significant ($\beta = .063$, $p < .001$), whereas the latter indirect path is not ($\beta = .016$, $p = .115$). Thus, the results suggest an affirmative answer to RQ2: Political interest has an indirect

Conditional Effect of Incidental Exposure as a Function of Political Interest

Figure 3. A Johnson-Neyman (JN) plot showing the conditional effect (θ) of incidental exposure (W1) on news sharing (W2) at varying levels of political interest (W1). The relationship between incidental exposure and news sharing is positive and statistically significant where political interest is equal to or higher than 3.55.

relationship with incidental exposure through news sharing, but it does not have an indirect relationship with news sharing through incidental exposure.

Discussion

This article started with the observation that on social media platforms, individuals are embedded in multiple, intersecting content flows (Thorson and Wells 2016). Two orthogonal sets of predictions have emerged from the growing effort to understand how people are exposed to and engage with news and political content on these platforms. Theory predicts that where media choice is relatively low, both politically interested and politically uninterested individuals should engage with news (Stromback, Djerf-Pierre, and Shehata 2013). Because incidental exposure presents a partial choice scenario (Bode 2016), this logic therefore suggests that incidental exposure will lead to news engagement, particularly among the least politically interested individuals (e.g. Fletcher and Nielsen 2018), although findings regarding equalizing effects on political engagement are mixed (e.g. Heiss and Matthes 2019; Valeriani and Vaccari 2016). Meanwhile, theory about news algorithms suggests the reverse temporal ordering and an antecedent role for political interest (e.g. Thorson et al. 2021). The goals of this study were threefold: (1) to integrate literature on incidental exposure and algorithms into an overarching theoretical framework of curated flows (Thorson and Wells 2016); (2) to test orthogonal predictions regarding temporal ordering and the role of political interest; and (3) to compare the 'cross-lagged' relationships, which tells us something about the relative weight that each temporal ordering carries in terms of shaping exposure and engagement on social media platforms.

The study finds that both 'cross-lagged' paths were statistically significant. Incidental exposure is positively related to news sharing over time, as predicted by prior literature on news engagement (e.g. Karnowski et al. 2017), and the reverse-ordered relationship is also positive and statistically significant, as predicted by

literature about news algorithms (e.g. Thorson et al. 2021). And while the coefficient is slightly stronger for the latter path, the difference between the two coefficients is not statistically significant. Thus, the study finds no evidence that one order is predominant over the other. Rather, both paths carry equal weight in terms of shaping individuals' exposure to and engagement with news and political content on social media. That said, the study does find differences in terms of the role that political interest plays in each stage of the process. The study finds that political interest moderates the path from incidental exposure to news sharing, though in a direction that suggests reinforcement rather than compensatory or equalizing effects. On the other hand, political interest plays a very different role in the other 'cross-lagged' path: There is an indirect effect of political interest on incidental exposure via news sharing. Thus, the role of political interest distinguishes the two cross-lagged paths as representative of different stages in a larger process of news exposure and engagement.

Before discussing the implications of these conclusions, it is important to consider how they are limited by the study's design, measurement, and analysis. First, the sample is not a true probability sample, but is rather based on quota sampling techniques. However, the sample does reflect the target population along key variables. Second, causal inferences cannot be made with these data because the study cannot eliminate all alternative explanations. However, the design is longitudinal, which allows the study to test differences in time ordered processes. Third, the study relies on self-reported measures, and these measures may over- or under-estimate relevant behaviours. Still, these types of measures are commonly used in survey-based research, and respondents answered the questions with internal consistency. An additional limitation related to measurement is that the current way of measuring incidental exposure does not distinguish between passive information scanning and intentional processing of information (Matthes et al. 2020). This distinction is theoretically and practically important for establishing a link between incidental exposure and news engagement, and future research could develop measures that capture it. Fourth, the study cannot assess 'growth curves' because it only has two time points. Ceiling effects may be observed if such curves can be estimated, and future research could replicate this study's design with more time points.

Finally, there are reasons to expect that the relationship between incidental exposure and news engagement might vary across different social media platforms, because the affordances and norms that shape posting on these platforms also differ in ways that affect both variables. For example, posting news is more common on Facebook and Twitter than it is on Instagram (Shearer and Matsa 2018), making exposure and engagement more likely on those platforms. Meanwhile, Snapchat is designed for sharing in smaller circles of friends (Piwek and Joinson 2016), which could limit the diffusion of news through social networks. While there is not enough space in this article to study the focal relationships for each social media type, comparing platforms might prove to be a fruitful avenue for future research.

Turning now to the implications of the findings for theory, results pertaining to both the moderation and mediation models suggest that the most politically interested individuals are more likely to be exposed to and engage with political content. This conclusion points towards a 'Matthew Effect' (Heiss and Matthes 2019; Kümpel

2020), or a 'rich-get-richer' process of news exposure and engagement. This conclusion is in line with prior research on news feed algorithms (Thorson et al. 2021), which suggests that engagement predicts future exposure, which in turn leads to more engagement. However, it runs counter to some theory about the role of media choice in shaping information gaps (Strömbäck, Djerf-Pierre, and Shehata 2013), as it does not align with claims regarding the compensatory nature of the societal effects of incidental exposure (Fletcher and Nielsen 2018), which suggest that social media have the capacity, through their tendency to incidentally expose people to news and political content, to compensate for historical engagement gaps created by the rise of digital media technologies (Prior 2007). Contrary to this prediction, the current findings show that the most politically interested people are also the most likely to encounter and engage with news and political content in social media environments.

This conclusion raises concerns about information inequities. While many people are embedded in news-rich social media networks, others may live in social media news deserts, in which news and political content is sparse (Thorson 2019). It is important for research to examine the factors that create these deserts, examining variables beyond political interest, such as the construction of social networks and the offline factors that shape them (Mitchelstein et al. 2020; Thorson 2020; Weeks and Lane 2020), as uncovering these antecedents is important for promoting equity and inclusion in the political system and to understand who is engaged with the political system and who isn't.

The results also point towards a reciprocal relationship between exposure and engagement, which can be interpreted either as a 'virtuous circle' from the normative perspective of deepening political engagement, or an 'unvirtuous circle' from the normative perspective of inclusiveness in democratic processes (e.g. Lee and Xenos 2020; Strömbäck and Adam 2010). Although the evidence presented here cannot establish causal relationships, the findings imply that exposure and engagement are linked in a reciprocal cycle of information exposure and engagement. But this conclusion raises the possibility of ceiling effects. What are the limits of this reciprocal relationship? This study is unable to examine 'growth curves,' because estimating these curves in the latent growth modelling (LGM) framework requires at least three time points to identify the statistical model. Future research should examine these growth curves by designing a study with at least three timepoints, because establishing the limit of the reciprocal relationship between exposure and engagement is an important unanswered question for theory on news exposure and engagement.

Finally, the findings raise ethical and normative concerns about the role of individual choice in selecting news content on social media platforms. Choice in these environments is partial (Bode 2016) and indirect (Gillespie 2014), raising concerns about individual autonomy in online environments in which humans interact with algorithmically intelligent computer platforms. These algorithms are proprietary, and while we understand the broad contours of their selection criteria (Rieder 2017), there is a general lack of transparency about the specific reasons people see certain content. This opacity is problematic in light of the prevalence of mis- and disinformation on social media platforms (Marwick and Lewis 2017; Tucker et al. 2018), which could undermine democratic processes at both the collective and individual levels. Thus, public policies

that promote algorithmic transparency and algorithmic literacy education are important for maximizing individual choice in modern democratic societies.

In conclusion, this research has shown evidence that supports two orthogonal predictions about news exposure and engagement on social media platforms. Incidental exposure is related to subsequent news sharing, and news sharing is also related to subsequent incidental exposure. The study also illuminates the different roles that political interest play in different the stages of the process of exposure and engagement; however, they also highlight that regardless of the temporal order, exposure and engagement are likely interrelated in a reciprocal relationship that produces a 'Matthew effect' or 'rich-get-richer' dynamic. Future research should continue to investigate these dynamics, enhancing our understanding of the ways in which people encounter and engage with political information in the contemporary media environment.

Data Availability

The dataset supporting this analysis is available at http://dx.doi.org/10.17632/73tpgmb829.2.

Disclosure Statement

The author declares no conflicts of interest.

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