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News Media Use and Political Engagement Among Adolescents: An Analysis of Virtuous Circles Using Panel Data

SANNE KRUIKEMEIER and ADAM SHEHATA

This study analyzes reinforcing spirals between news media use and two manifestations of political engagement: political interest and participation intention. Drawing on a three-wave panel study among adolescents, we test the Virtuous Circle Thesis (VCT) in both an online and an offline setting, by distinguishing between selection effects and media effects as key ingredients of the VCT. Overall, the findings lend mixed support to the general argument. While the relationship between specific forms of news media use and political interest appears to be driven primarily by selection effects, reciprocal relations were found mainly between television news and participation intention. The VCT assumption of reciprocal influences was supported most clearly when adolescents' total news media use was considered. Taken together, virtuous circles appeared to operate rather similarly online and offline.

Keywords media effects, news media use, political engagement, reinforcing spirals, selection effects, virtuous circle

The link between news media use and citizens' engagement in politics is one of the most prominent issues in the field of political communication (Holt, Shehata, Strömbäck, & Ljungberg, 2013). Central to the discipline is the discussion whether news media have the potential to strengthen democracy by encouraging citizens' engagement in politics, or whether the news media only attract those citizens who are already politically interested and active (Boulianne, 2011; Strömbäck & Shehata, 2010). At the heart of this discussion lies the Virtuous Circle Thesis (VCT). According to Norris (2000), the "most politically knowledgeable, trusting, and participatory are most likely to tune in to public-affairs coverage. And those most attentive to coverage of public affairs become more engaged in civic life" (p. 317). Through a reinforcing spiral, it is argued, a divide between politically engaged and non-engaged citizens emerges.

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Despite the widely recognized and applied assumptions made by Norris, the VCT rests on assumptions that are seldom tested empirically due to lack of longitudinal data. To examine reciprocal relationships between news use and political engagement, and enable stronger empirical claims about causal relations, panel data are needed. While Norris (2000) formulated the VCT primarily on cross-sectional data analyses, recent studies have made important progress in putting this argument to test. Still, however, research has often been restricted by cross-sectional and two-wave research designs (e.g., Gil De Zúñiga, Jung, & Valenzuela, 2012; Ksiazek, Malthouse, & Webster, 2010; Livingstone & Markham, 2008; Moeller & De Vreese, 2013), despite the fact that "multi-wave" panel data are needed to fully capture reciprocal relations over an extended period of time. Taken together, many scholars assume reciprocal relationships but few have the data to support such claims.

This article attempts to make three distinct contributions to the political communication literature, in order to better understand the dynamic relationship between news media use and political engagement. First, we address the key assumption of reciprocal relationships using *three* waves of panel data covering a period of three years. By distinguishing between *selection effects* and *media effects*, we will examine which "causal forces run stronger" (Boulianne, 2011, p. 157), as some scholars point to the existence of asymmetrical reciprocal causation (e.g., that news use has a stronger effect on political engagement than vice versa; Boulianne, 2011; Gil De Zúñiga et al., 2012). Second, following Moeller and De Vreese (2013), we focus particularly on the role of news media as an agent for adolescents' political socialization in a high-choice media environment, where adolescents have multiple opportunities for media choice (Prior, 2007). As recently argued by Slater (2015), analyzing reciprocal relations between media use and identity formation during adolescence and young adulthood may be particularly important: "Since personal and social identities are still in formation, there is room for escalation of both identity-consistent exposure and effects. The reinforcing spirals process during socialization can help crystallize personal and social identity as well as maintain such identities over time" (p. 11). Scholars posit that early learning is very powerful and enduring in adult life (e.g., lifelong persistency model), while it is also assumed that people learn their whole life (e.g., lifelong openness model; Jennings & Niemi, 2014; Sears, 1975; Sears & Levy, 2003). Finally, following the multiple ways in which adolescents can access news in today's high-choice media environment (Moeller & De Vreese, 2013; Prior, 2007), we bring the study of virtuous circles to new territory by comparing the effects of online and traditional news media use on political engagement. More specifically, we will test the hypothesis that virtuous circles and reinforcing spirals operate differently in an online media environment compared to the traditional news media.

By analyzing reciprocal effects between online and traditional news use and political engagement, we hope to offer important insights into the role of online news media in political socialization processes. Hence, the key research question of this study is, "To what extent are there reciprocal relationships between online and traditional news consumption and political engagement (i.e., political interest and participation intention)?" To answer our research question, we use three waves of a longitudinal panel data collected among adolescents in Sweden.

Socialization and Virtuous Circles

During the past few decades, a growing body of literature has investigated the media's impact on citizen engagement from different perspectives (Newton, 1999; Norris, 2000). In general, some have argued that exposure to news media has negative effects on citizens' engagement in politics, with detrimental repercussions on democracy (for a similar discussion, see Avery, 2009; Mitchelstein & Boczkowski, 2010; Strömbäck & Shehata, 2010). According to "media malaise" theorists, the lack of substance, focus on negativity, and emphasis on conflict and violence in news coverage fuels mistrust in politics and weakens political efficacy (Avery, 2009; Robinson, 1976; Strömbäck & Shehata, 2010). Other scholars argue, however, that the news media has a "mobilization" effect: Citizens who are exposed to news media are likely to become more politically interested and active (Moeller & De Vreese, 2013; Strömbäck & Shehata, 2010). In the present study, we adopt a socialization perspective according to which news media can inform, educate, and mobilize young citizens to become politically interested and active (Holtz-Bacha & Norris, 2001; Mitchelstein & Boczkowski, 2010; Newton, 1999). At the same time, today's high-choice media environment provides endless opportunities to select media that meet the interests and preferences of the individual, leading to a significant degree of "self-socialization" where human agency plays a key role. As argued by Arnett (1995), adolescents use media selectively as part of their identity formation, which in turn contributes to "the cultivation of one's values, abilities, and hopes for the future" (p. 522).

Such a self-socialization perspective is closely related to Norris' (2000) work on virtuous circles. She emphasized that media use and engagement reinforce each other, resulting in mutually reinforcing spirals. Politically engaged citizens are motivated to pay attention to the news and they consequently learn from that media, which lowers citizens' barriers to become politically active (Norris, 2000). Thus, those who are motivated enough to seek out, follow, and pay attention to the news are more likely to develop their political engagement further. This relates closely to the acclaimed *reinforcing spiral approach* introduced by Slater (2007). He argues that media consumption influences beliefs and behaviors—such as political engagement—and in turn, beliefs and behaviors influence media consumption. These effects will occur conjointly over time, turning into a spiral of continuous influences (Slater, 2007).

The distinction between *selection* effects and *media* effects is crucial to both the VCT as well as the reinforcing spiral approach, and it helps us to better understand the political socialization potential of news media. However, while both theories rest on the assumption of reciprocal influences between political engagement and media use, this dynamic process can be analytically divided into two distinct mechanisms: The (a) politically engaged self-select into the news media, while (b) news media use promotes further engagement. Even though the VCT clearly relies on a reciprocal influence assumption, it is far from clear whether these influences are symmetric or whether they run more strongly in one direction than the other. In fact, as argued earlier, the assumption of reciprocity is very seldom tested empirically.

Although several studies have found tentative support for the underlying processes behind the VCT and reinforcing spirals, using cross-sectional (see, e.g., Curran et al., 2014; Liu, Shen, Eveland, & Dylko, 2013; Moeller & De Vreese, 2013), two-wave (Avery, 2009; Dimitrova, Shehata, Strömbäck, & Nord, 2014; Gil De Zúñiga, Molyneux, & Zheng, 2014; Holbert, 2005; Strömbäck & Shehata, 2010), three-wave (Boulianne, 2011) and even four waves of panel data (Holt et al., 2013),

the assumption of reciprocal influences, as well as the relative importance of selection and media effects, are seldom tested empirically and explicitly using multi-wave panel data (see Boulianne, 2011; Gil De Zúñiga et al., 2014). Not only are such issues important to address from a theory-testing perspective, but, as we argue next, bringing the VCT to new territory may shine important light on how reinforcing spirals may differ on traditional and online media platforms. As a first hypothesis, we put the VCT assumption of reinforcing spirals to test:

H1: There are reciprocal influences between news media use and political engagement over time, covering both selection effects and media effects (the virtuous circle hypothesis).

Traditional Versus Online News Media Use

Our approach to comparing virtuous circles based on traditional and online media follows the distinction between selection and media effects. As we argue, it is possible to reconstruct two broad positions from the literature on digital media and political engagement that could inform two competing hypotheses on the differences between virtuous circles based on online and traditional news media use. Importantly, however, to fully understand the reinforcing spirals that may be at work, considering both potential differences in selection processes and media effects is crucial.

During the past two decades, some scholars have repeatedly argued that online news sources could promote political engagement, especially among younger citizens (for an overview, see Hindman, 2009). While various rationales have been proposed to support this viewpoint (Boulianne, 2011; Esser & De Vreese, 2007; Johnson & Kaye, 2003; Moeller, De Vreese, Esser, & Kunz, 2014; Moy, Manosevitch, Stamm, & Dunsmore, 2005; Tedesco, 2008), the key argument relates to barriers of obtaining news and information (selection effects) as well as the mobilizing potential of customized and personalized content (media effects).

Focusing on the selection process side of the virtuous circle equation, it is commonly argued that the Internet lowers the resources—in terms of time and effort (someone can search for the news instantly)—needed to find news, and offers a larger and more diverse supply of political content. This makes it easier for citizens to access and acquire political and current affairs news (Boulianne, 2011; Tedesco, 2008). Less engaged citizens might, therefore, gain from using the Internet for news consumption. This is perhaps even more likely with the rapid rise of social media as a source of news particularly among younger groups of citizens (Gil De Zúñiga et al., 2012; Nielsen & Schrøder, 2014). Through their digital social networks, users can share and receive news recommendations in a setting where social communication transcends traditional boundaries between private and public, between entertainment and politics, etc. In that sense, news encounters on social media may to some extent even occur inadvertently, as highlighted by a recent report from the Pew Research Center. The report characterized news exposure on Facebook as a common but largely incidental experience: "All in all… it may be the very incidental nature of the site that ultimately exposes more people to news there. Indeed, the more time one spends on the site, the more likely they are to get news there" (Mitchell, Kiley, Gottfried, & Guskin, 2013, p. 3). Thus, personal motivation and self-selection is supposed to be less important in the online environment, as political news and information can be acquired at a "lower cost."

Turning to the media effects side of the VCT, arguments focus on aspects related to user control, information processing, and interactivity. For instance, since the online environment offers greater user control and opportunities to easily find, share, and discuss news of personal importance, user involvement is strengthened. Thereby, online news use typically requires more attention and higher likelihood of active forms of information processing, which, in turn, promotes further interest (Boulianne, 2011). Thus, compared to traditional news media, the online news environment provides mechanisms that encourage *user agency*, which in turn may boost adolescents' sense of self-efficacy. These mechanisms include interactivity more broadly, as well as possibilities to discuss and share news, as well as to contribute user-generated content (see, e.g., Hermida, Fletcher, Korell, & Logan, 2012). Thus, finding news and information about political affairs of personal relevance is easier than ever, which subsequently can mobilize users into political action (Boulianne, 2011). In short, using and experiencing online news may be qualitatively different from consuming traditional news media.

In contrast to the arguments just outlined, the literature also provides less "optimistic" accounts regarding the mobilizing function of online media (Scheufele & Nisbet, 2002). For instance, rather than pointing to lower news barriers some argue that selection effects are one of the distinguishing features of the online media environment. The tremendous growth of media outlets across multiple platforms has resulted in a fragmented high-choice media environment where selective exposure and personal content preferences increasingly determine media use (Bennett & Iyengar, 2008; Sunstein, 2001). Citizens who lack an interest in politics can easily avoid news, with political motivations becoming more important for explaining individual-level differences in news exposure. With higher levels of user control, greater diversity and supply of content, and endless opportunities to seek out media according to personal preferences, the selectivity barrier for accessing news may be higher online than on traditional media—leading to larger news exposure gaps between engaged and disengaged citizens (Prior, 2007).

When it comes to the media effects side, various arguments point in the direction of relatively weak effects of using online news. First, if online news primarily attracts citizens who are highly politically engaged to begin with, there may be little room for additional mobilization. Second, it is sometimes argued that the online news experience is different from traditional media. While printed newspapers often publish in-depth stories, including background information and thematic frames (Leandros & Doudaki, 2009), online news is rather characterized by a regular *flow* of constantly updated stories that are shorter and less detailed. Thus, online news is primarily about *immediacy* (Karlsson, 2011). In combination with higher levels of control over the selection of news, users seem to read less national, international, and political news in an online environment (Santana, Livingstone, & Cho, 2011; Tewksbury & Althaus, 2000). Finally, some scholars point out that "people appear to perceive the printed-paper medium as best suited for effortful learning, whereas the electronic medium is better suited for fast and shallow reading" (Ackerman & Goldsmith, 2011, p. 29).

Taken together, the two sides in the literature on media use and political engagement make different predictions on how the reciprocal dynamics of the VCT operate on traditional and online media environments. They also provide different arguments and empirical evidence supporting their accounts. Through the lens of the VCT, these two accounts can be summarized in the following way. While both perspectives assume reciprocal influences, they differ in the relative strength of self-selection and media effects. On the one hand, the *online optimist* account assumes lower barriers for accessing news

online and thereby weak self-selection, but relatively stronger media effects on engagement. On the other hand, the *online pessimist* account assumes substantially stronger selection effects in the online environment, due to the greater choice opportunities available on the Internet. Media effects are expected to be less important among this already highly engaged group, since both the character of online news as well as the way users encounter and process (browsing and news scanning) these stories is qualitatively different in a traditional media setting. Based on these two versions of virtuous circles on the Internet, we contrast two competing hypotheses on the relative importance of selection effects and media effects in an online environment:

H2a: Virtuous circles online are characterized by relatively weak selection effects and strong media effects (the online optimist hypothesis).

H2b: Virtuous circles online are characterized by relatively strong selection effects and weak media effects (the online pessimist hypothesis).

Engagement: Interest and Participation

Before we test our specific expectations, we must define and explain how political engagement is operationalized. Political engagement can be conceptualized in many different ways (Delli Carpini, 2004; Alesina & Giuliano, 2011; Sylvester & McGlynn, 2010). Delli Carpini (2004) indicates that engagement has different components, but notes that most scholars agree that it constitutes of having, for instance, democratic norms and values (e.g., political interest), having political beliefs (e.g., in the current study, intention to participate), or engaging in actual behavior (e.g., voting). Previous studies that tested virtuous circles also employed different dependent measures, such as interest in politics (Boulianne, 2011; Curran et al., 2014; Holt et al., 2013; Livingstone & Markham, 2008), offline and online political participation (Dimitrova et al., 2014; Gil De Zúñiga et al., 2012; Gil De Zúñiga et al., 2014; Holt et al., 2013; Liu et al., 2013; Livingstone & Markham, 2008), and political trust (Avery, 2009; Moeller & De Vreese, 2013). Although we agree that all of these measures fall under the umbrella of political engagement, this study includes two important components of political engagement, namely political interest and participation intention. Intended political participation indicates adolescents' positive orientation toward political participation. This positive orientation might predict how they will politically behave in their adult life. Research found that when youngsters are socialized within a system (e.g., parental influence, media influence, political education, or influence of activities—joining of youth affiliations) and become positive toward the idea of voting, joining a party and becoming politically active, they, in turn, become politically active in their adult life (McFarland & Thomas, 2006).

Furthermore, we will focus on political interest as the second dimension, as this is one of the most important components of political engagement (Delli Carpini, 2004). Political interest is regarded as a motivational component of political engagement, which in future life can be a powerful driver of political participation (Holt et al., 2013; Prior, 2010).

Method

This study uses data from three waves of a longitudinal panel survey conducted among youths who were between 13 and 17 years old during the first wave of data collection. The data were

gathered annually, with approximately one year between each panel wave. Data collection was conducted in Örebro, a region with a population of approximately 275,000 people in central Sweden. This region is representative of the national averages in terms of demographics such as unemployment rate, family income, population density, and political leanings. The sample included all 13- to 14-year-old students (Cohort 1: junior high school) and 16- to 17-year-old students (Cohort 2: senior high school) at 13 (out of 26) different schools in the region, representing approximately 50% of all students in the target groups. The schools were selected in order to comprise both vocational and theoretical programs, as well as schools in areas representing differences in terms of social and ethnic backgrounds. Within the selected schools, all students in the respective age groups were included in the sample. The number of respondents (and the response rates) for the three panel waves are distributed as follows: Cohort 1: 904 (94%), 883 (89%), 843 (88%); Cohort 2: 892 (85%), 807 (81%), 740 (81%). Sixty percent of all respondents participated in all three waves.

The study is thus not based on a random national sample, but a regional one, and the strategic sampling ensured representativeness and variation of significant background variables.[1] The research design, based on the respondents filling out questionnaires in the classroom during ordinary school hours, managed by trained research assistants, made a random national sample almost impossible. The strength, however, is the very high response rate across the three panel waves as well as the quality of the data following the on-site administration and monitoring of questionnaire completion. See the Appendix for a full table of the response rates at each panel wave.

Measures

Media Use Variables. In the present study we distinguish between four types of news media use. Respondents were asked how often they follow the news (a) by reading printed daily newspapers, (b) by listening to radio news, (c) by watching television news, and (d) by using the Internet to follow the news—with response categories ranging from 1 (At least five days a week) to 5 (Never). The scales were inverted and recoded to range between 0 (minimum value) and 1 (maximum value). For the purpose of this study, the first three are considered "traditional news media" sources.

Political Mobilization Variables. As discussed earlier, we test the VCT in this study using two engagement variables. Adolescents' *political interest* was measured using the following three survey items: (a) How interested are you in politics?, ranging from 1 (Not at all interested) to 5 (Very interested); (b) How interested are you in what is happening in society?, ranging from 1 (Not at all interested) to 5 (Very interested); and (c) People differ in how they feel about politics. What are your feelings?, ranging from 1 (Extremely boring) to 6 (Really fun). These items were recoded to range between 0 and 1 before averaged into a single political interest scale (Cronbach's $\alpha = 0.82$, at Wave 1). *Political participation intention* is based on three items focusing on adolescents' likelihood of engaging in traditional forms of participation. Respondents were asked about the probability that they in the future—as adults—will (a) vote in national elections, (b) join a political party, and (c) become a political candidate for a local or city office, with response categories ranging from 1 (Definitely not) to 4 (Definitely). The scales were recoded to range between 0 and 1 before being added into an institutional participation index (Wave 1 Cronbach's $\alpha = 0.64$, $M = 0.39$, $SD = 0.21$).

Control Variables. In addition to the news media and mobilization variables presented earlier, a number of control variables are used in the empirical analyses. These include political knowledge, frequency of political discussions (Eveland, Hayes, Shah, & Kwak, 2005), as well as family socioeconomic status. The measurements of all variables are presented in more detail in the Notes section.[2]

Data Analysis

In order to analyze the causal and reciprocal effects between news media use and political engagement, we rely on two different panel analytic methods: the econometric and structural equation modeling approaches. Both approaches have their relative strengths and weaknesses, and were developed for somewhat distinct purposes (Finkel, 2008). By using both, we are able to account for two fundamental criteria for valid causal inference: (a) ruling out spurious relationships due to both observed *and* unobserved omitted variables, and (b) assessing the direction of, or the potentially reciprocal, influences between media use and political engagement.

In a first step, we estimate *cross-lagged panel models* using structural equation modeling in order to assess whether the effects run from media use to political engagement (*media effects*), from engagement to news media use (*selection effects*), or whether there are mutual influences between news media use and engagement (*reciprocal effects*). These autoregressive models provide estimates both of the stability of media use and political engagement between waves, as well as how lagged values of each effect *change* in the other over time (Acock, 2013; Finkel, 2008).

In the second step, a *fixed effects* (FE) panel model is estimated using all three waves of data. By focusing only on individual-level variation in both independent and dependent variables between panel waves, the FE estimator accounts for unobserved heterogeneity between units; that is, differences between individuals that influence the outcome but that do not vary over time (Allison, 2009; Finkel, 2008; Kennedy, 2008). Therefore, the FE estimator basically controls for omitted variables by using "each individual as his or her own control" (Allison, 2009, p. 1). Thereby, these models can only estimate the effects of factors that change over time. Given that all key variables were measured across the three waves, we are able to analyze how changes in media use are related to changes in each outcome variable, controlling for unobserved (stable) heterogeneity at the individual level. As noted by Dilliplane and colleagues, this technique "arguably provides the most stringent causal test possible outside of an experimental setting" (Dilliplane, Goldman, & Mutz, 2013, p. 241). Given the time lag of approximately one year between panel waves—leaving room for individual-level variation over time—we will also control for a number of time-variant personal factors that are related to news media use, political interest, and participation. By controlling for individual-level changes in political knowledge and interpersonal political discussion, our aim is to more closely capture the unique effect of news media use on interest and participation.

By comparing these different panel models we are better able to assess both the direction of influences between news media use and political engagement, as well as to provide a substantially stronger test of socialization effects by controlling for stable unit-level heterogeneity.

Results

The main purpose of this study is to analyze the reciprocal relationship between news media use and political engagement—and to explicitly test how the VCT operates through different media. Figure 1 shows the results from four cross-lagged models estimating the reciprocal effects of each form of news media use on the one hand, and political interest on the other hand (details regarding model specification are found in the figure note, and full tables presented in the Appendix). The first main conclusion from Figure 1 is that reciprocal effects are evident only with respect to newspapers. Reading news in print has positive effects on subsequent levels of interest ($b = .09$, $p < .001$ and $b = .06$, $p < .001$), but there are also significant positive effects in the other direction ($b = .07$, $p < .01$ and $b = .06$, $p < .01$), suggesting the presence of a mutually reinforcing relationship between reading newspapers and political interest. This is not the case for television, radio, and online news. For each of these forms of news media use, there are consistent selection effects but no evidence of media effects. Political interest has positive effects on watching television news ($b = .12$, $p < .01$ and $b = .12$, $p < .001$), listening to news on the radio ($b = .09$, $p < .001$ and $b = .06$, $p < .01$), as well as using online news ($b = .05$, $p < .01$ and $b = .12$, $p < .001$)—but there are no significant effects the other way around. A second important finding from Figure 1 relates to the stability of both news media use and political interest over time. The stability of political interest is consistently higher than each form of news media use (as reflected by the stability coefficients), clearly indicating that political interest is an individual trait that remains robust even among this group of young citizens.

Figure 2 displays the results from a similar set of cross-lagged models focusing on political participation intention. Here the evidence for reciprocal effects is more striking. Reading newspapers ($b = .07$, $p < .01$ and $b = .07$, $p < .01$), watching television news ($b = .09$, $p < .01$ and $b = .08$, $p < .01$), and using online news ($b = .10$, $p < .001$ and $b = .07$, $p < .001$) has consistent effects on participation intention, while the effects of radio news are evident but less consistent across panel waves ($b = .06$, $p < .05$ and $b = .03$, $p > .05$). Consistent selection effects—from participation intention to news media use—are found for television ($b = .06$, $p < .05$ and $b = .06$, $p < .05$) and radio news ($b = .08$, $p < .05$ and $b = .08$, $p < .01$), and less consistently for printed newspapers ($b = .04$, $p > .05$ and $b = .04$, $p < .05$) and online news ($b = .04$, $p > .05$ and $b = .08$, $p < .01$).

Taken together, the dynamic relationship between news media use and political interest appears to be driven primarily by selection effects. This is the case for all studied forms of news media use, except from reading printed newspapers, which also seems to promote further interest among adolescents. With respect to participation intention, the findings lend stronger support for a pattern of reciprocal influences, whereby news media use reinforces political engagement among adolescents with preexisting intentions to participate. Overall, there are few striking differences between media in this regard.

While the cross-lagged models provide important information on the direction of relationships between news media use and political engagement, fixed-effects panel models are substantially better at accounting for unobserved heterogeneity between respondents and, thereby, control for stable omitted variables. Rather than focusing on between-person variation, the fixed-effects models rely on within-person variation only to estimate the effect of news media use on political engagement—and in that sense provide a substantially stronger test of causal effects. Following the econometric approach, Table 1 presents two-way fixed-effects models based on all three waves of the panel data. To account for time-related factors—such as maturation or period-specific

Printed newspapers

Note: N=1161. Model fit: Chi-square(2)= 0.604, RMSEA = 0.000; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

Television news

Note: N=1154. Model fit: Chi-square(2)= 3.359, RMSEA = 0.024; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

Radio news

Note: N=1157. Model fit: Chi-square(2)= 0.448, RMSEA = 0.000; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

Online news

Note: N=1158. Model fit: Chi-square(2)= 0.998, RMSEA = 0.000; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

Figure 1. Cross-lagged effects between news media use and political interest (standardized coefficients).

Notes. Estimates are standardized path coefficients with standard errors clustered on the school level. Each prediction also controls for age, gender, and socioeconomic status. After assessment of model fit, structural paths from Wave 1 news use to Wave 3 news use, and from Wave 1 interest to Wave 3 interest, were also added to the equation (not displayed in the figures). Correlations between all exogenous variables as well as between error terms at each panel wave allowed, though not displayed in the figure.

a **Printed newspapers**

Note: N=1163. Model fit: Chi-square(2)= 0.565, RMSEA = 0.000; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

b **Television news**

Note: N=1157. Model fit: Chi-square(2)= 0.231, RMSEA = 0.000; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

c **Radio news**

Note: N=1158. Model fit: Chi-square(2)= 2.239, RMSEA = 0.010; CFI = 1.00
*p < .05.**p < .01. ***p < .001.

d **Online news**

Note: N=1161. Model fit: Chi-square(2)= 0.592, RMSEA = 0.000; CFI = 1.00
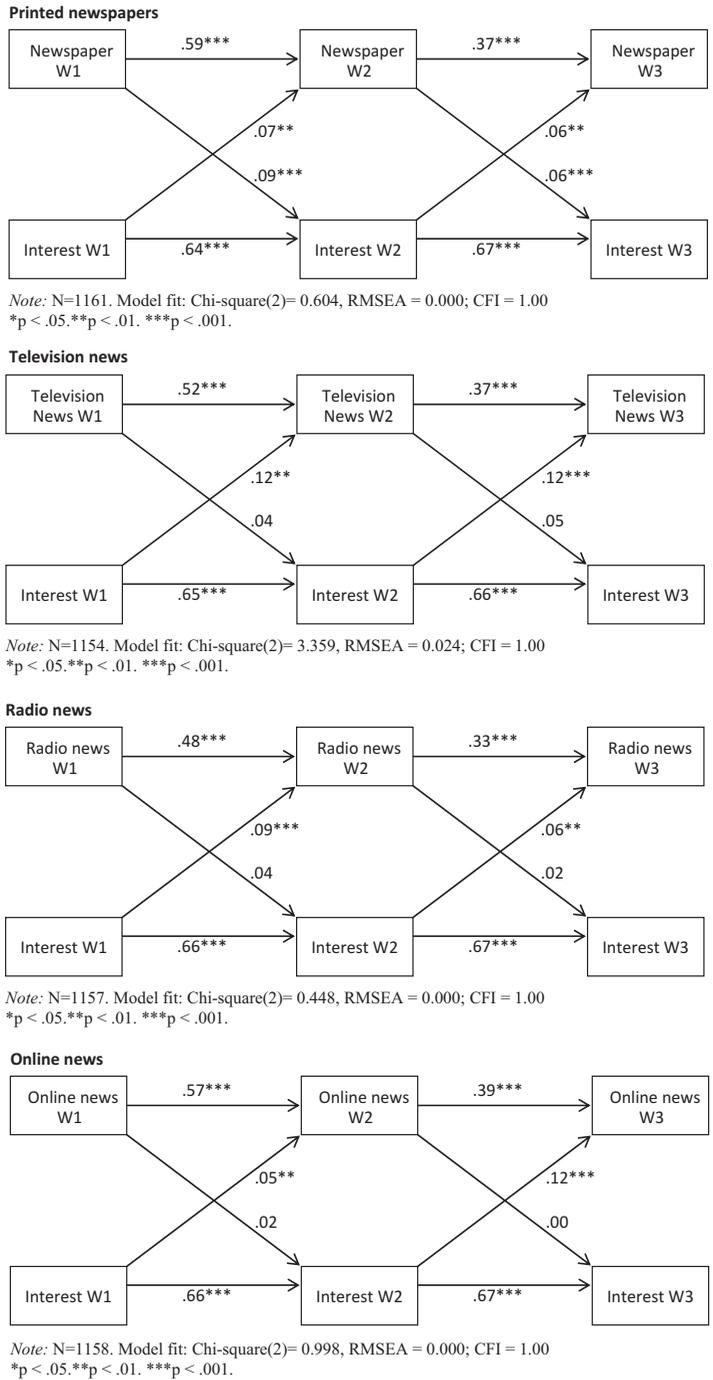*p < .05.**p < .01. ***p < .001.

Figure 2. Cross-lagged effects between news media use and political participation intention (standardized coefficients).

Notes. Estimates are standardized path coefficients with standard errors clustered on the school level. Each prediction also controls for age, gender, and socioeconomic status. After assessment of model fit, structural paths from Wave 1 news use to Wave 3 news use, and from Wave 1 participation to Wave 3 participation, were also added to the equation (not displayed in the figures). Correlations between all exogenous variables as well as between error terms at each panel wave allowed, though not displayed in the figure.
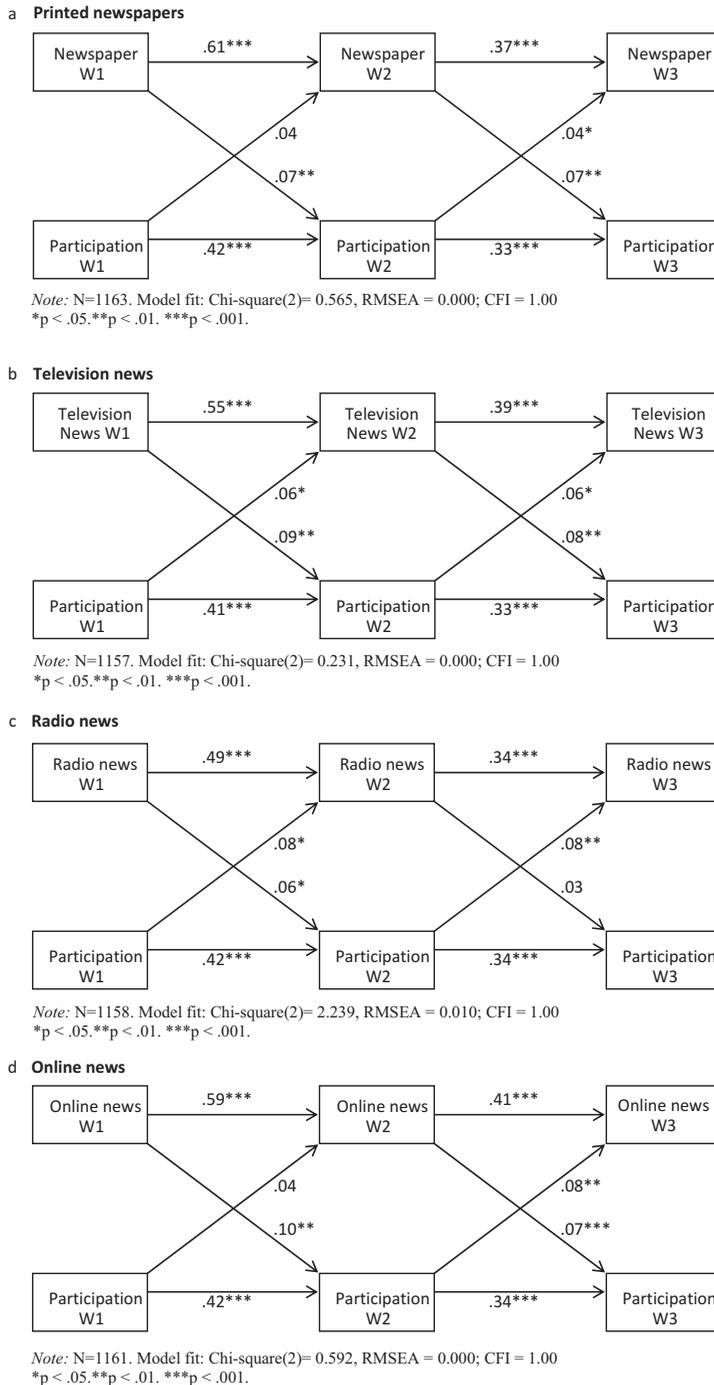
Table 1

Effects of traditional and online news on political interest and participation intention (fixed effects)

	Political Interest		Political Participation	
	Model 1	Model 2	Model 1	Model 2
Printed newspapers	.02 (.01)	.00 (.02)	.02 (.02)	.01 (.02)
Television news	.10*** (.02)	.06** (.02)	.07*** (.02)	.06** (.02)
Radio news	.04** (.01)	.02 (.01)	.01 (.02)	-.00 (.02)
Online news	.08*** (.01)	.05** (.02)	.03 (.02)	.01 (.02)
Control variables				
Political knowledge	–	.00 (.00)	–	.01 (.00)
Political discussions	–	.32*** (.02)	–	.11*** (.03)
Socioeconomic status	–	.01 (.04)	–	.04 (.04)
Wave 2	.02*** (.00)	.01* (.01)	.03*** (.01)	.02*** (.01)
Wave 3	.04*** (.01)	.03*** (.01)	.04*** (.01)	.03*** (.01)
R^2 within	.09	.18	.03	.04
N (Individuals/observations)	1968/4819	1826/3954	1981/4836	1835/3963

Notes. Unstandardized b-values with unit-level clustered standard errors in parentheses. All models were also estimated using standard errors clustered on the school level. The results were no different with respect to the direction and statistical significance of the news media use effects.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

circumstances—that affect all respondents' political engagement similarly, the models also include two dummy variables representing Wave 2 and Wave 3.

Looking first at political interest, Model 1 includes the four news media use variables as the only predictors, revealing that newspaper reading is the only variable not having a significant effect. Changes in watching television news ($b = 0.10$, $p < 0.001$), listening to news on the radio ($b = 0.04$, $p < 0.01$), and following the news online ($b = 0.08$, $p < 0.001$) are all positively related to changes in political interest at the individual level—controlling for all stable respondent characteristics. While these two-way fixed effects models completely rule out spuriousness due to omitted stable variables, they do not account for personal characteristics that do change over time. With a between-wave time lag of approximately one year, it is possible that other variables, related to both news media use and political engagement, have changed as well. To further isolate the unique effect of news media use, Model 2 includes two time-variant control variables that are related to both news media use and political engagement: interpersonal political discussions and political knowledge. In addition, we also include a time-variant measure of socioeconomic status. Despite this, both television news ($b = 0.06$, $p < 0.01$) and online news ($b = 0.05$, $p < 0.01$) remain significant predictors of political interest.

Turning to political participation intention, the message is rather straightforward. Only changes in television news display a significant effect on participation intention, both in Model 1 with news media use as the only time-varying predictors ($b = 0.07$, $p < 0.001$), and in Model 2, which also controls for individual-level changes in political knowledge, interpersonal discussion, and socioeconomic status ($b = 0.06$, $p < 0.01$).[3]

Taken together, the results presented here do not support the argument that there are clear divides between online news on the one hand and traditional news on the other hand, in terms of virtuous circles and reinforcing spirals. Rather, the dynamics appear to work fairly similarly. In that sense, it is worth noting that there is a significant degree of overlap in usage of these media. Adolescents who frequently use online news are also watching television news (Pearson's $r = 0.39$), reading newspapers ($r = 0.34$), and listening to radio news ($r = 0.17$) to a larger extent—reflecting a fairly unidimensional concept of news media use (Cronbach's $\alpha = 0.66$–0.70 across the three panel waves). Therefore, when a measure of adolescents' total news consumption across these media is used in cross-lagged panel models, we do see a more consistent pattern of reciprocal effects between news media use and both forms of political engagement. Since these effects of total news media use were also significant in the fixed-effects model specification, it would be wrong to conclude that news media use exerts no impact on political engagement among adolescents. Rather, it seems like the presence of virtuous circles depends less on the distinction between traditional and online media than on whether adolescents' full range of news media use is considered.[4]

Discussion

Research on the relationship between news media use and political engagement often acknowledges the presence of reciprocal causal relationships. In some cases, the assumption of mutual influences even constitutes the main theoretical argument. This is certainly the case with respect to the Virtuous Circle Thesis (Norris, 2000), which explicitly builds on the idea of reinforcing spirals between media use and political engagement (Slater, 2007). Despite the widely accepted notion of the VCT, few studies have been able to comprehensively analyze the presence of reciprocal relationships over an extended period of time, due primarily to lack of multi-wave panel data. The present study has aimed at

making a distinct contribution to the literature on the VCT and reinforcing spirals by putting the argument of reciprocal causal influences to a thorough empirical test, using three waves of annually gathered panel data among Swedish adolescents. In sum, the findings from our cross-lagged and fixed-effects panel models lend mixed support to the VCT.

One the one hand: When it comes to the dynamic relationship between adolescents' specific news media use and political interest, the results clearly indicate a process driven primarily by selection effects. The fact that political interest displays high stability even among this sample of young citizens further underscores the significance of selection effects in relation to news media use. Furthermore, when imposing stronger control for omitted stable factors, the findings suggest that political interest is primarily related to television and online news media use.[5] Thus, the dominance of selection effects and weak evidence of reciprocal influences lends limited support to the media effects side of VCT when specific forms of news media use are considered. The story is, however, somewhat different for participation intention. In this case, the findings reveal several instances of reciprocal effects, but in the end only television news survives as a significant predictor of participation intention across both the cross-lagged and fixed-effects models. Put differently, from the many tests of the VCT conducted here, the relationship between adolescents' use of television news and their participation intention most clearly reflects the reciprocal, reinforcing dynamics predicted by the VCT.

On the other hand: The VCT received more clear support when adolescents' total news media use was considered. Not only did the main analyses provide very little evidence of clear divides between traditional and online news media in terms of how virtuous circles operate, but there was also significant overlap in the usage of all forms of news media. Thus, when more fine-grained and detailed measures of adolescents' news media use across multiple platforms are employed, the assumed reciprocal influences behind the VCT become visible.

To conclude, we find general support for H1: The relationship between adolescents' news media use and political engagement resembles a virtuous circle, but only when their full range of news media use is considered. Regarding the competing H2a (online optimist) and H2b (online pessimist), the evidence is more in line with the latter: Selection effects characterize the relationship between online news and political interest, while seemingly positive cross-lagged effects of online news on participation intention disappear completely in the fixed-effects model. Therefore, based on the findings presented here, online news seems to operate in a similar fashion as traditional media when it comes to attracting and promoting political engagement among adolescents. The distinction between "online" and "offline" as broad categories of news use is simply not crucial in light of the VCT.

Taken together, the results of this study have several implications. First, the findings lend general but mixed support for the reciprocal dynamics between news media use and political engagement suggested by the virtuous circle thesis in particular (Norris, 2000; Strömbäck & Shehata, 2010), as well as theories of self-socialization (Arnett, 1995) and reinforcing spirals (Slater, 2007) more generally. More than anything, the main results indicate that selection effects dominate over media effects when specific measures of news media use are considered—and this is particularly true with respect to political interest. In line with the work of Prior (2010), political interest appears to be a very stable individual-level characteristic even among young Swedish citizens. Those adolescents with a strong interest in politics are significantly more likely to follow the news, but this type of media use does little to further promote interest.

Second, the VCT received clearest support in the reciprocal effects between television news and political participation intention. Here it is worth noting that the data for this study were collected in a country with comparatively strong and popular public service broadcasting institutions (Aalberg & Curran, 2011; Hallin & Mancini, 2004). As high-lighted in several previous studies, compared to commercial television news, watching public service television channels is more strongly related to various dimensions of political knowledge and engagement (Aarts & Semetko, 2003; De Vreese & Boomgaarden, 2006; Shehata, Hopmann, Nord, & Höijer, 2015; Soroka et al., 2013). Looking specifically at political knowledge, efficacy, and interest, Curran and colleagues (2014) recently concluded "that the virtuous circle of democratic reinforcement operates primarily in relation to public service television" (p. 823). Of course, we cannot say what television channels the respondents typically watch based on the data presented here, but the presence of strong public service television channels may well be a factor here.

Third, our findings pointing to a dominance of selection effects in the online news-political interest relationship are not in line with a study by Boulianne (2011), which found that "online news sources transform people into interested and… engaged citizens to a greater degree than online news serves as a tool for those already interested in politics" (p. 157). The reasons behind these contradictory findings are far from obvious, not least since many factors at different levels of analyses may be at work. Here, we can only note that compared to Boulianne (2011), this study was conducted in Sweden, during a non-election period, with different time lags between panel waves, and based on a sample of adolescents rather than the general population. More research is certainly needed to explore these relationships further.

In addition, while the focus of this study has been on "news media use" without specific knowledge about exactly what content the respondents were exposed to, this type of media use was rather strongly related to political interest cross-sectionally.[6] It may, however, very well be the case that the relationship between media use and engagement is dependent on content characteristics and contexts (Avery, 2009). We did not, for instance, find any support for media malaise (Curran et al., 2014; Strömbäck & Shehata, 2010). On the contrary, the effects were generally positive. Although this is important, we cannot rule out that other types of media use may influence adolescents negatively, and that opposite spirals may operate for entertainment media or news coverage dominated by a focus on political game and strategy (Moeller & De Vreese, 2013; Shehata, 2014). Correspondingly, even stronger support for the VCT may emerge if measures of news use referred explicitly to political news coverage.

Another measurement limitation of the current study relates to reliance on single items of distinct forms of news media use. It may very well be the case that more reliable, multiple indicators, scales of online news use, newspaper reading, etc., would yield stronger support for the VCT in the media-by-media analyses conducted here. In that sense, we cannot be fully certain whether the different findings based on the use of separate items representing distinct forms of news media use on the one hand, and the combined index of adolescents' total news media use on the other hand, have methodo-logical or substantial explanations. Furthermore, by referring to Prior's (2009a, 2009b) warnings, relying on media exposure survey measures that are based on respondents' self-reported answers might be a problem, due to the fact that citizens overreport their news exposure. To help respondents, several media exposure measures could be included and additional information about other people's media use could help them to estimate their news exposure more precisely (Prior, 2009a). Thus, further consideration of how to best measure news use in today's fragmented media environment is certainly warranted.

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Notes

1. Based on comparative population data from 2010, the Cohort 1 sample consists of 51.5% females (48.7% among this age group in the Swedish population) and 9.3% born outside of Sweden (9.8% in the population). The Cohort 2 sample similarly consists of 50.9% females (48.8 % among the Swedish population) and 8.6% born outside of Sweden (8.8% in the population).

2. *News media use* was measured based on the survey question "How often do you get news from the following media?," with four items separating between (a) Read a daily printed newspaper, (b) Listen to news on the radio, (c) Watch the television news, and (d) Use the Internet to follow the news. The response categories ranged from 1 (At least five days a week) to 5 (Never). A traditional news media use index was constructed based on the first three items. These were inverted and recoded to range between 0 and 1 before being averaged into a single index (Wave 1 Cronbach's α = 0.64, M = 0.39, SD = 0.22). Online news media use is based in the last item. This variable was also inverted and recoded to range between 0 and 1.

   Political knowledge was measured based on a battery of six questions tapping knowledge about prominent political actors and institutions as well as current affairs issues. For instance, participants were asked questions such as, "Which of the following EU institutions is elected directly by citizens of the member states?", "One of the following persons has not been prime minister of Sweden; who?", and "What does foreign aid mean?" Four response alternatives were provided to each item, and correct answers were coded 1, and 0 otherwise. A political knowledge index was created by summing responses to each item, yielding variables ranging from 0 (No question answered correctly) to 6 (All questions answered correctly) (M = 3.73, SD = 1.43).

   Frequency of political discussion with parents and friends was measured separately using two items focusing on the frequency of discussions about (1) What you have heard on the news about what has happened in Sweden or around the world, and (2) Politics and society, with response categories ranging from 1 (Very often) to 4 (Never). The scales were inverted and recoded to range between 0 and 1 before added into a parent (Wave 1 Pearson's r = 0.54, M = 0.46, SD = 0.25) and friend (Wave 1 Pearson's r = 0.46, M = 0.36, SD = 0.24) political discussion index.

   Finally, *family socioeconomic status* was created on the basis of the following five items in the adolescent survey: (a) If you want things that cost a lot of money (for example a computer, skateboard, cell phone) can your parents afford to buy them if you want them?; (v) If you compare with the others in your class, do you have more or less money to buy things?; (c) Does your family have more or less money than other families where you are living?; (d) How is the economy in your family?; (e) How often do you and your family go for vacations? Responses to these four- and five-level items were recoded to range between 0 and 1 and summed to form a single-family socioeconomic status index (Cronbach's α = 0.76).

3. When each form of news media use is included separately (i.e., not "competing" with each other as predictors) in four "Model 2" specifications, the overall findings are very similar: Television news turns out as the only significant predictor of participation intention.
4. In addition, we also tested a series of alternative fixed-effects models, with Wave 1 news media use predicting subsequent levels of political engagement (interest and participation intention). By including an interaction term between each form of news media use and time (controlling for the impact of initial engagement to account for ceiling effects), these findings were very similar to the lagged effects of news media use in the cross-lagged models presented in the article.
5. Even though there were significant reciprocal influences between newspaper reading and political interest in the cross-lagged models, the absence of any newspaper effects in the fixed-effects specification suggests that these effects are spurious due to omitted variables.
6. The bivariate Wave 1 correlations with political interest were $r = 0.40$ (television news), $r = 0.31$ (newspapers), $r = 0.24$ (radio news), and $r = 0.34$ (online news).

Appendix

Table A1
Sample and participation intention rate for each panel wave

	Cohort 1 (13–14 years old)		Cohort 2 (16–17 years old)	
Year	Sample	Participation Rate	Sample	Participation Rate
2010	960	94% ($N = 904$)	1052	85% ($N = 892$)
2011	987	89% ($N = 883$)	996	81% ($N = 807$)
2012	954	88% ($N = 843$)	914	81% ($N = 740$)

Table A2
Means and standard deviations for key variables by cohort

	Cohort 1			Cohort 2		
	Wave 1	Wave 2	Wave 3	Wave 1	Wave 2	Wave 3
Political interest	.42 (.21)	.45 (.24)	.47 (.23)	.50 (.24)	.54 (.24)	.55 (.24)
Political participation	.38 (.20)	.42 (.21)	.43 (.20)	.41 (.21)	.44 (.19)	.44 (.19)
Newspapers	.40 (.30)	.39 (.29)	.36 (.30)	.48 (.32)	.49 (.31)	.43 (.32)
Television news	.46 (.28)	.48 (.28)	.42 (.28)	.48 (.27)	.51 (.27)	.47 (.27)
Radio news	.31 (.29)	.34 (.29)	.34 (.29)	.36 (.30)	.39 (.31)	.38 (.31)
Online news	.37 (.31)	.43 (.30)	.45 (.30)	.54 (.31)	.61 (.30)	.60 (.32)
N (minimum)	878	845	799	853	797	710

Table A3
Cross-lagged effects between news media use and political interest
(standardized coefficients)

	Newspapers	Television News	Radio News	Online News
Political interest W2				
Political interest W1	.64*** (.05)	.65*** (.04)	.66*** (.04)	.66*** (.04)
News media use W1	.09*** (.02)	.04 (.04)	.04 (.02)	.02 (.03)
Age W1	.08** (.03)	.08*** (.03)	.07** (.03)	.08** (.03)
Gender W1	−.01 (.02)	−.01 (.02)	−.02 (.02)	−.01 (.02)
Socioeconomic status W1	.01 (.02)	.01 (.02)	.02 (.03)	−01 (.02)
Political interest W3				
Political interest W2	.67*** (.02)	.66*** (.03)	.67*** (.02)	.67*** (.03)
Political interest W1	.11** (.04)	.11** (.04)	.13*** (.04)	.13*** (.04)
News media use W2	.06*** (.02)	.05 (.03)	.02 (.02)	.00 (.02)
Age W1	.01 (.02)	.01 (.02)	.01 (.02)	.01 (.02)
Gender W1	.01 (.02)	.01 (.02)	.00 (.02)	.01 (.02)
Socioeconomic status W1	.02 (.02)	.02 (.02)	.02 (.02)	.02 (.02)
News media use W2				
News media use W1	.59*** (.02)	.51*** (.03)	.48*** (.04)	.57*** (.04)
Political interest W1	.07** (.02)	.12*** (.03)	.09*** (.02)	.05** (.02)
Age W1	.07** (.02)	−.02 (.02)	−.01 (.03)	.11*** (.03)
Gender W1	−.03 (.03)	−.06* (.02)	.06* (.03)	−.11*** (.03)
Socioeconomic status W1	.04** (.01)	.04* (.02)	.03 (.02)	.01 (.02)
News media use W3				
News media use W2	.37*** (.05)	.37*** (.04)	.33*** (.02)	.39*** (.03)
News media use W1	.27*** (.03)	.24*** (.03)	.27*** (.04)	.22*** (.02)
Political interest W2	.06** (.02)	.12*** (.03)	.06** (.02)	.12*** (.02)
Age W1	−.01 (.01)	.05 (.02)	.05 (.03)	.02 (.02)
Gender W1	−.02 (.03)	−.04* (.02)	−.01 (.03)	−.08*** (.02)
Socioeconomic status W1	.05 (.04)	.03 (.02)	−.00 (.03)	.01 (.03)
N	1161	1154	1157	1158
Degrees of freedom	2	2	2	2
χ^2	0.604	3.359	0.448	0.998
RMSEA	0.000	0.024	0.000	0.000
CFI	1.000	1.000	1.000	1.000

Note. Standardized path coefficients with standard errors clustered on the school level within parentheses. Model fit statistics retrieved from model estimated without clustered standard errors.
* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

Table A4
Cross-lagged effects between news media use and political participation intention
(standardized coefficients)

	Newspapers	Television News	Radio News	Online News
Political participation W2				
Political participation W1	.42*** (.04)	.41*** (.04)	.42*** (.04)	.42*** (.04)
News media use W1	.07** (.02)	.09** (.03)	.06* (.03)	.10** (.03)
Age W1	.01 (.03)	.01 (.03)	.01 (.03)	−.02 (03)
Gender W1	.03 (.04)	.03 (.04)	.02 (.04)	.04 (.04)
Socioeconomic status W1	−.00 (.03)	−.01 (.03)	.00 (.03)	.00 (.03)
Political participation W3				
Political participation W2	.33*** (.04)	.33*** (.04)	.34*** (.04)	.34*** (.04)
Political participation W1	.22*** (.02)	.21*** (.02)	.21*** (.02)	.22*** (.02)
News media use W2	.08** (.03)	.08** (.02)	.03 (.02)	.07*** (.02)
Age W1	−.04 (.03)	−.03 (.02)	−.03 (.03)	−.04 (.02)
Gender W1	.05 (.03)	.06* (.03)	.04 (.03)	.05* (.03)
Socioeconomic status W1	.00 (.03)	−.00 (.03)	.01 (.03)	.00 (.03)
News media use W2				
News media use W1	.61*** (.02)	.55*** (.03)	.49*** (.04)	.59*** (.03)
Political participation W1	.04 (.03)	.06* (.03)	.08* (.03)	.04 (.02)
Age W1	.08** (.02)	−.00 (.03)	−.00 (.03)	.10** (.03)
Gender W1	−.03 (.02)	−.05* (.02)	.05 (.03)	−.11*** (.02)
Socioeconomic status W1	.03* (.01)	.04 (.02)	.03 (.02)	.02 (.03)
News media use W3				
News media use W2	.37*** (.05)	.39*** (.03)	.34*** (.02)	.41*** (.03)
News media use W1	.29*** (.04)	.25*** (.03)	.26*** (.04)	.23*** (.02)
Political participation W2	.04* (.02)	.06* (.03)	.08** (.02)	.08** (.02)
Age W1	−.00 (.01)	.07** (.03)	.06* (.03)	.04 (.03)
Gender W1	−.02 (.02)	−.04* (.02)	−.01 (.03)	−.08*** (.02)
Socioeconomic status W1	.05 (.04)	.03 (.03)	−.00 (.03)	.01 (.03)
N	1163	1157	1158	1161
Degrees of freedom	2	2	2	2
χ^2	0.565	0.231	2.239	0.592
RMSEA	0.000	0.000	0.010	0.000
CFI	1.000	1.000	1.000	1.000

Note. Standardized path coefficients with standard errors clustered on the school level within parentheses. Model fit statistics retrieved from model estimated without clustered standard errors.
   * $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.