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ORIGINAL ARTICLE

Internet Use and Political Interest: Growth Curves, Reinforcing Spirals, and Causal Effects During Adolescence

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This study analyzes reinforcing spirals between online media usage and political interest among adolescents. By applying a two-dimensional conceptualization of online media usage that distinguishes between content and interactivity characteristics, the study focuses on the mechanisms and processes stimulating the long-term development of political interest during adolescence. Findings from a unique, six-wave panel study conducted in Sweden over a period of 5 years suggest that reinforcing spirals are driven primarily by non-interactive political information usages of online media. These results contribute to a better understanding of the factors leading to the development of political interest during a crucial life phase, as well as the growing body of literature that theorize media and selection effects as part of reinforcing processes during adolescence.

Keywords: Youth Mobilization, Content Analysis, Panel Survey, Information Processing, News Effects, First-Time Voters, Adolescents, Interaction, Political Interest, Reinforcing Spirals, Media Effects.

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Levels of political interest among younger citizens are a matter of frequently-expressed concerns. A range of studies indicate clear, age-related differences in self-reported interest in political and societal issues among citizens (Zukin, Keeter, Andolina, Jenkins, & Carpini, 2006). Irrespective of whether such differences reflect a deep generational divide that is likely to persist well into the future or simply a life-cycle gap that will even out as young citizens age (Albacete, 2014; Glenn & Grimes, 1968), adolescence is typically characterized as a key phase in the development of political norms, values, and behavior (Sears & Levy, 2003). In this regard, political interest appears to be no exception. Studies suggest that citizens' interest in politics develops during adolescence and stabilizes already by the age of 20 (Prior, 2010; Russo & Stattin, 2017).

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In the present study, we ask whether increased usage of online media influences political interest among young citizens. It is of imperative importance to study online media usage, as adolescents spend a considerable amount of time online (Scott, Bay-Cheng, Prince, Nochajski, & Collins, 2017). Although it is well established that information about politics and society encountered through various media is crucial in shaping perceptions and ideas about the political world (Chaffee & Kanihan, 1997; Moeller & de Vreese, 2013), it remains unclear how the rapidly-expanding opportunities for media choice, content selection, and interactivity online influence political identity formation among adolescents. One of the most prominent theories speaking to the dynamic interplay between media selection and identity-relevant attitudes is the reinforcing spirals model (Slater, 2007, 2015). Put simply, reinforcing spirals theory suggests a reciprocal relationship between identity-consistent media usages and effects; young citizens with an emerging interest in politics are more likely to seek out and engage with political content through various media, and thereby reinforce their interest even further (Norris, 2000; Strömbäck & Shehata, 2010).

More specifically, this study has two distinct aims. First, we ask whether young citizens' Internet usage has any lasting—long-term—effect on their fundamental interest in political and societal matters. Our data are exceptionally well-suited for this. By utilizing a unique, six-wave panel study conducted in Sweden over a period of 5 years, we were able to analyze the development of political interest and online media usage over an extended period of time. Consequently, this research design provides unprecedented opportunities to analyze the dynamic relationship between online media usage and political identity formation during the formative years of adolescence, and thereby address a research question of high societal relevance.

Our second aim is to contribute to research on reinforcing spirals theory. Accordingly, we consider political interest as a key dimension of citizens' social identities, taking shape through various socialization and self-socialization processes during adolescence (Arnett, 2007; Slater, 2015). As such, political interest should be particularly likely to drive selective online media usage, and these selection processes should be especially likely to reinforce political interest further. What remains unclear, however, are the characteristics of young citizens' online media usage that drive interest in politics. Building upon recent theoretical and empirical work (Bakker & De Vreese, 2011; Ekström & Östman, 2015), we propose a two-dimensional conceptualization of online media usage, focusing on the distinction between content and interactivity characteristics. Thereby, this study not only tests the original reinforcing spiral theory, but specifically analyzes the conditionality of such spirals. We aim to provide a better understanding of the processes and mechanisms that underly the effects of online media usage on the development of political interest among adolescents.

Political interest and reinforcing spirals

Political interest—a fundamental variable in political communication research—is defined by Lupia and Philpot (2005, p. 1122) as “a citizen's willingness to pay

attention to political phenomena at the possible expense of other topics.” As such, political interest reflects an intrinsic motivation to engage and re-engage with topics related to politics, distinct both from external motivations on the one hand and from political behavior on the other (Hidi & Renninger, 2006; Shehata & Amnå, 2017; Van Deth, 1990). While political participation refers to specific activities, influenced by a variety of factors—not least social norms and pressures—interest in politics is uniquely confined to a more fundamental, personal curiosity about political and societal matters, reflecting both situational (state) and dispositional (trait) factors (Hidi & Renninger, 2006; Prior, 2010). This intrinsic motivation has proven to be one of the most important factors behind political engagement, participation, and other types of political behavior, recently characterized as “the best indicator of the possession of awareness, competence, information, and knowledge about politics” (Torcal & Maldonado, 2014, p. 680).

Research suggests that interest in politics develops early in life, in a process culminating during adolescence (Neundorff, Smets, & García-Albacete, 2013), and remains relatively stable afterward (Prior, 2010; Russo & Stattin, 2017). Across generations and political contexts, younger citizens report lower levels of political interest. This has been attributed to preoccupation with other important developmental steps in this age bracket (e.g., emancipating from parents, taking important life-decisions, etc.) and lack of experience in the expression and consequences of citizenship (Sigel, 1989). From a developmental psychological perspective, it can also be understood as a consequence of the maturation of the brain during adolescence. As the pre-frontal cortex, responsible for abstract thinking and long-term decision-making, is one of the last regions of the brain to fully mature, it can be argued that the complexity of the political world is less attractive to the teenage brain (Dahl, 2004). At the same time, age-related effects during the impressionable years (Krosnick & Alwin, 1989) are, in part, conditional on the political and social context and on political events, like elections or political upheaval (Sears & Valentino, 1997). It can also be argued that the lack in political interest in this age group is related to a deviant definition of what is political and how citizenship should be expressed (Bennett, Wells, & Rank, 2009).

Research into the process of political socialization shows that several other (communicative) factors influence the development of political norms, attitudes, and behavior, such as family communication patterns (Ritchie & Fitzpatrick, 1990), parental mediation (Weintraub Austin & Pinkleton, 2001), personality traits (Valenzuela, Bachmann, & Aguilar, 2016), and differential media use (Moeller & de Vreese, 2013). In particular, political content presented as entertainment is likely to trigger young audiences to become engaged and seek out additional information (Xenos & Becker, 2009). It should be noted that the majority of these studies aim to explain political behavior or attitudes, but not political interest as such, which is mostly regarded as an independent variable.

Our study builds theoretically on the notion of virtuous circles (Norris, 2000) and reinforcing spirals (Slater, 2007, 2015) during adolescence. Reinforcing spirals

are characterized by mutual feedback loops between media selection processes and media effects. Growth on one side of the spiral is assumed to lead to growth on the other side, yielding an amplification of the process. In particular, adolescents' who grow up in today's high-choice media environment have more opportunities than ever to select media of high personal relevance to them—to seek out whatever content they prefer and interact with others through social media—during a phase in life when their personal identities are forming (Arnett, 1995; Slater, 2015). During these formative years, we could therefore expect such reinforcing spirals between the development of political interest and media usage.

Also empirically, research suggests that such reinforcing spirals may be at work during adolescence. Not only do general levels of political interest increase during these years (Neundorf et al., 2013; Russo & Stattin, 2017; Shehata & Amnå, 2017), but also certain forms of online media usage. In particular, Ekström and Shehata (2018) found, based on panel survey data, that three forms of Internet usage increased gradually during adolescence; online social interaction, online political information exposure, and online political interaction. Although these aggregate-level trends indicate that reinforcing spirals may operate during adolescence, few studies have been able to adequately test such claims using data spanning over several years. In the next section, we elaborate on a two-dimensional conceptualization of online media usage, and discuss how different usages may trigger reinforcing spirals influencing the development of political interest among young citizens. As a baseline expectation, we proposed the following hypothesis:

H1: The relationship between political interest and online media usage is characterized by a reinforcing spiral of reciprocal selection and media effects over time.

The conditionality of the spiral: Content and interactivity characteristics

There is a growing consensus in the literature that Internet usage should be conceptualized as a multi-dimensional phenomenon (Bakker & De Vreese, 2011; Ekström & Östman, 2015; Shah, 2016). Internet usage encompasses a variety of modes of activities, driven by a mix of motivations. For most citizens, seeking and engaging with political content online constitute only a small fraction of their everyday Internet usage. In this study, we therefore focus on two dimensions of online media usage that consistently emerge as crucial in research on Internet and political engagement more generally: (a) whether the content adolescents engage with is explicitly political or not, and (b) whether usage is focused on information consumption or interactivity with others. These two dimensions cut across a vast array of more distinct Internet activities and represent quite universal features of today's online environment.

Figure 1 presents a two-dimensional framework, with four different modes of Internet usage that differ with respect to content and interactivity. The first

dimension (x-axis) distinguishes between informational and interactive usages. Following previous conceptualizations, “informational uses encompass searching, selecting, and processing information, whereas interactive uses include the range of tools designed to support interpersonal communication” (Shah, 2016, p. 15; see also Ekström & Östman, 2015), including linking and sharing content on social media. The second dimension (y-axis) distinguishes political from non-political usages of online media, thereby reflecting different content characteristics (Aarts & Semetko, 2003; Boulianne, 2015a). Taken together, combining these two dimensions yields four different modes of online media usage: (a) general information usage, (b) social interaction, (c) political information usage, and (d) political interaction. Based on the distinction between content and interactivity characteristics, we hypothesize that these modes are differently related to the development of political interest: these expectations are outlined below.

Online content and political interest

The notion that Internet usage can promote interest in politics—and political engagement more generally—rests partly on the idea of information availability. The online environment reduces citizens’ opportunity costs to access and find content of both personal and political relevance (Boulianne, 2015b; Kruikemeier & Shehata, 2017). Thresholds for accessing any type of content and information are now lower than ever through a plethora of websites, social networking platforms, and smartphone applications, at any hour of the day and any day of the week. In such high-choice environments, what content adolescents’ seek out, are exposed to, or engage with becomes increasingly important for understanding the potential effects of Internet usage (Boulianne, 2015a; Slater, 2015).

The difference that the Internet makes is not only to increase the accessibility of information more generally, but rather to enable customization of content that is of high personal relevance to individual users. Such content personalization could well be the mechanism that generates effects on political interest. Put simply, the abundance of online information makes finding personally-interesting content easy for individuals. Once engaged with content of high personal relevance, adolescents’ may develop an even stronger interest in the topic. Adolescents’ Internet usage should therefore primarily influence their political interest whenever such usage revolves around political matters. Even though frequent usage of the Internet for general social and information purposes may generate inadvertent exposure to current affairs news and politics (Kim, Chen, & Gil de Zúñiga, 2013), research increasingly suggests that content characteristics matter when it comes to political mobilization (Aarts & Semetko, 2003; Boulianne, 2009). As such, studies that—often—focused on the adult population have documented positive effects of political website usage (when perceived as effective and efficient, Lupia & Philpot, 2005), Facebook usage (Dimitrova, Shehata, Strömbäck, & Nord, 2014; Holt, Shehata, Strömbäck, & Ljungberg, 2013; Lin, 2016), and expressive blog use (Gil de Zúñiga, Bachmann, Hsu, & Brundidge,

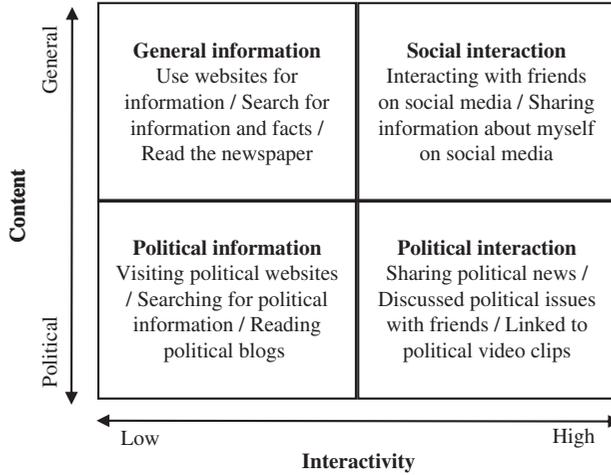


Figure 1 A two-dimensional conceptualization of adolescents’ online media usage.

2013) on various forms of political engagement. With respect to political interest, Boulianne (2015a, p. 70) recently noted that “content needs to be explicitly political to have a significant effect on political interest.” Therefore, we theorized that when content is political in nature, it is more likely to affect political interest.

At the same time, the greater availability of political information online does not mean that all adolescents will eagerly seek for—or engage with—such content. Due to self-selection mechanisms (Bennett & Iyengar, 2008; Kruikeimeier & Shehata, 2017), adolescents who lack a strong interest in politics can easily avoid politics in a high-choice online environment. The combination of these selection processes and media effects is what ultimately constitutes the reinforcing spiral between political online media usage and political interest: a spiral that may result in more enduring gaps between the “haves” and “have-nots” (Boulianne, 2011; Norris, 2000; Slater, 2015). As the causal mechanism proposed is inherently linked to content features, rather than media use in general, we expected to find distinctive patterns of reciprocal effects when comparing political with general media use.

H2: The reinforcing spiral between political interest and online media use is particularly driven by content characteristics, with usage of political content generating stronger influences than general content.

Online interactivity and political interest

Our second dimension of online media usage is interactivity, which is conceptually distinct from, and independent of, content (Ekström & Östman, 2015; Ekström & Shehata, 2018; Shah, 2016). In terms of causal mechanisms, online interaction may also have unique influences on political interest, which go beyond the effects of

specific content. More specifically, online interaction entails user performance, feedback, and connectivity: three qualities that set interaction apart from pure informational usage. Research on so-called expression effects (Pingree, 2007; Shah, 2016) suggests that “the act of expression tends to have an effect on the one expressing a message” (Gil de Zúñiga, Molyneux, & Zheng, 2014, p. 626), with potentially important implications for social identity formation, as well as political engagement (Ekström & Östman, 2015; Shah, 2016). By actively discussing with others, commenting, and sharing content through social media, users are involved in expressive performances where connecting with others around shared causes and experiences, and receiving instant feedback, is essential. As such, online interaction involves practices that may be particularly relevant to the development of intrinsic motivation (Hidi & Renninger, 2006; Ryan & Deci, 2000) and social identities (Arnett, 1995; Slater, 2015; Vaccari et al., 2015) during adolescence.

On the one hand, online interaction through social media has been linked to social capital among adults and college students (Bode, 2012; Gil de Zúñiga, Barnidge, & Scherman, 2017; Valenzuela, Park, & Kee, 2009). By being involved in digital social networks and connecting with others, users may both be inadvertently exposed to news, viewpoints, and the experiences of others, and develop a sense of community belonging that stimulates an interest in societal issues and politics. Furthermore, the interactive and deliberative nature of more expressive forms of online media usage may enhance this process, compared to pure informational media usage. Research has found that interactive communication can be more engaging and makes people more knowledgeable about politics (Kwak, Williams, Wang, & Lee, 2005), potentially promoting further interest. This is also largely in line with the differential gains model (Hardy & Scheufele, 2005; Scheufele, 2002), which posits that political talk has a crucial role in affecting political engagement (Vaccari et al., 2015).

On the other hand, although the technological thresholds for getting involved in online interactions are low, such activities still require certain motivations. Taken together, given the higher levels of engagement required and based on previous work that mostly examined adult populations, we predicted that interactive usages of online media have stronger influences on adolescents' development of political interest than informational usages, but also depend more heavily on a preexisting interest in politics.

H3: The reinforcing spiral between political interest and online media usage is particularly driven by communication form, with interactive usage generating stronger influences than informational usage.

Taking both arguments together, one might expect that online media usages that combine political and interactive features are particularly likely to trigger reinforcing spirals. This is, however, not necessarily the case. Political online interactions may not always be very deliberate or purposeful, but rather happening “on the fly” in a social media environment characterized by low thresholds, porous boundaries, and “traversability” (Brundidge, 2010; Ekström & Shehata, 2018), with

potentially limited effects on such an identity-relevant trait as political interest. Whether political interactive use will lead to a steeper reinforcing spiral compared to the other modes of online media usage is, therefore, an open question.

Methods and data

The present study used data from six annual waves of a longitudinal panel survey conducted as part of a large-scale research project on political socialization in Sweden. With a school-based sampling strategy and a controlled questionnaire administration, the study has been able to maintain a very high response rate across panel waves. The study was conducted in a middle-sized city of approximately 130,000 inhabitants, in a region representing the national population well in terms of the unemployment rate, income level, population density, and political leanings.

The schools included were strategically selected in order to represent both theoretical and vocational programs; schools in the city center, in suburbs, and rural areas; and schools in neighborhoods with differences in terms of social, economic, and ethnic background characteristics. In total, 10 lower secondary schools (*högstadium*) were selected at the outset of the fieldwork. Our sample consists of adolescents aged 13–14 years at the time of the first-panel wave. The questionnaires were distributed and administered by trained research assistants and filled out by students during scheduled school hours, which enabled exceptionally high response rates across panel waves. An overview of sample sizes and response rates throughout the fieldwork is provided in Table 1.

It should be noted that in two of these years, 2010 and 2014, national parliamentary elections were held in Sweden. As shown by previous research in Sweden, general political interest tends to increase during election years (Strömbäck & Johansson, 2007), which is important to consider in the current study.

Measures

Our main dependent variable is political interest, which was measured identically at each wave of the panel based on the following two survey items: (a) “how interested are you in politics?” and (b) “how interested are you in what is happening in society?”, with response categories ranging from 1 (not at all interested) to 5 (very interested). These items were recoded to range between 0 and 10, before they were averaged into a single political interest scale.¹

Following previous conceptual distinctions and operationalizations, we distinguished between four modes of online media use: general information, social interaction, political information, and political interaction. General information and social interaction were measured using several items following an overall question: “how often do you use the Internet/computer to do the following?” Four specific answer items were used to tap general information usage: (a) use websites to get information/learn about things of interest to me; (b) search for information/facts; (c) watch films or video clips; and (d) read the daily newspaper.² Furthermore, three

Table 1 Sample and Participation Rate for Each Panel Wave

	Cohort 1 (13–14 years old)	
	Sample	Participation Rate
<u>Year (age)</u>		
2010 (13–14)	960	94% (n = 904)
2011 (14–15)	987	89% (n = 883)
2012 (15–16)	954	88% (n = 843)
2013 (16–17)	934	77% (n = 723)
2014 (17–18)	935	74% (n = 695)
2015 (18–19)	927	72% (n = 668)

items were used to tap social interaction: (a) talking to friends using MSN, Myspace, or similar; (b) Keeping in touch and staying informed with my friends through Facebook or similar; and (c) sharing information about myself on Facebook, an online picture diary, or similar.³ The response scale for these items ranged from 1 (daily) to 5 (never). The two modes of political media usage are based on a battery of items related to the following overall question: “have you done any of the following during the past two months?” First, political information was measured using four items: (a) visited a political website; (b) searched for information about politics or societal issues on the Internet; (c) read about politics on a blog; and (d) watched videos or clips about societal issues or politics.⁴ Second, political interaction was measured using the following four items: (a) linked news to friends; (b) discussed societal or political issues with friends online; (c) linked video clips with political content; and (d) shared music with an important political or societal message.⁵

Apart from these main variables, we also made use of a number of control variables. These included socioeconomic status, based on a five-item additive index: (a) if you want things that cost a lot of money (e.g., a computer, skateboard, cell phone), can your parents afford to buy them if you want them?; (b) if you compare with 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 live?; (d) how are finances in your family?; and (e) how often do you and your family go for vacations? Adolescents’ total news media use was measured by four specific survey items concerning adolescents’ frequency of following 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 5 days a week) to 5 (never) (reversed). Finally, frequency of political discussions with parents and peers was measured separately, using two items concerning the frequency of discussions about (a) what you have heard on the news about what has happened in Sweden or around the world, and (b) politics and society, with response categories ranging from 1 (very often) to 4 (never). All these measures were rescaled to range between 0 (minimum value) and 10 (maximum value).⁶

Data analysis

To test the presence of reinforcing spirals between political interest on the one hand and each form of online media usage on the other, we employed methods for panel data analyses. First, we estimated a series of parallel growth curve models (Acock, 2013). These models estimated a latent random intercept and a latent random slope for each factor, enabling analyses of individual differences in initial levels, subsequent growth of each factor, and the correlation of the latent parameters. Significant covariance of the intercepts mean that the starting levels of both factors are correlated, while significant covariance of the slope means that, independent of the starting levels, the growth processes are correlated. In the case of political interest and Internet use, it means that individuals change in the same direction on both factors over time. The model of parallel growth curves can be extended to include cross-lagged paths (see, for example, Moeller & de Vreese, [2015] or Schemer [2012] for examples in the field of communication science) to account for lagged impact between the factors beyond the parallel growth process. This approach, hence, combines growth curve modeling with cross-lagged modeling. By simultaneously modeling the parallel growth curve and lagged effects, we can disentangle the temporal order of cause and effect. Significant, positive cross-lagged paths, in combination with a significant covariance of the slopes, mean that the growth of the two factors is not only correlated, but that a change in the parallel growth process at a specific point in time is correlated with a change in the other factor at the previous time point. If we find this consistently, there is evidence for a reinforcing spiral (Figure 2).

Even though these models provide excellent opportunities to study the association between growth processes over time, they do not solve problems of causal inference. In a second step, we therefore applied a relatively recently-developed method for analyses of reciprocal effects. By combining the strength of fixed-effects panel regression with cross-lagged effects, these models allow for the simultaneous inclusion of unit-specific effects, controlling for stable, unobserved heterogeneity between respondents, and lagged, dependent variables (Allison, 2009; Allison, Williams, & Moral-Benito, 2017). As such, these cross-lagged panel models with fixed effects use within-person variation only to estimate reciprocal effects, while controlling for stable “unobservables.” For our purposes, we used a 1-year lag of the dependent and independent variables in each model. To account for reverse causality in each estimation, we specified the independent variables as predetermined (sequentially exogenous), such that x was allowed to correlate with errors in y from previous waves.

Results

Descriptive data, speaking to the overall development of political interest, as well as each form of online media usage, across the six panel waves are presented in Table 2. Several of the variables display growth over time; as adolescents get older

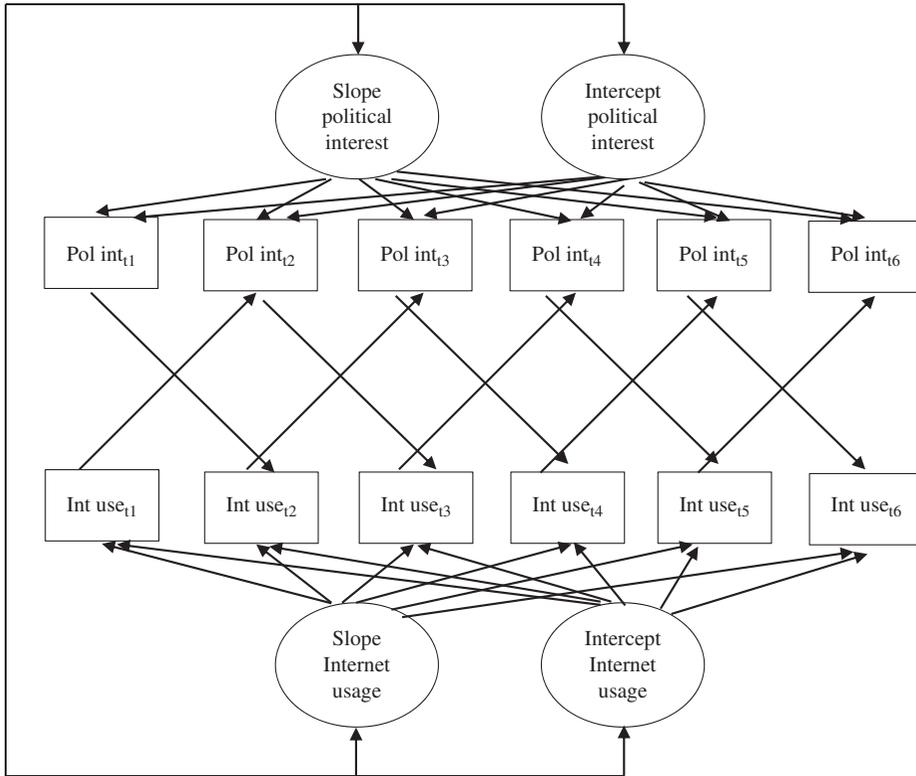


Figure 2 Analytical model of reinforcing spirals of political interest and Internet usage. The figure shows only the structural relationships between political interest and Internet usage. Residuals and correlations between residuals are considered, but not shown.

they become more interested in politics and more frequent users of general and political information, as well as more socially and politically interactive online.

The mean value of political interest increased from 4.5 to 6.2; general information usage from 4.6 to 6.3; social interaction from 6.21 to 6.9; political information from 1.4 to 2.9; and political interaction from 1.32 to 2.4 over the 5 years, all using the same 0–10 scale.⁷ It is also worth noting that there seems to be nothing particular happening in election years (Waves 1 and 5). Rather, key variables tend to follow a general increase over time.

Whether these aggregate-level trends are related at the individual level is, however, not clear from these data. The main research question of this paper concerns how these trends are related and whether a reinforcing spiral accounts for these relationships.

Analyzing growth curves

In Table 3, we start addressing this question by presenting the results of four parallel growth models estimating the latent intercept and slope of each factor, as well as

Table 2 Political Interest and Online Media Use Over Time (Mean Values and Standard Deviation)

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5	Wave 6
Political interest	4.50	4.66	4.64	5.26	5.63	6.16
(Min–Max: 0–10)	(2.32)	(2.49)	(2.46)	(2.47)	(2.44)	(2.40)
General information	4.64	4.86	5.49	5.89	6.16	6.26
(Min–Max: 0–10)	(2.15)	(2.02)	(2.10)	(1.88)	(1.76)	(1.83)
Social interaction	6.21	6.73	6.17	6.01	7.24	6.89
(Min–Max: 0–10)	(2.71)	(2.56)	(2.34)	(2.19)	(1.96)	(1.94)
Political information	1.35	1.47	2.00	2.88	2.94	2.89
(Min–Max: 0–10)	(2.09)	(2.08)	(2.51)	(2.55)	(2.87)	(2.92)
Political interaction	1.32	1.43	1.96	2.03	2.26	2.41
(Min–Max: 0–10)	(1.88)	(1.86)	(2.10)	(2.08)	(2.90)	(2.35)
<i>N</i> (minimum)	890	844	819	704	682	649

their covariance, using Structural Equation Modeling. Four models are presented, corresponding to each form of online media use.

Model 1 focuses on political interest and general information usage (*chi-square* = 185.94, *df* = 48; root mean square error of approximation (*RMSEA*) = .053; comparative fit index (*CFI*) = .96). For political interest, both the mean intercept ($M = 4.34$, $SE = .07$; $p < .001$) and the mean slope ($M = .33$, $SE = .02$; $p < .001$) are statistically significant. This is the case also for general information usage (intercept: $M = 4.70$, $SE = .06$; $p < .001$; slope: $M = .35$, $SE = .02$; $p < .001$). The covariances between intercepts and slopes are negative for both factors (political interest: covariance [*COV*] = $-.15$, $SE = .07$; $p < .05$; general information: $COV = -.18$, $SE = .05$; $p > .01$), suggesting that adolescents with high starting values grow at a slower rate. More interestingly, however, the covariances between the two intercepts ($COV = 1.27$, $SE = .15$; $p < .001$) and the slopes ($COV = .05$, $SE = .01$; $p < .001$) show that these are positively related. Adolescents with a stronger interest in politics initially are also more frequently using the Internet for information purposes, and growth in political interest is positively related to growth in such usage.

Model 2 replicates this model, focusing on political interest and online social interaction (*chi-square* = 371.31, *df* = 48; *RMSEA* = .081; *CFI* = .904). The slopes of both political interest ($M = .33$, $SE = .02$; $p < .001$) and online social interaction ($M = .14$, $SE = .02$; $p < .001$) are positive and statistically significant. The significant, negative covariance between intercept and slope for online social interaction ($COV = -.23$, $SE = .08$; $p < .01$) suggests that growth in social interaction is weaker among adolescents who were already socially interactive at the outset. Compared to general information usage, however, there is a negative covariance between the intercepts ($COV = -.47$, $SE = .18$; $p < .05$), but not the slopes ($COV = .00$, $SE = .01$; $p > .05$), of political interest and social interaction, suggesting that these factors are negatively related at the outset but unrelated in terms of growth processes.

Table 3 Parallel Growth Models (Unstandardized Coefficients)

	Model 1: General Information	Model 2: Social Interaction	Model 3: Political Information	Model 4: Political Interaction
<u>Political interest</u>				
Intercept	4.34*** (0.07)	4.35*** (0.07)	4.34*** (0.07)	4.35*** (0.07)
Slope	0.33*** (0.02)	0.33*** (0.02)	0.32*** (0.02)	0.33*** (0.02)
<u>General information</u>				
Intercept	4.70*** (0.06)	-	-	-
Slope	0.35*** (0.02)	-	-	-
<u>Social interaction</u>				
Intercept	-	6.21*** (0.08)	-	-
Slope	-	0.14*** (0.02)	-	-
<u>Political information</u>				
Intercept	-	-	1.33*** (0.02)	-
Slope	-	-	0.36*** (0.02)	-
<u>Political interaction</u>				
Intercept	-	-	-	1.36*** (0.06)
Slope	-	-	-	0.23*** (0.02)
<u>Covariance intercepts/slopes</u>				
Political interest	-0.15* (0.07)	-0.15* (0.07)	-0.14* (0.07)	-0.19* (0.07)
General information	-0.18** (0.05)	-	-	-
Social interaction	-	-0.23** (0.08)	-	-
Political information	-	-	-0.01 (0.07)	-
Political interaction	-	-	-	0.01 (0.06)

(Continued)

Table 3 Continued

	Model 1: General Information	Model 2: Social Interaction	Model 3: Political Information	Model 4: Political Interaction
<u>Covariance intercepts</u>				
Interest, general information	1.27*** (0.15)	-	-	-
Interest, social interaction	-	-0.47* (0.18)	-	-
Interest, political information	-	-	1.63*** (0.16)	-
Interest, political interaction	-	-	-	1.03*** (0.14)
<u>Covariance slopes</u>				
Interest, general information	0.05*** (0.01)	-	.-	-
Interest, social interaction	-	0.00 (0.01)	-	-
Interest, political information	-	-	0.12*** (0.02)	-
Interest, general interaction	-	-	-	0.07*** (0.01)
<u>Model fit</u>				
<i>Chi-square</i> (<i>df</i>)	185.94 (48)	371.31 (48)	262.67 (48)	181.88 (48)
<i>RMSEA</i>	0.053	0.081	0.066	0.052
<i>CFI</i>	0.962	0.904	0.95	0.96
<i>AIC</i>	37,504.964	39,418.368	39,123.919	37,946.640
<i>BIC</i>	37,712.331	39,625.736	39,331.287	38,154.007
<i>N</i>	1,030	1,030	1,030	1,030

Note: Estimates are unstandardized coefficients, with standard errors in parentheses. * $p < .05$; ** $p < .01$; *** $p < .001$.

RMSEA = root mean square error of approximation; CFI = comparative fit index; AIC = akaike information criterion; BIC = bayesian information criterion.

Model 3 focuses on the relationship between political interest and online political information ($chi-square = 262.67$, $df = 48$; $RMSEA = .066$; $CFI = .95$). Besides the significant slope of political interest ($M = .32$, $SE = .02$, $p < .001$), use of online political information also displays a statistically significant growth over time ($M = .36$, $SE = .02$, $p < .001$). Also, both the intercepts ($COV = 1.63$, $SE = .16$, $p < .001$) and slopes ($COV = .12$, $SE = .02$, $p < .001$) of the two factors are positively related, providing evidence for a reinforcing spiral.

Finally, Model 4 replicates these analyses, focusing on online political interaction ($chi-square = 181.88$, $df = 48$; $RMSEA = .052$; $CFI = .96$). The pattern is strikingly similar. Online political interaction displays a significant growth over time ($M = .23$, $SE = .02$; $p < .001$), as well as positive associations with political interest, with respect to both intercepts ($COV = 1.03$, $SE = .14$; $p < .001$) and slopes ($COV = .07$, $SE = .02$; $p < .001$).

Adding cross-lagged effects

Thus far, we have seen a pattern of positive relations in the intercepts and slopes of political interest and three forms of online media use: general information, political information, and political interaction. Although these parallel growth trends are indicative of a reinforcing process, several alternative explanations are plausible as well. One way to assess whether a reciprocal dynamic is present here is to add cross-lagged effects to the growth models above. These cross-lagged effects capture time-varying deviations above and beyond the linear growth curves. Doing so improves model fit for all four models, and the findings are displayed in Table 4.

First, Model 5 added cross-lagged effects to the parallel growth model of political interest and general information usage, which improves the fit statistics ($chi-square = 92.38$, $df = 38$; $RMSEA = .037$; $CFI = .99$). Although the covariance between the slopes remains statistically significant ($COV = .05$, $SE = .01$; $p < .01$), very few of the cross-lagged effects are.

Second, Model 6 similarly added cross-lagged effects to the growth model, focusing on political interest and online social interaction and also yielding a significantly better model fit ($chi-square = 152.92$, $df = 38$; $RMSEA = .054$; $CFI = .97$). Although the covariances between intercepts ($COV = -.52$, $SE = .20$; $p < .01$) and slopes ($COV = -.04$, $SE = .01$; $p < .05$) of both factors are negative, the cross-lagged effects reveal a pattern of rather inconsistent relationships. For instance, social interaction appears to have little influence on subsequent levels of political interest ($b_{Wave\ 1-Wave\ 2} = -.01$, $p > .05$; $b_{Wave\ 2-Wave\ 3} = -.05$, $p < .01$; $b_{Wave\ 3-Wave\ 4} = .00$, $p > .05$; $b_{Wave\ 4-Wave\ 5} = .02$, $p > .05$; $b_{Wave\ 5-Wave\ 6} = .05$, $p > .01$). At the same time, some evidence for positive effects of political interest on later social interaction are found ($b_{Wave\ 1-Wave\ 2} = .10$, $p < .001$; $b_{Wave\ 2-Wave\ 3} = .00$, $p > .05$; $b_{Wave\ 3-Wave\ 4} = -.02$, $p > .05$; $b_{Wave\ 4-Wave\ 5} = .18$, $p < .001$; $b_{Wave\ 5-Wave\ 6} = .13$, $p < .01$).

Third, adding cross-lagged effects to the political interest versus online political information model improved the model fit as well ($chi-square = 137.18$, $df = 38$; $RMSEA = .05$; $CFI = .98$). The covariances between the two intercepts ($COV =$

Table 4 Parallel Growth Models With Cross-Lagged Effects (Unstandardized Coefficients)

Model 5: Interest vs General Information		Model 6: Interest vs Social Interaction		Model 7: Interest vs Political Information		Model 8: Interest vs Political Interaction	
<u>Political Interest</u>		<u>Political Interest</u>		<u>Political Interest</u>		<u>Political Interest</u>	
Gen-info _{t1} →	0.00 (0.02)	Soc-interact _{t1} →	-0.01 (0.01)	Pol-info _{t1} →	0.08* (0.03)	Pol-interact _{t1} →	0.08* (0.04)
Interest _{t2}		Interest _{t2}		Interest _{t2}		Interest _{t2}	
Gen-info _{t2} →	-0.03 (0.03)	Soc-interact _{t2} →	-0.05** (0.02)	Pol-info _{t2} →	-0.01 (0.04)	Pol-interact _{t2} →	-0.08* (0.04)
Interest _{t3}		Interest _{t3}		Interest _{t3}		Interest _{t3}	
Gen-info _{t3} →	0.05 (0.03)	Soc-interact _{t3} →	0.00 (0.02)	Pol-info _{t3} →	0.10** (0.03)	Pol-interact _{t3} →	0.06* (0.03)
Interest _{t4}		Interest _{t4}		Interest _{t4}		Interest _{t4}	
Gen-info _{t4} →	0.07 (0.04)	Soc-interact _{t4} →	0.02 (0.03)	Pol-info _{t4} →	0.08* (0.03)	Pol-interact _{t4} →	0.08* (0.04)
Interest _{t5}		Interest _{t5}		Interest _{t5}		Interest _{t5}	
Gen-info _{t5} →	0.12* (0.05)	Soc-interact _{t5} →	0.05 (0.04)	Pol-info _{t5} →	0.13** (0.04)	Pol-interact _{t5} →	0.12* (0.05)
Interest _{t6}		Interest _{t6}		Interest _{t6}		Interest _{t6}	
<u>General information</u>		<u>Social Interaction</u>		<u>Political Information</u>		<u>Political Interaction</u>	
Interest _{t1} →	-0.03 (0.01)	Interest _{t1} →	0.10*** (0.02)	Interest _{t1} →	-0.01 (0.02)	Interest _{t1} →	0.01 (0.02)
Gen-info _{t2}		Soc-interact _{t2}		Pol-info _{t2}		Pol-interact _{t2}	
Interest _{t2} →	0.03 (0.01)	Interest _{t2} →	0.00 (0.02)	Interest _{t2} →	0.07* (0.03)	Interest _{t2} →	0.09** (0.03)
Gen-info _{t3}		Soc-interact _{t3}		Pol-info _{t3}		Pol-interact _{t3}	
Interest _{t3} →	0.04 (0.02)	Interest _{t3} →	-0.02 (0.03)	Interest _{t3} →	0.19*** (0.04)	Interest _{t3} →	0.08* (0.03)
Gen-info _{t4}		Soc-interact _{t4}		Pol-info _{t4}		Pol-interact _{t4}	
Interest _{t4} →	0.03 (0.03)	Interest _{t4} →	0.18*** (0.03)	Interest _{t4} →	0.15** (0.05)	Interest _{t4} →	0.10* (0.04)
Gen-info _{t5}		Soc-interact _{t5}		Pol-info _{t5}		Pol-interact _{t5}	
	0.03 (0.03)		0.13** (0.04)		0.08 (0.06)		0.10* (0.05)

(Continued)

Table 4 Continued

Model 5: Interest vs General Information		Model 6: Interest vs Social Interaction		Model 7: Interest vs Political Information		Model 8: Interest vs Political Interaction	
Interest _{t5} → Gen-info _{t6}		Interest _{t5} → Soc-interact _{t6}		Interest _{t5} → Pol-info _{t6}		Interest _{t5} → Pol-interact _{t6}	
<u>Cov. intercepts/slopes</u>		<u>Intercepts/slopes</u>		<u>Intercepts/slopes</u>		<u>Intercepts/slopes</u>	
Political interest	-0.21** (0.07)	Political interest	-0.16* (0.07)	Political interest	-0.20* (0.08)	Political interest	-0.24** (0.08)
General information	-0.19*** (0.05)	Social interaction	-0.21** (0.08)	Political information	-0.05 (0.07)	Political interaction	0.02 (0.06)
<u>Cov. intercepts</u>		<u>Intercepts</u>		<u>Intercepts</u>		<u>Intercepts</u>	
Interest, gen. information	1.30*** (0.17)	Interest, social interaction	-0.52** (0.20)	Interest, pol. information	1.44*** (0.21)	Interest, pol. interaction	0.87*** (0.18)
<u>Cov. slopes</u>		<u>Slopes</u>		<u>Slopes</u>		<u>Slopes</u>	
Interest, gen. information	0.05** (0.01)	Interest, social interaction	-0.04*(0.01)	Interest, pol. information	0.07** (0.02)	Interest, pol. interaction	0.03 (0.02)
<u>Model fit</u>		<u>Model fit</u>		<u>Model fit</u>		<u>Model fit</u>	
<i>Chi-square (df)</i>	92.383 (38)	<i>Chi-square (df)</i>	152.92 (38)	<i>Chi-square (df)</i>	137.18 (38)	<i>Chi-square (df)</i>	117.39 (38)
<i>RMSEA</i>	0.037	<i>RMSEA</i>	0.054	<i>RMSEA</i>	0.05	<i>RMSEA</i>	0.045
<i>CFI</i>	0.985	<i>CFI</i>	0.966	<i>CFI</i>	0.975	<i>CFI</i>	0.978
<i>AIC</i>	37,431.407	<i>AIC</i>	39,219.985	<i>AIC</i>	39,018.433	<i>AIC</i>	37,902.151
<i>BIC</i>	37,688.147	<i>BIC</i>	39,476.726	<i>BIC</i>	39,275.173	<i>BIC</i>	38,158.892
<i>N</i>	1,030	<i>N</i>	1,030	<i>N</i>	1,030	<i>N</i>	1,030

Note: Estimates are unstandardized coefficients, with standard errors in parentheses. Models 7 and 8 use robust standard errors. * $p < .05$; ** $p < .01$; *** $p < .001$.

1.44, $SE = .21$; $p < .001$) and the two slopes ($COV = .07$, $SE = .02$; $p < .01$) remain significant, while the cross-lagged effects reveal a pattern of reciprocal influences. Use of online political information has positive effects on subsequent levels of political interest ($b_{Wave\ 1-Wave\ 2} = .08$, $p < .05$; $b_{Wave\ 2-Wave\ 3} = -.01$, $p > .05$; $b_{Wave\ 3-Wave\ 4} = .10$, $p < .01$; $b_{Wave\ 4-Wave\ 5} = .08$, $p < .05$; $b_{Wave\ 5-Wave\ 6} = .13$, $p < .01$), while several of the effects in the opposite direction are significant as well ($b_{Wave\ 1-Wave\ 2} = -.01$, $p > .05$; $b_{Wave\ 2-Wave\ 3} = .07$, $p < .05$; $b_{Wave\ 3-Wave\ 4} = .19$, $p < .001$; $b_{Wave\ 4-Wave\ 5} = .15$, $p < .01$; $b_{Wave\ 5-Wave\ 6} = .08$, $p > .05$).

Finally, a similar pattern emerged when adding cross-lagged effects to the model focusing on political interest and online political interaction, as evident in Model 8. Improvement of model fit is significant ($chi-square = 117.39$, $df = 38$; $RMSEA = .045$; $CFI = .98$) and positive, cross-lagged effects are relatively consistent across waves. Online political interaction exerts a positive effect on subsequent political interest ($b_{Wave\ 1-Wave\ 2} = .08$, $p < .05$; $b_{Wave\ 2-Wave\ 3} = -.08$, $p < .05$; $b_{Wave\ 3-Wave\ 4} = .06$, $p < .05$; $b_{Wave\ 4-Wave\ 5} = .08$, $p < .05$; $b_{Wave\ 5-Wave\ 6} = .12$, $p < .05$). At the same time, political interest has positive effects on later online political interaction ($b_{Wave\ 1-Wave\ 2} = .01$, $p > .05$; $b_{Wave\ 2-Wave\ 3} = .09$, $p < .01$; $b_{Wave\ 3-Wave\ 4} = .08$, $p < .05$; $b_{Wave\ 4-Wave\ 5} = .10$, $p < .05$; $b_{Wave\ 5-Wave\ 6} = .10$, $p < .05$).

Taken together, these findings clearly suggest the presence of reinforcing influences, driven by content characteristics of online media usage. Put simply, there is a clear divide between general information and social interaction on the one hand and political information and political interaction usages on the other. At the same time, the substantive importance of these effects is less clear-cut. Most cross-lagged influences appear relatively small in absolute size (on average below 0.10 on the 0–10 scales), but these effects are above and beyond the correlated linear growth curves already accounted for.

Accounting for unobserved heterogeneity in cross-lagged effects

Thus far, the findings suggest the presence of reinforcing spirals among adolescents, between political interest on the one hand and political online media usage on the other hand. Although parallel growth curves and cross-lagged effects are indicative, recently-developed panel analytic methods enable stronger tests of the causal interplay between political interest and online media usage. Table 5 presents results from a series of dynamic panel models that combine the strengths of fixed-effects panel regression with reciprocal effects. Put simply, by removing all between-person variations, these models account for all stable, individual-level factors influencing the dependent variable, relying exclusively on within-person changes over time to estimate coefficients. As such, these models provide a more conservative and strict test of reciprocal effects than the growth models presented above. The upper part of Table 5 focuses on the effects of online media usage on political interest, while the bottom part displays the effects of political interest on online media usage.

When it comes to media effects, only political information usage ($b = .08$; $p < .01$) and political interaction ($b = .07$; $p < .05$) display significant, positive effects

Table 5 Dynamic Panel Models With Fixed Effects (Unstandardized Coefficients)

	Model 1 Interest vs Gen. Information	Model 2 Interest vs Social Interaction	Model 3 Interest vs Pol. Information	Model 4 Interest vs Pol. Interaction
<u>Media effects</u>				
Media use _{t-1} → Interest _t	0.06 (0.03)	-0.02 (0.02)	0.08** (0.03)	0.07* (0.04)
Political interest _{t-1}	0.30*** (0.02)	0.31*** (0.02)	0.28*** (0.03)	0.29*** (0.03)
<i>Chi-square</i> (df)	21.80 (21)	30.54 (21)	32.15 (21)	35.95 (21)
RMSEA	0.006	0.021	0.023	0.026
CFI	1.000	0.995	0.996	0.993
<u>Selection effects</u>				
Interest _{t-1} → Media use _t	0.02 (0.03)	-0.04 (0.04)	0.07* (0.04)	0.03 (0.03)
Media use _{t-1}	0.22*** (0.03)	0.29*** (0.04)	0.26*** (0.03)	0.24*** (0.04)
<i>Chi-square</i> (df)	43.49 (21)	83.01 (21)	55.42 (21)	60.46 (12)
RMSEA	0.032	0.054	0.04	0.043
CFI	0.986	0.955	0.981	0.973
N	1,029	1,029	1,030	1,030

Note: Estimates are unstandardized coefficients, with standard errors in parentheses. Robust standard errors account for skewness in some of the dependent variables. * $p < .05$; ** $p < .01$; *** $p < .001$.

on political interest, as evident from Models 3 and 4 in the table. Furthermore, the bottom part of Table 5 reveals only one significant selection effect: political interest has a positive effect on the usage of online political information ($b = .07$; $p < .05$). Again, however, the size of these coefficients indicates that these reciprocal effects are not very large in magnitude. For instance, a one-unit increase in the online political information usage corresponds to an increase in political interest of approximately 0.08 political interest units.

To provide a final test of the influence of political online media usage on political interest, Table 6 presents findings from two dynamic panel models, including “socialization” variables as within-person controls: changes in family socioeconomic status, adolescents’ total news consumption across different platforms, and interpersonal discussions with both parents and peers. When imposing these additional within-person controls, only usage of online political information ($b = .07$; $p < .05$) remains a statistically-significant predictor of later political interest.

Conclusion and discussion

This 5-year longitudinal study on the reciprocal relations between online media usage and political interest among adolescents had two specific aims: (a) to study

Table 6 Dynamic Panel Models With Fixed Effects (Unstandardized Coefficients)

	Model 1 Interest vs Political Information	Model 2 Interest vs Political Interaction
<u>Lagged dependent variable</u>		
Political interest _{t-1}	0.27*** (0.03)	0.28*** (0.03)
<u>Online Media Use</u>		
Political information _{t-1}	0.07* (0.03)	-
Political interaction _{t-1}	-	0.05 (0.04)
<u>Control variables</u>		
Socioeconomic status _t	-0.01 (0.03)	-0.01 (0.03)
Total news consumption _{t-1}	0.10** (0.04)	0.09* (0.04)
Parents' political talk _{t-1}	-0.02 (0.03)	-0.01 (0.03)
Peers' political talk _{t-1}	-0.00 (0.03)	0.01 (0.03)
<u>Model fit</u>		
Chi-square (df)	97.31 (67)	105.34 (67)
RMSEA	0.021	0.024
CFI	0.99	0.99
N	1,029	1,029

Note: Estimates are unstandardized coefficients, with standard errors in parentheses. * $p < .05$; ** $p < .01$; *** $p < .001$.

the development and formation of political interest during adolescence and, particularly, whether young citizens' Internet usage has any lasting, long-term effects on this personal motivation that is crucial to functioning democracies (Prior, 2010; Torcal & Maldonado, 2014); as well as (b) to make a distinct contribution to research on reinforcing spirals theory (Slater, 2007, 2015). With respect to the first aim, the findings presented here clearly suggest that certain forms of online media usage matter for the development of political interest during adolescence. Adolescents who particularly engage with political content online develop a stronger interest in politics over time. These findings corroborate results from quasi-experimental research suggesting that Internet access, as such, has no effect on political interest, efficacy, or knowledge (Richey & Zhu, 2015). What matters, in the end, is how citizens use the Internet (Boulianne, 2015a; Ekström & Östman, 2015). At the same time, however, these effects of online media usage appear relatively weak.

Regarding the second aim, the study contributes to research on reinforcing spirals in important ways. Empirically, the unique, six-wave panel data employed here, which was conducted over a period of 5 years during adolescence, when young citizens' social identities (Arnett, 2007) and political interest form (Prior, 2010; Russo & Stattin, 2017; Shehata & Amnå, 2017), are exceptionally well-suited for testing the reciprocal influences between media selection and media effects suggested by the

reinforcing spiral model (Slater, 2007, 2015). The theoretical implications of our approach and findings are summarized below.

To begin with, by specifically analyzing the development of political interest, we demonstrate the value of reinforcing spirals theory in understanding socialization processes more generally. While previous work tended to focus on “negative” aspects of media selectivity-driven reinforcement, such as attitude polarization (Song & Boomgaarden, 2017), youth aggressiveness, and risk behaviors (e.g., see Slater & Hayes, 2010), the findings presented here clearly indicate that similar reinforcement processes can also have more positive effects on adolescent socialization (Kruikemeier & Shehata, 2017; Moeller & de Vreese, 2015).

Furthermore, our analyses revealed the conditionality of reinforcing spirals. By theoretically proposing a two-dimensional conceptualization of online media usage, distinguishing between content and interactivity characteristics, we provide a better understanding of the processes and mechanisms linking online media usage to the development of political interest among young citizens. Taken together, the findings lend support for the basic premise of the reinforcing spirals theory: political interest and (certain forms of) online media usage are reciprocally related among adolescents (H1). However, the findings also suggest that the content dimension (H2) is more important than the interactivity dimension (H3) when it comes to explaining growth in political interest. What matters in terms of triggering a reinforcement process is whether adolescents seek out and engage with content that is explicitly political (Boulianne, 2015a), not whether they are engaged in extensive online interactivity. At the same time, our findings also showed that mere informational political usages had more consistent, mutually-reinforcing effects than interactive usages of online political content. Let us briefly discuss three potential explanations and implications of this finding, while also noting some limitations of our study.

The first explanation may be of the greatest theoretical value. If political interest resembles a psychological trait (Hidi & Renninger, 2006; Prior, 2010), largely insensitive to social influences (Shehata & Amnå, 2017), the differential effects of informational and interactional political usages of online media may reflect partly different mechanisms. As defined here, informational usages involve a set of predominantly intra-personal activities—including content selection, attention, processing, and elaboration—while interactional usages capture predominantly inter-personal online activities. Such intra-personal activities require fairly strong internal motivations and can be cognitively demanding, which, in turn, may be exactly what matters when it comes to shaping adolescents’ interest in politics (Chaiken & Eagly, 1989; Petty & Cacioppo, 1986). Thereby, online political interaction—sometimes genuine and deliberate, but often happening “on the fly” in a social media environment characterized by porous boundaries and traversability (Brundidge, 2010; Ekström & Shehata, 2018)—is just a side effect of a psychological process that has already taken place. Accordingly, online interactivity may have no independent effect on political interest, beyond the intra-personal process driven by content selection, attention, and elaboration. These findings, therefore, underscore the

importance of human agency and self-socialization (Arnett, 2007) as drivers of the reinforcement spiral.

The second explanation is related to research design. As this study focused on long-term effects, measured in 1-year intervals, these analyses may not capture what could be rather immediate and short-term effects of online political interactivity. If such interactions stimulate an instantaneous effect on political interest, which then wanes rather quickly, this is not registered in our analyses. Although this may be the case, it again highlights the differential impact of informational and interactional usages of online media in terms of shaping political interest.

The third explanation relates to the character of online interactions. Recent theoretical and empirical work has highlighted the conditional effects on citizens' political engagement stemming from political interactions, both offline (Mutz, 2002; Torcal & Maldonado, 2014) and online (Shah, 2016; Wells et al., 2017). Put simply, whether citizens' personal experiences of interacting with others online are positive or negative may matter a great deal when it comes to shaping their interest in politics. Here, levels of opinion disagreement, incivility, and hostility in the online environment are probably crucial, and potentially affect people differently. This is, therefore, a factor that needs to be accounted for in future studies.

Apart from these limitations and suggestions, it should be noted that the findings presented here rely on data from a single country: Sweden. Although the measures used and mechanisms addressed are, in many ways, generic, the generalizability of our results to other contexts needs to be tested further. Sweden is a western European democracy with certain media and political system characteristics, social structures, levels of interpersonal and institutional trust, and patterns of media and Internet usage: all factors that may condition the effects documented here. Therefore, replicating this study in other countries is important for assessing the generalizability and contextual conditionalities of our findings.

In conclusion, however, this study has provided unique contributions to research on reinforcing spirals theory, both theoretically and empirically. Apart from demonstrating its relevance for analyzing the development of political interest during adolescence, our study suggests that reinforcing spirals are primarily, but not unconditionally, driven by content characteristics of online media usage. The fact that such reinforcement processes are not due exclusively to a pure content effect, but may also depend on the communication form, is important for future research on the conditionalities and mechanisms behind reinforcing spirals.

Notes

- 1 Pearson's r , Wave 1 (W1) = 0.46, W2 = 0.58, W3 = 0.65, W4 = 0.69, W5 = 0.68, and W6 = 0.71.
- 2 Cronbach's α , Wave 1 = 0.68, W2 = 0.65, W3 = 0.64, W4 = 0.59, W5 = 0.54, and W6 = 0.55.
- 3 Cronbach's α , Wave 1 = 0.80, W2 = 0.80, W3 = 0.55, W4 = 0.49, W5 = 0.63, and W6 = 0.63.
- 4 Cronbach's α , Wave 1 = 0.80, W2 = 0.77, W3 = 0.83, W4 = 0.78, W5 = 0.83, and W6 = 0.85.
- 5 Cronbach's α , Wave 1 = 0.69, W2 = 0.65, W3 = 0.71, W4 = 0.68, W5 = 0.73, and W6 = 0.76.

- 6 Descriptive statistics on pooled data: socioeconomic status (Min = 0, Max = 10, M = 5.88, standard deviation [SD] = 1.83); total news media use (Min = 0, Max = 10, M = 4.01, SD = 2.10); frequency of political discussions with parents (Min = 0, Max = 10, M = 4.96, SD = 2.48); and frequency of political discussions with peers (Min = 0, Max = 10, M = 3.96, SD = 2.43).
- 7 Since there is a general drop in the number of respondents over time, we replicated the descriptive analyses presented in Table 2 among respondents with non-missing values from all six panel waves. For political interest (n = 397), the trends over time and changes between panel waves are very similar to those presented in Table 2, clearly suggesting that growth in political interest reflects real increases, and not artifacts of panel dropout. This is also the case for the other variables in Table 2.

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