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Generational effects of culture and digital media in former Soviet Republics

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In public opinion, social and digital media provide means for influence as well as sorting according to pre-existing values. Here we consider types of media usage versus opinion using new polling results in the former Soviet republics (FSRs) of Belarus, Ukraine, and Georgia. Over 1000 individuals in each country were asked about a news event (the January 6 riot at the U.S. Capitol) and about the long-term future of their country. We find that year of birth and country of residence, rather than self-reported media reliance, consistently predicted the respondents' views, particularly on the future of their country. The timing of these differences suggests a cultural difference between generations growing up in the Soviet Union (likely more pro-Russian) versus afterward, in an FSR (more pro-Western). Whereas digital media choice is somewhat correlated with perceptions of a recent, international news event, the more predictive factors are longer-term cultural values and age cohorts within each nation.

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Introduction

An understanding public opinion on geopolitical events, overlapping factors include the influence of mass media, social media, culture, life experience, and socio-economic contexts. Recent interest in social media as spaces for disinformation and propaganda (Agarwal et al., 2017; EIPT, 2020; Horne et al., 2020; Johnson et al., 2016, 2019; Weimann, 2015) highlights the potentially rapid change in the balance and variation of these factors. This dynamic situation invites opportunistic observational studies in different countries (Vartanova and Gladkova, 2019), of not only social media versus mainstream mass media in the spread of political opinions, but also politically biased media structures (Benkler et al., 2018) and, even more broadly, the role of individual, generational and cultural memory (Lesthaeghe, 2014; Loftus, 2005).

Culture, as the context for human behavior, differs substantially between nations (Gelfand et al., 2020; Inglehart and Baker, 2000; Inglehart and Welzel, 2005) and underlies behavior, values, beliefs, and perceived realities (Cronk, 1999; Durkheim, 1915; Henrich, 2015). Cultural values represent deeply embedded attitudes and beliefs socialized during formative years (Bianchi, 2014; Cheung et al., 2011; Grusec and Kuczynski, 1997; Sears and Funk, 1999). The imagined identity of nationalism can facilitate social coordination (Anderson, 1991; Chudek and Henrich, 2011). Different cultures vary in the contexts for how contemporary digital media are changing the balance of social transmission of information, including the spread of misinformation and disinformation (Aral et al., 2009; Bond et al., 2012; Gallotti et al., 2020; Garcia-Herranz et al., 2014; Lazer et al., 2014; Ruck et al., 2019; Vosoughi et al., 2018).

Cultural change tends to be inter-generational in time scale because learning from the previous generation is a significant part of socialization (Grusec and Kuczynski, 1997). As a result, cultural values are often more consistent across generations (decades) of birth within each nation than they are by the year the cultural value survey was administered (Ruck et al., 2018). Generational differences arise as each age cohort develops in a changed world, while each cohort's sociopolitical attitudes tend to be resilient over their life span (Alwin and Krosnick, 1991; Bruce, 2011; Land and Yang, 2013; Ryder, 1965; Stolzenberg et al., 1995). In the 20th century, as new generations adapted to continual technological and socioeconomic modernization (Gorodnichenko and Roland, 2016; Herzer and Strulik, 2017; Varnum and Grossmann, 2017), long-term cultural shifts within nations contributed to inter-generational differences in values and habits (Algan et al., 2010; Foa et al., 2016; Gelfand et al., 2011; Inglehart, 2008; Norris and Inglehart, 2004; Petanjek et al., 2011).

With regard to media influences in public opinion formation, assumptions on how swiftly media-motivated opinion changes might occur vary depending on the theoretical perspective adopted. For instance, a theory that takes a more long-term understanding of media influence is Cultivation Theory. Originated by communications scholar George Gerbner, Cultivation Theory is built upon the premise that mass-disseminated messages create symbolic environments reflective of the ideological structures in which they are produced (Gerbner, 1973; Morgan, 2012). Media influences on people are viewed as long-term with the notion that an individual's ritualistic exposure to discursive themes repeatedly presented by media shape one's worldview. In other words, the shaping of social reality does not immediately take place but rather evolves through repeated exposure over a period of time.

Other theoretical approaches (e.g., Elaboration Likelihood Model, Selective Exposure Theory, etc.) to media studies, however, acknowledge the potential for immediate media effects and the existence of reciprocal influences (i.e., not only one-way). For

our research, we incorporate Selective Exposure Theory. Under this theory, individuals are driven by their psychological or social needs to select certain media for consumption (Knobloch-Westerwick, 2015). Systematic biases toward certain messages are present. Founded on Cognitive Dissonance Theory (Festinger, 1957), people are thought to avoid information that might cause cognitive discomfort and tend to seek information that aligns with their opinions and attitudes. In media terms, people are motivated to select and consume media content that might validate or secure their beliefs or values. Under this theory, the potential interaction between media messages and the socio-political context in which they are produced is considered.

Both Selective Exposure Theory and Cultivation Theory are relevant to social media, which enable agents to be both producers and consumers of cultural content that can embody individual or shared values (Howard and Parks, 2012). In terms of selective exposure, social media can facilitate homophily, via the sorting of social networks according to cultural dispositions, intrinsic preferences, and/or demographics (Aral et al., 2009; Christakis and Fowler, 2013; Kendal et al., 2018; Shalizi and Thomas, 2011). In terms of cultivation, this sorting of online populations often aligns with political and/or ideological views (Acerbi, 2019; Druckman et al., 2021; Grinberg et al., 2019; Johnson et al., 2019, 2020; Waller and Anderson, 2021). Indeed this sorting is often inherent in the strategies for deploying non-human and meta-human agents that have become pervasive in social media (Botes, 2022; Broniatowski et al., 2018; Ferrara et al., 2016; Horne et al., 2019; Jakesch et al., 2021; Kumar et al., 2017; Shah, 2017; Starbird et al., 2018; Zannettou et al., 2019).

Public opinion can also change in response to major events (Bentzen, 2018; Grossmann et al., 2015; Henrich et al., 2019). While events in other countries may have ephemeral emotional impact, local events, and history can resonate for generations (Nunn, 2009), shaping views of other countries in view of past interactions or conflicts (Acemoglu et al., 2001; Becker et al., 2016; Iyer, 2010). Long-lasting narratives may be facilitated by mass and social media (Wagner-Pacifici, 2010, 2017), using new events to reaffirm existing socio-cultural narratives (Darczewska, 2014; Gerber and Zavisca, 2016).

Sorting out these different factors with certainty is difficult to achieve from observational data alone (Aral et al., 2009; Christakis and Fowler, 2013; Shalizi and Thomas, 2011). We can, however, posit hypotheses about expected patterns for an ephemeral news event versus more deeply held geopolitical alignment, under media influence versus characteristics of the different cohorts. Consistent with both cultivation and selective exposure theories, we expect broad geopolitical alignment to be patterned on the year of birth, nationality, and possibly other covariates such as education, as these reflect the conditions of childhood development. Under media influence, by contrast, we would expect attitudes to depend on media choice but not on individual covariates.

This study. Here we explore generational and media-choice effects in the Former Soviet Republics (FSRs) of Belarus, Ukraine, and Georgia, through surveys on the perceptions of two different phenomena—one is an ephemeral, international news event: the January 6, 2021 riot at the U.S. Capitol. The other is the broader, presumably more long-developed view of whether the respondent feels the country is headed toward Russia or the European Union. Complementary information was obtained from questions about respondents' reliance on domestic vs. Russian media and digital media vs. traditional media. The ages of respondents were recorded as a covariate to their responses.

Current research on interventions to counter dis/misinformation similarly focuses on Western populations and their preferred media (Groh et al., 2022; Nevo and Horne, 2022). Russia is the main source of pro-Russian narratives and disinformation as well as its largest audience. Over time, each of the FSR countries has been subjected to Russian propaganda. The cultural and historical differences among these FSRs, as well as the decade of birth, are among the key variables in investigating the influence of Russian narratives on public opinion in each population. In these FSRs, older generations raised in the Soviet Union may share more cultural values and preferences in common with each other than they do with younger, post-Soviet generations in their own respective FSRs. We would expect attitudinal differences between those who grew up before versus after the breakup of the Soviet Union in 1991. In addition to having grown up in the USSR, older generations of FSR citizens also grew up amid Soviet-era narratives, from both family members and the state, about World War II and shared Slavic identity, that posits their shared culture versus that of the European Union (Kozachenko, 2019). In these FSRs, media could play to different generational attitudes toward Russia versus the E.U. (Gaufman, 2015; Kuzio, 2016). During the winter of 2013–2014 in Ukraine, for example, Russian state media invoked neo-Soviet narratives in labeling the new pro-European government as “fascists” and “Nazis” (Kozachenko, 2019).

Our access to opinions in these countries follows a larger project, which has examined the effectiveness of these Russian narratives in shaping public opinion in these different FSRs through surveys, focus groups, and social media analysis. In Belarus, the government has continued to control traditional media through legislative and surveillance means, including the power to terminate media operations at any time (Freedom House, 2021; Szostek, 2015). As new digital media channels and social media access became more widespread with the Internet, Belarusians were able to receive more diverse media content. Following the public protests against the outcome of the Belarusian presidential election in 2020, however, the government has progressively placed restrictions on public access to independent media outlets (Freedom House, 2021). In Ukraine, media were relatively free following the collapse of the Soviet Union, with increased press censorship and governmental pressures (Roman et al., 2017), followed by a recent shift toward pro-Western leadership and freer media (Freedom House, 2021). Before the Russian invasion of 2022, Ukrainians had more freely consumed Russian media, as well as Ukrainian media owned by those with close ties to the Kremlin (Polman, 2021).

Methods

Our primary data source for this study comes from a survey conducted in three FSRs. Specifically, we conducted representative surveys administered to random samples of people from Belarus ($N = 1014$), Ukraine ($N = 2000$), and Georgia ($N = 1000$), between April and June of 2021 (Luther et al., 2022). Face-to-face interviews were used in Georgia and Ukraine, but interviews in Belarus were conducted by phone, due to unrest there at the time. Respondents were at least 18 years of age and the samples were representative of the general populations of each country by age, gender, region, and size of settlement (excluding the occupied territories of Donbas and Crimea in Ukraine).

The survey questions, limited in number, aimed to assess the relationship between media consumption and views of the Russian government and its competence. We asked respondents if Russian policies benefit their country, and we inquired regarding their support for or opposition to the European Union (“If you had to choose between improving relations between Belarus (Ukraine, Georgia) and Russia or joining the European Union, which would

you choose?”) Additionally, we examined feelings about how the 2021 Capital Riot in the U.S., would affect the standing of the United States politically. Though limited by the logistics of access, these questions addressed attitudes toward the Russian government from various angles, and small focus group interviews were also conducted to verify the relationships identified in the larger surveys.

Ephemeral event versus long-term geopolitical alignment. First, to capture two different types of opinions, we use the responses to two of our survey questions: one about a recent event and one about long-term geopolitical alignment. As described above, we choose these two different types of opinions as they each may be influenced more or less by generational homophily versus media influence.

On the subject of a recent event, respondents were asked their view on the effect of the Capitol riot on U.S. standing in global affairs, with the options: “The U.S. will become stronger”, “No effect”, “The U.S. will become weaker” and “Don’t know”. From this, we construct a variable, C , to measure optimism about the U.S. following the event. Treating the responses as ordinal, we assign $C = 0$ for those who reported “weaker”; $C = 0.5$ when “no effect” is reported, and $C = 1$ for respondents who reported “stronger”. As a proxy for differences of opinion on this subject, we compare the proportion of respondents who reported “no effect” (both with and without the “Don’t know” responses) to the proportions who replied either “weaker” or “stronger”.

From the question asking respondents if they preferred improved relations between their country and Russia or their country joining the European Union, we constructed a variable to measure opinions on geopolitical alignment. Again, treating the responses as ordinal, we assign $F = 0$ for those who reported alignment with Russia, $F = 0.5$ for those who reported they were uncertain and $F = 1$ for those who reported alignment with the European Union.

Media influence versus birth cohorts. Next, we captured each respondent’s age and asked respondents about their media consumption habits. In this case, the respondent’s age represents generational homophily, while media consumption habits represent the influence of media.

For media context, respondents were asked: “What are your major sources of information on the events and issues in your country and the world? (Name the three most important)”. Survey respondents could pick from five media groups:

- Domestic mass media (D_m): TV, radio, or print media located in the country of the survey respondent (Belarusian, Ukrainian, or Georgian mass media).
- Russian mass media (R_m): TV, radio, or print media located in Russia.
- Domestic digital media (D_d): Online media, such as blogs or news websites, from the country of the survey respondent (Belarusian, Ukrainian, or Georgian digital media).
- Russian digital media (R_d): Online media, such as blogs or news websites from Russia.
- Social media (S): Information from social media platforms, such as Facebook, Twitter, YouTube, Telegram, or Vkontakte.

In our surveys, we defined digital media more narrowly than in most of the literature. *Mass media* refer to analog media in the forms of print media (i.e., print newspapers, print magazines, etc.), radio broadcasting, film, or broadcast/cable television. In the broad sense, *digital media* include online websites, social media platforms, blogs, billboards, and entertainment streaming platforms. In our surveys, however, we defined digital media as those providing news and information, including the websites of

traditional news media and individual news blogs. In the source options that we provided our survey respondents, we separated digital media from social media in order to identify individuals who solely use social media as sources for information and news. The level of interactivity via social media sites is distinct from what is found via digital news websites or news blogs. Social media entails a network of users interacting at great speed, with popular or leading social media users having more influence over the interactions, especially during key event periods (Pond, 2021). Based on our initial analysis of our data, however, we found little differences between digital media users and social media users and thus, the decision was made to combine the two groups of individuals for our analysis.

Further, the responses to this question were not mutually exclusive, and so we created measures for digital vs. mass media and Russian vs domestic media. For digital vs. mass media (E_c) we use:

$$E_c = R_d + D_d + S - R_m - D_m \quad (1)$$

For Russian vs. domestic (Q_c), we use

$$Q_c = R_d + R_m - D_d - D_m \quad (2)$$

Lastly, in our analysis we also include a variant of this media context question, focused on trust rather than simply consumption: “Which of the following information sources do you trust the most? (Name the three most trustworthy)”. This variant had the same answer options as described above. The measures follow the same formulae as E_c and Q_c , but will be labelled as E_t and Q_t , respectively.

Cultural context. As further context to the results from our survey, we incorporated national-scale data on two cultural values, derived previously from multivariate factor analysis of World and European Values Survey data (EVS, 2011; WVS, 2020) in 109 countries (Ruck et al., 2018, 2020a, b). Like our survey, the World Values Survey derives from face-to-face interviews of about 1000 randomly selected individuals in each country—although these are different individuals than in our survey, of course, we aim to compare the data by mean values, aggregated by a decade of birth. The first factor represents secularism (versus religiosity), which is correlated with political engagement, respect for individual rights, and low prosociality (Ruck et al., 2020a). The second capture cosmopolitanism, which reflects how open people are to having neighbors that are foreign or of a different ethnicity (Ruck et al., 2020a).

Logistic regression and marginal effects. Together, these measures were analyzed through 36 multivariate logistic regressions (logistic because the outcome variable is binary), which help control for demographics, such as gender, rural versus urban, wealth, and education. Specifically, 18 logistic regressions were run with U.S optimism (C) as the dependent variable in each country (Belarus, Georgia, and Ukraine), each with an increasing number of controls:

$$C \sim E_c + Q_c \quad (3)$$

$$C \sim E_c + Q_c + F \quad (4)$$

$$C \sim E_c + Q_c + F + \text{demographics} \quad (5)$$

$$C \sim E_t + Q_t \quad (6)$$

$$C \sim E_t + Q_t + F \quad (7)$$

$$C \sim E_t + Q_t + F + \text{demographics} \quad (8)$$

As a reminder, E captures the consumption (or trust) of digital media versus mass media, no matter where that media comes from (domestic or Russian), while Q captures the consumption (or trust) of media from Russia versus domestic, no matter the format of that media (digital or mass media).

These regressions are then repeated with the variables C and F flipped, making respondent’s opinions on their country’s future as the dependent variable.

$$F \sim E_c + Q_c \quad (9)$$

$$F \sim E_c + Q_c + C \quad (10)$$

$$F \sim E_c + Q_c + C + \text{demographics} \quad (11)$$

$$F \sim E_t + Q_t \quad (12)$$

$$F \sim E_t + Q_t + C \quad (13)$$

$$F \sim E_t + Q_t + C + \text{demographics} \quad (14)$$

Importantly, for non-linear regression models—like the logistic regression we use—the effect coefficients are not representative of the actual effect the predictor variables have on the outcome. Therefore, we use partial derivatives over the sample to estimate the marginal effects of the predictors. These marginal effects are unit specific and give interpretable and comparable effects for the predictors of the response to the U.S. Capitol Riot and for the predictors of the response to country alignment. The errors in the marginal effects are the variances in the average marginal effect in the sample. We employed an implementation of this approach from the R package “margins”.

More details about each regression model can be found in the Supplementary Materials.

Results

In general, we find that birth year predicts one’s opinion on their country’s future political alignment, from pro-Russian among the old to more pro-E.U. among the young. In aggregate, we find this positive correlation among all the data from the three FSRs pooled together ($n = 4000$, Pearson’s $r = 0.113$ [95% CI 0.082, 0.144], $p \approx 10^{-11}$). As shown, however, in Supplementary Tables S4, S5, and S6, as well as Fig. 1a, this effect shifts up or down when disaggregated across the three countries. Notably, among Belarusians, there is a leveling-off among the older ages, which suggests a Soviet-era effect for people born before the 1970s (Fig. 1a).

We also find that, unsurprisingly, younger people (later years of birth) rely more on digital media rather than traditional media (Supplementary Fig. S2a). This highlights the difficulty in concluding the year of birth (Fig. 1a) is causal, as one might argue that digital media, consumed more by young people, causes a pro-EU attitude. As shown in Fig. 1c, the more reliance there is on digital media, the stronger the alliance is towards the EU (except the last point on the right, with a small sample size and large variance)—an effect that is strongest in Belarus (see Supplementary Table S5).

These effect of digital versus traditional media needs to be untangled from the effect of Russian versus domestic media, which generally have different biases (depending on the country). As discussed below, the year of birth has little effect on whether people use Russian versus domestic media (Supplementary Fig. S2b). In contrast, reliance on Russian media does correlate significantly with a more Russian-oriented view of the future of one’s country, particularly in Ukraine and Georgia (see Supplementary Tables S4 and S6). Hence, consistent with Cultivation Theory, while the choice of media technology is clearly age-related, it does not appear to be a strong determinant of geopolitical outlook.

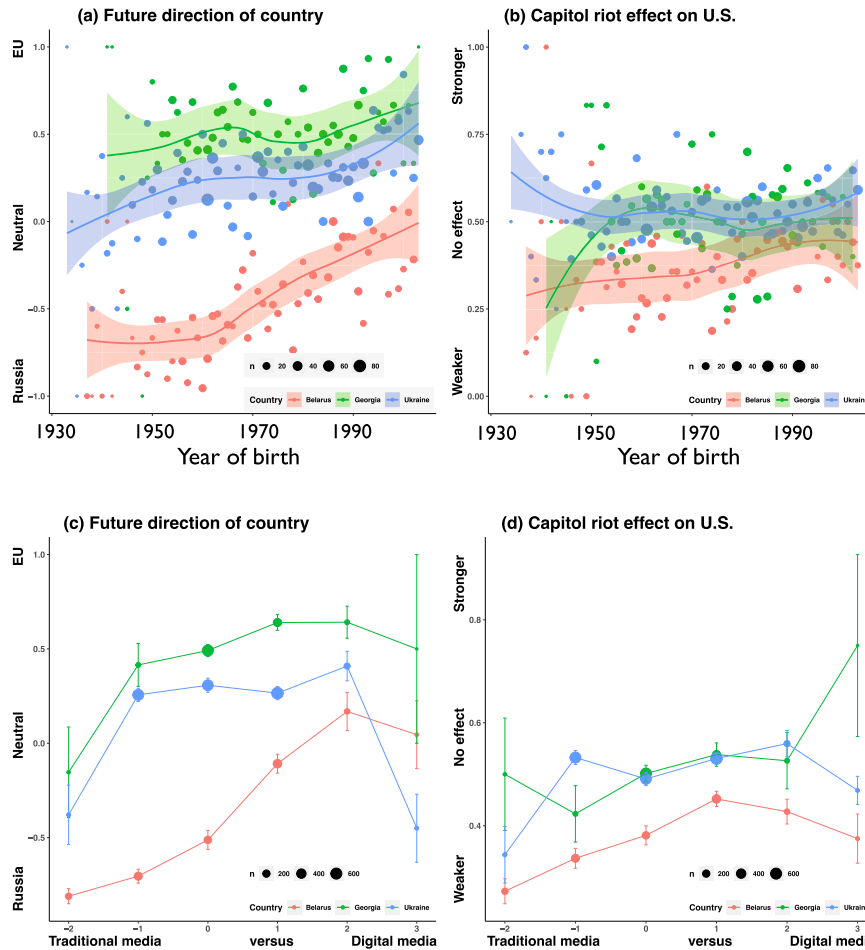


Fig. 1 Effects on opinions. Top row: The effect of respondent age on opinions about. **a** The future political alignment of the country towards Russia versus the E.U., and **b** U.S. standing following the Capitol riot. Bottom Row: Effect of digital media source on those same opinions, in **c** and **d**, respectively. Symbol size represents how many responses, *n*, are averaged by that symbol.

Instead, what does determine the geopolitical outlook is the consumption of, and trust in, Russian media sources.

Also consistent with Cultivation Theory, other covariates pattern with attitudes toward the country’s future political alignment, but not with the choice of media technology. Increased education and wealth each correlate with a more EU-oriented view of the future country (Supplementary Fig. S1). Across all three FSRs, the strongest overall correlation is between education level and E.U.-oriented view (Pearson’s $r = 0.16$ [95% CI 0.85, 0.147], $p < 0.00001$).

In contrast to the effect on opinions about the country’s future, people’s opinions of the Capitol riot show little correspondence with a year of birth (Fig. 1b), and only weak correlation among all data points ($n = 4000$, Pearson’s $r = 0.055$ [95% CI 0.015, 0.094], $p = 0.007$). Indeed, many respondents were not strongly opinionated about the U.S. Capitol riot, with the majority in each FSR replying “No effect” or “Don’t know” to the question (see Table 1). Among those who did have an opinion, Belarusians were most pessimistic about U.S. global standing following the event, and Georgians were most optimistic (see Table 1). Georgians were also more opinionated, with only 24% saying the riot will have “no effect”, as compared to almost 40% in both Ukraine and Belarus. In all three countries, neither education level nor wealth shows an effect on opinions about the Capitol riot.

We can look at how the “no effect” responses break down in each FSR by the Russian-vs.-domestic media measure, *Q*, and by digital-vs.-mass media measure, *E*. In each FSR, domestic media

	Belarus	Ukraine	Georgia
U.S. stronger	3.9	12.0	18.8
U.S. weaker	18.4	9.7	17.7
Don’t know	39.0	40.4	39.6
No effect	38.7	37.9	23.9

users (13–25%) are much more likely than Russian media users (<4%) to reply “no effect” (Table 2). Digital media users (9–18%) were somewhat more likely than mass media users (2–11%) to see an effect (Table 3).

In the lower half of Fig. 1, we see the effect of traditional versus digital media sources on these same dispositions. The relationship in Fig. 1c takes on the expected “softmax” form for how the probability of a binary decision responds to its perceived payoff (Daw et al., 2006) if increased digital media use provides more “payoff” to a more E.U.-oriented view (Fig. 1c). Media preference does not correlate strongly with people’s views on the effect of the Capitol riot on the U.S. (Fig. 1d). In Fig. 1c and d, an exception is among the small number of respondents who selected social, domestic and Russian digital media (x -axis = 3), yielding large standard errors: this presumably reflects the diversity of biases among these different media sources.

Table 2 Per cent of respondents in each country who replied “No effect,” (Table 1, bottom row) versus Russian-vs.-domestic media, Q.

Q	Belarus	Ukraine	Georgia
−2: Fully domestic	1.6	5.5	8.3
−1: More domestic	12.0	19.6	9.6
0: Balanced	21.3	12.4	5.9
1: More Russian	3.5	0.4	0.1
2: Fully (Russian)	0.3	0.1	0.0
Total “No effect”	38.7	37.9	23.9

Table 3 Per cent of respondents in each country who replied “No effect” (Table 1, bottom row) versus digital-vs.-mass media, E.

Q	Belarus	Ukraine	Georgia
−2: Fully mass media	4.1	0.5	0.4
−1: More mass media	7.4	9.3	1.3
0: Balanced	7.7	10.4	13.4
1: Some digital media	13.4	14.1	7.3
2: More digital media	4.8	2.9	1.4
3: All digital media	1.2	0.8	0.1
Total “No effect”	38.7	37.9	23.9

A correlation between pro-E.U. and pro-U.S. attitudes would seem to reflect a general pro-Western disposition. Despite age and media factors not playing a significant role in one’s opinions on the U.S. Capitol riot, a pro-E.U. attitude correlates with the opinion that the U.S. will be stronger after the Capitol riot. This association is consistent across all three countries (Fig. 2), also Supplementary Tables S1, S3, and S2).

Within this larger pro-Western disposition, birth year, media choice, and media trust were all correlated with one’s opinion about their country’s future political alignment. Regarding opinion about the U.S. Capitol Riot, however, these three variables did not overall have a significant effect.

Lastly, nation-level cultural factors affect opinions about the country’s future. We see this when we incorporate the cultural factors previously derived (Ruck et al., 2018, 2020a), sliced by country and a decade of birth, and comparing them to our survey responses. For the secular-religious factor, Fig. 3a shows two trends. On an international scale, the more religious the country—from Belarus as the most secular to Georgia as the most religious—the stronger the affiliation with E.U. (Fig. 3a). Within Belarus and within Ukraine, however, are smaller-scale trends that plot orthogonal to the broader one, as younger cohorts have become more secular while becoming also more pro-E.U. (Fig. 3a). In these countries, religious-secular values appear to be primary in their effect, with a year of birth as secondary. This is made more striking by contrast to the relative lack of effect exhibited by the cultural factor of cosmopolitanism (Fig. 3b).

Discussion

Overall, our findings affirm cultivation and selective exposure. We find that generational effects and “deep” cultural values (i.e. not merely current geopolitics) are at least as important as geopolitical factors in determining orientations toward the EU versus Russia in these FSRs (Belarus, Ukraine, and Georgia). Consistent with Cultivation Theory, the cultural values of the FSRs more strongly determine their reaction to a major sociopolitical event—the U.S. Capitol Riot—than media consumption habits. Broad geopolitical preferences aligned with the EU, rather than Russia, consistently

predicted a less negative reaction to the Capitol Riot; whereas consuming digital or Russian media had an inconsistent effect.

Media influence had its greatest effect when predicting one’s geopolitical preferences rather than one’s reaction to an ephemeral event, with added effects of age and differences between FSRs. In Ukraine, trust in and consumption of Russian media predicted geopolitical preference towards Russia, while in Belarus trust and consumption of Russian media had no detectable effect. Instead, trust in and consumption of digital media had an effect, where digital media predicted geopolitical preferences towards the European Union. This inconsistency of media influence is somewhat surprising, as Russian state-owned media have attempted to leverage Soviet nostalgia in the FSRs (Gaufman, 2015; Kozachenko, 2019; Kuzio, 2016). A study of social media during and after civil unrest in Ukraine 2013–14 (Euromaidan), for example, concluded that “re-constructed Soviet memory was actively used in order to undermine national identification with Ukraine.” (Kozachenko, 2019).

Cultivation and selective exposure co-mingle in our findings, in that, for example, differences in media influence likely also reflect differences in media usage between the FSRs. In 2022, social media were used by 84.3% of the population of Georgia, 64.6% of Ukraine, and 46.1% of Belarus, according to Kepios (Kemp, 2022). Between 2021 and 2022, the reported increase in social media users in each FSR was substantial (Kemp, 2022): +8.9% in Ukraine, +11.5% in Belarus, and +8.1% in Georgia (these figures predate the war in Ukraine). In terms of traditional media, pro-Russian populations receive more pro-Russian news from Russia, rather than domestic sources: Belarus is closely aligned with Russia politically, whereas Georgia and Ukraine are more pro-Western, outside the pro-Russian separatist regions of Ukraine. Further research is needed to delve into the factors that might be motivating the selection of certain media sources. Coming from the perspective of Selective Exposure Theory, in addition to examining these factors, the socio-political and cultural context in which media consumption takes place should also be examined.

Within the populations of Belarus and Ukraine, we found the younger cohorts were both more secular and more pro-E.U. This would appear to derive from the different experiences and cultural memories of different age cohorts. As Kozachenko (2019) describes:

First, most of the people in these countries were exposed to the Soviet-era myths of World War II ... Second, nearly every family has a member who fought during the war, either surviving it or not, with family stories of these people passed to a younger generation ... In addition to this, a large proportion of people have actual experience of living in the USSR with many possessing a positive memory of it.

Given a continuity of historical narratives relayed to younger generations, the differences in age cohorts ought to reflect something else. This seems likely to be differences in economic and political conditions of childhood development between age cohorts, as there have been substantial changes among the FSRs in the last 50 years.

As it is a far-away event, it is not surprising that the FSR respondents did not exhibit deeply held opinions about the 2021 U.S. Capitol riot. Amid the diverse scope of a person’s real-world interactions and communications (Boulianne et al., 2020; Lee and Yin, 2021), digital media are unlikely to substantially influence opinion around a subject that is not important to them. This suggests that social media provide a lens for observing homophily stemming from pre-existing cultural differences within a population.

The palimpsest of patterns also reflects the different trends of national history versus generational change within each country (Aksoy et al., 2020; Inglehart and Welzel, 2005; Ruck et al., 2018, 2020a). It appears that younger cohorts reflect different,

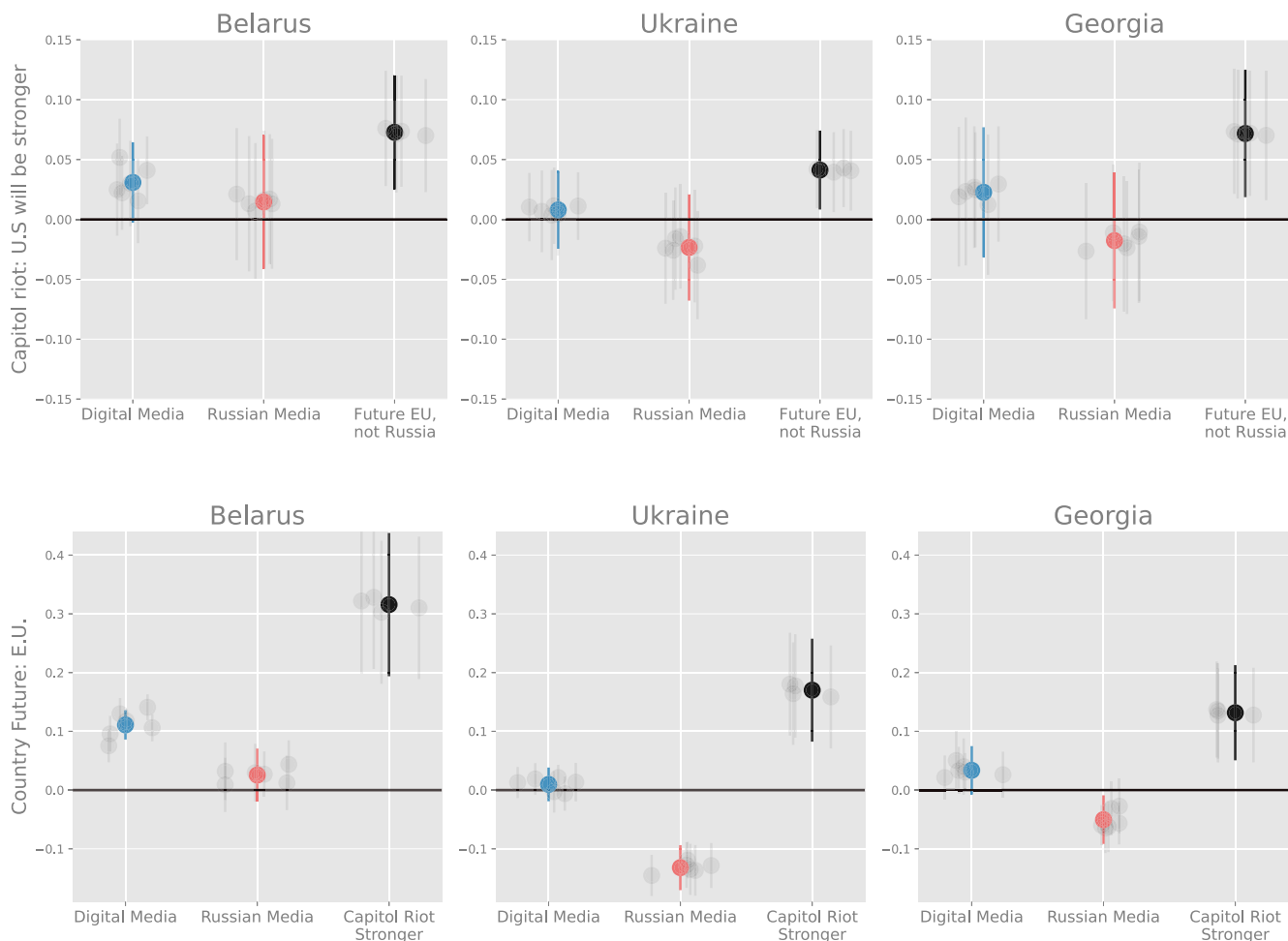


Fig. 2 Marginal effects from multivariate regressions predicting opinions about U.S. standing following the Capitol riot (top row) and prediction opinions about one's country's future (bottom row). The colored bars represent the average effect over multiple regression configurations. The faded bars are the effects of the different model configurations. See Supplementary Tables S1-S6 for the full regression results and methods of marginal effect calculation.

post-Soviet, economic and political conditions since 1991. Belarus has had one president since 1994, who has been pro-Russian politically, whereas Ukraine and Georgia have had freer elections and more democracy and individual freedoms. Overall, the results suggest that “long-wave” cultural values move more slowly than, and relatively independently of, “short-wave” news events. Making this distinction could be important to sound policy addressing the problems of misinformation and disinformation across different cultures and generations.

We infer that the strong effect of nationality stems from historical differences in cultural development (Ruck et al., 2020b). Across the three FSRs, the more religious populations are also more pro-E.U. This might seem surprising, as World Values Survey data show that EU countries are generally more secular than Russia (Ruck et al., 2020a). Yet, despite their former incorporation into the Soviet Union, these different FSR populations likely maintain differences in deep/stable cultural values including religion, language, and ethnicity, which are conservative and do not readily diffuse between groups (Spolaore and Wacziarg, 2009). In Belarus, for example, the Belarusian language has socio-political connotations versus Russian (Hentschel and Zeller, 2014), and has become in some quarters a signal of solidarity. Under this hypothesis, the nexus of Communist beliefs would have spread more readily from Russia to culturally similar countries and slower to the culturally more distant countries, where both anti-Russian attitudes and religiousness persist.

In terms of maintaining certain views with disinformation, contemporary events can often be skewed to fit with prevailing political opinions and gradually transformed through time. During and after the Ukraine crisis of 2014–2015, for example, Soviet-era symbols and narratives were shared on the Russian social media service VKontakte in ways that promoted neo-Soviet myths and nostalgia about World War II (Kozachenko, 2019). After a spontaneous, organic response to events on social media, different actors vie to control the narrative. After mass protests in Russia in 2011–2012 regarding legislative elections, for another example, pro-government Twitter users were able to shift the political discourse and marginalize opposing voices (Spaiser et al., 2017). It may also be the case that the social engineering policies of post-soviet leaders in Belarus, Georgia, and Ukraine—such as pro-Russian education and media initiatives in the 1990s (Manaev, 2011) and opposing initiatives in Belarus and Georgia (DeWaal, 2011; Ukraine Government News, 2021)—have had an impact on generational differences. It is not possible to parse these impacts out with the limited questions in this survey. Before social media existed, psychological experiments on Russian participants showed that their memories of the 1999 attacks on Moscow apartment buildings could be altered by a suggestion that they had seen a wounded animal in the attacks and had mentioned it in their original memory reports, even

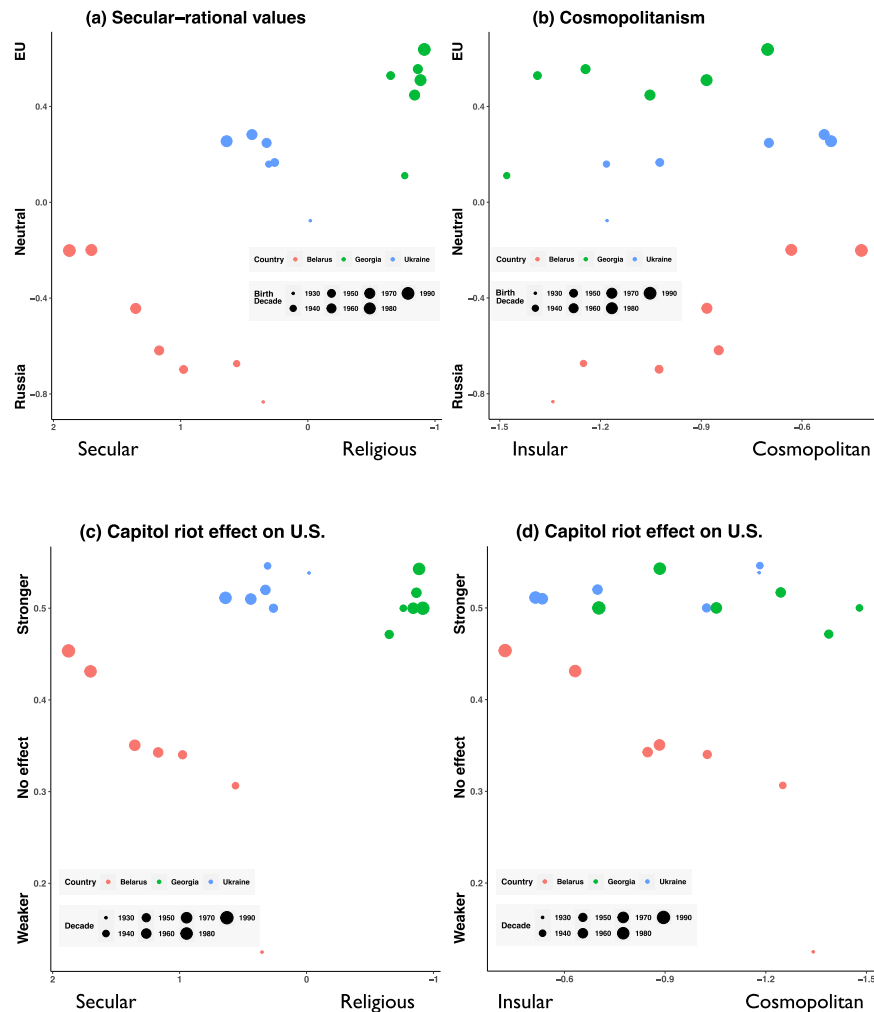


Fig. 3 Attitude on the future political alignment of the country versus (a) Secularism and (b) Cosmopolitanism, in FSRs. Optimism about the U.S. after the Capitol riot versus **c** Secularism and **d** Cosmopolitanism in FSRs. The size of each data point represents the decade of birth, where the smallest is 1930 and the largest is 1990.

elaborating the memory with imagined detail (Nourkova et al., 2004). In contrast, none of the Russian participants recalling the 9/11 attack on the World Trade Center were convinced by that suggestion (Nourkova et al., 2004).

Our results are a reminder to us that even in the social media age, generational time, and geographical distance still shape the collective memory of events. When interacting with cultures, particular historical events can acquire mythical status in cultural memory (Benkler et al., 2018; Bentzen, 2018; Nunn, 2009). Although the personal impact of public news usually declines with time (Bentley et al., 2014; Moore et al., 2019), cultural memory is inter-generational. This deep cultural ancestry (Mace and Pagel, 1994; Matthews et al., 2016; Ruck et al., 2020b; Sookias et al., 2018), generally much older than contemporary geopolitical events, underlies social norms, institutions, and religions dictating attitudes towards national identity, allies and adversaries, property rights, public institutions, and government (Acemoglu and Robinson, 2012; Grier, 1997; Inglehart and Welzel, 2010; McCleary, 2008; Pejovich, 1999).

Conclusions

In these FSRs, we have observed a clear generational effect on pro-EU vs. Russian attitudes, as younger participants tended to be more pro-EU and rely more on digital media. The ever-difficult question is, where lies the causation? Are digital media causing

people to be pro-EU, or is it growing up in a post-Soviet world, neither or both? We propose that the main driver of the effects we observed lies in generational differences and that digital media are shaped by the participation of those generations.

While one might concoct an intricate argument that media are the primary cause, we believe the most parsimonious explanation for all our results is homophily, based on year and nationality of birth. The reasoning is that geopolitical attitudes, but not media choice, pattern strongly with a year of birth and nationality. Media choice had predictive power, but inconsistently so. Although higher levels of education predict a more pro-EU attitude, the effect of education was not strong in our multivariate regressions (see Supplementary Materials). Furthermore, education level does *not* pattern with domestic versus Russian media choice, suggesting education level is not causal of political orientation. Though we see a stronger generational effect for the consumption of digital media, the weakness of the media effect means age is still operative through its influence on cultural values.

Data availability

The data that support the findings of this study are available on request from the lead author, BDH. The data are not publicly

available due to their containing information that could possibly compromise the privacy of research participants.

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Competing interests

The authors declare no competing interests.

Ethical approval

All research was performed in accordance with relevant guidelines/regulations applicable when human participants are involved (Declaration of Helsinki). The research was approved by the University of Tennessee-Knoxville Human Research Protections Program (HRPP), which determined that the application was eligible for exempt status under 45 CFR 46.104.d, Category 2 (<https://www.hhs.gov/ohrp/regulations-and-policy/regulations/45-cfr-46/revised-common-rule-regulatory-text/index.html#46.101>). Our application was determined to comply with proper consideration for the rights and welfare of human subjects and the regulatory requirements for the protection of human subjects.

Informed consent

Per the approved IRB application, a brief informed consent statement was presented orally to participants (for surveys). Participants were not provided with written documentation of consent. Their willingness to respond to the survey or interview constituted documentation of their consent.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-023-01670-6>.

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