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ORIGINAL ARTICLE

Knocking on Hell's door: dismantling hate with cultural consumption

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Abstract
How local cultural activities influence development and human behaviour is gaining popularity. Experimental evidence shows that cultural consumption is effective in countering hate. This is crucial, as hate, in turn, has a negative influence on the socioeconomic performance of places. Still, little is known on this, outside few more qualitative case studies. This paper provides a quantitative analysis of the impact of cultural consumption on hate events in the Italian NUTS3 regions. IV estimation using a unique longitudinal database, with georeferenced hate manifestations and a population-based measure for cultural consumption, shows that cultural consumption determines a reduction in hate events. Our findings support the idea that cultural change acts as key enabling factor for people open-mindedness and place inclusiveness. Our results hold after various robustness checks, suggesting the need for policy interventions promoting cultural consumption also to accomplish more tolerant communities.

Keywords Hate · Discontent · Cultural economics · Spillovers · Social capital

JEL Classification D31 · H · I3 · J1 · Z1

1 Introduction

Hate has non-negligible economic costs. It undermines social cohesion, dampens collaboration, solidarity and trust (Glaeser, 2005; Hall, 2013), which are all vital for economic performance (Guiso et al., 2006). Hate victims experience vulnerability, anxiety and shame (Paterson et al., 2018). These feelings compromise their social and working life. Hate also harms people belonging to the same group of the victims, since the sense of fear often "spills-over" to the whole group (Iganski, 2008).

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Institutions are increasingly preoccupied with countering hate, acknowledging that people do not restrain from hating just because it is forbidden by law (i.a. OSCE-ODHIR, 2019; Siragusa et al., 2020; von der Leyen, 2020). Indeed, evidence shows that hate is often culture-related (*i.a.* Gerstenfeld, 2017; Hall, 2013) and with a strong local dimension (Anderson et al., 2020; Denti & Faggian, 2021). Recent work calls for an exploration of interventions capable of changing stereotypes and prejudices to decrease hate (Nollenberger et al., 2016).

Thus, understanding the influence of cultural activities on hate has both an economic and policy dimension.

Despite the growing interest on hate and the existing rather limited evidence showing that cultural consumption can counter hate, a larger-scale quantitative study on the relationship between cultural consumption and hate is still missing. We aim at filling this gap.

Our work relates to the increasing interest in economics and economic geography on the role of culture—defined in terms of local beliefs, value and expectations—in shaping the socioeconomic development of places (Huggins et al., 2021; Mellander et al., 2018). We provide evidence on the role of culture in offsetting hate, adding to the existing contributions investigating the influence of local culture on socioeconomic outcomes, such as innovation (Falck et al., 2018), happiness and well-being (Hand, 2018; Wheatley & Bickerton, 2017), entrepreneurship (Audretsch et al., 2017), local taxation (Eugster & Parchet, 2019), migration flows (Kemeny & Cooke, 2018), redistribution (Bazzi et al., 2020; Guiso et al., 2006), trade and FDI (Guiso et al., 2009), civic capital and institutional quality (Becker et al., 2016; Guiso et al., 2016; Pitlik & Rode, 2017), human capital development (Carlana, 2019; Figlio et al., 2019), job-search (Eugster et al., 2017), GDP (Tabellini, 2010) and financial markets (Guiso et al., 2008).

Showing that cultural consumption reduces hate, we contribute to the literature showing that culture promotes local inclusiveness and well-being (Wheatley & Bickerton, 2017), improving the local socioeconomic performance. In this sense, this work also relates to the growing interest in policy fostering the well-being of places and sustainable growth (Nozal et al., 2019; OECD, 2014; Veneri & Murtin, 2019).

The paper also contributes to the evidence-base on the socioeconomic geography of hate (Anderson et al., 2020; Denti & Faggian, 2021) by investigating the role of culture as a "protective factor" against hate.

We focus on Italy, as it represents an interesting case for different reasons. First, Italy is facing a growing trend in the number of hate events, with a 31% average annual growth rate between 2009 and 2018 (Lunaria, 2019; OSCE-ODIHR, 2019). Second, figures show that Italian hate events are spatially heterogeneous (Denti & Faggian, 2020) and strongly influenced by the local environment (Denti & Faggian, 2021). Third, descriptive evidence in Italy shows that the share of people not taking part in any cultural activity is growing (ISTAT, 2020). Forth, we exploit a unique longitudinal database for Italian NUTS3 regions constructed by merging information on georeferenced hate events with cultural consumption patterns between 2009 and 2018.

Our strongest and most significant finding is that an increase in cultural consumption is associated with a strong and significant decrease in hate events. Our results are robust to instrumenting cultural consumption with shift-share instrumental variables (IV) based on the historical (1955) cultural consumption across Italian NUTS3. Including a rich set of controls at the local level (NUTS3) to address lingering concerns about omitted variables, including persistent cultural norms and spatial spillovers, does not change the estimates. Moreover, we follow Mayda et al. (2021) in checking for reverse causation by testing whether past hate events affected cultural consumption and we find no evidence of such reverse causation.

The paper is organized as follows. The next section reviews the relevant literature. Sections 3 and 4 describe the data and the empirical strategy. Sections 5 presents our findings and robustness checks. Finally, Sect. 6 discusses the results and offers some conclusions and policy implications.

2 Background literature

Following two different strands of literature, we argue that cultural consumption may generate a cultural change capable of countering hate.

The first strand of literature shows that hate narratives are built on stereotypes and prejudices (Brown, 2014; Glaeser, 2005; Voigtlander & Voth, 2012). These stereotypes and prejudices are part of the local culture, which is defined as the set of beliefs, values and expectation shared by members of a social groups (Perry, 2001; Whitley & Kite, 2010). Recently, scholars, following a more "evolutionary" perspective on culture (Andersen et al., 2017; Giavazzi et al., 2019), have found that some components of local culture, including hate, evolve quickly after people experience new stimuli (Andersen et al., 2017; Giavazzi et al., 2019; Giuliano & Nunn, 2021). This evidence disputes the idea that culture is a slowly moving feature, hence opening to the opportunity that cultural consumption may influence people's beliefs also with regard to hatred. Stereotypes and prejudices have a strong local dimension as they contribute to the "community culture", which defines the broader societal traits and relations shaping places in terms of prevailing mindset, the overall "way of life" and relevant socioeconomic features such as happiness (Hand, 2018) and well-being (Gómez-Zapata et al., 2021; Wheatley & Bickerton, 2017). However, this "community culture" can change when new stimuli are introduced (Huggins & Thompson, 2016).

These contributions follow an evolutionary perspective on culture, which studies cultural norms referring to models used in evolutionary biology (Desmet & Wacziarg, 2021; Giavazzi et al., 2019). According to this perspective, there are two different channels of cultural transmission: a "vertical" channel, i.e. the family and its values, and a "horizontal" one, i.e. the interactions with the local context (Desmet & Wacziarg, 2021). The latter can generate rapid cultural innovation on flexible cultural norms such as fairness and solidarity (Giavazzi et al., 2019). Cultural consumption is part of the interactions happening in the social context, hence it is potentially capable of evolving hate beliefs.

The second strand of literature includes a series of studies in social psychology, showing that cultural consumption is an effective way to change the cultural *status quo* by changing beliefs (Appel & Richter, 2007; Inglehart, 2004; Murrar & Brauer, 2018; Vezzali et al., 2014). Cultural consumption includes museum exhibitions, concerts, theatres, media, books, etc. (Rössel et al., 2017). In fact, the "*indirect contact theory*" (Vezzali et al., 2014) argues that cultural consumption helps in overcoming existing prejudices by allowing the audience to identify with the characters portrayed in the media. Through this identifications, people experience the new perspectives embodied by the media characters in a way that is similar to those produced by direct contact (Ben et al., 2020; Paluck et al., 2021). This vicarious indirect contact reinforces empathy. For example, data show that exposure to fiction reduces implicit and explicit prejudices against Arab-Muslim (Johnson et al., 2013, 2014) and other stigmatized groups (Vezzali et al., 2015; Visintin et al., 2017).

This process is particularly effective to address negative prejudices against "outgroups" in contexts where direct contact is particularly difficult due to hostility and segregation or in socially/ethnically homogeneous communities (Brown & Paterson, 2016; Murrar & Brauer, 2018; Vezzali et al., 2014).

Randomized controlled trials in the USA show that going to the theatre—also controlling for individual characteristics such as gender, ethnicity, human capital and income—has positive effects on tolerance (Greene et al., 2018). Similar results are found for attendance to art exhibitions and concerts (Murrar & Brauer, 2018; Waston et al., 2019). Again in the US context, art exhibitions are found to increase tolerance by about 7% (2014b; Greene et al., 2014a), while exposure to fiction reduces implicit and explicit prejudices against immigrants and homosexuals both in Italy (Vezzali et al., 2015) and in the USA (Bond, 2021; Kaufman & Libby, 2012; Walter et al., 2018).

This bulk of experimental evidence corroborates the rationale for our investigation. In fact, even within the lively debate on the contribution of experimental evidence to understating real-world behaviours, there is broad agreement that the *sign* of the estimated effects resulting from experimental evidence can be generalized to real-world behaviours (Kessler & Vesterlund, 2015; Lonati et al., 2018).[1] For our investigation, this means that existing experimental evidence provides sound support for a negative association between cultural consumption and hate in the real world, which this paper will assess through real-world evidence.

Measuring the effect of cultural consumption on hate is strictly related to work in cultural economics investigating the influence of local culture on behaviours, which is still empirically under investigated (Coate & Hoffmann, 2021). Further, it also contributes to the evidence-base on the sources of regional variation in culture (Mellander et al., 2018) and on the understanding of cultural change at local level (Gómez-Zapata et al., 2021).

[1] The same level of consensus does not apply to generalizing the *size* of estimated effects from experimental approaches to real world behaviours (Findley et al., 2021; Kessler & Vesterlund, 2015; Lonati et al., 2018).

In our analysis, we also account for the evidence supporting the role persistent cultural norms on socioeconomic behaviours (i.a. Guiso et al., 2016; Dustmann et al., 2017; Inglehart & Norris, 2017). Notably, these works do not account for the recent evidence showing that cultural values change, and they consider culture mainly through an historical legacy perspective. Our approach is different, but we account for this established evidence among our robustness checks, by including a measure for the persistency of local cultural outlooks among confounders.

3 Data

We use geotagged data on hate events to measure the local intensity of hate and data on local consumption of cultural products to measure the intensity of new cultural stimuli occurring at the local level.

The source of data on hate events is the Lunaria database. Lunaria is an Italian non-profit organization, which has been collecting data on hate events since 2007. These hate events are criminal offences including threats, property damage, assault, murder motivated by bias or prejudice towards particular groups of people (Lunaria, 2017; OSCE-ODHIR, 2017). The reliability of the database has been vetted by international institutions, such as the OECD, the OSCE and the European Commission (Siragusa et al., 2020), which often refer to it in the monitoring of hate events in Italy.[2] The Lunaria database contains hate events reported by Italian newspapers and NGOs, which are verified by Lunaria via cross-checking with other media and administrative records. The inclusion of NGOs reports alleviates the problem of under-reporting hate events to the police. Each observation contains the place and the date of the event, allowing to map them across the Italian NUTS3 areas for each year starting from 2007. We consider events between 2009 and 2018,[3] which are summarized in Fig. 1. In the considered time period, hate events have been steadily growing at the national level (Fig. 1a.), with persistent spatial dispersion (Fig. 1b, I–III). The coefficient of spatial variation across Italian NUTS3 is consistently above 80%, suggesting that local features play a role in shaping hate.

The involvement of NGOs in the Lunaria database attenuates the established concerns on the amount of missing information due to under-reporting. At the same

[2] Lunaria is also a relevant partner for Italian institutions on hate monitoring. In 2020 Lunaria launched the Italian *Observatory on Discrimination in Spor*t in partnership with the Italian Government Anti-Discrimination Office (UNAR, 2020). Lunaria was also partner of the Italian National Statistical Office (ISTAT) and OECD for the development of well-being statistics merging administrative and non-administrative data, including Internet data (ISTAT, OECD, & Lunaria, 2016). Also, in a report by the Italian Government Observatory for Security Against Discriminatory Acts (OSCAD), Lunaria's methodology for recording hate events is acknowledged as robust and longstanding, to the point of representing a suitable base to support the police recording and collecting data on hate crimes (Perry, 2019). Finally, the relevance of the Lunaria's database is also recognized by the European Union Agency for Fundamental Rights, which uses the data from the Lunaria's database in the database on Anti-Muslim hatred across Europe (https://fra.europa.eu/en/databases/anti-muslim-hatred/home).

[3] 2007 and 2008 are excluded from our investigation since Lunaria started applying cross-checking of the collected information from 2009 onwards (Lunaria, 2009).

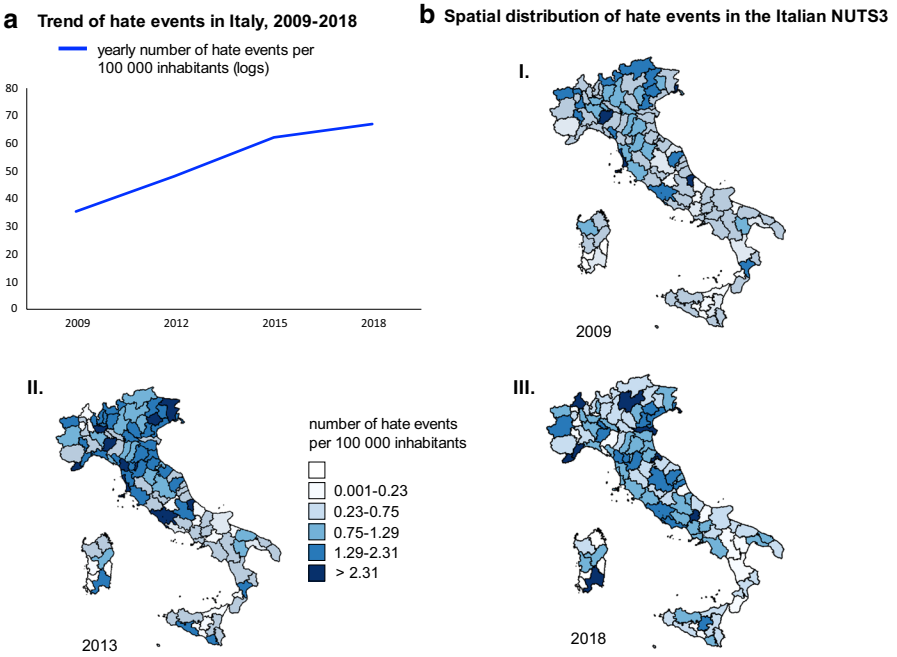

Fig. 1 The national trend and the spatial outlook of hate events in Italy between 2009 and 2018

time, other sources for measurement bias remain and must be addressed. First, media-coverage bias could happen, due to specific viewpoints on hate of each media outlet. Second, interpretation bias about what is considered (and therefore measured) as hate event is a threat to measurement. This last threat follows from the lack of agreed definition of hate events. These two sources of bias are inherent to measurement of violent act against disempowered groups (Miller & Segal, 2019) and also to measurement of intimidating acts committed by organized crime (Daniele & Dipoppa, 2017). In the robustness checks, we address these potential threats referring to existing works.

To measure cultural consumption, we use the Italian Society of Authors and Publishers (SIAE) data on the total audience of cultural events (both free and paid admissions) for the Italian NUTS3 areas. SIAE is a public body controlled by the Presidency of the Italian Government, the Ministry of Cultural Heritage and Tourism and the Ministry of Economy and Finance. The SIAE Observatory—"*Osservatorio dello Spettacolo*"—collects yearly data on the cultural activity in public and private venues involving concerts, cinema, theatre, opera, musical comedies, dance, exhibitions, traveling show attractions. To the best of our knowledge, this unique database provides the most comprehensive yearly information on cultural consumption at this spatial fine-granularity and it is a good proxy for cultural consumption. However, some limitations must be acknowledged. First, the database does not contain book readings, which undoubtedly constitute a relevant component of cultural consumption. Second, it conveys information on the "quantity" of events, the size

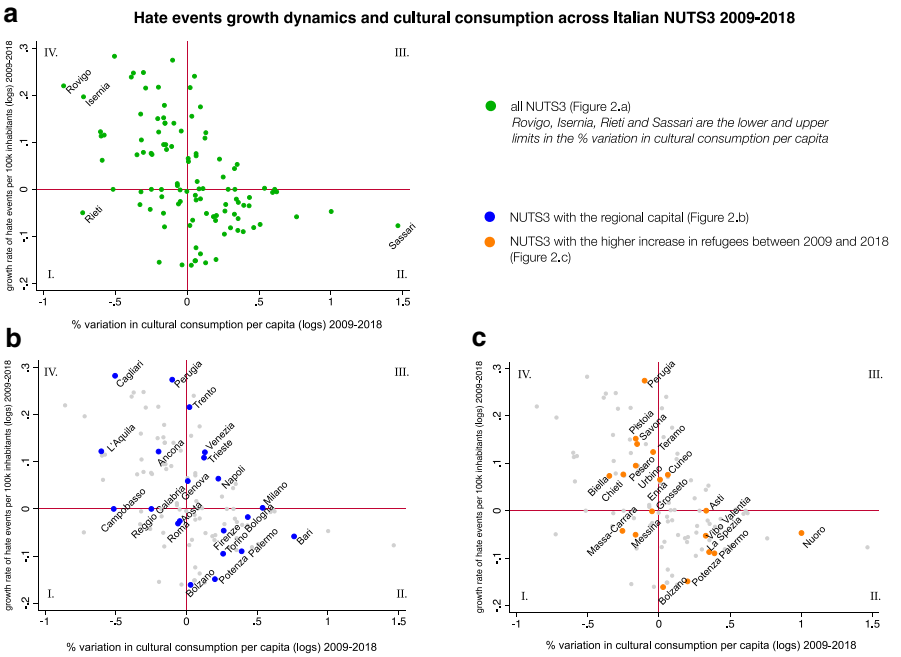

Fig. 2 Cultural consumption and the growth of hate events 2009–2018

of the audience and the money spent on attendance, with no measure of the "quality" of the events. Despite these limitations, it represents a thorough population-based measure for cultural consumption at NUTS3 level and it has the advantage of including data as far back as the 1930s. Alongside normalizing cultural consumption by the resident population, we weight cultural consumption of each NUTS3 area by the tourism attractiveness of the area, measured through a yearly index from the National Office of Statistics (ISTAT). The weighting strategy corrects for the fact that certain areas may be characterized by patterns of cultural consumption highly determined by tourists rather than locals (Espon, 2020) by assigning higher weights to the cultural consumption in NUTS3 areas less attractive to tourists. Our timespan is 2009–2018.

Figure 2a displays the growth of hate events and cultural consumption across Italian NUTS3 regions between 2009 and 2018. It is clear that cultural consumption has marked spatial differences across provinces. Nearly half of NUTS3 regions (46%) lie in quadrants I and IV, where cultural consumption has a negative trend, while the remaining NUTS3 (54%) lie in quadrants II and III, with a positive trend of cultural consumption. We also notice that the majority of NUTS3 are clustered in quadrants II and IV. The bulk of NUTS3 regions with a negative variation in cultural consumption lies in quadrant IV, where hate events have a positive growth rate. The majority of NUTS3 with a positive variation in cultural consumption lies in quadrant II, where hate events have a negative growth rate. The observed distribution does not appear to be influenced either from the NUTS3 containing the

regional capital (Fig. 2b) or by the NUTS3 with the higher increase in hosted refugees between 2009 and 2018 (Fig. 2c). This descriptive evidence seems to support a negative effect of an increase in cultural consumption on the growth of hate events (see Fig. 4 in Appendix for additional descriptive evidence).

Alongside cultural consumption, we consider several potential confounding factors that have been identified in the literature. We consider foreign population and refugees (i.a. Barone et al., 2016; Halla et al., 2017), educated people (Denti & Faggian, 2021; Lancee & Sarrasin, 2015; Piff & Robinson, 2017), crime rate (i.a. Dustmann & Fasani, 2016), unemployment (i.a. Anderson et al., 2020; Falk et al., 2011) and social capital (Fratesi et al., 2019; Satyanath et al., 2017) (See Tables 4, 5 in Appendix for variables' summary and descriptive statistics).

On social capital, we follow the established literature which conceptualizes and empirically supports its multi-dimensionality (Calcagnini et al., 2019; Gannon & Roberts, 2020; Murphy et al., 2016). According to this literature, social capital has four relevant dimensions: personal relationships, cooperative norms and trust, social network support and civic engagement. In this literature, social capital is measured through a synthetic indicator to capture these multiple dimensions. The indicator is designed through Principal Component Analysis (PCA) on several variables representative of the different dimensions[4] (Calcagnini et al., 2019; Fini et al., 2011; Gannon & Roberts, 2020). Importantly, measuring social capital suffers from partial correspondence between any one specific theoretical viewpoint on social capital and practical availability of variables (Calcagnini et al., 2019; Murphy et al., 2016). This is particularly true for longitudinal investigations addressing the local area level, which need yearly data at fine spatial granularity. In our case, this implies designing the social capital index through a variable selection that covers the four dimensions of social capital while being constrained by yearly and provincial data availability.[5]

Given that there are missing observations for the share of refugees, we do not use this variable in the baseline model specifications, although we include it in the robustness checks.

[4] PCA identifies latent components underlying a large set of indicators, thus allowing to reduce the multi-dimensionality of social capital with a minimum loss of information (Calcagnini & Perugini, 2019; Gannon & Roberts, 2020; Murphy et al., 2016). Also, PCA transforms a set of possibly correlated variables into a smaller set of uncorrelated variables. Possible correlation among variables measuring social capital is a relevant empirical issue given that each dimension of social capital is likely to intertwine to a some degree with the others (Hassell, 2019).

[5] These characteristics for data prevent the use of generalized survey trust questions as measure for social capital in this investigation. To the best of our knowledge, for Italy there is no multi-year trust survey with yearly data collected to be robust at the province (NUTS3) level. The European Social Survey (ESS), one of the most established survey collecting data on generalized trust, has figures about Italy for few years (2012, 2016 and 2018) and only for the regional and macro-regional level. Other surveys (*i.a* European Value Survey, World Value Survey, Eurobarometer surveys, Quality of Government survey on the quality of institutions, Multipurpose survey on households by the Italian National Statistics Office) consider either the country or the regional level. In any case, among robustness checks, we provide correlational measures between the social capital index resulting from PCA and measures for trust designed from voting turnouts and generalized trust surveys. Clearly these correlational measures are subject to: (i) limited time coverage for both voting turnout and generalized trust surveys and (ii) different (larger) geographic scale for generalized trust surveys.

4 Empirical strategy

To measure the effect of local cultural consumption on the proliferation of hate events at provincial level (NUTS3), we estimate a two-way fixed effect model as baseline. We also include potential spillover effects of cultural consumption in neighbouring provinces, specifying a spatial-lag that accounts for the possibility that hate events in area i depends systematically on the cultural consumption in the closest 4 neighbouring areas, where proximity is measured through centroids distance, i.e. $k \in J$, where J is the set of all areas (Anselin, 1988) and $k=4$. Formally, the model is as follows:

$$lnhate_{it} = \alpha + \delta_1 lnculture_{it} + \gamma_1 lnSpillcult_{it} + \nu_{it}\Omega_{it} + \mu_i + \tau_t + \vartheta_{it} \quad (1)$$

where $lnhate_{it}$ is the number of hate events per 100 000 inhabitants in NUTS3 i at time t. $lnculture_{it}$ is the size of the audience of cultural events (both paid and free admissions) adjusted to deflate attendance from tourists and weighted by the total population in NUTS3 i at time t. $lnSpillcult_{it}$ is the size of the audience of cultural events (both paid and free admissions) adjusted to deflate attendance from tourists weighted by the total population in the neighbouring NUTS3s. Ω_{it} contains the control variables capturing observable economic and social differences across provinces, all weighted by population, μ_i and τ_t are space and time fixed effects, respectively. All explanatory variables are in logs as specified in Eq. (1). The two parameters are most interested in δ_1, which measures how hate events at provincial level are directly influenced by cultural consumption in the same province, and γ_1, which measures whether hate events at provincial level indirectly are influenced by cultural consumption in neighbouring provinces.

4.1 Identification

Potential endogeneity of cultural consumption could produce bias estimates. A possible source of bias is sorting of people across provinces. An increase in hate events may push people interested in the consumption of cultural amenities, to move in areas where the payoffs from amenity consumption are not countered by the hate disamenity. To mitigate this concern, we construct a Bartik-type instrument (Baum-Snow & Ferreira, 2015). In particular, we predict the cultural consumption in $NUTS3_i$ using historical information on the local cultural consumption in 1955. In practical terms, we start with the initial (1955) geography of cultural consumption across Italian provinces, and we allow cultural consumption to grow over time according to the national patterns. Hence, the initial cultural consumption at provincial level serves as a set of weights indicating how national cultural consumption growth likely affects each province. Formally, the Bartik-type instrument (Goldsmith-Pinkham et al., 2020) z_{it} is given by:

$$z_{it} = q_i g_t^{IT} \quad (2)$$

where q_i is the share of annual audience expenditure in cultural events per capita in NUTS3 i in 1955 and g_t^{IT} is a measure of growth in annual audience expenditure in Italy at time t, with $t \in [2009, 2018]$ and normalized using the 2019 consumption price index (CPI).

The choice of 1955 is due to several reasons. First, although the data goes back as far as 1931, in the years between 1924 and 1955 there was particularly restricted cultural production and consumption in Italy, due to the strong control and censorship imposed by Fascist regime, the World War 2, the Nazi occupation and the after-war reconstruction (Barbero, 2017; Bonsaver, 2003; Gordon, 2000; Rundle, 2000). Second, cultural products were available for a very restricted audience (Bonsaver & Gordon, 2005) until the 50s, when the new geopolitical landscape and the economic boom provided for sizeable cultural stimuli and mass production and consumption of cultural products throughout the whole Italian territory (Cosulich, 2003; Gundle, 2000). Third, 1955 is sufficiently detached from the years spanning between the end of 1960s till late 1980s, another period of social and political turmoil with various incidents of far-left and far-right political terrorism ("*anni di piombo*").

By freezing the geography of cultural consumption to 1955, we alleviate sorting concerns (Boustan et al., 2013). At the same time, some threats to identification remain and we discuss some of them here. First, there could be reverse causation combined with persistence and correlation over time. If places that are more likely to experience hate also reduce cultural consumption and correlation over time is strong, this channel might bias estimates. We address this issue performing a falsification test following Mayda et al. (2021), practically regressing the cultural consumption on a measure of past hate, to show that there is no significant correlation. Another threat is that places may have persistent features influencing cultural consumption and hate. Again, following Mayda et al. (2021), we reduce this concern using place and historical fixed effect and socioeconomic controls.

Having identified our instrumental variable, we use Eqs. (1) and (2) to estimate whether there is a causal relationship between cultural consumption and hate events by means of a two-stage least square with instrumental variable (2SLS-IV) model for panel data with time and space fixed effects. For robustness check we also change the baseline year for the instrumental variable considering both 1958 and 1961. The strength of the IV estimates is also assessed with regard to some caveats about the use of Bartik-type instruments (Goldsmith-Pinkham et al., 2020; Jaeger et al., 2018), the main critique being that the shift-share instrument does not account for local adjustment dynamics that can affect the investigated outcome. More into details, the standard Bartik instrument fails to account for contemporaneous factors (e.g. local shocks) that affect both local hate events and cultural consumption (McKenzie, 2018). If the adjustment to these shocks takes time, estimates might suffer from serial correlation due to the ongoing general equilibrium adjustment effects (Jaeger et al., 2018). To account for this, the results from the IV panel with fixed effects are assessed following the "*multiple instruments*" approach by Jaeger et al. (2018) to account for potential adjustment dynamics. Formally, Eq. (1)

is estimated through IV panel estimation with fixed effect adding a lagged cultural consumption among regressors and instrumenting for this with the analogous Bartik instrument.

Among the robustness checks, we also account for the potential effect of persistent cultural features, acknowledging that while some cultural features are changing, others display persistency (Becker et al., 2016; Giavazzi et al., 2019; Giuliano & Nunn, 2021; Guiso et al., 2016). We do so following established literature on the effect of persistent culture in Italy, designing our proxy for the influence of historical culture exploiting the geography of Italy prior to the 1861 unification process (Di Liberto & Sideri, 2015; Guiso et al., 2016).

Finally, we also account for the possibility that hate events at time t are a function of that same attitude at time $t-1$ as modified by new information. This idea is based on the established literature on public opinion and attitudes (Wilkins, 2018), showing that behaviours, such as hate, may display some degree of time persistency. To account for this, we specify a dynamic panel model where past levels of hate are introduced as predictors of current hate. Formally, we estimate the Arellano–Bond dynamic model using the generalized method of moment (GMM)-difference panel data regression estimation methods that also allows to account for the potential endogeneity of the relationship between cultural consumption and hate (Cameron & Trivedi, 2010). We also allow for cultural consumption not being strictly exogenous, by assuming that it depends on its past realizations (Crociata et al., 2014), since the GMM methods allow for the inclusion of lags of the treatment (Wilkins, 2018), and on past and possibly current realizations of the errors. The model specification is given by the following dynamic model in levels with a time-lagged dependent variable, a time-lagged independent treatment, a time-lagged external spillover factor for the treatment and the set of control variables

$$\begin{aligned} lnHate_{it} = {} & a_0 + blnHate_{it-1} + d_1 lnculture_{it} \\ & + d_2 lnculture_{it-1} + c_1 lnSpillcult_{it} + c_2 lnSpillcult_{it-1} \\ & + f_{it}\Omega_{it} + \mu_i + \tau_t + \varepsilon_{it} \end{aligned} \tag{3}$$

By estimating the GMM model, we also relate to the existing debate on the pros and cons of including a lagged dependent variable among regressors[6] (Wilkins, 2018), to check whether our results may be driven by the inclusion/exclusion of this regressor.

[6] Lagged Dependent Variables (LDV) critics argue that LDVs suppress the explanatory power of other variables so that regressions that exclude the LDVs often obtain larger coefficient estimates for independent variables, compared with regressions that include the LDVs. LDVs supporters show that when the LDV is part of the data-generating process, excluding it creates omitted variable bias (Keele & Kelly, 2006).

Table 1 Two-way fixed effect panel model estimates and sensitivity tests for the effect of cultural consumption on hate events in the Italian NUTS3 areas between 2009 and 2018

	No interaction	Interaction term		
	(1)	(2)	(3) No spatial spillovers	(4) Refugees
Cultural consumption	− 0.147**	− 0.165**	− 0.175***	− 0.172**
	(0.073)	(0.074)	(0.064)	(0.08)
Cultural consumption spillovers	− 0.133*	− 0.130*		− 0.185**
	(0.073)	(0.073)		(0.076)
Social capital	− 0.031	0.077	0.081	0.116
	(0.053)	(0.093)	(0.094)	(0.105)
Social capital*cultural consumption		− 0.042*	− 0.04	− 0.043
		(0.024)	(0.024)	(0.028)
Controls	YES	YES	YES	YES
Refugees among controls	NO	NO	NO	YES
TIME FE	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES
R-squared	0.207	0.210	0.204	0.202
Obs	1050	1050	1060	810
Cluster	106	106	106	106
LM test autocorrelation	0.1978	0.1952	0.1366	0.4329

Robust standard errors; coefficients statistically significant at ***1%, **5%, and *10%. Controls are: (i) human capital, foreign population, unemployment, crime rate in columns 1–3; (ii) human capital, foreign population, unemployment, crime rate, refugees in column 4

5 Results

5.1 Baseline results

Equation (1) is estimated via a two-way fixed effect model with 106 NUTS3 observations for the period 2009–2018.[7] The results in Table 1[8] show that an increase in cultural consumption leads to a reduction in hate events, and this holds in all model specifications. (For the detailed results on estimates of the control variables, see Table 8 in Appendix.) The size of the estimated effect is non-negligible. Starting from the baseline specification (column 1), if local cultural consumption increases by 1 p.p., hate events decrease by nearly 15%. We also find that an increase in cultural consumption in the neighbouring areas has a mild countering effect on hate events. In this case, an increase by 1 p.p. is linked to a decrease of nearly 13% of hate events.

These findings hold to the inclusion of potential confounders, which behave according to expectations. Looking for possible interactions between cultural

[7] We have excluded the NUTS3 Sud Sardegna since data on its cultural consumption were fragmented.

[8] Estimation has been performed using the command xtreg in STATA.

consumption and other socioeconomic variables, we find evidence of a mild effect exerted by the interaction with social capital (column 2).[9] Although social capital does not exert any significant direct effect, its interaction with cultural consumption creates a further decrease in hate events by about 4%. The diminishing effect on hate of the interaction between social capital and cultural consumption can be interpreted referring to the dual nature of social capital, i.e. bonding or bridging. Bonding social capital favours cooperation and collaboration among people with a strong social identity but it may obstacle openness towards individuals coming from other places and endowed with a diverse culture (Putnam, 2000). Bridging social capital favours connections among diverse groups and individuals. The primacy of bonding over bridging may prevent openness towards minority groups (Amin, 2005). Our evidence suggests that when culture interacts with social capital it favours its bridging component over the bonding one, therefore reducing hostility towards diverse groups. By not considering the interaction term, as in column 1, we are only able to capture a negative, but not significant, effect of social capital. Instead, by considering the interaction term, we can highlight the influence exerted through culture. This finding can be interpreted considering that the social capital index identified by the principal component analysis (PCA) is mostly defined by elements related to social networks and support (see Table 7 in Appendix), which can be influenced by cultural consumption towards more openness (Giavazzi et al., 2019).

The models in Columns 3 and 4 serve as sensitivity tests. Column 3 shows that the effect of the local consumption of culture holds when we remove spatial spillovers, although the interaction between social capital and cultural consumption loses significance. Column 4 confirms the effect of cultural consumption when the share of refugees is included in the controls. Again, the interaction term loses its significance. The results also hold when we consider only the subset of extremely violent hate events consisting of severe physical attacks and damages (see Table 8, column 6 in Appendix).

Therefore, the results from the two-way fixed effect model support a relevant effect of cultural consumption in decreasing hate. They also suggest a mild effect for the spatial spillovers of cultural consumption coming from the neighbouring provinces. Finally, there is mild evidence of a further effect of cultural consumption channelled through its interaction with social capital, although not robust to the sensitivity tests.

Estimates account for heteroscedasticity since we cluster errors at NUTS3 level. The Wooldridge LM test shows that data does not suffer from serial correlation. The relatively short timespan covered in the analysis implies a "*large N /small T*" panel, that is a larger cross-sectional (N) than time dimension in the panel (T). This a priori prevents non-stationarity from affecting our estimates through spurious correlation, and at the same time three different unit root tests for panel data (the Im-Pesaran-Shin, the augmented Dickey–Fuller and the Phillips–Perron tests) confirm stationarity for the dependent variable, the treatment and the controls (see Table 10

[9] We have tested other possible interactions between cultural consumption and the other confounders, to find non significance.

in Appendix). We check for cross-sectional dependence through the Pesaran test and the Friedman statistic, which support no spatial autocorrelation in the data (see Table 11 in Appendix).

Our measure for social capital is given by a synthetic index from principal component analysis (PCA) that we performed on acknowledged social capital dimensions (personal relationships, cooperative norms and trust, social network support, civic engagement). As explained, we rely on this type of measure because the empirical setting requires yearly data at NUTS3 level. At the same time, it is important to account for the established literature which measures social capital using data on generalized trust and to check how our synthetic index relates to these measures, keeping in mind that the latter are available only for a subset of years and large spatial scale. We do so by inspecting the association between the synthetic index and two different measures for generalized trust: trust in institutions, captured by voting turnout at national elections, and trust in people captured by trust surveys (OECD, 2017).

Within our considered timespan, national elections took place in 2008, 2013 and 2018 and data on voting turnout are available at NUTS3 level (Italian Ministry of Interior, 2022). The correlation coefficient between the social capital synthetic index and voting turnout for these years is 0.72, suggesting a good alignment between the synthetic index and trust measured through voting turnout.[10] We then consider a measure for interpersonal trust from the European Social Survey data, given by the question "*Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people*?" (OECD, 2017). This measure is available for 2012 and 2016 and only at regional (NUTS2) level (ESS-NSD—Norwegian Centre for Research Data, 2016). Also in this case, the correlation coefficient between the synthetic index and the measure for trust is positive, and it equals 0.53. This evidence suggests that the synthetic index for social capital used in this analysis moves in the same direction as measures for social capital based on trust measurements.

5.2 Endogeneity of cultural consumption

The estimates of a causal relationship between cultural consumption and hate events are summarized in Table 2[11] that details the results of the IV-2SLS panel model where cultural consumption is instrumented through the Bartik-type exogenous regressor described in Sect. 4 and summarized by Eq. (2). Table 2 provides evidence of a meaningful relationship between cultural consumption and hate events that goes beyond a measure of association. The results hold under several sensitivity

[10] We consider voting turnout at the national election, ruling out non-national elections (regional and municipal) since the latter take place at different times across Italy, also within provinces. We have considered also voting turnout at both national and European elections, even if they refer to two different institutions. In this case, we have a measure for voting turnout for 2008, 2009, 2013, 2014, 2018 and the correlation coefficient between the synthetic index for social capital and voting turnout equals 0.51.

[11] Estimation has been performed using the commands xtivreg and xtivreg2 in STATA.

Table 2 IV 2SLS panel model estimates and sensitivity tests for the effect of cultural consumption on hate events in the Italian NUTS3 areas between 2009 and 2018

	No interaction	Interaction			
	(1)	(2)	(3) No spatial spillovers	(4) Refugees	(5) Hate events: only physical attacks and damages
Cultural consumption	− 0.212**	− 0.283**	− 0.202**	− 0.302**	− 0.132**
	(0.098)	(0.112)	(0.088)	(0.150)	(0.042)
Cultural consumption spillovers	− 0.120*	− 0.129*		− 0.192**	− 0.001
	(0.069)	(0.069)		(0.078)	(0.038)
Social capital	− 0.026	0.668	0.630	0.497	0.009
	(0.052)	(0.523)	(0.799)	(0.561)	(0.046)
Social capital*cultural consumption		− 0.092**	− 0.366	− 0.414	− 0.012
		(0.039)	(0.472)	(0.485)	(0.029)
Controls	YES	YES	YES	YES	YES
Refugees among controls	NO	NO	NO	YES	NO
Time FE	YES	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES	YES
R-squared	0.206	0.210	0.205	0.201	0.08
Obs	1050	1050	1 060	810	1050
Cluster	106	106	106	106	106
KP LM statistic p value	0.000	0.000	0.000	0.000	0.000
KP Wald F- statistic	235.665***	137.791**	81.055**	17.136***	137.791**
Hansen *J* statistic *p*-value	0.2865	0.2935	0.3414	0.4086	0.3005
IV estimated coefficient from first stage					
a. direct effect (y = cultural consumption)					
Synthetic cultural consumption	0.818***	0.824***	0.881***	0.849***	0.824***
	(0.053)	(0.056)	(0.082)	(0.066)	(0.056)

Table 2 (continued)

	No interaction	Interaction			
	(1)	(2)	(3) No spatial spillovers	(4) Refugees	(5) Hate events: only physical attacks and damages
Social capital	0.052*	0.086	0.137*	0.128*	0.086
	(0.027)	(0.058)	(0.081)	(0.070)	(0.058)
Social capital*synthetic cultural consumption		− 0.019	− 0.041	− 0.032	− 0.019
		(0.023)	(0.031)	(0.026)	(0.023)
Controls	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES	YES
*b. indirect effect (y = social capital*cultural consumption)*					
Synthetic cultural consumption		0.12	0.133*	0.161*	0.12
		(0.081)	(0.075)	(0.924)	(0.081)
Social capital		1.033***	1.031***	0.994***	1.033***
		(0.189)	(0.182)	(0.212)	(0.189)
Social capital*synthetic cultural consumption		0.112***	0.074**	0.094*	0.112***
		(0.027)	(0.002)	(0.04)	(0.027)
Controls		YES	YES	YES	YES
Time FE		YES	YES	YES	YES
NUTS3 FE		YES	YES	YES	YES

Robust standard errors; coefficients statistically significant at ***1%, **5%, and *10%. The interaction term in the IV 2SLS estimation in columns 2–4 is performed following Wooldridge (2010). The first stage is performed with fixed effects and having the same set of controls as the second stage. Controls: (i) cultural consumption spillovers, human capital, foreign population, unemployment, crime rate in columns 1–3; (ii) cultural consumption spillovers, human capital, foreign population, unemployment, crime rate, refugees in column 4

presented in columns 3–4. (For the detailed results on estimates of the control variable, see Table 9 in Appendix.)

Column 1 reports estimates of the IV-2SLS when the interaction between social capital and cultural consumption is not considered, to show that an increase in cultural consumption of 1 p.p. determines a reduction in the growth of hate events amounting to 21%. The impact of cultural consumption is larger, suggesting the two-way fixed effect model underestimates its impact on hate.

We need to rule out that reverse causation plus hate persistence could be a strong driver of the correlation. We follow Mayda et al. (2021) and we perform two tests. First, whether hate is associated with cultural consumption during the following 8 years. Second, we perform the same test for the predicted cultural consumption as given by our instrumental variable. A correlation between hate and subsequent cultural consumption might imply that places with more hate are a deterrent for consuming culture affecting subsequent cultural consumption and generating a correlation with subsequent hate that may be due to reverse causation. We find no systematic correlation between past hate and the subsequent 8-year cultural consumption, even when we use cultural consumption measured through the instrument (Table 14 in Appendix). While cultural consumption does not happen randomly, past hate does not seem to have predictive power in determining its level.

In columns 2–4 we include the interaction between social capital and cultural consumption. Since the interaction term involves cultural consumption, it might be partially correlated with cultural consumption itself. Following Wooldridge (2010), we deal with this introducing two reduced-form equations in the estimation. In both reduced-form equations, our chosen instrument is given by the Bartik-type instrument summarized in Eq. (2) that predicts the actual cultural consumption as a weighted average of national patterns of cultural consumption growth (the "*shift*" in the literature on Bartik-type instruments) using as weights the ith NUTS3's cultural consumption in 1955 (the "*shares*" in the literature on Bartik-type instruments). The first reduced-form equation regresses cultural consumption on the Bartik-type instrument, social capital, the interaction between the instrument and social capital and control variables. The second reduced-form equation regresses the interaction between cultural consumption and social capital on the Bartik-type instrument, social capital, the interaction between the instrument and social capital and control variables. The structural equation is given by Eq. (1). Estimates are outlined in column 2.

Findings show that here an increase in 1 p.p. in the local consumption of culture determines a decrease of more than 28% in hate events, confirming that the two-way fixed effect model underestimates the impact of cultural consumption on hate. Further support to this bias for the two-way fixed effect model estimates can be found in the 2SLS-IV estimates for the interaction between social capital and cultural consumption. The estimated coefficient for the interaction of social capital with cultural consumption outlined in column 2 of Table 2 has a larger negative and highly significant coefficient, compared with the results in column 2 of Table 1.

Columns 3 and 4 show that the main finding of the relevant role of cultural consumption on reducing hate hold removing the spatial spillover of cultural consumption and introducing the relative share of refuges among controls. Similarly to the two-way

fixed effect model, the interaction between cultural consumption and social capital loses significance. The first-stage results outline that the instruments have the expected positive sign and are always significant. The Kleibergen–Paap underidentification test captured by the KP LM statistic p-value supports the relevance of the chosen instruments in explaining the endogenous regressor and that the model is identified. Estimates do not suffer from an issue of weak instruments, since the Kleibergen–Paap Wald F statistic values are above the Stock and Yogo critical values in all model specifications. The Hansen *J* statistic supports our models as not over-identified. The first-stage regressions confirm that cultural consumption is partially correlated with synthetic cultural consumption and not with the interaction between synthetic cultural consumption and social capital. Similarly, the interaction between cultural consumption and social capital is partially correlated with the interaction between synthetic cultural consumption and social capital and either no correlated or mildly correlated with synthetic cultural consumption. These findings mean that the rank condition for 2SLS is satisfied.

Finally, as introduced in the data description, there are potential bias from measurement issues that must be considered. Lunaria's database contains information collected and cross-checked from local and national newspaper articles, complemented with reporting from NGOs, activists and citizens. Notwithstanding the cross-validation done by Lunaria, the information in the database could suffer from news-coverage bias, originating from the specific perspectives on hate of each media outlet. Hence, it might happen that actual hate events are missing from the database due to the absence of newspaper articles about them, in turn due to the media not considering these episodes as hate events. This first bias intertwines with an interpretation bias, which is inherent to the lack of an agreed definition of hate events.

To address these concerns, we follow established approaches on measurement bias for intimidatory events (Daniele & Dipoppa, 2017) and violence against disempowered groups (Miller & Segal, 2019). Practically, we do a robustness check on the subset of visible and extremely serious hate events from the Lunaria database consisting of severe physical attacks and damages to properties and services due to discriminatory motives (some examples of this subset are in Appendix). Visible and extremely severe hate crimes are likely to be covered by different media, from the local to the national level. Media coverage of the same event by diverse and numerous outlets attenuates concerns of both news-coverage bias and interpretability bias. Further, the visibility of these hate crimes makes them particularly suitable to address under-reporting bias, since they are observed by a wide audience, therefore reaching the media irrespectively from the victims reporting them (Daniele & Dipoppa, 2017). Table 2, column 5 reports the estimates from this robustness check, which confirm our baseline result. (Detailed estimates are in Table 9 in Appendix.)

The next sections detail further robustness checks supporting the internal validity of our results.

5.3 Accounting for persistent cultural norms

We check the robustness of our results accounting for the potential effect of distant historical experience, which could influence today behaviours according to

the extant literature showing that while some cultural features are changing, others display persistency (Becker et al., 2016; Giavazzi et al., 2019; Giuliano & Nunn, 2021; Guiso et al., 2016). Similarly to other works on the effect of persistent cultural norms on the Italian context, we design our proxy for the influence of historical culture using the geography of Italy prior to the unification process, which was implemented after 1861 (Di Liberto & Sideri, 2015; Guiso et al., 2016). Differently from many European countries, Italy experienced high degree of political and institutional fragmentation from the collapse of the Roman Empire until 1861, being divided into several states whose cultural variety is recognized as relevant for the current regional identities (Broers, 2003; Melis, 1996). Existing evidence supports an effect of the Italian pre-Unitarian political and cultural geography on current institutions and socioeconomic outlook (Di Liberto & Sideri, 2015).

We consider Italian pre-Unitarian states between 1560 and 1659, i.e. the geography that resulted after the Peace of Cateau-Cambrésis (1559) which ended the 65-year struggle between France and Spain for the control of Italy. This choice appears appropriate since the institutional geography resulting from the Peace of Cateau-Cambrésis lasted for nearly a century. This is a sufficiently long period for an historical legacy. Also, it is remarkably longer than any other geography of pre-Unitarian states after 1659.[12] From this geography, outlined in Fig. 3, we create a set of dummies corresponding to a different pre-Unitarian state as already done by previous works (Denti & Faggian, 2020; Di Liberto & Sideri, 2015).

We then use these pre-Unitarian state dummies to account for the potential confounding effect of persistent cultural values in our IV-2SLS model (Correia, 2018, 2019; Guimarães & Portugal, 2010). The results,[13] summarized in Table 3, confirm our main findings as cultural consumption still relates negatively to hate. Also estimates for spatial consumption spillovers, social capital and the interaction between social capital and cultural consumption confirm our main results.

More into details, column 1 shows that a 1 p.p. increase in cultural consumption reduces hate proliferation by around 21%.

Again, spatial spillovers of cultural consumption have a negative and significant reduction effect on hate proliferation of about 12%. Also, the remaining estimates align with our main results. Post-estimation diagnostics show the goodness of our instrumental variables. In fact, the KP LM statistic p-value suggests that the instruments are relevant and that the model is identified. The instruments are strong, given that the Kleibergen–Paap Wald F statistic values are above the Stock and Yogo critical values in all model specifications. The Hansen *J* statistic shows our models are not over-identified. From first-stage results it appears that instruments have the

[12] After 1659, the geography of pre-Unitarian states experienced frequent disruptions due to many wars. Already in 1700, the War of the Spanish Succession caused sudden political and institutional shifts, which ended with a new geography of pre-Unitarian states following the Peace of Utrecht in 1713. The same happened again in 1738, following the Treaty of Vienna and in 1748 following the Treaty of Aix-La-Chapelle. Between 1796 and 1806 the Italian institutional landscape was disrupted by Napoleon's Italian Campaigns, as well as in 1815 after the Congress of Vienna.

[13] Estimation has been performed using the command ivreghdfe in STATA (Correia, 2018).

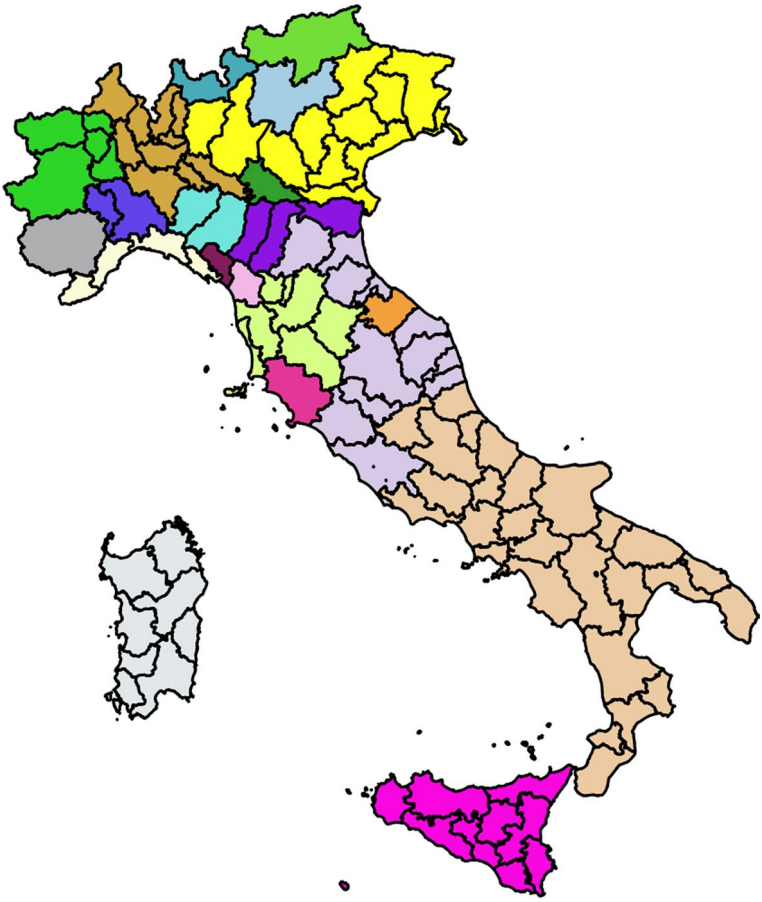

Fig. 3 The geography of Italian pre-Unitarian states from 1560 to 1659 as resulting from the Peace of Cateau-Chambresis (1559)

expected positive sign and are always significant. Also, the rank condition for 2SLS is satisfied.

5.4 Other robustness checks

The results in the previous sections indicate that consuming cultural products plays a role in reducing hate even when we control for endogeneity of cultural consumption and for persistent cultural norms. Naturally, some concerns remain over the interpretation and the robustness of this result. This section will address several threats: the robustness of causal evidence with respect to the baseline year used in the design of the instrument; potential bias that may affect the instrument according to extant literature; a competing model specification.

Table 3 IV 2SLS panel model estimates accounting for the influence of historical culture

	No interaction	Interaction		
	(1)	(2)	(3) No spatial spillovers	(4) Refugees
Cultural consumption	− 0.211**	− 0.218**	− 0.273**	− 0.246**
	(0.096)	(0.095)	(0.089)	(0.107)
Cultural consumption spillovers	− 0.120**	− 0.122**		− 0.190**
	(0.013)	(0.041)		(0.075)
Social capital	− 0.026	0.087	0.631	0.117
	(0.057)	(0.089)	(1.030)	(0.071)
Social capital*cultural consumption		− 0.097**	− 0.556	− 0.400
		(0.045)	(0.785)	(0.571)
Controls	YES	YES	YES	YES
Refugees among controls	NO	NO	NO	YES
Time FE	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES
Pre-Unitarian states FE	YES	YES	YES	YES
Obs	1050	1050	1 060	810
Cluster	106	106	106	106
KP LM statistic p value	0.028	0.031	0.087	0.066
KP Wald F- statistic	204.77***	178.800***	108.499***	168.445***
Hansen *J* statistic *p*-value	0.2865	0.3139	0.3663	0.4241
IV estimated coefficient from first stage				
a: direct effect (y = cultural consumption)				
Synthetic cultural consumption	0.818***	0.812***	0.881***	0.832***
	(0.057)	(0.053)	(0.103)	(0.067)
Social capital	0.052**	0.188**	0.137*	0.234**
	(0.023)	(0.072)	(0.082)	(0.088)
Social capital*synthetic cultural consumption		− 0.012	− 0.041	− 0.022
		(0.515)	(0.032)	(0.026)
Controls	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES
Pre-Unitarian states FE	YES	YES	YES	YES
*b: indirect effect (y = social capital*cultural consumption)*				
Synthetic cultural consumption		0.120	0.133*	0.161
		(0.154)	(0.075)	(0.160)
Social capital		1.033***	1.031***	0.994**
		(0.004)	(0.182)	(0.319)
Social capital*synthetic cultural consumption		0.072**	0.074**	0.093*
		(0.001)	(0.002)	(0.03)
Controls		YES	YES	YES
Time FE		YES	YES	YES

Table 3 (continued)

	No interaction	Interaction		
	(1)	(2)	(3) No spatial spillovers	(4) Refugees
NUTS3 FE		YES	YES	YES
Pre-Unitarian states FE		YES	YES	YES

Robust standard errors; coefficients statistically significant at ***1%, **5%, and *10%. The interaction term in the IV 2SLS estimation in columns 2–4 is performed following Wooldridge (2010). The first stage is performed with fixed effects and having the same set of controls as the second stage. Controls: (i) cultural consumption spillovers, human capital, foreign population, unemployment, crime rate in columns 1–3; (ii) cultural consumption spillovers, human capital, foreign population, unemployment, crime rate, refugees in column 4

First, we check whether estimates from the 2SLS-IV depend on the choice of the baseline year for the Bartik-type instrument, to see that it is not the case. Our results hold even when the baseline year for the instrumental variable changes to 1958 and 1961, respectively (See Table 12 column 1 and Table 13 column 1 in Appendix for the estimation results). Second, due to the potential bias inherent to the Bartik-type of instrument, we have also performed the 2SLS-IV estimation using the "*multiple instruments approach*"(Jaeger et al., 2018), hence adding a lagged cultural consumption to regressors to then instrumenting for it by means of the Bartik-type instrument. The results confirm the impact of cultural consumption in reducing hate also when we account for the adjustment dynamics in cultural consumption (see Table 12 column 2 in Appendix for the estimation results and the detailed model specification).

Third, we estimate the Arellano–Bond difference GMM model that is a competing model specification to account for both endogeneity of cultural consumption and the fact that hate events may display some degree of time persistency, similarly to other public opinion and attitudes (Wilkins, 2018). In practical terms, we want to check whether the results change when we allow for the current level of hate to depend also on the level of hate the year before. The results again confirm the negative impact of cultural consumption on hate, with a highly significant and negative coefficient for cultural consumption, which holds also to the inclusion of the lagged value of hate events among regressors (See Table 13 columns 2–5 in Appendix for the estimation results).

6 Discussion and conclusions

This paper is a first empirical investigation of the effect of cultural consumption on the reduction of hate events across Italian NUTS3 regions. Estimates reveal a relevant effect of consuming cultural products on reducing hate. The size of the effect is sizeable, given that increasing cultural consumption by 1 p.p. relates to 20% reduction in hate events. Since culture is the repository of the prejudices on which hate narratives are built, updating the local cultural outlook by means of consuming cultural products opens up new perspectives and helps challenging the existing stereotypes, thus breaking the hate-building process (Perry, 2001).

We have also measured the effect of spatial spillovers of cultural consumption, to check whether cultural consumption is capable also to exert an indirect effect through spatial externalities. We find evidence of a mild association showing that cultural consumption does not appear to have a strong spatial reach outside the place in which it gets consumed. The results hold to the inclusion of potential confounding features which could contribute to explain the observed intensity of hate. The role of cultural consumption on hate reduction is further confirmed when we control for potential threats to internal validity, including endogeneity, the role of persistent cultural norms and the choice of the estimation method.

Our chosen proxy to measure cultural consumption does not convey any information on the "quality" of the cultural events attended by people. This issue is a potential limitation for our results since experimental evidence on the effect of cultural consumption on hate reduction outlines that cultural products targeting tolerance have a greater impact in offsetting hate (Bond, 2021; Vezzali et al., 2015; Waston et al., 2019). We address this issue referring to extensive qualitative evidence showing that in our considered timespan cultural production in Italy was actively engaged in projects targeting inclusiveness and tolerance across the whole territory. Italian museums realized numerous activities on inclusiveness (Coopculture, 2015; Fondazione ISMU, 2021). Similarly figures show that productions within theatre, dance and music targeting the topics of tolerance and openness have been supported by the Italian Ministry of Culture, foundations and regional governments and released throughout the country both in cities and towns (Bodo et al., 2009; Italian Ministry of Culture, 2014; Pereira et al., 2010). This qualitative evidence suggests that cultural products were remarkably tailored to address tolerance and inclusiveness, corroborating our empirical findings.

Our results support the "*indirect contact theory*" (Brown & Paterson, 2016; Vezzali et al., 2014), by providing a robust and significant measure of the role of cultural products in reducing prejudice-driven behaviours. In this respect, our results also add quantitative support to the existing small-scale experimental evidence showing that exposure to cultural products is effective in reducing hate against disempowered groups (Greene et al., 2018; Murrar & Brauer, 2018; Vezzali et al., 2015).

Our evidence also confirms that cultural change towards more tolerant communities can happen in a relatively short timespan thanks to the innovative drive of cultural products. This result can be combined with the aforementioned evidence on the strong focus on tolerance pursued by cultural production across Italy in the considered time period to advance an interesting insight for policy design. Consumption of cultural products targeting inclusiveness can be effective in improving the community's performance in terms of hate reduction. Therefore, policy interventions aimed at stimulating participation to cultural activities at local level could contribute to counter hate. This insight aligns with the existing approaches suggesting to combine indirect and "*soft*" approaches aimed at promoting community resilience with direct and legislative approaches in fighting hate (Bayer & Bárd, 2020; Gagliardone et al., 2015; IRS, 2020). The indirect approaches, including consumption of cultural products with a focus on tolerance, do not suffer from the drawback of interfering with freedom of speech and they also allow to avoid hatemongers to present themselves as martyrs or victims of the justice system (Bayer & Bárd, 2020).

An interesting finding refers to the effect on hate of the interaction between cultural consumption and the endowment of social capital. Estimates from our regressions provide mild support for hate reduction through the indirect effect of cultural consumption channelled by social capital.

The paper targets only Italy, therefore there are limitations regarding its external validity. These limitations are also due to the key issue of how to measure hate. To this regards, countries have different legislations addressing hate and hate crimes, making cross-country analysis extremely difficult (OSCE-ODHIR, 2017).

Appendix

See Appendix Fig. 4 and Tables 4 and 5.

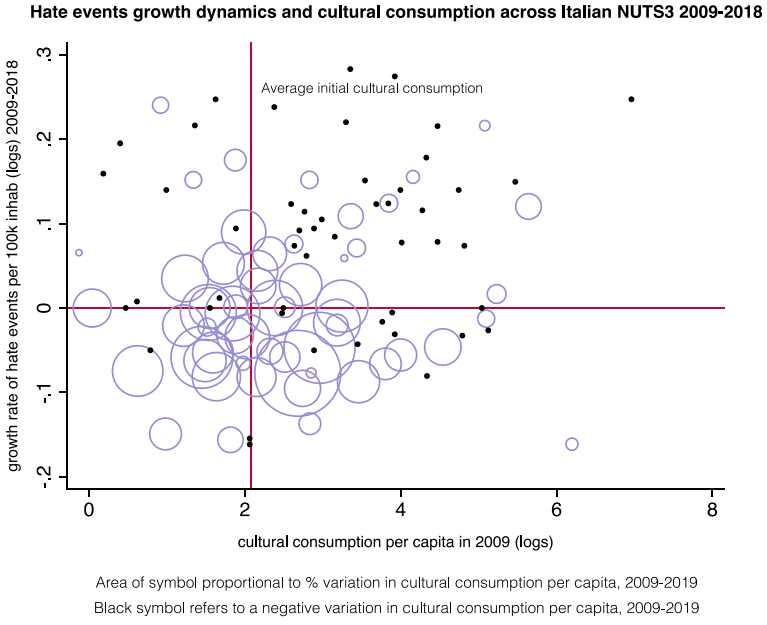

Fig. 4 Hate events growth dynamics and cultural consumption across Italian NUTS3 2009–2018. The graph outlines data on the initial level of cultural consumption per capita (horizontal axis), the annual growth rate of hate events per 100,000 inhabitants (vertical axis) and the corresponding variation in cultural consumption, with the area of the lavender circle being proportional to the percentage increase in cultural consumption per capita and the dark circle corresponding to a decrease in cultural consumption per capita between 2009 and 2018. The distribution of NUTS3 with respect to their initial level of cultural consumption suggests that high initial levels of cultural consumption do not prevent a place to experience increasing hate events if further culture is not consumed. The NUTS3 characterized by a decrease in cultural consumption are clustered in the upper part of the graph. They tend to experience higher growth rates of hate events between 2009 and 2018. The NUTS3 with a positive increase in cultural consumption per capita are mainly clustered in the lower part of the graph, where the growth rate of hate events is negative. These patterns suggest that increased cultural consumption is related to a decrease in the growth of hate events

Table 4 Variables description

Variable	Definition	Source
Hate	Number of hate events for 100 000 inhabitants	Lunaria
Cultural consumption	Audience of cultural events (paid and free admissions) weighted by population	SIAE
Cultural consumption spatial spillovers	Audience of cultural events (paid and free admissions) in the 4 nearest provinces weighted by population	SIAE
Human capital	Share of population aged 25–64 with at least high school diploma	ISTAT
Foreign population	Share of foreign population	ISTAT
Unemployment	Share of unemployed people	ISTAT
Crime rate	Reported crimes for 100 000 inhabitants	ISTAT
Refugees	Refugees for 100 000 inhabitants	SPRAR
Social capital	Synthetic indicator designed through Principal Component Analysis (PCA) on the following local features:	
	• Selective garbage collection on the total amount of garbage weighted by the quality of the environmental policy of local governments;	ISPRA—LUISS Fondazione Etica
	• Number of partners of cooperatives (mutual societies) per 100 000 inhabitants;	ISTAT
	• Share of population aged above 65 benefitting from public elderly care and services (ease of access to service);	ISTAT
	• Share of population aged below 3 benefitting from public nursery (ease of access to service);	ISTAT
	• Number of suicides per 100 000 inhabitants;	ISTAT
	• Share of population aged 15–29 which is not in employment, education and training;	ISTAT
	• Number of protests per 100 000 inhabitants	ISTAT
Weighting factors		
Population	Resident population	ISTAT
Index of touristic attractiveness	Staying of tourists (measured in days) per populations	ISTAT
Instrumental variable components		

Table 4 (continued)

Variable	Definition	Source
1955–2018 expenditure in culture	Money spent in cultural events per inhabitants at NUTS3 level	SIAE Historical Archives
1955–1964 population	Resident population at NUTS3 level	ISTAT Historical Archives
1955–2019 CPI index	Consumer Price Index	ISTAT

Each variable is measured at NUTS3 level for Italy with yearly observations between 2009 and 2018

Table 5 Descriptive statistics

Variable (in logs)	Mean	SD	Min	Max	Observations
Hate	0.5505	0.4287	0	2.4188	1 060
Cultural consumption	1.3859	0.6129	− 1.4922	3.2282	1 060
Cultural consumption spatial spillovers	2.8195	0.5110	0.3175	4.3725	1 050
Human capital	4.0399	0.1370	3.5918	4.3268	1 060
Foreign population	1.7779	0.6673	− 2.7342	2.8603	1 060
Unemployment	2.2651	0.4837	0.7374	3.4486	1 060
Crime rate	8.1476	0.3646	6.4007	9.0457	1 060
Refugees*	0.2962	5.3851	− 9.2103	6.2351	820
Social capital index 1	0.0268	1.0046	− 2.4086	2.3677	1 060
Social capital index 2	− 0.0018	0.9875	− 2.2589	5.6566	1 060
Population	12.9393	0.7094	11.3531	15.287	1 060
Touristic attractiveness	1.4245	1.056	− 1.281	4.140	1 060
1955 cultural expenditure	1.7785	1.0993	− 0.9528	4.5596	1 060

*Data on refugees account for yearly observation for each NUTS3 for 2010 and 2014–2018. There are missing data for 2009, 2011 and 2013

Some Examples of Hate Events from the Lunaria Database

18/08/2019 Gallarate (Milan): the sacristan of the Basilica of Santa Maria Assunta, Deodatus Nduwimana, an Italian citizen originally from Burundi, was attacked with racist phrases (because of the colour of his skin) and pushed, until he fell to the ground, in the square in front of the church, by another man. The fall dislocated his shoulder, forcing him into bed.

17/06/2019 Rome (Rm): at dawn, a 25-year-old Gambian citizen was attacked outside a bar in the San Lorenzo district, Via del Volsci. First, they call him "monkey". Then they hit him with kicks, punches, a broomstick and another stick. Then they chase him through the streets of San Lorenzo, threatening with a knife anyone who even stops to understand what is happening. The young man is taken to hospital with a head injury and fractured nasal bones.

22/08/2018 Pisa (Pisa): a man, a middle-aged businessman, starts throwing stones and insulting all the black people who pass under his balcony, engaging in a personal battle to shut down the Tuscan-Senegalese restaurant recently opened in front of his house. The man brings stones and sharp glass onto the terrace to throw them even in the presence of a four-year-old Italian girl, daughter of the owners of "Sapori d'Africa e Toscani". Among those hit were also two black 20-year-olds, injured in the legs, who had just had dinner in the restaurant and were on their way home. The man threatened to fire a gun, shouting: "S….y Senegales", "S….y niggers" and also "sons of a ….."

Social Capital index: Principal Component Analysis (PCA)

See Appendix Fig. 5 and Tables 6 and 7.

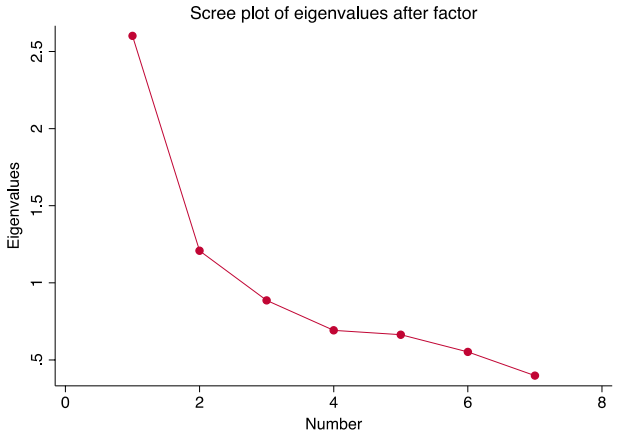

Fig. 5 Principal component analysis: Scree plot. The point of inflexion of the graph occurs at two components supporting findings for Table 4. Table 4 and Figure 5 suggest a cut-off point of two components, giving two indexes for social capital

Table 6 Principal component analysis: Eigenvalues of the correlation matrix on the Italian NUTS3

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	2.60141	1.39346	0.3716	0.3716
Factor 2	1.20795	0.32222	0.1726	0.5442
Factor 3	0.88573	0.19397	0.1265	0.6707
Factor 4	0.69176	0.02863	0.0988	0.7696
Factor 5	0.66312	0.11125	0.0947	0.8643
Factor 6	0.55187	0.15372	0.0788	0.9431
Factor 7	0.39815		0.0569	1

PCA transforms a set of possibly correlated variables into a smaller set of uncorrelated variables called principal components. Indicators that measure a similar underlying concept cluster onto a component and are weighted within each component relative to the variance explained. Factor 1 and Factor 2 can be retained for analysis, as they reported an eigenvalue greater than 1. Considered variables are summarized in Table 4 and they are meant to measure each dimension of social capital with the constraint of having yearly observation at NUTS3 level. Into details, this is the mapping between each dimension of social capital and considered variables: personal relationships: number of suicides per 100 000 inhabitants (Micucci & Nuzzo, 2012); share of population aged 15–29 which is not in employment, education and training (Gannon & Roberts, 2020); **cooperative norms and trust**: number of partners of cooperatives (mutual societies) per 100 000 inhabitants (Micucci & Nuzzo, 2012;); **social network support:** share of population aged above 65 benefitting from public elderly care and services (ease of access to service) (Calcagnini et al., 2019); share of population aged below 3 benefitting from public nursery (ease of access to service) (Calcagnini et al., 2019); **civic engagement**: selective garbage collection on the total amount of garbage weighted by the quality of the environmental policy of local governments (Calcagnini et al, 2019; Micucci & Nuzzo, 2012); number of protests per 100 000 inhabitants (Fini et al., 2011; Sabatini, 2007)

Table 7 Principal component analysis: coefficients of each variable that contributes to each component

Variable	Factor 1	Factor 2
a. All variables have yearly observations at NUTS3 level		
Elderly public care	0.0340	0.8456
Nursery availability	0.7275	– 0.0041
Youth strain	– 0.7845	– 0.1836
Protests	– 0.4405	– 0.4304
Cooperatives	0.6602	0.4575
Suicide	– 0.5051	– 0.3594
Share of recycling	0.7020	0.1153

Table 7 shows the rotated factor loadings in the PCA for each factor. Rotation allows to have reduced concerns of factors that are correlated to each other, and it is recommended when identifying variables to create indexes as in the present case (Hamilton, 2013).

From Table 7 it appears that the social capital index given by Factor 1 is mostly defined by youth strain and nursery availability. The social capital index given by Factor 2 is mostly defined by elderly public care. Hence, it seems that the two indexes are heavily defined by social networks support and they mainly differ along an age-dimension. Factor 1 is defined by dimensions inherent young cohorts and Factor 2 by elderly cohorts. In the paper we present estimates referring to one of these two indexes, Factor 1. Estimates referring to the second index, Factor 2, are detailed in Table 15 and they align with the main findings (Tables 8, 9, 10, and 11).

Table 12 column 2 present estimates from the multiple instruments approach used to account for potential bias of the Bartik estimator (Jaeger et al., 2018). More into details, column 2 provides estimates for the structural equation below

$$lnhate_{it} = \alpha + \delta_1 lnculture_{it} + \delta_2 lnculture_{it-1} + \gamma_1 lnSpillcult_{it} + \nu_{it}\Omega_{it} + \mu_i + \tau_t + \vartheta_{it} \tag{A1}$$

The instruments are given by: Eq. (2) and its lagged version $z_{it-1} = q_i g^{IT}_{t-1}$, the interaction of Eq. (2) with social capital and the interaction of $z_{it-1} = q_i g^{IT}_{t-1}$ with social capital. The instruments need to have enough variation to detect the underlying dynamics separately, which is assessed through the underidentification test measured through the Kleinbergen–Paap LM statistic (Jaeger et al., 2018). By considering, respectively, cultural consumption in 1961 and in 1955 as instruments, the underidentification test is satisfied. Table 12, column 2 shows the results suggesting that the short-run effect and the longer-term effect move in the same direction, hence confirming our main findings. The results from column 2 are also consistent with the critiques to the Bartik-type instrument showing that avoiding to control for dynamic adjustment lead to biased estimates (McKenzie, 2018). The first stage is performed with NUTS3 and time fixed effects and having the same set of controls as the second stage (Tables 12 and 13).

In the Arellano–Bond GMM, we have also included the lag of the cultural consumption to see that it does not appear to have a meaningful influence on hate. Also,

Table 8 Two-way fixed effect panel model detailed estimates and sensitivity tests for the effect of cultural consumption on hate events in the Italian NUTS3 areas between 2009 and 2018

	(1)	(2)	(4) No spatial spillovers	(5) Refugees	(6) Physical attacks and damages
Cultural consumption	− 0.147**	− 0.165**	− 0.175***	− 0.172**	− 0.098*
	(0.073)	(0.074)	(0.064)	(0.08)	(0.051)
Cultural consumption spillovers	− 0.133*	− 0.13*		− 0.185**	− 0.02
	(0.073)	(0.073)		(0.076)	(0.058)
Social capital	− 0.031	0.077	0.081	0.116	0.008
	(0.053)	(0.093)	(0.094)	(0.105)	(0.066)
Social capital*cultural consumption		− 0.042*	− 0.04	− 0.043	− 0.002
		(0.024)	(0.024)	(0.028)	(0.018)
Human capital	0.083	0.122	0.095	0.299	− 0.11
	(0.314)	(0.311)	(0.317)	(0.355)	(0.213)
Foreign pop	0.105***	0.107***	0.102***	0.121***	0.021
	(0.028)	(0.027)	(0.028)	(0.024)	(0.027)
Unemployment	0.175*	0.179*	0.191*	0.219*	0.116*
	(0.098)	(0.099)	(0.099)	(0.12)	(0.069)
Crime rate	0.112	0.111	0.133	0.215	0.057
	(0.1)	(0.1)	(0.098)	(0.151)	(0.091)
Refugees				0.001	
				(0.005)	
Time FE	YES	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES	YES
R-squared	0.207	0.210	0.204	0.202	0.084
Obs	1 050	1 050	1060	810	1 050
Cluster	106	106	106	106	106
LM test autocorrelation	0.1978	0.1952	0.1366	0.4329	

Robust standard errors; coefficients statistically significant at ***1%, **5%, and *10%

social capital behaves consistently with the 2SLS-IV estimates. It has a negative and non-significant association with hate when considered alone, as shown in column 2. When the interaction between social capital and cultural consumption is considered, then the estimated impact of the interaction is negative and highly significant, as displayed by the estimated coefficient in column 3. While the coefficient associated with direct effect of social capital is positive, again in line with estimates from the 2SLS-IV. Controls behave consistently with the results from the 2SLS-IV. The Arellano–Bond Diff GMM does not appear to suffer from over-identification as summarized by the *p*-value for the Hansen test (Tables 14 and 15).

Table 9 IV 2SLS panel model detailed estimates and sensitivity tests for the effect of cultural consumption on hate events in the Italian NUTS3 areas between 2009 and 2018

	No interaction	Interaction			
	(1)	(2)	(3) No spatial spillovers	(4) Refugees	(5) Physical attacks and damages
Cultural consumption	− 0.212**	− 0.283**	− 0.202**	− 0.302**	− 0.132**
	(0.098)	(0.112)	(0.088)	(0.150)	(0.042)
Cultural consumption spillovers	− 0.120*	− 0.129*		− 0.192**	− 0.001
	(0.069)	(0.069)		(0.078)	(0.038)
Social capital	− 0.026	0.668	0.630	0.497	0.009
	(0.052)	(0.523)	(0.799)	(0.561)	(0.046)
Social capital*cultural consumption		− 0.092**	− 0366	− 0.414	− 0.012
		(0.039)	(0.472)	(0.485)	(0.029)
Human capital	0.078	0.328	0.289	0.522	− 0.091
	(0.31)	(0.385)	(0.435)	(0.513)	(0.151)
Foreign pop	0.108***	0.117***	0.110**	0.122***	0.016
	(0.027)	(0.031)	(0.035)	(0.024)	(0.019)
Unemployment	0.17*	0.178	0.189*	0.214*	0.068
	(0.096)	(0.111)	(0.109)	(0.126)	(0.045)
Crime rate	0.118	0.097	0.120	0.120	0.032
	(0.099)	(0.126)	(0.121)	(0.216)	(0.063)
Refugees				0.0004	
				(0.005)	
Time FE	YES	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES	YES
R-squared	0.206	0.210	0.205	0.201	0.08

Table 9 (continued)

	No interaction	Interaction			
	(1)	(2)	(3) No spatial spillovers	(4) Refugees	(5) Physical attacks and damages
Obs	1050	1050	1 060	810	1050
Cluster	106	106	106	106	106
KP LM statistic p value	0.000	0.000	0.000	0.000	0.000
KP Wald F- statistic	235.665***	137.791**	81.055**	17.136***	137.791**
Hansen *J* statistic *p*-value	0.2865	0.2935	0.3414	0.4086	0.3005
IV estimated coefficient from first stage					
a: direct effect (y = cultural consumption)					
Synthetic cultural consumption	0.818***	0.824***	0.881***	0.849***	0.824***
	(0.053)	(0.056)	(0.082)	(0.066)	(0.056)
Social capital	0.052*	0.086	0.137*	0.128*	0.086
	(0.027)	(0.058)	(0.081)	(0.070)	(0.058)
Social capital*synthetic cultural consumption		− 0.019	− 0.041	− 0.032	− 0.019
		(0.023)	(0.031)	(0.026)	(0.023)
Controls	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES	YES
*b: indirect effect (y = social capital*cultural consumption)*					
Synthetic cultural consumption		0.12	0.133*	0.161*	0.12
		(0.081)	(0.075)	(0.924)	(0.081)
Social capital		1.033***	1.031***	0.994***	1.033***
		(0.189)	(0.182)	(0.212)	(0.189)

Table 9 (continued)

	No interaction	Interaction			
	(1)	(2)	(3) No spatial spillovers	(4) Refugees	(5) Physical attacks and damages
Social capital*synthetic cultural		0.112***	0.074**	0.094*	0.112***
consumption		(0.027)	(0.002)	(0.04)	(0.027)
Controls		YES	YES	YES	YES
Time FE		YES	YES	YES	YES
NUTS3 FE		YES	YES	YES	YES

Robust standard errors; coefficients statistically significant at ***1%, **5% and *10%. The interaction term in the IV 2SLS estimation in columns 2–4 is performed following Wooldridge (2010). The first stage is performed with fixed effects and having the same set of controls as the second stage. First stage estimates in columns 2 and 6 are the same since the two regressions changes only regarding the dependent variable, which is given by the total set of hate events in column 2 and by the subset of visible and extremely severe hate events in column 6

Table 10 NUTS3 unit root tests

	IPS	IPS trend	ADF	ADF trend	Phillips–Perron	Phillips–Perron trend
Hate events	− 10.7433***	− 9.7802 ***	350.8751***	469.7389***	571.5248***	580.8032***
Cultural consumption	− 5.4181***	− 2.9299**	349.7234***	359.1308***	359.2287***	280.2657**
Spatial weighted average	− 4.5890***	− 6.9222***	677.6189***	683.5166***	338.4287***	508.9833***
Human capital	− 4.1554***	− 1.0853	242.0944*	544.9776***	200.2728	354.2178***
Crime rate	− 12.7826***	− 14.5788***	68.1462	473.1573***	4123.3066***	6795.3455***
Foreign resident pop	− 2.0695**	− 0.8731	209.1346	85.3832	434.7490***	50.6907
Unemployment	− 5.3354***	8.2496	354.6257***	82.7496	314.5177***	114.3894
Social capital index 1	− 8.4458***	− 5.647***	249.1875**	194.6556	319.2732***	254.4785*
Social capital index 2	− 9.6143***	− 5.3279***	344.1416***	150.7372	416.6813***	308.3305***

*Significant at 10%; ** significant at 5%; *** significant at 1%. IPS—Im-Pesaran-Shin test for unit roots; the W[t–bar] test statistic is standard–normally distributed under the null hypothesis of non-stationarity; ADF Augmented Dickey–Fuller test for unit roots

Table 11 Cross-sectional dependence in the two-way panel model with fixed effects

Pesaran test	Friedman test
Average absolute correlation of the residuals	Pr value
0.200	0.980

The Friedman test strongly support the absence of spatial autocorrelation. The Pesaran test shows that the correlation among residuals is indeed low

Table 12 Robustness checks for the 2SLS IV with FE. 1961 as baseline year for the Bartik-type instrument (column 1) and using the multiple instruments approach to account for potential dynamic bias in the Bartik-type instrument (column 2)

	(1) 1961 as baseline year for IV	(2) Multiple instruments
Cultural consumption (instrumented)	− 0.196**	− 0.328**
	(0.099)	(0.121)
Lagged past cultural consumption instrument (instrumented)		− 0.011
		(0.172)
Cultural consumption spillovers	− 0.127*	− 0.016
	(0.069)	(0.048)
Social capital	0.082	0.817
	(0.077)	(0.874)
Social capital*cultural consumption (instrumented)	− 0.094**	− 0.763
	(0.039)	(0.741)
Lagged social capital* past cultural consumption (instrumented)		− 0.008
		(0.0907)
Controls	YES	YES
Time FE	YES	YES
NUTS3 FE	YES	YES
R-squared	0.211	0.1124
Obs	1050	839
Cluster	106	106
KP LM statistic *p* value	0.0000	0.0001
KP Wald *F*-statistic	262.279***	
F test of excluded instruments		31.74
Sanderson–Windmeijer multivariate *F* test of excluded instruments		21.96
IV estimated coefficient from first stage		
a: direct effect (y = cultural consumption)		
Synthetic cultural consumption	1.042***	1.035***
	(0.0523)	(0.071)
Synthetic cultural consumption *lagged*		0.013
		(0.037)
Social capital	0.075**	0.182
	(0.034)	(0.065)

Table 12 (continued)

	(1) 1961 as baseline year for IV	(2) Multiple instruments
Social capital*synthetic cultural consumption	− 0.027	0.069
	(0.016)	(0.063)
Social capital*synthetic cultural consumption *lagged*		0.012
		(0.009)
*b: indirect effect (y = social capital*cultural consumption)*		
Synthetic cultural consumption	0.010	0.068
	(0.085)	(0.119)
Synthetic cultural consumption *lagged*		0.059
		(0.074)
Social capital	1.176***	0.975***
	(0.127)	(0.225)
Social capital*synthetic cultural consumption	0.029**	0.069**
	(0.014)	(0.033)
Social capital*synthetic cultural consumption *lagged*		0.020
		(0.028)
c: direct effect lagged (y = cultural consumption lagged)		
Synthetic cultural consumption	1.042***	0.131
	(0.0523)	(0.117)
Synthetic cultural consumption *lagged*		0.700***
		(0.054)
Social capital	0.075**	0.091
	(0.034)	(0.056)
Social capital*synthetic cultural consumption	− 0.027	0.041*
	(0.016)	(0.024)
Social capital*synthetic cultural consumption *lagged*		0.018
		(0.023)
*d: indirect effect lagged (y = social capital*cultural consumption lagged)*		
Synthetic cultural consumption	0.010	0.162
	(0.085)	(0.125)
Synthetic cultural consumption *lagged*		0.109
		(0.128)
Social capital	1.176***	0.186**
	(0.127)	(0.083)
Social capital*synthetic cultural consumption	0.029**	0.056
	(0.014)	(0.038)
Social capital*synthetic cultural consumption *lagged*		0.422***
		(0.044)

a, b, c and d are performed with NUTS3 and time fixed effects and having the same set of controls as the structural form equation. Robust standard errors; Coefficients statistically significant at ***1%, **5% and *10%

Table 13 Detailed estimates for the robustness checks

	2SLS IV	Arellano–Bond Diff GMM			
	(1) 1958 as baseline year for IV	(2) No interaction	(3) Interaction	(4) No spatial spillovers	(5) Refugees
L1 Hate		0.154**	0.105**	0.125**	0.071
		(0.059)	(0.05)	(0.057)	(0.059)
Cultural consumption	− 0.292***	− 1.159**	− 0.902**	− 1.315***	− 1.319**
	(0.108)	(0.442)	(0.408)	(0.373)	(0.541)
L1 Cultural		− 0.65	− 1.108**	− 0.816	− 0.087
consumption		(0.662)	(0.437)	(0.539)	(0.535)
Cultural consumption	− 0.108	− 0.229	− 0.153	− 0.116	− 0.041
spillovers	(0.072)	(0.162)	(0.115)	(0.116)	(0.216)
Social capital	0.103	− 0.009	0.549***	0.404*	0.634***
	(0.08)	(0.074)	(0.19)	(0.213)	(0.216)
L1 Social capital			0.417***	0.186	0.074
			(0.151)	(0.155)	(0.124)
Social capital*cultural consumption	− 0.106***		− 0.196***	− 0.113*	− 0.163***
	(0.039)		(0.062)	(0.066)	(0.059)
L1 Social capital*cultural consumption			− 0.013	− 0.065	0.021
			(0.058)	(0.06)	(0.054)
Human capital	0.117	0.495	0.496	0.53	0.636
	(0.304)	(0.36)	(0.344)	(0.359)	(0.432)
Foreign pop	0.113***	0.171	0.157***	0.22***	0.155**
	(0.027)	(0.126)	(0.042)	(0.074)	(0.068)
Unemployment	0.167*	0.092	0.322**	0.142	0.332**
	(0.095)	(0.123)	(0.125)	(0.138)	(0.167)
Crime rate	0.121	0.083	0.048	0.047	0.675*
	(0.100)	(0.296)	(0.258)	(0.276)	(0.345)

Table 13 (continued)

	2SLS IV	Arellano–Bond Diff GMM			
	(1) 1958 as baseline year for IV	(2) No interaction	(3) Interaction	(4) No spatial spillovers	(5) Refugees
Refugees					0.001
					(0.008)
Time FE	YES	YES	YES	YES	YES
NUTS3 FE	YES	YES	YES	YES	YES
R-squared (within)	0.208				
Obs	1050	834	834	834	504
Cluster	106	106	106	106	106
Hansen *J* statistic *p*-value	0.8742	0.099	0.109	0.177	0.230
KP LM statistic *p* value	0.000				
KP Wald *F*-statistic	16.819				
AR(1) *t* statistic		− 4.46	− 6.48	− 4.95	− 4.86
AR(1) *t* statistic *p* value		0.006	0.000	0.000	0.000
AR(2) *t* statistic		1.90	1.76	1.94	1.46
AR(2) *t* statistic *p* value		0.67	0.79	0.70	0.143
Number of instruments		29	50	43	51
IV estimated coefficient from first stage					
a: direct effect (y = cultural consumption)					
Synthetic cultural consumption	0.383***				
	(0.066)				
Social capital	0.260***				
	(0.064)				
Social capital*synthetic cultural consumption	− 0.026				
	(0.017)				

Table 13 (continued)

	2SLS IV	Arellano–Bond Diff GMM			
	(1) 1958 as baseline year for IV	(2) No interaction	(3) Interaction	(4) No spatial spillovers	(5) Refugees
*b: indirect effect (y = social capital*cultural consumption)*					
Synthetic cultural consumption	0.013				
	(0.039)				
Social capital	1.211***				
	(0.131)				
Social capital*synthetic cultural consumption	0.032**				
	(0.016)				

2SLS and Arellano–Bond difference GMM

Robust standard errors; coefficients statistically significant at ***1%, **5%, and *10%. The interaction term in the IV 2SLS estimation in columns 1 is performed following Wooldridge (2010). The first stage is performed with fixed effects and having the same set of controls as the second stage. Controls in columns 1–4 are: human capital, foreign population, crime rate, unemployment. Controls in column 5 are: human capital, foreign population, crime rate, unemployment, refugees. All GMM specifications are estimated with two-step estimation and Windmeijer correction; The coefficient on the lagged dependent variable in all the considered GMM specification lies within the range for dynamic stability. Columns (2)–(5): hate and cultural consumption are endogenous; columns (3)–(5): the interaction term and social capital are endogenous. Estimation performed with the command xtabond2 (Roodman, 2009) in STATA

Table14 Falsification test to assess reverse causality in the 2SLS IV estimates following Mayda et al. (2021)

	(1) Change in Cultural consumption	(2) Change in Synthetic Cultural consumption
Hate events 8 years ago	− 0.070	− 0.058
	(0.050)	(0.044)
Controls	YES	YES
NUTS3 FE	YES	YES
Time FE	YES	YES
Observations	208	208
R-squared	0.220	0.187
Clusters	106	106

Estimates of the correlation between lagged hate and change in cultural consumption

Robust standard errors; coefficients statistically significant at ***1%, **5% and *10%. Controls are: human capital, unemployment, crime rate, foreign population, social capital and cultural consumption spillovers

Table 15 2SLS IV estimates with the social capital index given by the second principal component from PCA

	(1) No interaction	(2) Interaction
Cultural consumption (instrumented)	− 0.216**	− 0.216**
	(0.098)	(0.100)
Cultural consumption spillovers	− 0.119*	− 0.122*
	(0.070)	(0.069)
Social capital (Second principal component)	0.005	0.018
	(0.029)	(0.032)
Social capital*cultural consumption (instrumented)		− 0.077
		(0.071)
Controls	YES	YES
Time FE	YES	YES
NUTS3 FE	YES	YES
R-squared	0.206	0.209
Obs	1050	1050
Cluster	106	106
KP LM statistic *p* value	0.0000	0.0000
KP Wald *F*-statistic	226.570***	55.157***
IV estimated coefficient from first stage		
a: direct effect (y = cultural consumption)		
Synthetic cultural consumption	0.822***	0.820***
	(0.054)	(0.055)
Social capital (Second principal component)	0.123	0.011
	(0.015)	(0.016)

Table 15 (continued)

	(1) No interaction	(2) Interaction
Social capital*synthetic cultural consumption		0.005
		(0.011)
*b: indirect effect (y = social capital*cultural consumption)*		
Synthetic cultural consumption		− 0.168
		(0.115)
Social capital (Second principal component)		0.063
		(0.053)
Social capital*synthetic cultural consumption		0.374***
		(0.039)

Estimations are performed with NUTS3 and time fixed effects and having the same set of controls as the structural form equation. Robust standard errors; Coefficients statistically significant at ***1%, **5% and *10%

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