



NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

Violetta I. Korsunova, Olesya V. Volchenko

CULTURAL MODERNISATION AND FILM INDUSTRY: NAKED FACTS FROM IMDB

BASIC RESEARCH PROGRAM

WORKING PAPERS

SERIES: SOCIOLOGY
WP BRP 97/SOC/2021

This Working Paper is an output of a research project implemented within NRU HSE's Annual Thematic Plan for Basic and Applied Research. Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE.

Violetta I. Korsunova¹, Olesya V. Volchenko²

CULTURAL MODERNISATION AND FILM INDUSTRY: NAKED FACTS FROM IMDB^{3 4}

This paper focuses on the relationship between film content and human values in Europe. Our research fills in two research gaps. For one thing, it reveals the links between people's values and visual cultural production that can showcase the effects of changing values on culture. The other part of our research concerns the use of the Internet Movie Database (IMDb) as a data set reflecting changes in modern societies. We track the changes in film topics provided by the IMDb and European Values Study (EVS) data to see how the changes in people's values are linked to the popularity of related topics. Our special focus lies on the link between choice values and the probability of nudity depiction in films. The sample contained all European countries across 1960-2013. Using multilevel regression analysis, we found that the probability of female nudity is associated with the level of choice values, whereas the male nudity is more likely to appear in films related to the topic of homosexuality.

JEL Classification: A13, C3, Z11.

Keywords: cultural modernisation, emancipative values, film studies, female nudity, male nudity, nudity in films.

¹ National Research University Higher School of Economics. Laboratory for Comparative Social Research, Junior Research Fellow; E-mail: vikorsunova@hse.ru

² National Research University Higher School of Economics. Laboratory for Comparative Social Research, Junior Research Fellow; E-mail: ovolchenko@hse.ru

³ The article was prepared within the framework of the HSE University Basic Research Program.

⁴ We thank Veronica Kostenko for her successful academic matchmaking and important theoretical insights. Our special gratitude goes to late Prof. Ronald Inglehart for his valuable comments and inspiration.

Introduction

Film production is not an isolated process. Filmmaking is highly embedded in the cultural background of the author and is shaped by the social and cultural contexts. Cultural industries are thought to be affected by the cultural environment: values and attitudes shape the patterns of production and the types of products (Hesmondhalgh, 2018). That being said, culture is known as probably the most polysemantic concept in modern humanities and social science which poses a problem to the definition of cultural context. Generally, sociologists view culture as a set of beliefs, values, and attitudes incorporated in social institutions, meanwhile, scholars in culture studies tend to see culture as a set of symbols embodied in various types of texts. In the current study, we combine these two approaches to see how different types of cultures are related to each other by juxtaposing the social attitudes of the population and European film production.

Particularly, this work focuses on the relationship between cultural modernisation measured by the prevalence of choice values (Welzel, 2013) and nudity depiction in films. Choice values are a subcategory of the emancipative values proposed by Welzel (2013) who argues that the economic development and increase in existential security leads to the shift in value orientations among the population. This revised modernisation theory suggests that people start preferring self-expression and personal freedom over conservative views. This manifests through higher acceptance of minorities, tolerance toward sexual freedom and more egalitarian views. In this case, choice values cover the issues related to sexual freedom. Consequently, we may expect that the increase in the prevalence of choice values is reflected in the cinema.

The depiction of nudity in films is itself an ongoing discussion in many areas of studies. The employment and perception of nude bodies has been under the scrutiny for decades of film studies. This issue relates to numerous aspects of art history, ethics and aesthetics, as well as gender studies and the sociology of the body. Established gender orders are a particularly prominent aspect in the discussion of nudity depiction in films. This discussion focuses on the differences in the presentation of male and female characters including body images. Another branch of studies covers the representation of sexual orientations, and the acceptable ways of showing certain types of relationships. In the current study we aim to look at how cultural context shapes the depiction of men and women on screen.

This study relies on several databases. The primary source of information is the Internet movie database (IMDb) which is a collaborative dataset of films and television programs containing information about technical characteristics, content and crew. Data on value orientations is obtained

and calculated using European value study (EVS). We also use V-dem data on government media censorship and World bank data on GDP per capita to take into account external factors that may affect the content of films.

Cinema in comparative perspective

The history of the film industry and cinema highlights the impact they made on the cultural sphere of the world's societies. At the very beginning, cinema is represented by short, black and white silent films of the 1890-1900s which were mostly produced in France and Germany. However, in the 1910s the USA won the title of the world's leader in cinema production, and Hollywood is still holding the field. Production and export policies of the USA and World War 1 are assumed to be among the main causes of such transition from European to American hegemony. This transition was juxtaposed with the changes in cinema perception: first films were considered as artistic or scientific means while the USA producers created another branch of entertainment and established the rules and principles of the cinema industry (Nowell-Smith, 1996).

Nevertheless, European directors tried to avoid the influence of the American industry. Yet several studios joined the mainstream direction, the other directors made attempts to stay independent and followed certain European cinema movements such as expressionism in Germany or impressionism in France. In the 1920s cinema was firstly divided into 'mass' and 'film d'arte' (Nowell-Smith, 1996; Bordwell, 1997).

The transformation of cinema production paralleled technical development. In the middle of the 1910s, the first colouring techniques appeared, and by the end of the 1920s, it was possible to reproduce all real colors. Sound films have also appeared c. 1930, and they changed the production process (Keil, Singer, 2009).

Along with technical alterations, the social meaning of the film industry transformed. The integral pervasion of the cinema made it to be a useful means of transmitting attitudes and values. Films were used for propaganda aims in Nazi Germany, Soviet Union, Great Britain, the USA, and other countries where it was necessary. The patriotic moods and pride for the nation were usually the topics of such films in the 1930-1940s (Barker, 2013; Kenez, 1992).

World War 2 left the mark on the topics and aesthetic principles of the films. Italian neorealism and Hollywood 'noir' depicted the desperate moods of the post-war era. Dark colours, desolate main characters, thrillers as the main category became the description of the most notable films of that time (Ruberto, Wilson, 2007; Naremore, 2008; Silver et al. 2004). However, this characteristic of the time

does not truly reflect the preference of the audience. Romantic films and comedies were much more likely to be on the top of the lists than 'noirs' (Chopra-Gant, 2006, 12-15). This points to the problem of the possibility to affect the values through the range of cultural products.

In addition to that, the distinction between popular and independent films endured a variety of cinema movements across Europe. 'New waves' overflowed the industry in European countries in the 1950-1970s. Those movements intended to create personally styled cinema works where the director participated in each step of the production process. This system opposed mainstream Hollywood and popular European production with standardized procedures of writing, filming, and montage (Bordwell, 1986; Wiegand, 2012).

Further, the transformation of popular cinema was present at the time of the 1970-1980s. New technologies allowed for more complicated special effects and action, so the comedies were sided by the range of action films and blockbusters at the time. This trend was quite common for all popular film industries throughout the world (for instance, the 'spaghetti western' in Italy became popular in the 1970s). More recent film production shows higher diversity in genres and topics both in popular and independent films (Fridlund, 2006; Turnock, 2014; Tarr, Rollet, 2001).

The distinction between mainstream Hollywood-like production and independent films created the opposition between the transnational cinema and national film industries (Crane 2014; Higbee, Lim, 2010; Brunet, Gornostaeva, 2006). The transnational cinema implies the production that results in the universally accepted and successful cultural product, that is affected by the budgets, distribution, promotion, as well as the issues and topics raised in the films (Bergfelder, 2005). This type of production aims to appeal to the preferences of the broader audience, thus, referring to global trends and phenomena. On the contrary, national production is viewed as the reflection of the local communities, diasporas, and post-colonial societies (Marks, 2000; Enwezor, 2007) or, more generally, as film industries not related to the cross-national production (Nestingen et al., 2005). The final products of those industries are considered to specifically indicate the local issues as opposed to the universal ideas.

At the same time, the idea of supranational identities is also examined by scholars who assume that the common trends are present in the films produced in one geopolitical location (Bondebjerg, Redvall, 2011; Bergfelder, 2005). Here, the production pattern and contents in different countries may be similar to each other, yet, they oppose those of the mainstream global industries.

Here we aim to analyse the internal pattern in film production within the supranational category of Europe. In particular, we focus on the trends in the representation of certain topics and their relation to social and cultural contexts.

Cultural modernisation and cultural production

Social values shape all spheres of social life. The term itself is a complex phenomenon with many bases for interpretation. Yet, one of the common grounds is their being robust and stable. However, despite the stability of prevailing social attitudes, they change over time. This process is called cultural modernisation. According to Inglehart (Inglehart, 1997), social values depend on the level of existential security. Wars, famine, economic and social inequality, and other issues lead to survival orientations. At this point, only those forms of behavior that support physical survival are welcome and accepted. Here many restraints are applied to sexual life, gender roles, migration, religious choices, and other spheres of life. As the issues of survival become less urgent, new cohorts grow up with different views on existential security. Physical safety is deemed self-evident and the restrictions on social life start to dissolve. Consequently, new social values emerge; these values constitute more tolerant attitudes toward sexual behavior, gender equality, ethnicity, and other minority groups. These two different forms or attitudes shape two dimensions of polarization in society: people can demonstrate either traditional or secular-rational orientations in their attitudes to authorities. At the same time, individuals are opposed by survival and self-expression orientations toward their life chances. Individuals in more modernised societies tend to have secular-rational and self-expression orientations (Inglehart, Baker, 2000). Modernisation leads to cultural changes that affect people's behavior: they become more tolerant, loyal to democracy, and supportive of liberation (e.g. gender equality, homosexuality, divorce, etc) (Inglehart, Baker, 2000; Inglehart, Welzel, 2005). People become less willing to fight and prefer to remain peaceful as they have new life chances due to modernisation (Inglehart et al., 2015).

One of the ways to define modernisation is to estimate emancipative values (Welzel, 2013). Emancipative values refer to the set of beliefs that follows human empowerment (Welzel, 2013: xxv). This definition means that the more control people gain over their lives and the better living conditions they have the more they start to value their independence and freedom of choice. The concept of emancipative values covers several domains of social attitudes related to various aspects of life. These aspects include sexual freedoms (choice values), gender equality (equality values), expression of public opinion (voice values), and personal independence (autonomy values). In this paper we focus on choice values as they are mostly related to sexual freedom and acceptance.

As it was mentioned above, modernisation leads to a higher level of democracy that affects all social areas. Cultural modernisation results in more tolerant attitudes toward sexual freedoms. Sex is no longer associated with reproduction only; it is now considered as a source of pleasure (Foucault, 1978). Cultural turn that drove attention to the field of consumption also affected sexual life (Warde, 2015). Sexual behavior turned into a part of a lifestyle that is perceived as a certain type of consumption (Hawkes, 1996).

Existing film studies also address the issue of the representation of nudity in films. According to the psychoanalytic approach, nudity depiction as all other issues rest on the patriarchal system where the female characters are portrayed in a way to provide pleasure to the male viewers. Mulvey refers to this issue as the 'male gaze' that accepts women in films as either erotic objects for male characters or erotic objects for those who watch the film (Mulvey, 1975). At this point, female nudity is deemed appropriate as it serves these aims.

Another issue here is the disbalance of male and female nudity prevalence. According to Lehman (2001), the long-time taboo on the depiction of male nudity is attributed to the conventional image of masculinity that is rooted in a patriarchal system that prohibits any form of gaze over the nude male body as it is associated with homosexuality. Moreover, the idea of showing male genitalia explicitly threatens the dominance of phallus which is an ideal concept and should not be depicted through real objects. Consequently, female nudity is more accepted and more frequent.

Further, studies have more emphasis not on the depiction itself but on the ways films are interpreted by the audience. At this point, the meanings of certain phenomena are related to the prevailing values and norms that are referred to as ideology. Eventually, it redefines sex as a public issue that may be discussed and depicted. Thus, nudity becomes a legitimate visual aid that does not need onward liberalization to maintain that status. Moreover, the type of depicted nudity appears to be more manifold. The erosion of patriarchal norms and decrease in both gender inequality and heteronormativity also allowed to exhibit non-heterosexual relationships and move away from the stereotypical perception of masculinity. Along with it, as the issues of gender equality become more widespread, more diverse female characters emerge in films and the 'male gaze' (Mulvey, 1975) loses its ground (although it is still popular).

Bodies in films

Body representation in films is one of the key topics in film studies. Specifically, the portrayal of the female body came into view of the researchers. Generally passive female characters who suffer from violence throughout the 60s and 70s broadcast women's position as inferior to men's (Haskell,

1974), which results in the way female and male bodies are portrayed onscreen. Meanwhile, the representation of patriarchal values in mainstream films was juxtaposed with the rise of independent and avant-garde cinema which were seen as a prospect to challenge the depiction of the existing gender order.

The beginning of the 70s was marked with the early feminist film theories that designated common ideas about the representation of female and male bodies in films. Johnston (1973) points at the ongoing stereotyping of women in cinema. As female characters are built around their male counterparts, they are only perceived in relation to them, which endorses the existing system of gender inequality where women's position is evaluated by the men in their lives. Later on, the particular interest in the sexualization and objectification of the bodies emerged with the growth of film studies' scope. Employing the psychoanalytic approach, Mulvey (1975) suggests that the films bring the pleasure of both looking at others and identification with them. Female characters being the objects of the male gaze are written in a way to appeal to their fantasies. Along with it, the female viewers learn to identify with these characters. At the same time, male bodies are sidelined from such representation as they are presumed to be a subject, not an object. Further, feminists indicate the necessity to develop new approaches to portray women using codes and language from outside of the patriarchal vocabulary (Mulvey, 1979; Gledhill, 1978). These theorists compete for a more diverse depiction of female characters and shift from the male gaze.

On the contrary, the dominant position of a man is constructed through the idealism of the male body. The idealistic depiction implies male bodies to be concealed so that it does not subvert the existing enigma of the ideal (Lehman, 2013). Moreover, even the naked male bodies are not presented as a spectacle (Neale, 1993), whereas women onscreen represent 'to-be-looked-at-ness' (Jacobsson, 1999). However, later theorists express criticisms of the Freudian approach since this theory is phallogentric and refuses female agency to enjoy the narrative, as well as that it doesn't take into account existing examples of strong and ambivalent female characters (Penley, 2013; Modleski, 1988).

Concurrently, culture studies point at different meanings underlying nudity depiction. As societal and value changes occur, the shift in body representations takes place, mirroring the ongoing social processes (Tasker, 1993b). This may refer to the "masculinity crisis" (Peberdy, 2011) in the late 80s and early 90s films, which address the problematic issue of showing virility and femininity in the age of the second wave of feminism (Tasker, 1993a; Powrie, 1997). The empirical evidence suggests the increase in the sexualised presentations of male bodies and the objectification of men in more recent visual culture (Smelik, 2016). Some scholars might attribute this to the acknowledgment

of the female gaze. For instance, the research shows that women evince more interest in mainstream films with sexual content (Bahk, 2000). However, the studies of the concept of the female gaze indicate its intrinsic differences from the male gaze. Women perceive the image of men along with their overall character with the body being just a part of the whole picture (Cohen, 2010). Furthermore, other researchers claim that the increase in presence of male nudity is not caused by the rise of women's demands but by the influence of homosexual aesthetics (Bordo, 1999).

Another branch of research focuses on the process of film production and its relation to the final content. The results show that fewer women are involved in film production as screenwriters, directors, or producers (Bielby, Bielby, 1996). Women are still portrayed as oriented on romantic and sexual relationships rather than on career and academic success (Yakaboski, Donahoo, 2017). Another study shows that the number of female actors in the cast increases the probability of nudity (Cerridwen, Simonton, 2009). However, the presence of nudity and sex does not increase the revenue or critical acclaim (Thompson, Yokota, 2004).

Hypotheses

With the regards to the existing literature, we can expect several outcomes. First, the idea of human empowerment along with the spread of orientations on sexual freedoms and self-expression leads to the increase of the acceptance of nudity. According to this, our first hypothesis goes as follows:

Hypothesis 1a: The probability of nudity in films is growing along with the growth of choice values.

However, eventually, the growth of emancipation and personal freedom would also reshape the attitude to the exploitation of body images that may shake the position of nudity as an artistic tool, especially in terms of female nudity depiction. Therefore:

Hypothesis 1b: The probability of nudity in films is the highest in countries with medium level of choice values (the link between choice values and the probability of nudity is quadratic).

Hypothesis 2: The probability of female nudity depiction increases in the medium level of choice values (the link between choice values and the probability of female nudity is quadratic).

On the contrary, acceptance of more diverse gender identities and sexual freedom leads to the acceptance of nude male bodies, thus:

Hypothesis 3a: The probability of male nudity depiction increases when the level of choice values grows.

At the same time, the growth of more liberal views on gender and sexuality may not be reflected in the mainstream media and may be only reserved for the films that highlight the topics of sexuality. From this perspective:

Hypothesis 3b: The depiction of male nudity is more probable in films concerning the topic of homosexuality.

Although the growth of more liberal views is important for the initial acceptance of nudity, the increase in choice values may not be as crucial once nudity becomes a legitimate visual tool, therefore:

Hypothesis 4a: The link between choice values and the probability of nudity becomes weaker overtime.

Hypothesis 4b: The link between the topics of homosexuality and the probability of nudity is decreasing overtime.

Data and Methodology

Dataset of films

For the study we combine several datasets that contain information about film production, human values and economic development.

The empirical basis of our study is the Internet Movie Database (abbreviated as IMDb). It is an online dataset of movies and television programs ever filmed all around the world starting from the first works of Lumiere brothers ending up with the most recent motions shown in cinemas tonight.

IMDb data has been used in numerous studies in various scientific disciplines. One branch of the research addresses film's success either via the analysis of box-office (Ding et al., 2017; Quader et al., 2017; Zhou, Yen, 2018) or user ratings (Oghina et al., 2012; Hsu et al., 2014). Some papers address gender inequality in reviews (Otterbacher, 2013; Boyle, 2014) and film production (Chen, Cui, 2020). Communication studies and computer science apply IMDb to quantify cinema industry and define key pictures (Bioglio, Pensa, 2018; Canet Centellas et al., 2016; Zakhlebin, Horvát, 2017). Another scope of IMDb analysis is dealing with country representation from a geopolitical point of view (Dodds, 2006; Ridanpää, 2014). Other studies focus on developing or improving film

recommendation systems (Melville et al., 2002; Oghina et al., 2012; Jung, 2012; Fleischman, Hovy, 2003).

The film dataset was obtained via IMDB alternative interface on November, 28, 2014. The original full dataset contains information about 3 120 130 film items. Further we exclude observations with undefined running time, genre, keywords or year; movies of certain genres that are not related to mass cinema production, as well as all TV series. Eventually, we select films that were released in European countries between 1960 and 2013. The final dataset consists of 31 898 films.

The number of films across time and countries is presented on figure 1. One can see that the production of films is distributed unevenly: France, Germany, Italy, and the UK are in the leading positions whereas other countries have much fewer films released. Time differences are present as well, as the number of films is growing in more recent years (in particular since the 1990s).

Figure 1 about here

Keywords

A keyword is a word or word collocation that describes plot, topics or technical features of each movie. Overall, the database contains 161 225 unique keywords.

As we focus on nudity depiction in films, we selected keywords that contain references to nudity.

First, we selected keywords containing direct reference to nudity depiction. The list of keywords was obtained through the text queries “naked”, “nudity”, and “bare”. Initial search result consisted of 96 keywords with “naked” from which we selected 84 words related to nudity. Along with it, the database had 48 keywords containing the word “bare”, however some of them are not related to nudity, therefore they were excluded from the analysis. As a result, we end up with 18 keywords containing “bare” and related to nudity.

Regarding keywords with “nudity”, the data contained 80 items referring to this word. However, we had to exclude keywords that describe censored or concealed nudity as they refer to the absence of nudity and imply special actions taken to prevent nudity depiction. Finally, we obtained the list of 169 keywords that describe nudity depiction in films.

Second, we classified the acquired keywords to general, female and male nudity. If the keyword contained reference to a female body (“female”, “girl”, “woman”), it was labeled as female nudity; likewise, references to male bodies (“boy”, “male”, “man”) were classified as male nudity.

Those keywords that did not contain any gender references were combined with male and female nudity keywords as general nudity.

The next step was to find films that concern the issue of homosexuality. For this purpose, we selected all keywords containing “gay”, “lesbian” and “homosexual”. The query resulted in 406 items, yet, some of the keywords were not related to homosexuality, therefore, they were excluded from the final array. The ultimate list of keywords included 533 items. In this research we are not distinguishing between positive (e.g., “gay-liberation”), negative (e.g., “anti-gay”) and neutral connotations (e.g., “gay-man”) as we assume that the presence of the topic per se can indicate certain social attitude in the film industry.

The full list of keywords indicating general nudity, female nudity, male nudity and homosexuality is presented in the appendix.

Fluctuations of the shares of films containing the keywords of interest is presented on figure 2.

Figure 2 about here

Choice values calculation

European Value Study datasets were used to acquire information about human values in the countries of analysis. Choice values are calculated as an additive index of the personal attitudes toward three issues: abortion, homosexuality, and divorce. The respondents were asked if they justify the aforementioned phenomena; all answers are measured with a 10-point scale where 1 stands for “never justifiable” and 10 stands for “always justifiable”. The answers are scaled so they vary from 0 to 1. The resulting index of choice values is estimated as the mean values of three answers.

As EVS data consists of 5 cross-sectional surveys (conducted in 1981, 1990, 1999, 2008, and 2017) we used linear interpolation in order to obtain data for the years between the waves. Data from 1960 to the first available EVS wave was estimated using the cohort extrapolation technique (Brunkert et al., 2019).

Another issue that should be addressed is the absence of values data for currently non-existent countries, particularly, Czechoslovakia and Yugoslavia. The level of choice values in Czechoslovakia comprises the weighted means of values in Czech Republic and Slovakia. Likewise, data for Yugoslavia was calculated as the weighted mean for the former republics (Bosnia and Herzegovina, Croatia, Montenegro, North Macedonia, Serbia, and Slovenia) till 1991. Similarly, choice values for

FYR and Serbia and Montenegro were estimated as the average of values in Serbia and Montenegro proportionally to their population sizes in 1992-2006.

According to the revised modernisation theory, the prevalence of choice values increases overtime (Inglehart, Welzel, 2005), hence these two variables are correlated. Nevertheless, as we are interested in effects of both time and values, we kept both variables in the regression models. In order to avoid multicollinearity, we estimated an OLS model to predict choice values by year and then used model residuals as a predictor in the subsequent models. As a result, we obtained a variable that indicates the level of choice values and does not correlate with year.

Control variables

To take into account cross-country differences in economic development we include Real GDP per capita in 2011 US\$, multiple benchmarks (Bolt et al., 2018) as a control variable in all the subsequent models.

As the features of the films may be affected by the main production companies, we decided to consider the impact of the collaboration with the USA companies. Using IMDb, we construct a new binary variable with value '1' meaning the film was released in collaboration with the USA, and '0' meaning the USA companies did not participate in the film production.

To account for the different degrees of description of films produced in different countries and years we also include the number of keywords into the models.

Further, since nudity is a subject of regulation, we need to consider the censorship in the countries of analysis. To do so we employ the indicator of government attempt of media censorship provided by V DEM Variety of democracy (Coppedge et al., 2020). The index varies from -2.57 to 3.30 with the lower values meaning higher levels of governmental control and censorship attempts.

Descriptive statistics for all variables are presented in table 1.

Table 1 about here

Data analysis

In the following section, using 3-level hierarchical binary regression models we will predict the probability of male/female/general nudity depiction in a film. We treat film features as 1st level predictors, characteristics of countries in a particular year as 2nd level predictors, and countries as a

top-level of hierarchical clustering. The final database consists of 31898 films nested within 1355 country-year units and within 42 countries.

Intraclass correlation (ICC) coefficient for the null model with general nudity as a dependent variable is 0.07 at the country-year level and 0.06 at country level, for the null model with female nudity as a dependent variable ICC is 0.11 at the country-year level and 0.07 at country level, and for the null model with male nudity as a dependent variable ICC is 0.04 at the country-year level and 0.05 at country level.

To start, we estimate a set of models to test our first hypothesis (table 2). The first model tests the relationship between the level of choice values and probability of nudity depiction.

An increase in the level of choice values is positively related to the probability of female nudity depiction, however, it is not associated with general nudity or male nudity. The results confirm hypothesis 1b, as the link between choice values and the probability of nudity is non-linear with the highest probability corresponding to the medium level of values. Hypothesis 2 is not proven since the quadratic relationship between choice values and the probability of female nudity is non-significant, though the visualization of the effect on figure 3 suggests that this relationship may become significantly non-linear in the future. Hypothesis 3 is not confirmed either: choice values do not affect the probability of male nudity depiction.

Figure 3 about here

The probability of nudity depiction also correlates with the issue of homosexuality. Films that contain the topics related to ‘gay’ issues have two times more chances of general nudity and three times more chances of male nudity depiction. Nevertheless, this topic doesn’t affect the probability of female nudity. On the contrary, films with keywords related to ‘lesbian’ are more likely to contain all types of nudity, yet, this association is much more prominent in the cases of general and female nudity (7.07 and 9.59 times more respectively). At the same time, the general topic of ‘homosexuality’ shows more divergent relationships with different types of nudity. Firstly, the chances of general nudity depiction are not related to the presence of this topic. Secondly, its relationships with the probability of female and male nudity are the opposite: such films have lower chances of female nudity, however, the presence of male nudity becomes more probable. Overall, general and female nudity is better predicted by the models (conditional $R^2 = 0.30$ for both female and general nudity models compared to 0.21 for male nudity models), although all models demonstrate excellent fit (McFadden et al., 1977: 26).

Considering the control variables, economic development has a positive association with the probability of all types of nudity. However, films produced in a collaboration with USA filmmaking companies have lower chances to contain nudity. Censorship is negatively associated with the probability of general and female nudity whereas the chances of male nudity depiction are not related to the governmental efforts to censor media content. Films that are better described with keywords predictably have higher chances to contain keywords related to nudity.

Table 2 about here

Along with the initial models we also analysed how the relationship between the set of variables had changed throughout the explored time period. For this purpose, we estimated interaction effects between the year of production and choice values along with the presence of homosexuality in films.

Table 3 shows the interactions between the year of production and choice values. The results show that the link between female nudity and choice values, as well as between general nudity and choice values decreases over time. Male nudity, however, is not related to choice values throughout a given period of time.

Table 3 about here

The marginal effects of choice values are presented in fig. 4. The far-left plot shows the changes in the relationship between choice values and general nudity. The result indicates a steady decrease in the correlation between values and nudity depiction over time, as the link becomes non-significant since the mid. 90s. A more sudden decline can be observed regarding the link between female nudity and value orientations (central plot). Despite being strong at the beginning of the analysed period, the correlation halves by mid. 80s and becomes non-significant in the early 2000s. Considering male nudity (far-right plot), the relationship with choice values remains non-significant throughout the decades, although a slight upward trend is present.

Figure 4 about here

Along with the direct positive relationship between general nudity and homosexuality in films, we estimated interaction effects between the year of production and the presence of keywords related to homosexuality (“homosexual”, “gay”, “lesbian”). Table 4 shows the interactions between the presence of general nudity and the presence of homosexuality. The association with the presence of words “homosexual” remains stable, while the link between keyword “gay” and the

probability of female nudity becomes weaker. Further, the correlation with the keyword “lesbian” decreases over time for all types of nudity.

Table 4 about here

Marginal effects of keywords related to homosexuality are presented on figures 5 and 6. Figure 5 illustrate the significant interaction between year and the presence of keyword “gay” and female nudity. It can be seen that the probability of female nudity in films that contain keyword “gay” is decreasing throughout the time, and in 1990s the difference between films with and without this keyword becomes disappears.

Figure 5 here

Contrary to that, films that contain keyword “lesbian” have higher probabilities of female and general nudity throughout all analysed period, although the effect becomes weaker overtime. In the beginning of the period films with keyword “lesbian” have about 90% probability of female nudity depiction, whereas nowadays the probability dropped to about 30%.

Figure 6 about here

At the same time, the relationship with male nudity, which has been modest to begin with, turned non-significant in the early 2000s.

Limitations of the study

First of all, the quality of IMDb keywords remains to be the question. For example, we are not always able to detect a particular type of nudity based on the keywords. As the keywords are ascribed by the users, we cannot be sure that all films that contain nudity were selected for the analysis, though, the sensitivity of this topic and its importance for rating systems make us believe that this particular phenomenon is more or less covered by the keywords. Besides, the problem of incompleteness and noise inevitably accompany all studies that use big data sources (Salganik, 2019).

Second, the study is limited to European countries only. The analysis of cinema industries in other regions may diverge from the current study.

Third, since the annual data on values is unavailable, current design required advanced techniques of data interpolation and extrapolation. Though the approach allowed us to grasp general trends of cultural modernisation, the more nuanced picture of temporal changes remains unknown.

Fourth, we cannot claim any causal inference as the methods of analysis do not allow to establish cause and effect relationships. However, our theoretical framework strongly supports the causal effect of choice values.

Discussion

The results of the analysis highlight several core findings. First, the trends in female and male nudity depiction are considerably divergent overtime. The initial rise in the shares of films with nudity in the 1970s can be attributed to the depiction of female nude bodies, whereas male nudity was almost non-present during the time. The overall fluctuations in the distribution of female nudity may be opposed to the steady increase in the shares of films with male nudity. Further, social attitudes are only related to the depiction of female nudity, meanwhile the presence of male nudity is not dependent on the prevalent values. These findings may show that the public discourse is reflected through the depiction of female bodies. Regarding the theory of emancipation (Welzel, 2013) and, overall, modernisation theory (Inglehart, 2000), these results show that the shift in value orientations toward more liberal views opens a prospect to more sexual freedoms in cinema production. Along with it, although the prevalence of choice values does not determine the presence of male nudity in films, the gradual increase in the probability of male nudity depiction at least illustrate the changes in perception of formerly unacceptable phenomena. Moreover, that may indicate the increase in male body objectification that corroborates previous findings (Smelik, 2016).

Further, the relationship between values and general nudity seems to be non-linear. The results show that the shares of films with nudity is higher in countries with medium level of choice values, whereas in lower and higher modernised societies the shares are smaller, which goes in line with the idea that the perception of nudity changes (Tasker, 1993b). Filmmakers in more modernised societies have fewer intentions to only portray women to satisfy male gaze (Mulvey, 1975), thus, producing fewer films with nude female bodies. For instance, the plummeting of the chances of female nudity in films containing the keyword “lesbian” illustrates the shift from sexualization of same-sex relationships between women to the representation of other elements. However, the link between choice values and female nudity is closer to linear despite the marginal significance of a quadratic effect. This finding, nevertheless, does not necessarily contradict our expectations as the visualization of the relationship demonstrates that the trend is yet to become non-linear.

Another important finding is the weakening of the link between nudity and choice values overtime. This means that once value shifts bring about more liberal views on the depiction of nudity, the prevalence of choice values becomes a less vital factor.

Regarding male nudity, choice values have no impact on the probability of this type of nudity. At the same time, the presence of topics related to homosexuality increases the chances of male nudity in films: films with topics of homosexuality have 6 times more probability to depict nude male bodies. Female nudity is also more likely to be encountered in films with these themes, though the effect is not as strong. Further, the relationship between the topic of homosexuality and female nudity is weakening overtime, whereas its association with male nudity remains stable. These results, along with the lack of influence of choice values on male nudity corresponds to the idea that male nudity is a tool reserved for specific storylines related to same-sex relationships (Lehman, 2013; Bordo, 1999).

Conclusion

This study examines the relationship between types of culture: cinema production and cultural values. Using the example of cinema production and choice values we analysed how prevailing attitudes are related to the prevalence of correspondent phenomena onscreen, particularly, nudity. The current topic remains a rather underexplored area of research, especially in quantitative approach, with various explanations being possible according to existing theoretical frameworks in film studies, cultural studies, and sociology. This paper's findings show that many factors contribute to the acceptance of nudity in films. This process underlines the importance of gender order, that shapes the divergent presentation of nude men and women in films. Particularly, female bodies' depictions reflect the ongoing process of cultural modernisation, whereas male nudity is still related to specific narratives within films. From this perspective, that means that the use of female nudity is shaped by cultural context while the use of male nudity is determined by the type of story intended by filmmakers.

The results also highlight the window of discourse regarding nudity depiction. Shifts of values orientations make it possible to use nudity as a legitimate visual tool. However, as time passes, the importance of social attitudes erodes.

References

- Bahk, C. M. (2000). College students' responses to content-specific advisories regarding television and movies. *Psychological Reports*, 87(1), 111-114.
- Barker, J. L. (2013). *The aesthetics of antifascist film: radical projection* (Vol. 19). Routledge.
- Bergfelder, T. (2005). National, transnational or supranational cinema? Rethinking European film studies. *Media, culture & society*, 27(3), 315-331.

- Bielby, D. D., & Bielby, W. T. (1996). Women and men in film: Gender inequality among writers in a culture industry. *Gender & Society*, 10(3), 248-270.
- Bioglio, L., & Pensa, R. G. (2018). Identification of key films and personalities in the history of cinema from a Western perspective. *Applied network science*, 3(1), 1-23.
- Bolt, J., Inklaar, R., de Jong, H., & van Zanden, J. (2018). *Rebasing 'Maddison': new income comparisons and the shape of long-run economic development* (No. GD-174). Groningen Growth and Development Centre, University of Groningen.
- Bondebjerg, I., & Redvall, E. N. (2011). *A small region in a global world: patterns in Scandinavian film and tv culture*. Centre for Modern European Studies-CEMES, University of Copenhagen.
- Bordo, S. (1999). *The male body: A new look at men in public and private*. New York: Farrar, Straus and Giroux.
- Bordwell, D. (1986). Classical Hollywood cinema: Narrational principles and procedures.
- Bordwell, D. (1997). *On the history of film style*. Harvard University Press.
- Boyle, K. (2014). Gender, comedy and reviewing culture on the Internet Movie Database. *Participations*, 11(1), 31-49.
- Brunet, J., & Gornostaeva, G. (2006). Company profile: Working Title Films, independent producer: internationalization of the film industry. *International journal of arts management*, 9(1), 60-69.
- Brunkert, L., Kruse, S., & Welzel, C. (2019). A tale of culture-bound regime evolution: the centennial democratic trend and its recent reversal. *Democratization*, 26(3), 422-443.
- Canet Centellas, F. J., Valero Navarro, M. A., & Codina Bonilla, L. (2016). Quantitative approaches for evaluating the influence of films using the IMDb database. *Communication & Society*, 29(2), 151-172.
- Cerridwen, A., & Simonton, D. K. (2009). Sex doesn't sell—nor impress! Content, box office, critics, and awards in mainstream cinema. *Psychology of Aesthetics, Creativity, and the Arts*, 3(4), 200-210.
- Chen, J., & Cui, M. (2020, April). Analysing Gender Bias in IMDB Films Based on Social Networks. In *IOP Conference Series: Materials Science and Engineering* (Vol. 806, No. 1, p. 012022). IOP Publishing.

- Chopra-Gant, M. (2006). 'So What Kind of Film is it?': Genre, Publicity and Critical Practice. In Dowd, G., Strong, J., & Stevenson, L. (Eds.), *Genre Matters: Essays in Theory and Criticism* (pp. 123-133). Intellect Books.
- Cohen, P. M. (2010). What have clothes got to do with it? Romantic comedy and the female gaze. *Southwest Review*, 95(1/2), 78-88.
- Coppedge, M., Gerring, J., Knutsen, C. H., Lindberg, S. I. , Teorell, J., Altman D., Bernhard M., Fish M. S., Glynn A., Hicken A., Lührmann A., Marquardt K.L., McMann K., Paxton P., Pemstein D., Seim B., Sigman R., Skaaning S.-E., Staton J., ... Ziblatt, D. (2020). "V-Dem Codebook v10" *Varieties of Democracy (V-Dem) Project*.
- Crane, D. (2014). Cultural globalization and the dominance of the American film industry: Cultural policies, national film industries, and transnational film. *International journal of cultural policy*, 20(4), 365-382.
- Ding, C., Cheng, H. K., Duan, Y., & Jin, Y. (2017). The power of the "like" button: The impact of social media on box office. *Decision Support Systems*, 94, 77-84.
- Dodds, K. (2006). Popular geopolitics and audience dispositions: James Bond and the internet movie database (IMDb). *Transactions of the Institute of British Geographers*, 31(2), 116-130.
- Enwezor, O. (2007), 'Coalition building: Black Audio Film Collective and Transnational Post-colonialism', in Eshun, K., & Sagar, A. (Eds.), *The Ghosts of Songs: the film art of the Black Audio Film Collective* (pp. 106–129). Liverpool: Liverpool University Press.
- Fleischman, M., & Hovy, E. (2003, January). Recommendations without user preferences: a natural language processing approach. In *Proceedings of the 8th international conference on Intelligent user interfaces* (pp. 242-244).
- Foucault, M. (1978). *The history of sexuality: An introduction, volume I*. Pantheon Books New York.
- Fridlund, B. (2006). *The spaghetti western: a thematic analysis*. McFarland.
- Gledhill, C. (1978). Recent developments in feminist criticism. *Quarterly Review of Film & Video*, 3(4), 457-493.
- Haskell, M. (1974). Howard Hawks Masculine Feminine. *Film Comment*, 10(2), 34.
- Hawkes, G. (1996). *Sociology of sex and sexuality*. McGraw-Hill Education (UK).

- Hesmondhalgh, D. (2018). *The Cultural Industries* (4th ed.). SAGE Publications Ltd.
- Higbee, W., & Lim, S. H. (2010). Concepts of transnational cinema: towards a critical transnationalism in film studies. *Transnational cinemas*, 1(1).
- Hsu, P. Y., Shen, Y. H., & Xie, X. A. (2014, October). Predicting movies user ratings with imdb attributes. In *International Conference on Rough Sets and Knowledge Technology* (pp. 444-453). Springer, Cham.
- Inglehart, R. (1997). *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Princeton university press.
- Inglehart, R. (2000). Globalization and postmodern values. *Washington Quarterly*, 23(1), 215-228.
- Inglehart, R. F., Puranen, B., & Welzel, C. (2015). Declining willingness to fight for one's country The individual-level basis of the long peace. *Journal of Peace Research*, 52(4), 418-434.
- Inglehart, R., & Baker, W. E. (2000). Modernization, cultural change, and the persistence of traditional values. *American sociological review*, 65(1), 19-51.
- Inglehart, R., & Welzel, C. (2005). *Modernization, cultural change, and democracy: The human development sequence*. Cambridge University Press.
- Jacobsson, E. M. (1999). *A female gaze?* KTH Royal Institute of Technology.
- Johnston, C. (1973). Women's cinema as counter-cinema. in *Notes on Women's Cinema* (pp. 24–31.) London: Society for Education in Film and Television.,
- Jung, J. J. (2012). Attribute selection-based recommendation framework for short-head user group: An empirical study by MovieLens and IMDB. *Expert Systems with Applications*, 39(4), 4049-4054.
- Keil, C., & Singer, B. (Eds.). (2019). *American cinema of the 1910s: themes and variations*. Rutgers University Press.
- Kenez, P. (1992). *Cinema and Soviet society, 1917-1953*. CUP Archive.
- Lehman, P. (2013). Crying Over the Melodramatic Penis: melodrama and male Nudity in Films of the 90s. In *masculinity: Bodies, movies, Culture* (pp. 25-42). Taylor and Francis.
- Lehman, P. (Ed.). (2001). *Masculinity: Bodies, movies, culture*. Psychology Press.

- Marks, L. (2000). *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses*. Durham and London: Duke University Press.
- McFadden, D., Talvitie, A., Cosslett, S., Hasan, I., Johnson, M., Reid, F., & Train, K. (1977). Demand model estimation and validation. *Urban Travel Demand Forecasting Project, Phase, 1*.
- Melville, P., Mooney, R. J., & Nagarajan, R. (2002). Content-boosted collaborative filtering for improved recommendations. *Aaai/iaai*, 23, 187-192.
- Modleski, T. (1988). A Father is Being Beaten: Male Feminism and the War Film. *Discourse*, 10(2), 62-77.
- Mulvey, L. (1975). Visual Pleasure and Narrative Cinema'. *Screen*, 16(3), 6-18.
- Mulvey, L. (1979). Feminism, film and the avant-garde. *Framework*, (9), 3.
- Naremore, J. (2008). *More than night: Film noir in its contexts*. Univ of California Press.
- Neale, S. (1993). Reflections on men and mainstream cinema'. *Screening the male: Exploring masculinities in Hollywood cinema*, 9.
- Nesting, A., & Elkington, T. G. (Eds.). (2005). *Transnational Cinema In a Global North: Nordic Cinema in Transition*. Detroit: Wayne State University Press
- Nowell-Smith, G. (Ed.). (1996). *The Oxford history of world cinema*. Oxford University Press.
- Oghina, A., Breuss, M., Tsagkias, M., & De Rijke, M. (2012, April). Predicting imdb movie ratings using social media. In *European conference on information retrieval* (pp. 503-507). Springer, Berlin, Heidelberg.
- Otterbacher, J. (2013). Gender, writing and ranking in review forums: a case study of the IMDb. *Knowledge and information systems*, 35(3), 645-664.
- Peberdy, D. (2011). *Masculinity and film performance: male angst in contemporary American cinema*. Springer.
- Penley, C. (Ed.). (2013). *Feminism and film theory*. Routledge.
- Powrie, P. (1997). *French Cinema in the 1980s: Nostalgia and the Crisis of Masculinity*. Oxford University Press.

- Quader, N., Gani, M. O., Chaki, D., & Ali, M. H. (2017, December). A machine learning approach to predict movie box-office success. In *2017 20th International Conference of Computer and Information Technology (ICCIT)* (pp. 1-7). IEEE.
- Ridanpää, J. (2014). 'Humour is Serious' as a Geopolitical Speech Act: IMDb Film Reviews of Sacha Baron Cohen's *The Dictator*. *Geopolitics*, 19(1), 140-160.
- Ruberto, L. E., & Wilson, K. M. (Eds.). (2007). *Italian Neorealism and Global Cinema*. Wayne State University Press.
- Salganik, M. J. (2019). *Bit by bit: Social research in the digital age*. Princeton University Press.
- Smelik, A. (2016). Feminist film theory. *The Wiley Blackwell encyclopedia of gender and sexuality studies*, 491-504.
- Tarr, C., & Rollet, B. (2001). *Cinema and the Second Sex: Women's Filmmaking in France in the 1980s and 1990s*. A&C Black.
- Tasker, Y. (1993a). Dumb movies for dumb people: Masculinity, the body, and the voice in contemporary action cinema. In Cohan, S., & Hark, I. R. (Eds.) *Screening the male: Exploring masculinities in the Hollywood cinema* (pp. 230-244). Routledge.
- Tasker, Y. (1993b). *Spectacular bodies: Gender, genre, and the action cinema*. Psychology Press.
- Thompson, K. M., & Yokota, F. (2004). Violence, sex, and profanity in films: correlation of movie ratings with content. *Medscape General Medicine*, 6(3).
- Turnock, J. (2014). The True Stars of Star Wars? Experimental Filmmakers in the 1970s and 1980s Special Effects Industry. *Film History: An International Journal*, 26(4), 120-145.
- Warde, A. (2015). The sociology of consumption: Its recent development. *Annual Review of Sociology*, 41, 117-134.
- Welzel, C. (2013). *Freedom rising*. Cambridge University Press.
- Wiegand, C. (2012). *French new wave*. Oldcastle Books.
- Yakaboski, T., & Donahoo, S. (2017). Titillation, murder, and romance: Hollywood's objectification of women college students. In *Anti-Intellectual Representations of American Colleges and Universities* (pp. 101-120). Palgrave Macmillan, New York.

Zakhlebin, I., & Horvát, E. Á. (2017, November). Network signatures of success: Emulating expert and crowd assessment in science, art, and technology. In *International Conference on Complex Networks and their Applications* (pp. 437-449). Springer, Cham.

Zhou, Y., & Yen, G. G. (2018, July). Evolving deep neural networks for movie box-office revenues prediction. In *2018 IEEE Congress on Evolutionary Computation (CEC)* (pp. 1-8). IEEE.

Tables and figures

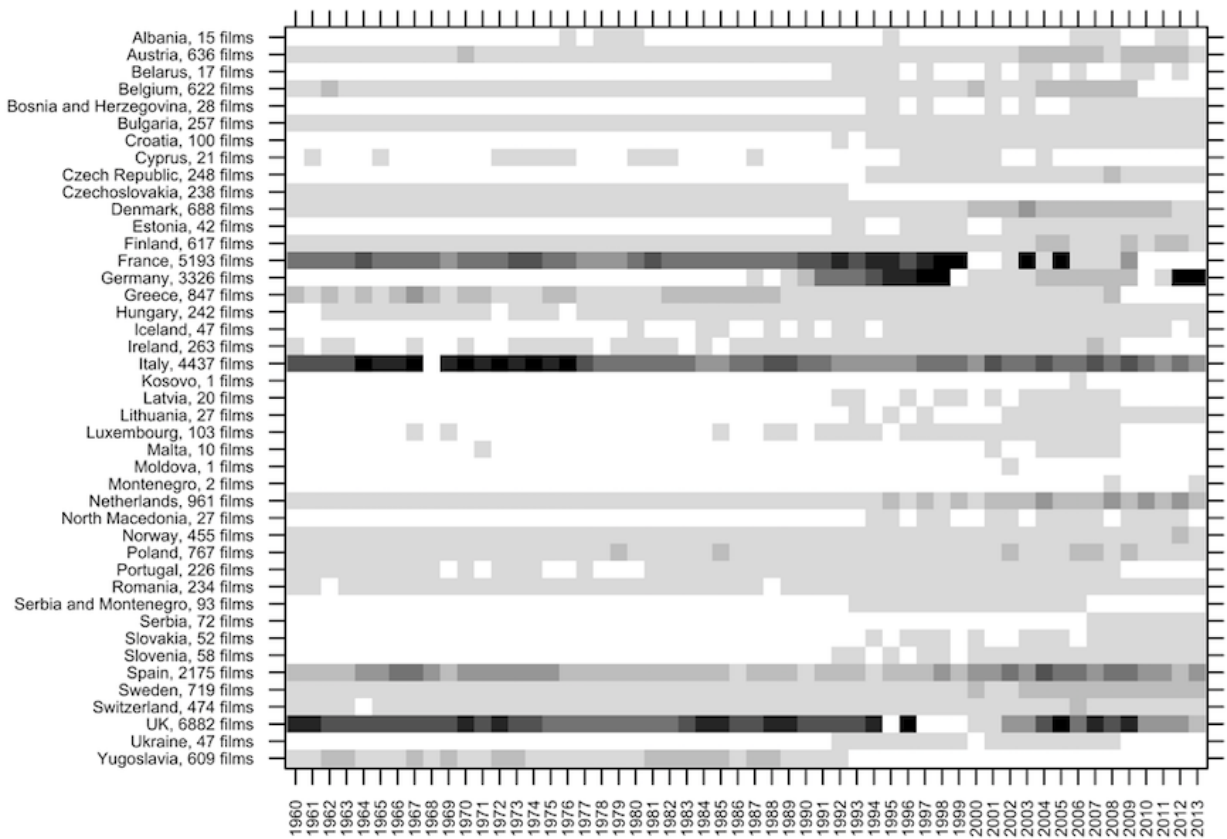


Fig. 1. Distribution of films across time and countries

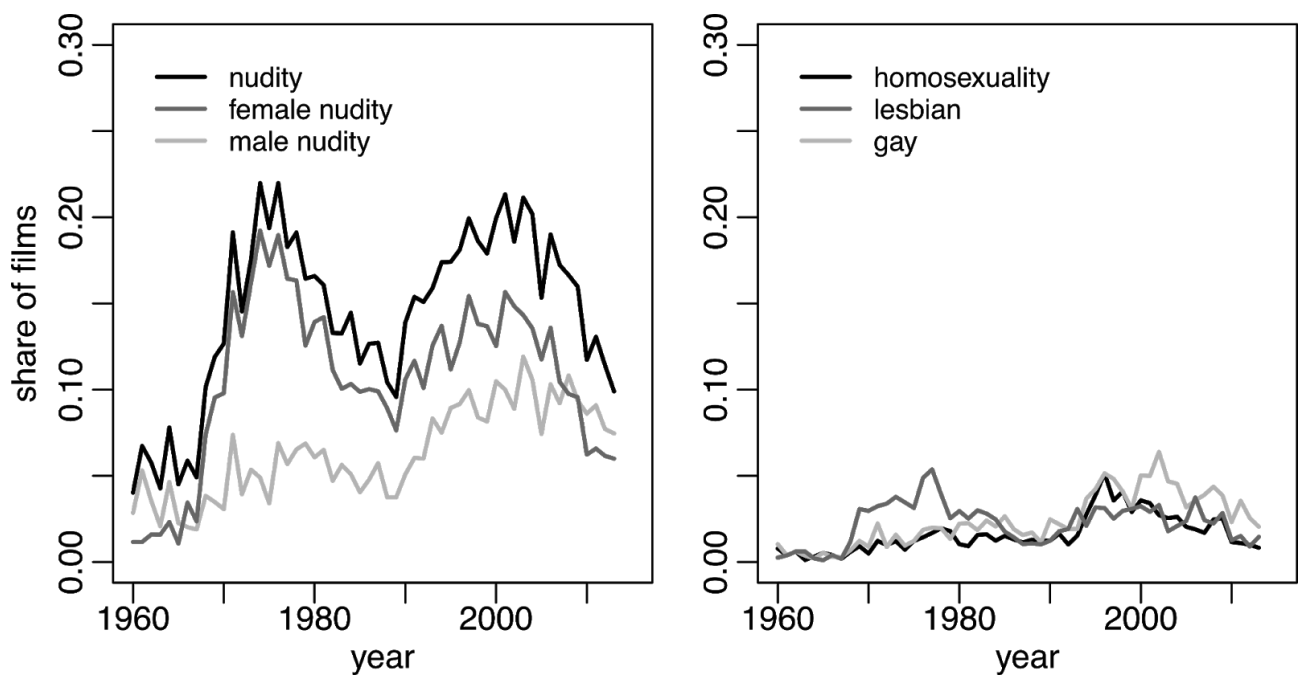


Fig. 2. Shares of films containing different types of nudity and the topics of homosexuality overtime.

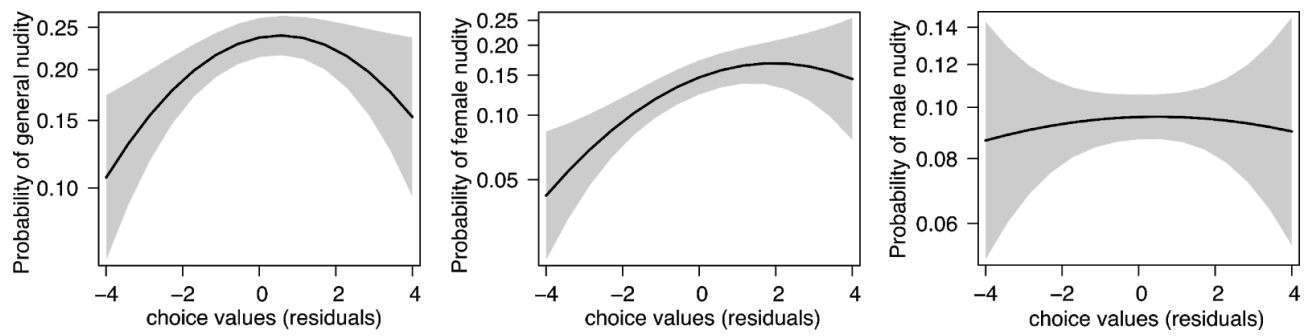


Fig. 3. Quadratic relationships between choice values and the probability of different types of nudity

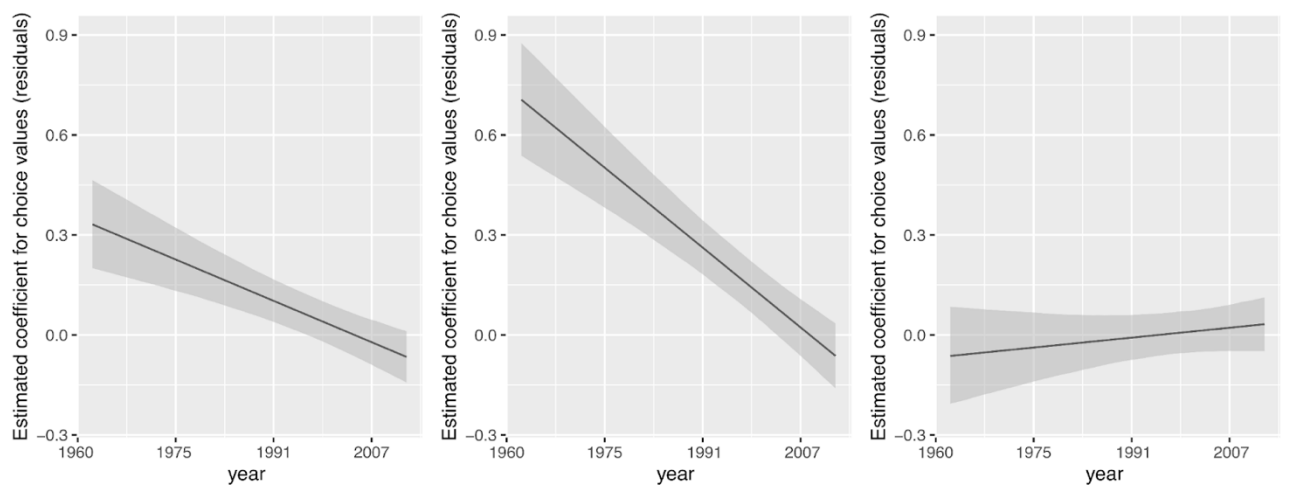


Fig. 4. Marginal effects of choice values over time

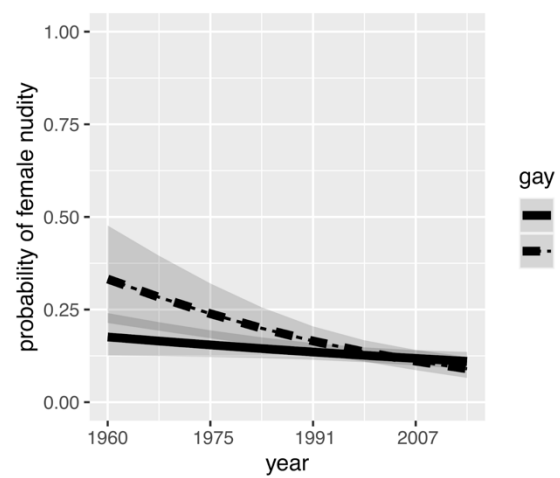


Fig 5. Marginal effects of keyword “gay” over time

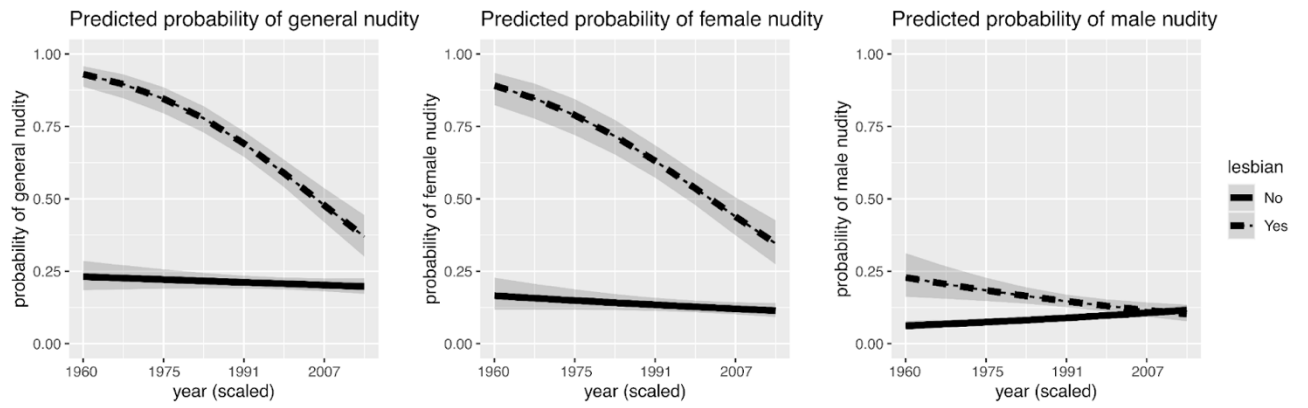


Fig 6. Marginal effects of keyword “lesbian” over time

Table 1. Summary statistics for films and country characteristics

	Mean (SD)	Median [Min, Max]
Choice Values residuals	0.00387 (0.0848)	0.0113 [-0.306, 0.302]
Real GDP per capita in 2011 US\$	25500 (11800)	25400 [1850, 81900]
Government censorship effort — Media	1.91 (1.24)	2.29 [-2.57, 3.30]
year	1990 (15.9)	2000 [1960, 2010]
number of keywords	27.7 (48.7)	8.00 [1.00, 444]
	present (%)	
USA	11.4	
general nudity (keyword)	25.7	
male nudity (keyword)	12.2	
female nudity (keyword)	18.2	
homosexual (keyword)	3.00	
gay (keyword)	4.67	
lesbian (keyword)	3.85	
N=31904		

Table 2. Probability of different types of nudity (multilevel binary logistic regression)

<i>Predictors</i>	General nudity				Female nudity				Male nudity			
	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>
(Intercept)	0.34 **	0.08	0.36 **	0.08	0.21 **	0.11	0.22 **	0.11	0.11 **	0.07	0.11 **	0.07
Year (scaled)	0.91	0.05	0.96	0.06	0.85	0.07	0.89	0.08	1.17 *	0.05	1.18 *	0.05
USA: yes	0.74 **	0.05	0.74 **	0.05	0.75 **	0.05	0.75 **	0.05	0.77 **	0.06	0.77 **	0.06
GDP (log)	1.14	0.07	1.09	0.07	1.22	0.09	1.17	0.09	1.08	0.07	1.08	0.07
Presence of keywords:												
homosexual	1.22	0.10	1.22	0.10	0.67 **	0.11	0.67 **	0.11	1.41 **	0.10	1.41 **	0.10
gay	2.02 **	0.08	2.02 **	0.08	1.11	0.09	1.11	0.09	3.21 **	0.08	3.21 **	0.08
lesbian	7.07 **	0.08	7.06 **	0.08	9.59 **	0.07	9.58 **	0.07	1.65 **	0.08	1.65 **	0.08
N of keywords	2.40 **	0.02	2.40 **	0.02	1.95 **	0.02	1.95 **	0.02	1.97 **	0.02	1.97 **	0.02
Censorship	0.84 **	0.03	0.84 **	0.03	0.80 **	0.04	0.80 **	0.04	0.94	0.03	0.94	0.03
Choice values res	1.05	0.03	1.05	0.03	1.18 **	0.04	1.18 **	0.04	1.01	0.03	1.01	0.03
Choice values res^2			0.95 *	0.02			0.96	0.02			0.99	0.02
Random Effects												
τ ₀₀ country.year:country	0.15		0.15		0.29		0.29		0.07		0.07	
τ ₀₀ country	0.09		0.08		0.22		0.21		0.03		0.03	
ICC	0.07		0.07		0.13		0.13		0.03		0.03	
Marginal R ² / Conditional R ²	0.257 / 0.309		0.259 / 0.308		0.194 / 0.303		0.195 / 0.302		0.188 / 0.213		0.189 / 0.213	

* $p < 0.01$ ** $p < 0.001$ N countries = 42; N country-year = 1355; N films = 31904

Table 3. Choice values and probability of different types of nudity over time (multilevel binary logistic regression)

<i>Predictors</i>	General nudity		Female nudity		Male nudity	
	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>
(Intercept)	0.33**	0.08	0.19**	0.10	0.11**	0.07
Year (scaled)	0.90	0.05	0.85	0.07	1.18*	0.05
Choice values res	1.11*	0.03	1.30**	0.04	0.99	0.04
Presence of keywords:						
homosexual	1.22	0.10	0.67**	0.11	1.41**	0.10
gay	2.02**	0.08	1.11	0.09	3.21**	0.08
lesbian	7.02**	0.08	9.52**	0.07	1.65**	0.08
USA: yes	0.74**	0.05	0.75**	0.05	0.78**	0.06
GDP (log)	1.13	0.07	1.18	0.09	1.08	0.07
N of keywords	2.40**	0.02	1.95**	0.02	1.97**	0.02
Censorship	0.85**	0.03	0.83**	0.04	0.94	0.03
Year * Choice values res	0.88**	0.03	0.79**	0.03	1.03	0.03
Random Effects						
τ ₀₀ country.year:country	0.14		0.25		0.07	
τ ₀₀ country	0.09		0.17		0.03	
ICC	0.06		0.11		0.03	
Marginal R ² / Conditional R ²	0.260 / 0.307		0.203 / 0.294		0.188 / 0.212	

* $p < 0.01$ ** $p < 0.001$

N countries = 42; N country-year = 1355; N films = 31904

Table 4. The presence of the keywords “homosexual”, “gay” and “lesbian” and the probability of different types of nudity over time (multilevel binary logistic regression)

<i>Predictors</i>	General nudity		Female nudity		Male nudity		General nudity		Female nudity		Male nudity		General nudity		Female nudity		Male nudity	
	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>	<i>O.R.</i>	<i>S.E.</i>
(Intercept)	0.34**	0.08	0.21**	0.11	0.11**	0.07	0.34**	0.08	0.21**	0.11	0.11**	0.07	0.33**	0.08	0.20**	0.11	0.11**	0.07
Year (scaled)	0.91	0.05	0.85	0.07	1.17*	0.05	0.91	0.05	0.86	0.07	1.18*	0.05	0.94	0.05	0.88	0.07	1.22**	0.05
Presence of keywords:																		
homosexual	1.21	0.10	0.72*	0.11	1.42*	0.11	1.23	0.10	0.66**	0.11	1.41**	0.10	1.22	0.10	0.67**	0.11	1.42**	0.10
gay	2.02**	0.08	1.12	0.09	3.21**	0.08	1.98**	0.09	1.26	0.09	3.26**	0.09	2.06**	0.08	1.14	0.09	3.27**	0.08
lesbian	7.07**	0.08	9.62**	0.07	1.65**	0.08	7.06**	0.08	9.67**	0.07	1.65**	0.08	8.33**	0.08	11.03**	0.08	1.76**	0.08
USA: yes	0.74**	0.05	0.75**	0.05	0.77**	0.06	0.74**	0.05	0.75**	0.05	0.78**	0.06	0.74**	0.05	0.75**	0.05	0.78**	0.06
GDP (log)	1.14	0.07	1.22	0.09	1.08	0.07	1.14	0.07	1.22	0.09	1.08	0.07	1.13	0.07	1.21	0.09	1.07	0.07
Choice values res	1.05	0.03	1.18**	0.04	1.01	0.03	1.05	0.03	1.18**	0.04	1.00	0.03	1.05	0.03	1.19**	0.04	1.01	0.03
N of keywords	2.40**	0.02	1.95**	0.02	1.97**	0.02	2.40**	0.02	1.95**	0.02	1.97**	0.02	2.39**	0.02	1.94**	0.02	1.97**	0.02
Censorship	0.84**	0.03	0.81**	0.04	0.94	0.03	0.84**	0.03	0.81**	0.04	0.94	0.03	0.85**	0.03	0.81**	0.04	0.94	0.03
Year * homosexual	1.04	0.11	0.76	0.12	0.99	0.11												
Year * gay							1.05	0.09	0.74*	0.09	0.97	0.09						
Year * lesbian													0.43**	0.10	0.52**	0.09	0.63**	0.09
Random Effects																		
τ_{00}																		
country.year:country	0.15		0.29		0.07		0.15		0.29		0.07		0.14		0.28		0.07	
τ_{00} country	0.09		0.22		0.03		0.09		0.22		0.03		0.09		0.22		0.03	
ICC	0.07		0.13		0.03		0.07		0.13		0.03		0.07		0.13		0.03	
Marginal R^2 / Conditional R^2	0.257 / 0.309		0.195 / 0.303		0.188 / 0.213		0.257 / 0.309		0.195 / 0.302		0.189 / 0.213		0.263 / 0.312		0.200 / 0.306		0.191 / 0.215	

* $p < 0.01$ ** $p < 0.001$

N countries = 42; N country-year = 1355; N films = 31904

Appendix

Keywords related to general nudity

accidental-nudity, accidentally-looking-at-naked-person, animated-nudity, bare-back, bare-butt, bare-hick, brief-nudity, brief-teenager-nudity, butt-naked, cartoon-nudity, casual-nudity, caught-naked, cgi-nudity, committing-suicide-while-naked, cooking-naked, dancing-naked, eating-naked, embarrassment-nudity, faux-nudity, full-frontal-nudity, graphic-nudity, gratuitous-nudity, half-naked, half-naked-waiter, hanging-upside-down-naked, hiding-in-pile-of-naked-corpses, horseriding-naked, imagining-someone-naked, innocent-people-murdered-naked, jump-into-river-naked, jumping-into-pool-naked, kissing-someone's-bare-butt, man-and-woman-naked-in-bed, naked, naked-apron, naked-balloon-dancers, naked-bathing, naked-body, naked-butt, naked-chef, naked-corpse, naked-couple, naked-dead-body, naked-gladiator, naked-housekeeping, naked-in-a-church, naked-in-public, naked-in-sauna, naked-in-the-snow, naked-killer, naked-model, naked-murderer, naked-news, naked-on-beach, naked-outdoors, naked-skiing, naked-soldier, naked-yoga, native-nudity, nudity, nudity-in-changing-room, nudity-in-front-of-a-minor, nudity-on-stage, opening-scene-nudity, outdoor-nudity, partial-nudity, partial-public-nudity, pouring-chocolate-over-naked-body, public-nudity, puppet-nudity, rear-male-nudity, rear-nudity, resting-one's-head-on-a-bare-butt, riding-motorcycle-naked, running-naked, running-out-of-river-naked, semi-nudity, social-nudity, stripped-naked, surprise-nudity, teen-rear-nudity, threadbare-coat, thrown-out-naked, tied-up-naked, unblurred-nudity, waking-up-naked

Keywords related to female nudity

bare-breasted-girl, bare-breasted-woman, bare-breasts, bare-butt-woman, brief-female-frontal-nudity, brief-female-full-frontal-nudity, brief-female-nudity, brief-topless-female-nudity, close-up-of-a-woman's-bare-butt, clothed-male-naked-female, clothed-man-talks-to-naked-woman, crone-nudity, eating-sushi-off-naked-woman, fake-female-frontal-nudity, female-explicit-nudity, female-frontal-nudity, female-full-back-nudity, female-full-frontal-nudity, female-full-rear-nudity, female-naked-in-front-of-a-minor, female-nudity, female-nudity-in-photograph, female-nudity-reflected-in-a-mirror, female-rear-nudity, full-frontal-female-nudity, girl-frontal-nudity, girl-rear-nudity, half-naked-female, man-and-woman-naked-in-bed, naked-dead-woman, naked-chick, naked-female, naked-female-corpse, naked-girl-poster, naked-woman, naked-woman-in-bed, naked-woman-in-coat, naked-woman-in-fur-coat, old-woman-nudity, partial-female-nudity, photographing-naked-woman, picturing-woman-naked, topless-female-nudity, underaged-female-nudity, woman-swimming-naked, woman-wakes-up-naked

Keywords related to male nudity

bare-butt-male, bare-chested-boy, bare-chested-male, bare-chested-male-bondage, bare-chested-male-fighting, bare-chested-male-in-gym-class, beating-naked-man, boy-frontal-nudity, boy-rear-nudity, brief-male-full-frontal-nudity, brief-male-nudity, clothed-female-naked-male, full-frontal-male-nudity, full-male-frontal-nudity, half-naked-man, male-explicit-nudity, male-frontal-nudity, male-full-back-nudity, male-full-frontal-nudity, male-nudity, male-partial-nudity, male-rear-nudity, man-and-woman-naked-in-bed, naked-dead-man, naked-fat-man, naked-male-butt, naked-male-corpse, naked-male-in-shower, naked-male-model, naked-man, naked-man-in-fur-coat, naked-man-murdered, partial-male-nudity, rear-male-nudity, woman-laughing-at-a-naked-man

Keywords related to homosexuality

african-american-lesbian, anti-gay, anti-gay-bigotry, anti-gay-celebrity-tv-reality-television-show, anti-gay-language, anti-gay-potion, anti-gay-us-candidate, anti-homosexual, arrested-for-homosexuality, asian-lesbian, atlanta-gay-pride, black-lesbian, character-asks-are-you-gay?, closet-lesbian-relationship, closeted-gay, closeted-gay-man, closeted-homosexual, closeted-lesbian, crypto-homosexual, death-of-gay-lover, death-of-lesbian-partner, degayification, dehomosexualization, denying-homosexuality, disabled-gay, elderly-lesbian, ex-gay, fake-gay, faking-homosexuality, fear-of-lesbianism, first-gay-kiss, first-gay-sexual-experience, first-lesbian-experience, forced-lesbian, forced-lesbianism, gay, gay-&-lesbian, gay-70s, gay-90s, gay-acceptance, gay-action, gay-action-hero, gay-activism, gay-activist, gay-activist-alliance, gay-actor, gay-adoption, gay-affair, gay-african-american, gay-alien, gay-allegory, gay-and-lesbian-alliance-against-defamation, gay-and-lesbian-community-center, gay-angst, gay-arab, gay-artist, gay-asian, gay-asylum-seeker, gay-athlete, gay-bait, gay-baptist, gay-bar, gay-bashing, gay-bathhouse, gay-baths, gay-beach, gay-bear, gay-benefactor, gay-best-friend, gay-biker, gay-black-man, gay-bookstore, gay-boy, gay-boyfriend, gay-brother, gay-bully, gay-candidate, gay-celebrity, gay-character, gay-chat-room, gay-chicken, gay-cinema, gay-club, gay-co-worker, gay-coach, gay-come-on, gay-community, gay-confidant, gay-congressman, gay-conversion, gay-cook, gay-cop, gay-couple, gay-cowboy, gay-cruise, gay-cruising, gay-crush, gay-culture, gay-dancer, gay-dating, gay-deceiver, gay-decorator, gay-designer, gay-detective, gay-disco, gay-doctor, gay-documentary, gay-elected-official, gay-erotic-art, gay-erotica, gay-escort, gay-ex-boyfriend, gay-ex-husband, gay-fantasy, gay-farmer, gay-fashion, gay-father, gay-film-festival, gay-flirting, gay-football-player, gay-for-pay, gay-friend, gay-friendly-church, gay-games, gay-gangster, gay-gene, gay-hairdresser, gay-hero, gay-history, gay-hitman, gay-hollywood, gay-holocaust, gay-homelessness, gay-hookup, gay-hotel, gay-humor, gay-husband, gay-hustler, gay-icon, gay-in, gay-incest, gay-innuendo, gay-intelligence-officer, gay-interest, gay-is-

good-slogan, gay-islam, gay-jew, gay-joke, gay-kid, gay-kiss, gay-latino, gay-lead-character, gay-lesson, gay-liberation, gay-liberation-front, gay-liberation-movement, gay-life, gay-lifestyle, gay-lingo, gay-love, gay-lover, gay-lovers, gay-mafia, gay-magazine, gay-male-prostitute, gay-male-straight-female-friendship, gay-man, gay-man-arrested, gay-man-has-sex-with-a-lesbian, gay-man-has-sex-with-a-woman, gay-man-impregnates-woman, gay-man-lesbian-woman-relationship, gay-man-marries-a-woman, gay-man-marries-lesbian, gay-man-marries-woman, gay-man-straight-man-friendship, gay-man-straight-man-relationship, gay-man-straight-woman, gay-man-straight-woman-relationship, gay-marriage, gay-marriage-proposal, gay-men, gay-men's-chorus, gay-men's-chorus-of-tucson, gay-men's-health-crisis, gay-men-of-color, gay-minister, gay-mormon, gay-mother, gay-murder, gay-musical, gay-muslim, gay-nazi, gay-neighbor, gay-nerd, gay-newspaper, gay-nightclub, gay-nineties, gay-online-cam, gay-or-bi?, gay-or-straight?, gay-oral-sex, gay-orgy, gay-paganism, gay-panic, gay-parade, gay-paramedic, gay-parent, gay-parenthood, gay-partnership, gay-party, gay-pastor, gay-personal-assistant, gay-photographer, gay-pickup, gay-pirate, gay-plumber, gay-poet, gay-policeman, gay-politician, gay-porn, gay-porn-actor, gay-porn-magazine, gay-porn-star, gay-porno-movie-theatre, gay-porno-theater, gay-pornography, gay-pornography-filmmaking, gay-pot-dealer, gay-power, gay-pride, gay-pride-flag, gay-pride-parade, gay-priest, gay-prisoner, gay-prom-date, gay-prostitution, gay-protest, gay-punk, gay-queen, gay-rabbi, gay-rape, gay-reference, gay-refugee, gay-relationship, gay-republican, gay-rights, gay-rodeo, gay-role-model, gay-romance, gay-roommate, gay-rooster, gay-sailor, gay-samurai, gay-schoolboy, gay-scientist, gay-secondary-character, gay-seduction, gay-self-loathing, gay-sensibility, gay-sex, gay-shame, gay-sibling, gay-slang, gay-slur, gay-soccer-player, gay-social-spot, gay-society, gay-soldier, gay-son, gay-spirituality, gay-spy, gay-stars, gay-stereotype, gay-straight-alliance, gay-straight-friendship, gay-straight-relations, gay-straight-relationship, gay-street-manchattan-new-york-city, gay-student, gay-subtext, gay-surfer, gay-taunting, gay-teacher, gay-teenager, gay-thriller, gay-twins, gay-uncle, gay-vampire, gay-villain, gay-virgin, gay-vote, gay-waiter, gay-wedding, gay-western, gay-witch-hunt, gay-women-of-color, gay-youth, gay-zombie, gayby-boom, gaydar, gays-in-the-military, graphic-lesbian-sex, hatred-against-gays, homosexual, homosexual-affair, homosexual-athlete, homosexual-blow-job, homosexual-boxer, homosexual-cinema, homosexual-cop, homosexual-couple, homosexual-demon, homosexual-dragon, homosexual-father, homosexual-fellatio, homosexual-friend, homosexual-history, homosexual-interest, homosexual-jock, homosexual-killer, homosexual-kiss, homosexual-love, homosexual-lover, homosexual-man-has-sex-with-woman, homosexual-overtone, homosexual-panic-defense, homosexual-policeman, homosexual-psychopath, homosexual-rape, homosexual-rape-by-monster, homosexual-seduction, homosexual-self-discovery, homosexual-sex, homosexual-sex-orgy, homosexual-sex-scene, homosexual-son, homosexual-

subtext, homosexual-taboo, homosexual-teacher, homosexual-teenager, homosexual-undertones, homosexual-villain, homosexual-youth, homosexuality, homosexuality-and-religion, homosexuality-and-the-bible, homosexuality-in-china, implied-lesbian-rape, interracial-lesbian-kiss, interracial-lesbian-sex, interracial-lesbianism, interracial-lesbians, interracial-gay-couple, interrupted-lesbian-sex, israeli-gay-lifestyle, jewish-lesbian, latent-homosexuality, latina-lesbian, lesbian, lesbian-69-sex-position, lesbian-70s, lesbian-action, lesbian-activism, lesbian-actress, lesbian-affair, lesbian-artist, lesbian-athlete, lesbian-attracted-to-straight-woman, lesbian-attraction, lesbian-aunt, lesbian-baby-shower, lesbian-bar, lesbian-biker, lesbian-brothel, lesbian-character, lesbian-child, lesbian-club, lesbian-commune, lesbian-conference, lesbian-cop, lesbian-couple, lesbian-couple-dancing, lesbian-coworker, lesbian-cruise, lesbian-crush, lesbian-culture, lesbian-cunnilingus, lesbian-dating, lesbian-daughter, lesbian-detective, lesbian-doctor, lesbian-drama, lesbian-engagement, lesbian-erotica, lesbian-ex-lover, lesbian-fantasy, lesbian-feminist, lesbian-fiance, lesbian-film-festival, lesbian-fingering, lesbian-flirting, lesbian-foursome, lesbian-friend, lesbian-gang, lesbian-ghost, lesbian-grandmother, lesbian-great-grandmother, lesbian-group, lesbian-has-sex-with-a-man, lesbian-has-sex-with-man, lesbian-having-sex-with-a-man, lesbian-history, lesbian-incest, lesbian-innuendo, lesbian-interest, lesbian-kiss, lesbian-lead-character, lesbian-love, lesbian-love-affair, lesbian-love-triangle, lesbian-lover, lesbian-maid, lesbian-makeup-artist, lesbian-marriage, lesbian-married-to-man, lesbian-marries-a-man, lesbian-meeting, lesbian-mother, lesbian-musical-senior, lesbian-nanny, lesbian-necrophilia, lesbian-nun, lesbian-nurse, lesbian-officer, lesbian-orgy, lesbian-parent, lesbian-parenthood, lesbian-parents, lesbian-penetrative-sex, lesbian-policewoman, lesbian-politics, lesbian-proposition, lesbian-prostitute, lesbian-rape, lesbian-relationship, lesbian-reverend, lesbian-rights, lesbian-robot, lesbian-romance, lesbian-roommate, lesbian-school-teacher, lesbian-seduction, lesbian-sex, lesbian-sex-scene, lesbian-sister, lesbian-slur, lesbian-stereotype, lesbian-strapon-sex, lesbian-student, lesbian-subtext, lesbian-sushi-group, lesbian-teen, lesbian-threesome, lesbian-touching-someone's-penis, lesbian-twins, lesbian-twins-incest, lesbian-undertone, lesbian-vampire, lesbian-villainess, lesbian-wedding, lesbian-wife, lesbian-zombie, lesbianism, lesbians-caught-in-bed, lesbians-dancing, lesbians-flirting, lesbians-wanting-child, lipstick-lesbian, male-homosexuality, man-in-love-with-a-lesbian, man-pretending-to-be-gay, married-gay-couple, married-lesbian-couple, miss-gay-contest, mistaken-for-a-lesbian, mistaken-for-being-gay, mistaken-for-gay, mistaken-for-lesbian, murder-of-a-lesbian, murder-of-lesbian-couple, muslim-gay-bar, new-york-gay-men's-chorus, one-man-gay-pride-parade, openly-gay, outdoor-lesbian-sex, parents-families-&-friends-of-lesbians-and-gays, posing-as-a-gay-couple, posing-as-homosexual, post-gay, pregnant-lesbian, pretend-gay-wedding, pretend-lesbian, pretending-to-be-a-lesbian, pretending-to-be-gay, rape-of-a-lesbian, reference-to-gay-rights, reference-to-gay-studies, reference-

to-gayle-king, reference-to-janet-gaynor, reference-to-the-gay-games, reference-to-the-gay-pride-movement, reformed-homosexual, repressed-homosexual, repressed-lesbian, reverse-cowgirl-lesbian-sex, stand-up-comedy-gay, straight-becomes-gay, straight-brother-gay-brother-relationship, straight-gay-male-kiss, straight-gay-romance, straight-pretending-to-be-gay, straight-woman-attracted-to-gay-man, suspected-homosexual, suspected-lesbian, suspected-of-being-gay, two-gay-fathers, underground-gay-club, watching-a-gay-porn-video, watching-gay-porn, watching-gay-porno-film

Contact details and disclaimer:

Violetta Korsunova

National Research University Higher School of Economics. Ronald F. Inglehart Laboratory for Comparative Social Research, Junior Research Fellow;

e-mail: vikorsunova@hse.ru

Olesya Volchenko

National Research University Higher School of Economics. Ronald F. Inglehart Laboratory for Comparative Social Research, Junior Research Fellow; Department of sociology, Senior Lecturer;

e-mail: ovolchenko@hse.ru

Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE.

© Korsunova, Volchenko, 2021