

Unpacking Discourses on Childbirth and Parenthood in Popular Social Media Platforms across China, Japan, and South Korea

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Abstract

Social media use is linked to low fertility desires. However, we know little about the discourses surrounding family formation that people consume online. We analyze 219,127 comments on 668 short videos related to fertility and parenthood from *Douyin* and *TikTok* in China, South Korea, and Japan, a region famous for its extremely low fertility level, to examine the topics and sentiment expressed. *BERTopic* model is used to assist thematic analysis, and a large language model *Qwen* is applied to label sentiment. We find that comments focus on *childrearing costs* in all countries, *utility of children*, particularly in Japan and South Korea, and *individualism*, primarily in China. Comments from *Douyin* exhibit the strongest anti-natalist sentiments, while the Japanese and Korean comments are more neutral. Short video stances and content creators' identity significantly influence the responses, alongside regional socioeconomic indicators, including GDP, urbanization, and population sex ratio. This work provides one of the first comprehensive analyses of online discourses on family formation via popular algorithm-fed video-sharing platforms in regions experiencing low fertility rates, making a valuable contribution to our understanding of the spread of a low-fertility discourse online.

Introduction

The widespread use of social media among young people, along with its capacity to disseminate gender and family values, has significant implications for the future population structure. *TikTok*, for example, being ranked as the 5th most popular social app globally in 2024, has 70.10% of its users between the ages of 18 and 34 (TikTok App Report 2025). Online discourses can affect people's everyday practices and have a significant influence on people's value formation (Papacharissi 2015; Perloff 2014; Wei, Xu, and Hui 2024). As global population trends are increasingly shaped by low fertility rates, scholars are beginning to explore the connection between fertility intentions and online activities. Many studies have indicated that social media use is linked to reduced fertility desire or fertility levels (Liu et al. 2021; Wildeman, Schrijner, and Smits 2023).

Despite the significant potential of social media in shaping norms and cultural expectations about family formation,

there are few analyses of the popular online discourse surrounding childbirth and parenthood. We know little about the fertility and family-related discourses that are disseminated on popular social media platforms. This lack of understanding about these online discourses significantly hinders our comprehension of the relationship between social media consumption, family ideals, and low fertility.

Low fertility rates have persisted over decades in East Asia. In 2022, the Total Fertility Rates (TFR), indicating the average number of children a woman would have during her lifetime, reached 1.23 in China, 1.26 in Japan, and 0.78 in South Korea. Understanding how the public perceives childbirth and parenthood is crucial for understanding this lowest-low fertility pattern. Taking Japan as an example, the government has been promoting pro-natalist policies like financial incentives and childcare support since the early 1990s. However, these measures had little impact on fertility level (Boling 1998). A similar lack of policy response is observed in China, with the relaxation of the one-child policy since 2013. These trends imply that this region appears to have adopted a low-fertility norm. This norm reflects a consensus about families with one or zero child, or even anti-natalist views (Fernández and Fogli 2009). Anti-natalism is a philosophical position that holds a negative view of procreation (Smyth 2020). In the book "*Better Never to Have Been*," philosopher David Benatar argues that bringing a child into the world inevitably subjects it to significant suffering, given the unsatisfactory state of the world (Benatar 2008).

In this paper, we examine content related to low fertility or multi-child families on popular social media platforms and how this content influences online discussions. We also explore how short videos may provoke different responses. The interactions between content creators and consumers, along with their socioeconomic context and online expressions, reveal how social media platforms influence specific information dissemination. This is a key theme of ICWSM. The specific research questions are:

RQ1: What topics do viewers discuss when watching childbirth or parenthood-related short videos?

RQ2: How do the short video contents influence the discussions about childbirth and parenthood?

RQ3: What regional-specific socioeconomic factors shape those discussions about childbirth and parenthood?

We analyzed over 200k online comments from 668 short

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videos about childbirth and parenthood in China, Japan, and South Korea from *Douyin* and *TikTok*. We used the *BERTopic* algorithm to assist topic analysis and the Large Language Model (LLM) *QWen* to label sentiments toward fertility. To understand how these discourses are shaped by various videos, we group the videos based on the account types and whether the content is pro- or against reproduction. To understand how these discourses are shaped by local socioeconomic context, we link the comments' geolocation to their local socioeconomic indicators, such as GDP, urbanization rates, sex ratio, etc., at a provincial level for China.

This study provides one of the first insights into how childbirth and parenthood are interpreted and perceived on popular social media platforms. This research contributes to understanding the impact of the Web in shaping perceptions and narratives around family formation in a region known for its lowest fertility rates globally. This study offers a new perspective on the lowest-low fertility.

Background and Theories

Low Fertility in East Asia

China, Japan, and South Korea are neighboring East Asian nations that have experienced rapid industrialization and modernization. This region is also deeply influenced by Confucian values, emphasizing social order and family hierarchy. Typical values include men's superiority, respect for authority, and a commitment to education (Sin 2012). Most urban families in China have only one child, while Japan and South Korea have some of the highest rates of childlessness in the world. Approximately three in ten women in Japan and one in four women in South Korea are permanently childless (Frejka, Jones, and Sardon 2010).

China The introduction of the one-child policy in 1979 was followed by a sharp reduction in birth rates (Settles et al. 2012). Despite the policy's relaxation to allow two children in 2016 and further to three children in 2021, fertility rates have continued to drop (Zhang et al. 2022). Elevated education levels and career aspirations, especially of women, are accompanied by delayed marriage, especially in urban areas with rising housing prices (Zhang and Zhao 2023; Zhang et al. 2026).

Japan Economic instability and high living costs have been regarded as one of the leading reasons behind the extremely low fertility (Allison 2014). This situation is exacerbated by the overtime working culture (Chandra 2012). Traditional gender roles also persist, with the majority of women leaving the labor market once married or having children (Brinton 2023).

South Korea South Korea's fertility rate has plummeted to one of the lowest in the world, driven by factors similar to those in China and Japan (Lee and Choi 2015). High costs associated with education, housing, along with intense academic competition, place substantial pressure on parents (Chin et al. 2014).

Interpreting Childbirth and Parenthood

We summarize key literature to form a five-dimensional framework (health, population structure, child-rearing cost, utility of family, and values) to explain family formation in East Asia, to guide our later analysis.

Childrearing Cost Parents are expected to provide good education, healthcare, and housing to nurture their children to become "useful" (Zhang, Qin, and Zhou 2020). Exorbitant living expenses and intense educational competition exacerbate the difficulty of meeting this expectation (Fisher 2019). Subjective economic pressures, such as feelings of financial scarcity and uncertainty, stem from a pessimistic view of the future (Zhou and Wang 2026). This sense of the undesirable future lays the foundation for having zero or one child.

Utility Having children in Confucianism can fulfill three main responsibilities: supporting parental old-age care, showing them respect, and continuing the family lineage (Tang 1995). Among these, continuing the family lineage is the most important. Moreover, elderly care still largely depends on adult children (Zhou, Kan, and He 2022). Beyond Confucianism family values, having children also fosters a sense of intimacy and provides emotional rewards, contributing to the well-being of parents (Nomaguchi and Milkie 2020). Therefore, the important functions that families play provide strong support for a pro-natalist view.

Values Family values in East Asia appear to blend individualistic and traditional beliefs, highlighting the importance of both personal development and responsibility for family continuity (Inglehart and Baker 2000). Confucianism asserts that "There are three unfilial acts, and having no descendants is the greatest," underscoring the deep-rooted conviction that having children is essential in a collective context (Tang 1995), and those who do not have children should be sanctioned.

However, rapid industrialization, urbanization, and economic growth have introduced a new set of values, such as individualism, self-realization, and personal autonomy. Young adults increasingly prioritize personal goals, including higher education, career advancement, and personal fulfillment, over the default life obligation of having children (Lesthaeghe 2011). In particular, gender roles at home remain traditional. Although women have made significant advances in education and workforce participation, they are expected to be the prime caregivers (Kan et al. 2022). The burden of balancing professional aspirations with domestic responsibilities discourages many women from marrying or having children (Ochiai 2011).

Population Structure An aging population is linked to labor shortages, which are key motivations for pro-natalist policies (Demeny 1986). A rapidly aging population places significant pressure on old-age spending. Low fertility has weakened intergenerational support structures. In East Asian societies that emphasize filial piety, the expectation to be cared for by adult children can impose a high level of anxiety due to low fertility (Lin and Yi 2013). Concerns related to a shrinking population, labor shortage, and elderly care

reflect a pro-natal sentiment, while support for greater independence in self-care or increased public assistance for elderly care indicates a supportive attitude towards low fertility.

Health Health and medical care are also related to childbirth. Anxiety and fears of childbirth are common among childbearing women. Concerns about labor pain and complications can lead to remaining childless, bolstering anti-reproduction sentiment (Dencker et al. 2019). In contrast, access to assisted reproductive technology (ART), such as in-vitro fertilization (IVF), enables infertile people to have children (Yao et al. 2023). Discussions related to ART should demonstrate a pro-natal sentiment.

Short Videos and Responses

Short video content has a huge impact on related discussions. The *S-O-R (Stimulus-Organism-Response)* framework is a classic psychological model to analyze how stimuli from the environment influence an individual's internal processes (organism) and lead to a specific response (Mehrabian 1974). In social media analysis, this model helps understand how various types of content (stimulus) affect users' thoughts, feelings, and behaviors (organism), ultimately resulting in their reactions (response) (Xu et al. 2021).

Content creators' identity is the prime stimulus. *social relation theory* suggests that the social distance between communicators and audiences affects the reception of information (Haridakis and Hanson 2009). Personal accounts, perceived as peer communicators with small social distance, enhance emotional resonance and information acceptance among audiences. In contrast, mainstream or official narratives often use grand rhetoric to promote reproductive policies. This increases the social distance between content creators and their audiences, which can lead to backlash and result in less positive support for pro-natalist policies.

Socioeconomic Context and Responses

Viewers respond to the same information differently based on their own experiences and considerations of childbearing. The cost of childbirth is a significant factor contributing to low fertility. **economic development**, usually represented by GDP, can lead to increased purchasing power, making the high costs associated with childbirth more manageable. **Urbanization** is linked to rising housing prices (Jeanty, Partridge, and Irwin 2010), which strongly correlate with declining marriage rates.

Values play a crucial role. *Modernization theory* and the *Second Demographic Transition Theory* suggest that the emergence of more individualistic values results in lower fertility rates and more diverse family structures (Lesthaeghe 2011). Research in Western societies indicates that fertility rates are generally higher in areas with more gender-equal social norms (Goldscheider, Bernhardt, and Lappegård 2015). It is uncertain whether this trend applies to East Asia. A distorted **male-to-female sex ratio** is a clear sign of sex selection at birth and reflects a high level of gender inequality (Das Gupta et al. 2003) and may lead to

women's negative attitudes towards childbearing (Kolpashnikova, Zhou, and Kan 2020).

Data

Data are from *Douyin* for Chinese comments and *TikTok* for Japanese and South Korean comments. Both are algorithm-led short-form video sharing platforms. *Douyin*, being China's leading short video platform, has over 1 billion registered users and more than 700 million daily active users (TikTok App Report 2025). *TikTok*, the global version of *Douyin*, was the most-downloaded app in 2024 and had 1.6 billion active users (TikTok App Report 2025). The average age of *Douyin* users is 28 years (60% female; 78% aged 18–35). *TikTok* Japan users have a mean age of 27 years, and 52% are females. *TikTok* South Korea is gender-balanced, with the users primarily of 18–24-year-olds and an average age of 25 years (TikTok App Report 2025).

Short videos usually have multiple hashtags to reflect their relevant topics for promotion. We located related short videos through hashtag keyword search. Specifically, we adopted a hashtag-snowball strategy to retrieve short videos, similar to one previous study (Wei et al. 2024). First, the corresponding author, an expert in family studies, selected 10 seed keywords in English (1. single, 2. low fertility, 3. childbearing pressure, 4. childless, 5. DINK, 6. young parents, 7. childbirths, 8. family prosperity, 9. big family, 10. family policy). We translated these keywords into the corresponding language and typed them into the platform search box, and the platform would display suggested terms reflecting trending hashtags related to the seed keywords. For example, if “single” or “childbirth” were entered, the platform's search system would automatically recommend tags like “no marriage” and “natural labor,” respectively. We added the most recommended tags to each seed keyword to reach a list of 20 high-frequency hashtag keywords per country (in Appendix Table 6). Including more hashtag words leads to inefficient searches because a single short video often has multiple hashtags. This means that adding more highly correlated hashtags can cause the same video to be crawled repeatedly. Ultimately, we crawled short videos tagged with any of these keywords and their corresponding comments. Using the same seed keywords and then adding more based on the platform-specific algorithms ensures comparable yet platform-specific videos across countries.

To collect corresponding comments, we modified the web crawler from the open-source tool *MediaCrawler*. We stopped comment collection once each country reached approximately 100,000 comments (10 hrs/day, 15 days for China and 19 days for Japan and Korea). This number is similar to but larger than the sample size used in the most recent social media content analysis studies (Plepi, Welch, and Flek 2024). We also noted that further crawling resulted in a growing proportion of duplicated comments and became less efficient.

Due to China's significantly larger user base compared to those in Japan and Korea, there is a much higher volume of comments per video in China. Therefore, the number of videos in China is relatively small. We compared the video characteristics of Japan and South Korea, which were

Steps	Data	CN	JP	KR	Total
I.					
Keyword Search	Video	126	2077	2648	4851
	Comment	137,861	226,073	233,171	597,105
II.					
Remove duplicated/ irrelevant videos	Video	114	317	246	677
	Comment	136,125	114,826	104,996	355,947
III.					
Remove duplicates/ punctuation/ emoticon/ @-only comments	Video	113	317	246	676
	Comment	95,533	112,777	79,791	288,101
IV.					
Remove off-topic word clusters after BERT	Video	105	317	246	668
	Comment	74,828	82,887	61,412	219,127

Table 1. Data processing steps

crawled over the same 15 days as those for China, along with the full 19 days of data (reported in Table 2 vs. Appendix Table 9). Video characteristics from the two crawling durations are highly similar.

The videos span from April 2019 to August 2024. Chinese comments posted before April 2022 were dropped because universal geotags is available since April 2022 (Zhou, Wei, and Liao 2024). We removed comments containing only punctuation marks, emojis, or @usernames, leaving 288,101 comments. Table 1 presents the step-by-step selection of videos and comments. In the end, we analyzed 219,127 comments from 668 videos (China = 74,828 (Apr 2022–Aug 2024); Japan = 82,887 (Apr 2019–Aug 2024); South Korea = 61,412 (Apr 2019–Aug 2024).

Methods

Short-video Classification

Three researchers, who can read and speak Chinese (Authors 1, 2, 4), Japanese (Author 2), and Korean (Author 4), reviewed videos and coded the four video characteristics. First, video account types include (i) individuals sharing personal views or experiences, (ii) bystanders commenting on others’ views or experiences, (iii) experts (government officers or family scholars), and (iv) official mainstream media. The stance toward childbirth of the specific video is further coded as pro-reproduction or anti-reproduction. One senior researcher randomly selected 10% of the videos from each country to verify the short video coding.

The main figure displayed in the short video is coded into their gender (main figure) and age group (young (approximately 18-30 years old), middle-aged (approximately 31-55 years old), old (approximately 56+ years old)); if the characteristics of the main figure cannot be identified, e.g., news reporting of a family policy, we use the voice-over to infer gender and age. This information is useful to answer RQ2, where we would like to understand how short video characteristics drive discussions.

Video Characteristics	CN	JP	SK
Anti-reproduction	61%	51.1%	41.9%
Pro-reproduction	39%	48.9%	58.1%
Gender-M	36.2%	34.7%	38.6%
Gender-F	63.8%	65.3%	61.4%
Age-Young	41.9%	44.8%	85.8%
Age-Middle	40.9%	51.1%	13%
Age-Old	17.2%	4.1%	1.2%
Personal Sharing	39%	60.2%	41%
Bystanders	37.2%	17.7%	38.2%
Experts	16.2%	15.8%	16.3%
Mainstream Media	7.6%	6.3%	4.5%
Total	105	317	246

Table 2. Distribution of short video characteristics.

Table 2 reports the distribution of these video characteristics. Anti-reproduction views are the most common in Chinese videos. Videos predominantly feature female figures or are created by female creators. Individuals featured in the videos are mostly young, especially in Korea. The majority of videos are shared by individual accounts sharing personal views or experiences, followed by those commenting on others’ experiences. In contrast, videos from experts and mainstream media represent a smaller share.

Topic Analysis

We used both inductive and deductive approaches to extract major themes from comments, following the *Grounded Theory* proposal (Corbin and Strauss 2014). This proposal organizes texts into hierarchical layers. In the first step, comments are grouped into word clusters, and these clusters are further synthesized into broader topic themes and eventually into theoretical dimensions, drawing on thematic analysis methods demonstrated by Boyd-Graber et al., and Baumer et al. (Baumer et al. 2017; Boyd-Graber et al. 2017). Keywords and comments were retained and analyzed in their original languages without translation for the analysis.

For the inductive step, we employed the *BERTopic* algorithm (Grootendorst 2022), a topic modeling technique that leverages the power of transformer-based embeddings to classify a large dataset of unstructured user comments into word clusters. This method is particularly effective for analyzing social media content (Egger and Yu 2022) and has been applied in recent studies (Wei et al. 2024; Jeong, Yoon, and Lee 2019). The algorithm was used to generate and visualize a topic distance matrix, where the distance between every pair of topics represents their relationships. We optimized the *BERTopic* model with TOPICTUNER, selecting the hyperparameters that best balanced thematic granularity against coverage: CN = 92/9, JP = 74/22, KR = 70/7). With these settings, *BERTopic* generated country-specific clusters and their top c -TF-IDF word representations. *BERTopic* analysis resulted in 245 clusters from the Chinese comments, 302 clusters from the Korean comments, and 291 clusters from the Japanese comments.

Because the number of word clusters is too high for easy comprehension, we reduce it to broader topic themes. We

Stages	CN	JP	KR
I. BERTopic output: number of Word Clusters	245	291	302
II. Removing irrelevant word clusters	219	196	220
III. Consolidate word clusters into Topic Themes	17	18	16
IV. Allocate topic themes into Theoretical Dimensions	5	5	5

Table 3. Inductive and deductive phases for topic analysis

merged the word clusters based on lexical synonyms, as in Stage III, Table 3. The hierarchical topic tree from the *BERTopic* outputs is used as a reference (Results folder, Author GitHub). For example, “Fear of Childbirth” and “Healthcare Support” are combined because their branches in the topic tree were linked. However, a single cut-off in this tree hierarchy still creates many fragmented topics. Therefore, using this hierarchical tree as a starting point, we moved backward to the root of this tree, guided by the five theoretical dimensions and their related themes from the literature discussed above and the supervision of a family scholar. Three coders then independently coded the word cluster and discussed discrepancies in further group meetings. The inter-coder agreement on average was $\kappa = 0.82$. This process follows the standard *Grounded Theory* proposal (Corbin and Strauss 2014). This refinement reduced the hundreds of word clusters to 17 topic themes for China, 18 for Japan, and 16 for South Korea, as shown in Table 3. Four researchers aligned these topic themes into English. The resulting 21 synthesized themes in English are presented in Figure 1.

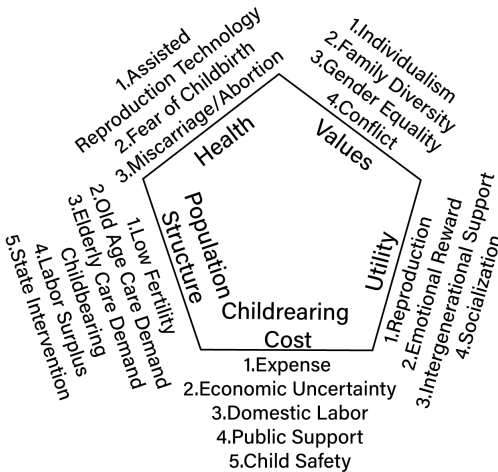


Figure 1: Topic themes and theoretical dimensions.

LLM Assisted Sentiment Analysis

We categorize each comment based on whether it expresses supportive, against, or neutral sentiments toward family formation. Many comments reflect a balanced, mixed view,

such as “*Many times I think that if I had children, I would be very happy, but even without them, I am currently very happy and content.*” This nuanced sentiment expression makes specified NLP models, such as the Roberta-base-cold model, less effective, and LLM can help (Gilardi, Alizadeh, and Kubli 2023; Wei et al. 2025). We used the open-sourced multilingual LLM *Tongyi Qianwen* or *QWen* (in English), which is developed by *Alibaba Cloud* and has an overall performance of its 72B model outperforms GPT-3.5 on 7 out of 10 tasks (Bai et al. 2023).

Prompt Testing Sentiment classification was performed on the original-language corpora. The prompts were iteratively refined (6 rounds) by gradually adding more examples. In each round, we evaluate the prompt performance by annotating 1,000 comments randomly selected from each country using LLM. The same 1,000 comments per language were manually coded. Using the prompt finalized in Round 6, *Qwen-turbo* achieved 88–93% alignment with human coders and macro-F1 scores within ± 0.03 for Chinese, Japanese, and Korean comments (Appendix Table 10), indicating comparable performance across the three corpora.

Experiment Setting Sentiment annotations are processed separately for two sets of comments. Specifically, the comment samples are divided into two groups: comments from short videos that express an anti-reproduction stance and comments from videos that express a pro-reproduction stance. We then annotated each set of comments using corresponding prompts. This setting aims to solve the issue that sentiment and stance are not always the same (Bestvater and Monroe 2023). For example, positive or supportive sentiments expressed under videos that convey anti-reproduction views should be coded as anti-natal, while the same sentiments under videos that convey pro-reproduction views should be coded as pro-natal. In the following discussion, we present the ‘pro-natal,’ ‘anti-natal,’ or ‘neutral’ stances as comment sentiments for easy interpretation.

After LLM annotated all comments, we randomly selected 1,000 comments from each country for human annotation and compared them with LLM results. 88% of the comments categorized by humans match the LLM categories. Appendix Table 11 reports the test results. Again, the performance was comparable across languages. Table 4 presents the sentiment analysis outcome. Chinese comments reveal the highest level of anti-natal sentiment, and those from Japan show the highest level of neutral sentiment. When discussing the sentiment analysis results, we dropped those with less than 1% unidentifiable sentiments.

	Anti-	Pro-	Neutral	Others	Total
CN	37,504 (50.12%)	14,952 (19.98%)	22,105 (29.54%)	267 (0.36%)	74,828
JP	24,892 (30.03%)	23,757 (28.66%)	34,021 (41.05%)	217 (0.26%)	82,887
KR	19,137 (31.16%)	20,190 (32.88%)	21,844 (35.57%)	241 (0.39%)	61,412

Table 4. Distribution of sentiment categories by country

Regression Analysis

Comments with annotated sentiment are used for regression analysis. We aim to predict the three sentiment types using multiple variables to examine whether one variable is associated with pro-natalist, anti-natalist, or neutral sentiment, when holding all other variables equal, aka, *ceteris paribus*.

We use a multivariate regression model (Chatfield 2018) and focus on whether sentiments vary based on (1) comment dimensions, (2) short video characteristics, and (3) local socioeconomic contexts, *ceteris paribus*. To predict the level of support for reproduction, we employed a *Multinomial logistic regression* (Agresti 2013) that is suitable for predicting a categorical variable. Our dependent variable is a three-level variable (against-reproduction, neutral, and pro-reproduction), without assuming an ordered structure. The model specification is set as follows:

$$\log\left(\frac{P(Y_i = k)}{P(Y_i = \text{Base})}\right) = \beta_{0k} + \sum_{j=1}^p \beta_{jk} X_{ji} + \epsilon_i \quad (1)$$

$P(Y_i = k)$ is the probability of comment i being assigned a sentiment category k . *Base* is the neutral sentiment. Therefore, $\ln\left(\frac{P(Y_i=k)}{P(Y_i=\text{Base})}\right)$ is the logged odds of the comment being classified into category k rather than ‘neutral.’ X_{ji} includes all the predictors, such as short-video characteristics or regional socioeconomic context (to be introduced in more detail in the Results section). ϵ_i is the random error term.

While an ordinal structure (anti-natalis < neutral < pro-natalist) might apply to this sentiment category, a likelihood-ratio test ($LR \chi^2(22) = 3832.66, p = 0.000$) rejected the proportional odds assumption of ordered logistic regression.

Results

Content Dimensions and Topic Themes

Figure 2 reports the distribution of the five dimensions in the comments. Over 57% of Chinese comments are about “Values,” while those in Japan and South Korea concentrate on “Utility of Childbirth.” “Child-rearing cost” is a common dimension in all countries. Figure 3 presents the word clouds featuring 21 themes from the word cluster grouping. The visualization is based on the words’ higher weighted log odds (Monroe, Colaresi, and Quinn 2008), which compares a word’s relative frequency in the target corpus to its frequency in all other comments—after a small Bayesian prior is applied—so that the words with the largest positive scores are those most distinctive of that corpus.

Childrearing Cost Dimension Child-rearing costs are the most common dimension among Korean comments. 5 topic themes are included: 1. “Expense,” 2. “Economic Uncertainty,” 3. “Domestic Labor,” 4. “Public Support,” and 5. “Child Safety”. In South Korea, “Expense” is the most common topic, with discussions mainly about the cost of raising children. Previous research shows that South Korea has some of the highest child-rearing costs in the world (Yeung 2024). In China, the topic “Economic Uncertainty” is the most common, with representative comments like “*Wages*

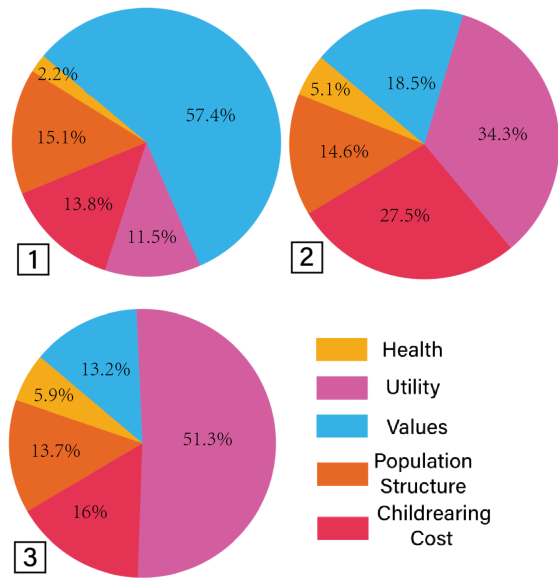


Figure 2: Distribution of theoretical dimensions in (1) China; (2) Japan; (3) South Korea.



Figure 3: Word cloud map of (1) 17 themes in Chinese Comments; (2) 18 themes in Japanese Comments; (3) 16 themes in South Korean Comments.

will not be increasing, so I don’t dare to have children” and “*I’m afraid of being laid off.*” In Japan, “*Domestic Labor*” is the most frequent topic, with conversations centered around women performing housework, such as “*I will be a housewife,*” “*Her muscles are strong; she does housework fast.*”, followed by concerns about expenses.

Utility Dimension Discussions about the important functions of having children are more common in Japan and South Korea. Four topic themes are connected to this dimension: 1. “Reproduction,” 2. “Emotional Reward,” 3. “Intergenerational Support,” 4. “Socialization.” In China and Japan, the topic “Reproduction” is the most common, with discussions focusing on having more children. Representative comments include “*I love children, just had my third.*” Comments like “*Continuing the family line.*” are more common in China. In Japan and South Korea, “Emotional Reward” is also one of the most common topics, with discussions like “*Such a cute child*” and “*I’m so happy to have such an adorable child.*”

Values Dimension This dimension has four topic themes: 1. “Individualism,” 2. “Family Diversity,” 3. “Gender Equality,” 4. “Conflict.” In China, “Individualism” is the most

common topic, typically focused on personal freedom and hedonistic reasoning. Comments often express individualistic viewpoints such as “Only by not having children can you enjoy life,” “No kids mean freedom,” and “Living her/his life well.” In Japan, “Gender Equality” is the most prevalent topic, with discussions often centered on gender roles, for example, “I don’t understand why childless men would criticize this. They should experience 10 months of natural childbirth or cesarean section before expressing a view.” In South Korea, “Conflict” is the most common topic, with discussions revolving around the tension between responsibility and the pressures of childbearing, such as “I am a mother of two children. The stress of raising them has made me depressed.” In China, expressions about the great pressure from their parents are more common.

Population Structure Dimension This theoretical dimension occupies a similar proportion across the three countries and consists of five topic themes: 1. “Low Fertility,” 2. “Elderly Care Demand,” 3. “Early Marriage and Childbearing,” 4. “Labor Surplus,” and 5. “State Intervention.” In China, the “Elderly Care Demand” is the most common theme, with its representative comments, such as “When I’m old, I’ll take care of myself” or “I’d rather enjoy now (not having kids) and face the bad consequences when older.” In Japan and South Korea, “State Intervention” is more prevalent. Representative comments in Japan include “raising taxes” and “government’s measures against low birth rates.” While in Korea, comments often mention “immigration to increase population” and “government policies.” Therefore, Chinese users expressed great concern for elderly care, while Japan and Korea emphasize government interventions to address the issue of a shrinking population.

Health Dimension The “health” dimension is the least mentioned and contains three topic themes: 1. Assisted Reproduction Technology, 2. Fear of Childbirth, and 3. Miscarriage/Abortion. In China and Japan, “Assisted Reproduction Technology” is the most common theme in this dimension. An illustrative Chinese comment noting that “Traditional Chinese medicine helped me have a child.” Japanese comments include phrases like “I had a child after continued treatment.” In Korea, “Fear of Childbirth” is the most common, with discussions focused on labor pain.

Sentiment Analysis Result

To simplify interpretation, the following discussions focus on anti-reproduction sentiment. Appendix Figure 7 C reports three sentiment categories. Figure 4 shows the geographical variations of the levels of anti-natal sentiment. 50.29% of the Chinese comments were categorized as “anti-natal.” In the Japanese sample, this proportion was 30.11%, and in the Korean sample, it was 31.28%. Within China, Qinghai (with a sparse population and a relatively higher level of ethnic minority groups, with Islam being the predominant religion) has the lowest anti-reproduction sentiment at 45.30%, followed by Tianjin at 47.80% and Chongqing at 48.13%. These two megacities are renowned for their high economic development and relaxed lifestyles. In contrast, the southwest region exhibits higher anti-reproduction sentiment. For

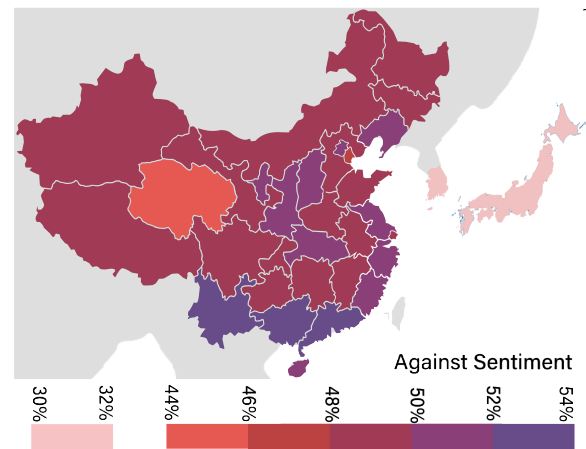


Figure 4: Levels of anti-natalist sentiment.

example, Guangxi and Yunnan provinces, with a relatively poor economic development level, show the strongest opposition to childbirth, with this sentiment at 52.52% and 52.47%, respectively.

Sentiment by Comment Content Figure 5 shows the distribution of anti-natal sentiment across theoretical dimensions. In China, the “Childrearing Costs” dimension generates the strongest anti-natalist comments, followed by comments related to “Values,” while the “Health” dimension generates the least anti-natalist comments. In Korea, significant opposition to childbirth is also observed in relation to child-rearing costs. In Japan, the highest level of anti-natal sentiment is observed in comments related to “Population Structure.” When comments pertain to the ‘Utility’ dimension, which focuses on the role of families, attitudes are the least anti-natalist in Japan and South Korea.

Sentiment by Video Characteristics Figure 6 plots the proportion of anti-natalist comments across the four content creator identities and two video stances towards reproduction. First, the proportion of anti-natalist comments is consistently higher under videos that express an anti-reproduction stance (indicated in blue). This difference is especially significant in South Korea, followed by Japan, and then China, underscoring the ability of these videos to align attitudes. It is interesting to note that Chinese users’ stances are less influenced by the opinions presented in short videos compared to users from Japan and Korea.

Considering the content creator’s identity, mainstream accounts receive the highest number of anti-natal comments in both China and Korea, regardless of their viewpoints. In Japan, however, if the mainstream media shows a pro-natalist attitude, the comments are much less likely to be anti-natal. Videos that share personal experiences related to childbirth or parenthood elicit the most polarized reactions, depending on the video’s stance. This highlights the strong emotional impact of personal stories.

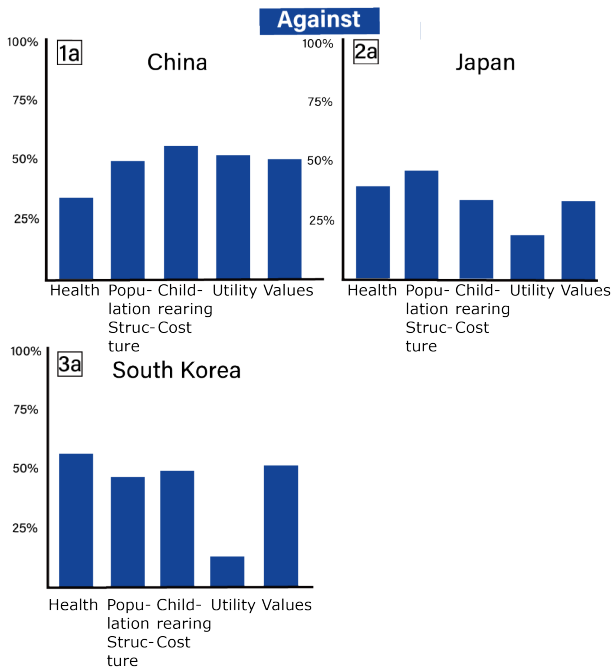


Figure 5: Anti-natalist sentiments by comment dimensions.

Regression Results

Multiple regressions are used to further examine whether the comment sentiment still varies across (1) the theoretical dimensions of the comment, (2) the short video characteristics, (3) selected local socioeconomic indicators (for the Chinese comments with geotags), after holding everything else the same. For the socioeconomic context where the comment comes from, we focus on economic development, urbanization, and gender equality levels. GDP per capita, representing the regional socioeconomic development level, is from China's 7th National Population Census. Urbanization level is the percentage of the population living in urban areas. We used the male-to-female population ratio to measure son preferences and female labor force participation rates to represent the economic cost of childbirth for women. Control variables are the provincial total fertility rate, Internet penetration rate, and the year of comment. Descriptive statistics (mean sentiment score, standard deviation, and sample size) of the variables are presented in Appendix Table 13. As the Japanese and South Korean datasets do not include IP location information, it was not possible to incorporate sub-national context variables in the models. Table 5 presents the estimated coefficients, highlighting the relationship between each variable and its predicted logged odds of the specific sentiment category vs. the neutral sentiment, *ceteris paribus*. The regression using the pooled country sample shows that compared to Chinese comments, Japanese and Korean comments are more likely to be neutral towards reproduction (Appendix Table 12).

Sentiment and Content Dimensions Compared to comments discussing “childbearing cost,” comments about

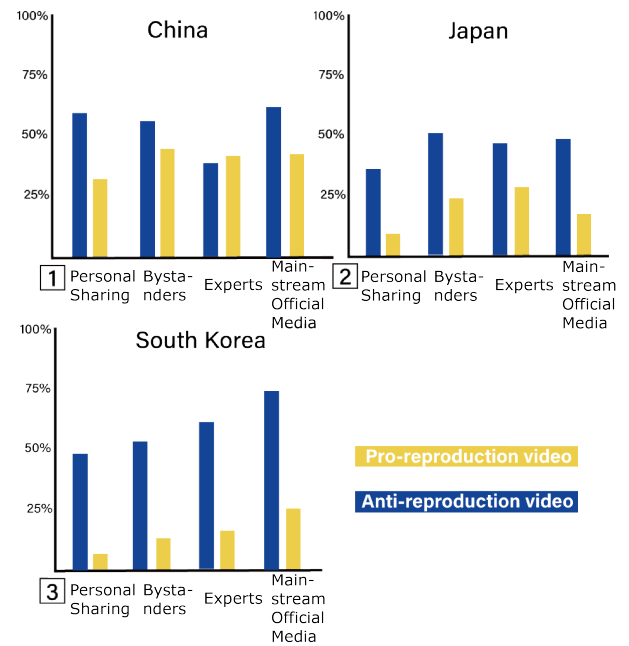


Figure 6: Anti-natalist sentiments by video characteristics.

“Health” are more likely to be pro-natal in China, more neutral in Korea, and less neutral in Japan. Compared to those discussing “childrearing costs,” Chinese comments discussing the “population structure” are much less likely to be anti-natal. Korean comments falling into this dimension tend to be more neutral, whereas Japanese comments are more anti-natal and less pro-natal vs. neutral. Comments about “Utility” express pro-natalist sentiment in all countries. Comments about “Values” are more likely to express neutral sentiments in China and Korea, but they tend to express more conflicting sentiments in Japan.

Sentiment and Video Characteristics Compared to comments under personal-sharing videos, comments on bystander videos in China are more anti-natalist or pro-natalist rather than neutral. In Japan and South Korea, bystander videos are more likely to provoke anti-natalist sentiments compared to neutral ones, and they are less likely to elicit pro-natalist sentiments. In all countries, mainstream media are more likely to provoke anti-natalist views compared to neutral views; however, in China, mainstream media are also more likely to generate pro-natalist views. Overall, the bystander and mainstream media in China seem to elicit more polarized comments; in Korea and Japan, they tend to provoke stronger anti-natal sentiment. In all countries, videos that express pro-natalist views are more likely to elicit pro-natalist sentiments and less likely to induce anti-natalist sentiments compared to neutral ones. Regarding the main figures featured in the short videos, those that include male figures are less likely to provoke either anti-natalist or pro-natalist comments in China, but they are more likely to induce anti-natalist comments in Korea and Japan.

Base: Neutral	China		Korea		Japan	
	Anti-natal	Pro-natal	Anti-natal	Pro-natal	Anti-natal	Pro-natal
Dimension: Health vs Childrearing Cost	-0.391*** (0.073)	0.513*** (0.074)	-0.364*** (0.049)	-0.193*** (0.058)	0.582*** (0.043)	1.254*** (0.045)
Dimension: Pop. Stru. vs Childrearing Cost	-0.317*** (0.034)	-0.024 (0.042)	-0.413*** (0.037)	-0.551*** (0.047)	0.257*** (0.026)	-0.536*** (0.038)
Dimension: Utility vs Childrearing Cost	-0.031 (0.038)	0.337*** (0.045)	-1.474*** (0.033)	0.174*** (0.036)	-0.276*** (0.024)	0.910*** (0.023)
Dimension: Values vs Childrearing Cost	-0.412*** (0.027)	-0.272*** (0.035)	-0.395*** (0.037)	-0.600*** (0.049)	0.211*** (0.026)	0.634*** (0.028)
Account: Bystanders vs Personal Sharing	0.124*** (0.022)	0.204*** (0.027)	0.273*** (0.032)	-0.317*** (0.025)	0.526*** (0.031)	-0.083** (0.036)
Account: Main Media vs Personal Sharing	0.246*** (0.046)	0.339*** (0.056)	0.889*** (0.038)	-0.164*** (0.040)	0.266*** (0.024)	-0.180*** (0.031)
Account: Experts vs Personal Sharing	-0.275*** (0.040)	0.002 (0.049)	0.482*** (0.059)	-0.249*** (0.064)	0.407*** (0.027)	-0.031 (0.034)
Video attitude: Pro- vs Anti-reproduction	-0.271*** (0.023)	1.170*** (0.027)	-1.504*** (0.026)	1.451*** (0.028)	-0.920*** (0.022)	1.360*** (0.021)
Video figure: Male vs Female	-0.158*** (0.027)	-0.530*** (0.032)	0.042* (0.024)	-0.100*** (0.022)	0.125*** (0.020)	-0.036 (0.023)
Video figure: Mid-age vs Youth	0.136*** (0.027)	0.224*** (0.033)	-0.031 (0.033)	-0.069 (0.042)	0.008 (0.020)	0.011 (0.019)
Video figure age: Old vs Youth	-0.076*** (0.029)	0.059* (0.035)	-0.372*** (0.129)	0.370*** (0.083)	0.270*** (0.035)	-0.047 (0.049)
Std. GDP per capita	0.048 (0.035)	0.109** (0.045)				
Urbanization Rate	-0.605* (0.314)	-0.732* (0.401)				
Sex Ratio	0.648* (0.349)	-0.314 (0.447)				
Female Labor Force Participation Rate	0.113 (0.237)	0.043 (0.301)				
Total Fertility Rate	-0.091* (0.051)	-0.018 (0.066)				
Internet Penetration %	0.312 (0.296)	0.445 (0.376)				
Constant	-0.220 (0.528)	-0.560 (0.674)	0.690*** (0.074)	-0.887*** (0.057)	-0.177*** (0.040)	-1.754*** (0.045)
Year Fixed Effect	Yes		Yes		Yes	
R2	0.0554		0.2169		0.1317	
N	72,595		61,171		82,670	

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

Table 5. Multinomial logistic regressions predicting the logged odds of ‘negative’ and ‘positive’ sentiment versus ‘neutral’ sentiment.

Sentiment and Regional Contexts Considering the local socioeconomic context, GDPP is positively correlated with pro-natalist sentiment ($\beta = 0.109^{**}$), implying that higher economic development reduces the financial pressures of childbearing, such as through higher incomes, a more prosperous labor market, and an overall optimistic outlook for the future. Urbanization rate is correlated with more neutral sentiment. The positive coefficient of the male-to-female sex ratio in predicting the logged odds of anti-natal vs. neutral sentiment ($\beta = 0.648^*$) suggests that as the number of males exceeds the number of females to a larger extent, comments become more anti-natal. Comments from regions with higher fertility levels tend to be less anti-natalist ($\beta = -0.091^*$). We conducted the same analysis using a pooled country sample with Japanese and Korean national statistics. The conclusions related to these regional contexts re-

main unchanged (Appendix Table 12).

Discussions

Fertility rates in East Asia continue to be among the lowest in the world. It is suspected that young people’s increased time spent online—particularly their exposure to digital content that emphasizes economic uncertainty and a pessimistic future—may contribute to their growing reluctance to form families. In this paper, we analyzed short videos and social media comments discussing low fertility, childbirth, and parenthood on popular platforms. We reported the main topics and embedded sentiments of these comments, how these sentiments were driven by various short video characteristics, as well as what regional context may shape these sentiments. These findings provide important insights into this online outlook about family formation and enhance our un-

derstanding of the relationship between digital technology and this extremely low fertility trend.

Online Discussion Topic Dimensions and Themes

Three dimensions—*Childrearing Costs*, *Utility of children*, and *Values*—dominate online discussions. Particularly in China and South Korea, comments center on high expenses related to housing and education, along with significant dissatisfaction with income. The perceived utility of children reveals pro-natal views, but their specific topics vary by culture: in China and Japan, children are essential for continuing the family line; in contrast, South Korea places more emphasis on the emotional rewards. “Values” occupy the central dimension in China with a strong emphasis on individual freedom, with 30% of the comments belonging to the individualism theme. Typical phrases include “*Only by not having children can you enjoy life.*” or “*Enjoy life.*” In Japan and South Korea, discussions concentrate on the conflict between traditional gender roles and women’s self-actualization.

Online Discussion Sentiments

In China, attitudes towards childbirth and parenthood are more polarized than those in Japan and Korea. The anti-reproduction sentiment is driven by economic concerns and individualism. Comments discussing “Utility of children” express more pro-natalist sentiments in all countries, but Chinese comments are less likely to focus on these topics. Japan and South Korea exhibit more balanced views, represented by a high level of comments with neutral sentiment.

Short Video and Response Sentiments The sentiment expressed in comments is also strongly influenced by video characteristics. Comment sentiments align closely with the attitudes expressed in short videos. Regression results show that compared to personal sharing, the bystander and mainstream media videos in China seem to elicit more conflicting sentiments. However, in Korea and Japan, they tend to provoke stronger anti-natal sentiment. This is likely due to perceived disconnects between official messages and viewers’ realities.

Regional Sentiment Dynamics Local socioeconomic conditions are closely associated with attitudes toward childbirth expressed online. Higher levels of economic development, as measured by GDP per capita, are generally linked to more pro-natalist sentiment. In contrast, economically less developed regions—such as China’s southwestern provinces—exhibit stronger anti-natalist discourse, where concerns about financial insecurity and economic pressure are particularly salient. Regions with a higher proportion of urban populations tend to express more neutral views on childbirth. Additionally, areas characterized by strong son preference show higher levels of anti-natalist sentiment. Comments from regions with relatively higher fertility levels are less likely to convey negative attitudes toward childbirth, underscoring the role of prevailing fertility norms. Overall, higher levels of human development are associated with more positive attitudes toward family formation.

Limitations and Future Work

Limitations are mainly related to the use of social media data. The data is drawn from users who actively post comments, which may not accurately represent the broader user base or the general population (Inara Rodis 2021). Individuals who express their views online are more likely to hold liberal and individualistic attitudes, which may bias our findings toward a more pessimistic portrayal of family formation and the backfire of the grand narratives led by the state. As a result, the analysis reflects only the opinions publicly articulated on these platforms and should not be generalized to the broader population in these countries. Nevertheless, this analysis remains important because it captures the online environment to which many individuals are increasingly exposed, and the circulation of such information may substantially influence public attitudes toward family formation. Second, we have no information about the commenters’ personal details, such as their gender and age. This limits our ability to analyze how gender and age dynamics influence the discourse. However, according to the *TikTok* business report, the majority of users are young and of prime child-bearing age. They are exactly the group of people of interest for this research. The third limitation is that the IP geolocation data on *Douyin* is limited to the provincial level within China. Considering the huge population size of each province, more nuanced regional differences that play a role in shaping public discourse might be overlooked. Finally, although the use of LLMs enables sentiment analysis at scale, LLMs may generate slightly different outputs across runs, which can pose challenges for replication. It is worth noting that similar variability also exists among human annotators. In our case, the LLM demonstrates good performance stability in terms of overall accuracy. Nevertheless, despite the generally high and comparable accuracy across the three languages, residual language-specific bias cannot be entirely ruled out.

Conclusions

Online discussions about family formation focus on child-rearing costs, the utility of children (mostly in Japan and Korea), and tensions between individualistic values and traditional family and gender norms. Notable country differences emerge, with comments from China reflecting the highest levels of anti-natalism and significant concerns about income and child-rearing costs. Views in Japan and South Korea are more neutral. Additionally, sentiment in comments is influenced by various short video characteristics, with video stance posing the strongest impact. Comments from areas with higher economic development, urbanization level, and gender equality also show more neutral or pro-natalist sentiments. These insights offer an important contribution to the field of social media analysis, particularly in understanding the formulation and spreading of views towards family formation on an algorithm-led video-sharing platform.

Ethical Statement

Data is from published online content. No user photos or videos are saved. User names are dropped and never

used. Regarding the provincial-level geo-location information, given that even the smallest province has at least one million people, it is unlikely that the universal disclosure of users' IP geo-location will enable user identification.

Acknowledgments

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Paper Checklist

1. Would answering this research question advance science without violating social contracts, such as violating privacy norms, perpetuating unfair profiling, exacerbating the socio-economic divide, or implying disrespect to societies or cultures? **Yes**.
 2. Do your main claims in the abstract and introduction accurately reflect the paper's contributions and scope? **Yes**
 3. Do you clarify how the proposed methodological approach is appropriate for the claims made? **Yes**, see the Methodology section.
 4. Do you clarify what are possible artifacts in the data used, given population-specific distributions? **Yes**, see the Limitations section.
 5. Did you describe the limitations of your work? **Yes**, see the Limitations section.
 6. Did you discuss any potential negative societal impacts of your work? **NA**.
 7. Did you discuss any potential misuse of your work? **Yes**, potential for misuse has been addressed in the Discussion section of our paper. We highlight that the findings are specific to the context of public comments on Douyin and caution against their inappropriate generalization.
 8. Did you describe steps taken to prevent or mitigate potential negative outcomes of the research, such as data and model documentation, data anonymization, responsible release, access control, and the reproducibility of findings? **Yes**, see our Ethical Statement.
1. Did you clearly state the assumptions underlying all theoretical results? **NA**
 2. Have you provided justifications for all theoretical results? **NA**
 3. Did you discuss competing hypotheses or theories that might challenge or complement your theoretical results? **NA**
 4. Have you considered alternative mechanisms or explanations that might account for the same outcomes observed in your study? **NA**
 5. Did you address potential biases or limitations in your theoretical framework? **Yes**, see the Limitations.
 6. Have you related your theoretical results to the existing literature in social science? **Yes**, see the Backgrounds and Theories.
 7. Did you discuss the implications of your theoretical results for policy, practice, or further research in the social science domain? **Yes**
1. Did you state the full set of assumptions of all theoretical results? **NA**
 2. Did you include complete proofs of all theoretical results? **NA**
1. Did you include the code, data, and instructions needed to reproduce the main experimental results (either in the supplemental material or as a URL)? **Yes**. The Author Github link is provided in the Acknowledgment section.
 2. Did you specify all the training details (e.g., data splits, hyperparameters, how they were chosen)? **Yes**.
 3. Did you include the total amount of compute and the type of resources used (e.g., type of GPUs, internal cluster, or cloud provider)? **Yes**, see the GitHub.
 4. Do you justify how the proposed evaluation is sufficient and appropriate to the claims made? **Yes**, the evaluation method's sufficiency and appropriateness are justified by comparing the sentiment analysis model's performance with other models.
 5. Do you discuss what is "the cost" of misclassification and fault (in)tolerance? **Yes**, the potential "cost" of misclassification in our study refers to the incorrect labeling of sentiments in the social media comments, which could lead to skewed interpretations of public opinion and potentially misinform policy-making or public understanding. To mitigate misclassification costs, we utilized stringent data pre-processing, cross-validation, and error analysis, as detailed in the Methodology section. The potential for misclassification and its impact are acknowledged in both the Methodology and Discussion sections, advocating for a nuanced interpretation of our findings.
1. If your work uses existing assets, did you cite the creators? **Yes**
 2. Did you mention the license of the assets? **NA**
 3. Did you include any new assets in the supplemental material or as a URL? **NA**
 4. Did you discuss whether and how consent was obtained from people whose data you're using/curating? **NA**
 5. Did you discuss whether the data you are using/curating contains personally identifiable information or offensive content? **Yes**, the potential presence of offensive content and measures taken for anonymization and ethical handling of the data are discussed.
 6. If you are curating or releasing new datasets, did you discuss how you intend to make your datasets FAIR? **NA**.
 7. If you are curating or releasing new datasets, did you create a Datasheet for the Dataset ? **NA**.
1. Did you include the full text of instructions given to participants and screenshots? **NA**
 2. Did you describe any potential participant risks, with mentions of Institutional Review Board (IRB) approvals? **NA**
 3. Did you include the estimated hourly wage paid to participants and the total amount spent on participant compensation? **NA**
 4. Did you discuss how data is stored, shared, and deidentified? **NA**

Appendix

Hashtag Keywords

China (Douyin)	Japan (TikTok)	South Korea (TikTok)
DINK	Single for Life	Childbirth Incentive Policies
Not Having Children	Single-Minded	Childbirth Subsidies
Not Getting Married and Not Having Children	Childless Couple	Childcare Support System
Non-Married	Childless Winners	Happy Parenting
No Children	Childless Losers	Overcome Low Birth Rates
Young People Don't Want to Have Children	Don't Want Children	Have a Child Early
Have a Child Early	No Children	High School Mums
Single Parents	No Children for Life	Multi-generational Families
Not Having Children to Enjoy Life	Having Children is Difficult	The Era of Ultra-low Birth Rates
Married and Sterile	Low Birthrate	Declining Birth Rate
Many Children, More Blessings	Measures to Combat the Low Birthrate	Childcare Stress
Family Prosperity	Support for Raising Children	Childcare Costs
Have More Children	Large Family	Parenting Hell
Have Both a Son and a Daughter	Large Family Mother	Solo Parenting
Have Children Early	Many Children	Decreased Willingness to Give Birth
Three Children	Many children, with Children Close in Age	Not Having Children
Childcare Costs	Want Children	Reasons for Not Having Children
Encourage Childbirth	Desired Number of Children	Dink Family
Childbirth Subsidy	Lovely Child	Single People
Single People	Happy Parenting	Non-Married

Table 6. 60 Hashtag Keywords sets by country

More Detailed Distribution of Topic Analysis Results

	CN	JP	SK
Health	1,675 (2.24%)	4,227 (5.10%)	3,619 (5.89%)
Population Structure	11,316 (15.12%)	12,214 (14.74%)	8,399 (13.68%)
Childrearing Cost	10,296 (13.76%)	22,390 (27.01%)	9,824 (16.00%)
Utility	8,613 (11.51%)	28,604 (34.51%)	31,487 (51.27%)
Values	42,928 (57.37%)	15,452 (18.64%)	8,083 (13.16%)
Total	74,828	82,887	61,412

Table 7. Distribution of the five dimensions by country.

Dimensions	Topic Themes	China	Japan	Korea
Childrearing		13.76	27.01	16.00
Cost	Child Safety	0.00	1.21	7.52
	Domestic Labor	1.08	8.87	0.00
	Economic Uncertainty	6.62	7.71	0.55
	Expense	5.87	3.26	7.93
	Public Support	0.20	5.95	0.00
Utility		11.51	34.51	51.27
	Emotional Support	5.09	12.33	35.21
	Intergenerational Support	2.99	2.18	0.00
	Reproduction Socialization	3.43	14.10	14.53
Values		0.00	5.90	1.53
		57.37	18.64	13.16
	Conflict	6.12	2.02	5.24
	Family Diversity	17.45	2.12	2.84
	Gender Equality	3.84	8.28	3.58
Population Structure	Individualism	29.97	6.22	1.51
		15.12	14.74	13.68
	Early Marriage and Childbearing	0.00	0.00	2.34
	Labor Surplus	1.89	0.00	0.00
	Low Fertility	2.29	3.41	0.74
Health	Old Age Care Demand	8.27	1.16	1.58
	State Intervention	2.68	10.17	9.02
		2.24	5.10	5.89
	Assisted Reproduction	1.36	3.18	0.00
	Fear of Childbirth	0.88	1.92	4.89
Total	Miscarriage	0.00	0.00	1.01
		100.00	100.00	100.00

Table 8. Distribution of topic themes by country

Short Videos and the Crawling Duration

We selected *TikTok* samples from Japan (JP) and South Korea (SK) that were crawled for the same 15-day duration as the China (CN) *Douyin* sample and prepared a distribution table below. As shown in Table 9, the characteristics of these reduced short video samples are consistent with those in the full sample in Table 2. Given the consistent video features across different crawling time durations, there is no evidence to suggest that the extended crawling of the JP and SK data with more short video numbers would bias the results.

Video Feature	JP	Total	SK	Total
Video stance- Anti-reproduction	53.5%	275	45%	200
Pro-reproduction	46.5%		55%	
Gender-M	35.6%	275	36%	200
Gender-F	64.4%		64%	
Age-Young	43.6%	275	85%	200
Age-Middle	51.6%		14%	
Age-Old	4.7%		1%	
Personal Sharing	58.9%	275	38.5%	200
Bystanders	6.5%		41.5%	
Experts	16.7%		15%	
Mainstream Media	17.8%		5%	

Table 9. Distribution of short video characteristics of the reduced JP and SK samples

Country	Sentiment	Manual labels	Tongyi Qwen	Accuracy
China	Anti-natal	569	518	80.8%
	Pro-natal	140	187	
	Neutral	291	295	
Japan	Anti-natal	296	303	92.9%
	Pro-natal	283	282	
	Neutral	421	415	
South Korea	Anti-natal	365	339	93.3%
	Pro-natal	271	298	
	Neutral	364	363	

Table 10. Trial sentiment distribution: same 1,000 comments, human vs. *Qwen* annotation.

Country	Sentiment	Manual Labels	Tongyi Qwen	Accuracy
China	Anti-natal	478	498	88.4%
	Pro-natal	203	210	
	Neutral	316	287	
	Unidentified	3	4	
Japan	Anti-natal	253	291	90.2%
	Pro-natal	296	291	
	Neutral	449	415	
	Unidentified	2	3	
South Korea	Anti-natal	334	331	97.7%
	Pro-natal	316	319	
	Neutral	345	345	
	Unidentified	5	5	

Table 11. 1,000 random samples from the full-scale LLM annotation for each country.

LLM Sentiment Annotation Performance

Illustrative Comment Quotations

BERTopic outputs provide word representation and the corresponding representative comment for each word cluster, based on c-TF-IDF weighting. Because one topic theme contains multiple word clusters, there are multiple representative comments. When illustrating the topic themes in the section titled "Content Dimensions and Topic Themes," we selected one of the representative comments from the *BERTopic* output.

Regression with Pooled Sample

	Pooled country data	
	Anti-natal	Pro-natal
Baseline Sentiment: Neutral		
Country: South Korea vs China	-0.904*** (0.111)	-0.685*** (0.137)
Country: Japan vs China	-0.882*** (0.129)	-0.632*** (0.163)
Dimension: Health vs Cost	-0.057 (0.059)	0.659*** (0.061)
Dimension: Population Structure vs Cost	-0.245*** (0.029)	-0.033 (0.037)
Dimension: Utility vs Cost	-0.184*** (0.030)	0.476*** (0.035)
Dimension: Values vs Cost	-0.359*** (0.024)	-0.154*** (0.031)
Account: Bystanders vs Personal Sharing	0.164*** (0.020)	0.114*** (0.025)
Account: Main Media vs Personal Sharing	0.332*** (0.033)	0.048 (0.042)
Account: Experts vs Personal Sharing	-0.163*** (0.032)	-0.130*** (0.039)
Video stance: Pro- vs Anti-reproduction	-0.430*** (0.019)	1.237*** (0.022)
Video figure gender: Male vs Female	-0.034 (0.021)	-0.404*** (0.026)
Video figure age: Middle-aged vs Youth	0.049** (0.022)	0.076*** (0.027)
Video figure age: Old vs Youth	0.010 (0.026)	-0.027 (0.031)
Std. GDP per capita	0.051 (0.035)	0.098** (0.045)
Urbanization Rate	-0.619** (0.313)	-0.631 (0.401)
Internet Penetration Rate	0.326 (0.296)	0.490 (0.376)
Sex Ratio	0.648* (0.348)	-0.421 (0.447)
Total Fertility Rate	-0.088* (0.051)	-0.012 (0.066)
Female Labor Force Participation Rate	0.086 (0.237)	0.051 (0.301)
Constant	0.555 (0.531)	-0.272 (0.677)
Year Fixed Effect		Yes
R2		0.0725
N		86,508

* p<0.1 ** p<0.05 *** p<0.01

Table 12. Multinomial logistic model predicting the logged odds of 'anti-natal' and 'pro-natal' sentiments vs. 'neutral' sentiment of the Pooled sample

We pooled comments from China, Japan, and South Korea. To prevent the results from being skewed by the large

number of comments from JP and SK that are not proportional to their population sizes vs. China, we randomly sampled comments from JP and SK to create a dataset with the number of comments that is proportional to each country's population size. Specifically, we used Guangdong Province, which has a population nearly equal to that of Japan, and Zhejiang Province, which has a population size similar to South Korea, as references to draw random samples from JP and SK. We also dropped five provinces with less than 1% of the comments. The final regression sample size was 86,508 for the pooled sample, holding the consistent proportions of video types, sub-themes, and sentiment scores as in the full sample. Table 12 shows that, compared to Chinese comments, Korean and Japanese comments are more likely to express a neutral sentiment. The conclusion related to the regional socioeconomic indicators remains the same as for the country-specific regression results.

	JP	SK	CN	Std.	Min	Max
Regional Context Variables						
Std. GDP per Capita 2021	3.436	2.819	-0.053	0.590	-0.873	1.619
Urbanization Rate 2021	0.920	0.810	0.665	0.093	0.511	0.893
Internet Penetration Rate 2022	0.830	0.980	0.764	0.051	0.647	0.898
Sex Ratio 2020	0.946	0.996	1.055	0.039	0.997	1.131
Total Fertility Rate 2020	1.300	0.800	1.275	0.277	0.740	2.119
Percentage of Comments						
<i>Theoretical Dimensions</i>						
Utility	34.48%	51.18%	11.53%	.	.	.
Childrearing Cost	27.03%	16.03%	13.81%	.	.	.
Values	18.65%	13.19%	57.40%	.	.	.
Pop. Structure	14.73%	13.69%	15.00%	.	.	.
Health	5.11%	5.90%	2.25%	.	.	.
<i>Account Types</i>						
Personal Sharing	57.57%	35.85%	48.28%	.	.	.
Main Media	19.98%	17.31%	5.29%	.	.	.
Experts	12.84%	4.25%	15.94%	.	.	.
Bystanders	9.61%	42.60%	30.49%	.	.	.
<i>Video Stances</i>						
Anti-reproduction	57.58%	43.48%	69.58%	.	.	.
Pro-reproduction	42.42%	56.52%	30.42%	.	.	.
<i>Video Figure Gender</i>						
Female	61.12%	58.81%	54.66%	.	.	.
Male	38.88%	41.19%	45.34%	.	.	.
<i>Video Figure Age</i>						
Youth	41.89%	87.20%	31.56%	.	.	.
Middle-aged	51.09%	11.41%	48.59%	.	.	.
Old	7.02%	1.39%	19.85%	.	.	.
<i>Comment Year</i>						
2021	8.02%	6.39%
2022	20.50%	14.61%	12.71%	.	.	.
2023	38.74%	27.14%	32.28%	.	.	.
2024	32.07%	51.87%	55.02%	.	.	.
Obs.	82,670	61,171	72,595			

Note 1: Because Japan and South Korea do not have sub-regions, they do not have standard deviations of the regional context variables.

Note 2: GDPP for Japan and South Korea are from the 2021 World Bank data in U.S. dollars

The exchange rate used for conversion is the average of the 2021 RMB/USD exchange rates.

Source 1: World Bank <https://datacatalog.worldbank.org/collections>.

Source 2: United Nations <https://data.un.org/>.

Table 13. Descriptive statistics by country.

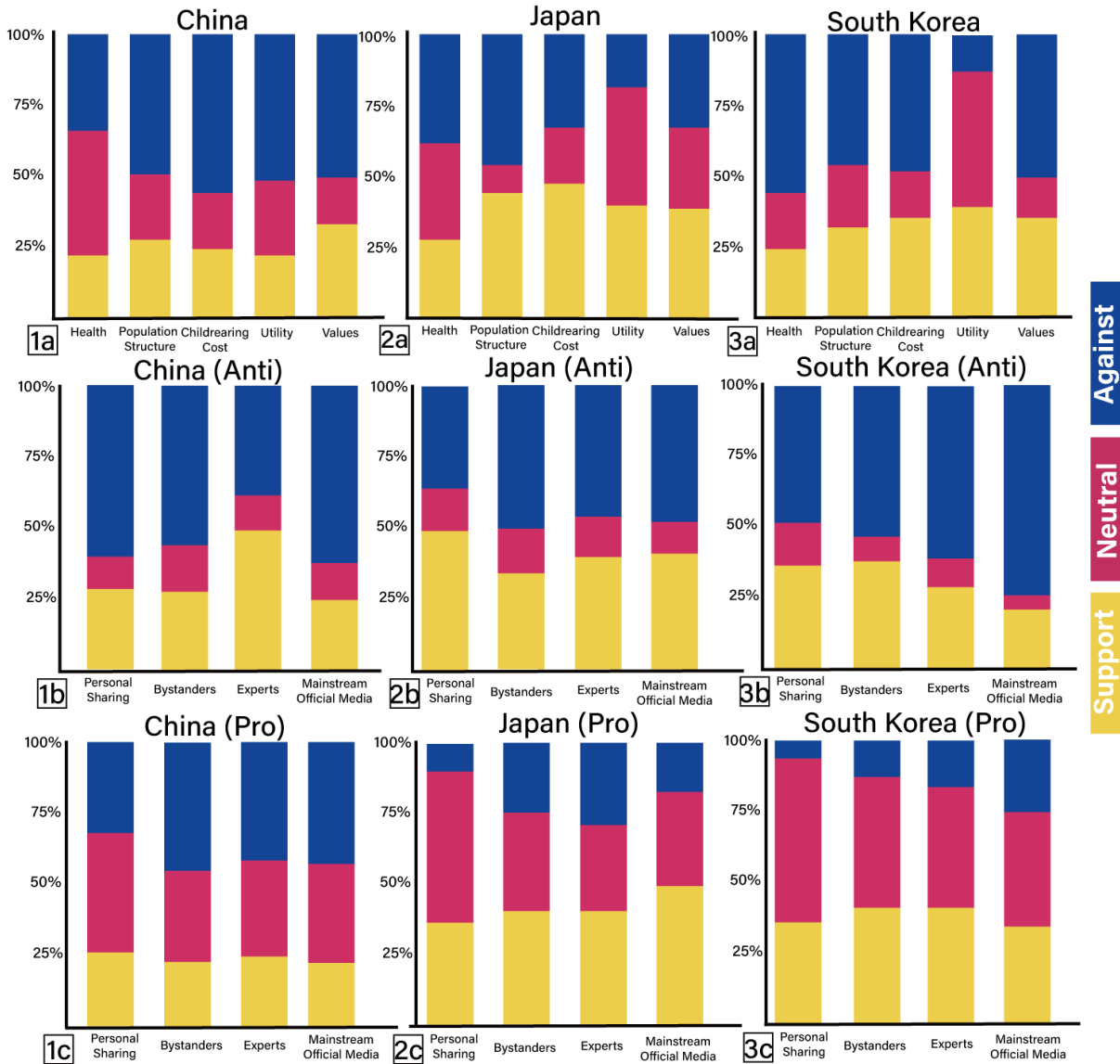


Figure 7: The distribution of sentiment categories across (1a)(2a)(3a) five dimensions, (1b)(2b)(3b) four video account types with an anti-reproduction stance, and (1c)(2c)(3c) four video account types with a pro-reproduction stance.