

FROM SOLIDARITY TO SURVIVAL: AN ANALYSIS OF THE TRANSITION OF SECURITY PERCEPTIONS IN THE KOREAN DIGITAL PUBLIC SPHERE DURING THE UKRAINE WAR USING KOBERT

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Abstract

This study examines how security perceptions in Korea's digital public sphere shifted in relation to the Ukraine war. Drawing on 101,900 items of portal news comments and YouTube news comments collected between 2022 and 2025, it applies sentiment-based discourse analysis using KoBERT. Rather than relying on a simple positive–negative split, the analysis classifies discourse into seven emotion categories and then consolidates them into security-relevant dimensions—threat perception, hostility, and humanitarian solidarity—to trace how emotional configurations evolve over time. The results indicate that Korea's security framing moved from an initially value-oriented stance centered on humanitarian solidarity, through a period of economic pragmatism as the war prolonged, and then shifted markedly toward an existential, survival-oriented mode following reports of North Korean troop deployments. This transition is captured by the Security Sentiment Transfer Index (SSTI) developed in this study, which rose from 0.85 in the outbreak phase to 4.80 during the deployment period. The pattern suggests that when external security crises become linked to domestically salient conditions, public interpretation tends to converge on survival concerns while normative evaluation recedes. Platform-level comparisons further show that SSTI values are consistently higher on YouTube than on portal news comments, with the largest divergence observed during the deployment period. This gap aligns with the role of visually driven content and recommendation dynamics in intensifying high-arousal emotions such as fear and anger. In addition, keyword-weight analysis identifies concrete terms—most notably "conscription" and "nuclear"—as salient triggers associated with the sharpest increases in SSTI, indicating that perceived proximity to personal safety and national vulnerability amplifies security sensitivity. Taken together, the findings underscore the importance of the emotional configuration of digital discourse as a factor in shifts in security perception. The study therefore argues that national crisis management may benefit from security communication strategies that address the public's perceived existential risk and micro-level anxieties, rather than treating security messaging as a one-way transmission of situational information.

Keywords

Ukraine War, Security Sentiment Transfer, KoBERT, Security Sentiment Transfer Index (SSTI), North Korean Deployment, Digital Public Sphere.



Resumo

Este estudo analisa como as percepções de segurança na esfera pública digital da Coreia se alteraram em relação à guerra na Ucrânia. Com base em 101 900 comentários de notícias em portais e no YouTube recolhidos entre 2022 e 2025, aplica uma análise do discurso baseada no sentimento utilizando o KoBERT. Em vez de se basear numa simples divisão entre positivo e negativo, a análise classifica o discurso em sete categorias emocionais e, em seguida, consolida-as em dimensões relevantes para a segurança — percepção de ameaça, hostilidade e solidariedade humanitária — para traçar a forma como as configurações emocionais evoluem ao longo do tempo. Os resultados indicam que o enquadramento de segurança da Coreia passou de uma postura inicialmente orientada para os valores, centrada na solidariedade humanitária, passando por um período de pragmatismo económico à medida que a guerra se prolongava, para depois se deslocar marcadamente para um modo existencial, orientado para a sobrevivência, na sequência de relatos sobre o destacamento de tropas norte-coreanas. Esta transição é captada pelo Índice de Transferência de Sentimento de Segurança (SSTI) desenvolvido neste estudo, que subiu de 0,85 na fase de eclodimento para 4,80 durante o período de mobilização. O padrão sugere que, quando as crises de segurança externas se ligam a condições internamente salientes, a interpretação pública tende a convergir para preocupações de sobrevivência, enquanto a avaliação normativa recua. As comparações ao nível das plataformas mostram ainda que os valores do SSTI são consistentemente mais elevados no YouTube do que nos comentários dos portais de notícias, com a maior divergência observada durante o período de mobilização. Esta diferença está em consonância com o papel do conteúdo visual e da dinâmica de recomendação na intensificação de emoções de alta excitação, como o medo e a raiva. Além disso, a análise de ponderação de palavras-chave identifica termos concretos — mais notavelmente «recrutamento» e «nuclear» — como gatilhos salientes associados aos aumentos mais acentuados no SSTI, indicando que a proximidade percebida com a segurança pessoal e a vulnerabilidade nacional amplifica a sensibilidade à segurança. Em conjunto, as conclusões sublinham a importância da configuração emocional do discurso digital como um fator nas mudanças na percepção de segurança. O estudo defende, portanto, que a gestão de crises nacionais pode beneficiar de estratégias de comunicação de segurança que abordem o risco existencial percebido pelo público e as ansiedades ao nível micro, em vez de tratar as mensagens de segurança como uma transmissão unidirecional de informação situacional.

Palavras-chave

Guerra na Ucrânia, Transferência de Sentimento de Segurança, KoBERT, Índice de Transferência de Sentimento de Segurança (SSTI), Desdobramento da Coreia do Norte, Esfera Pública Digital.

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Introduction

Digital media platforms such as YouTube and online news portals have become primary sources of information in contemporary daily life. Through these platforms, the public is routinely exposed to large volumes of information on international affairs and security issues. Even without direct experience of events, people form their own perceptions of conflict and violence through mediated images and texts. Social cognitive theory (Bandura, 2009, p. 96) describes this process as learning through indirect experience and suggests that media information can serve not only perceptual functions but also as a basis for concrete judgment.

The Ukraine war, which began in 2022, illustrates the influence of digital discourse in this regard. In the early stage of the war, public discussion in Korea tended to frame the conflict as a threat to the liberal order in Europe, accompanied by expressions of humanitarian solidarity. As the war prolonged, however, economic strain and fatigue gradually altered the tone of discussion. Reports in late 2024 concerning the deployment of North Korean troops to Russia constituted a turning point, leading many to reassess the war not as a distant conflict but as a material threat linked to security on the Korean Peninsula.

Such perceptual changes are often more visible in news comments and YouTube discussions than in survey results (Potter, 2014, p. 17). Reactions to the same news story frequently include a mixture of fear, anger, cynicism, and solidarity. These responses go beyond opinion expression and contribute to emotional frameworks through which war and security are understood. In this sense, digital discourse functions less as a passive reflection of information than as a space where uncertain international security environments are interpreted and given meaning in emotional terms.

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Previous sentiment analysis research has largely accumulated around short texts with relatively simple emotional structures, such as movie comments or product reviews. While these approaches have achieved technical progress, they face limitations in analyzing international conflicts where political context and emotion overlap, as in the Ukraine war often contain context-dependent expressions, and emotional direction may shift with narrative development and situational cues (Kim et al., 2022). When such materials are processed using short-text-oriented sentiment analysis methods, it becomes difficult to capture emotional flow and cumulative effects within discourse.

In this context, tracing changes in emotional framing with an advanced Korean pretrained model such as KoBERT provides a timely means of empirically examining how security perceptions in Korean society are reorganized. This study therefore seeks to track changes in emotional framing in the Korean digital public sphere from the outbreak of the Ukraine war in 2022 through 2025. Given the frequent overlap of emotional expressions in security discourse, it applies the logic of the sentiment combination model and the layered model proposed in prior studies and evaluates their analytical usefulness.

To this end, the study poses the following research questions:

Research Question 1. How do the relative weight and prevalence of humanitarian solidarity and security threat/hostility frames change across key phases of the Ukraine war (outbreak, stalemate, and deployment period), and how does the SSTI vary accordingly in the Korean digital public sphere?

Research Question 2. Between context-level and sentence-level analysis of news comments, which approach is more suitable for capturing the multi-layered emotional structure of security discourse while maintaining classification performance (accuracy and recall)?

Research Question 3. When the European security crisis intersects with the factor of North Korean troop deployment, how is Korean public interpretation restructured from value-oriented readings toward survival-oriented perceptions as reflected in the SSTI?

KoBERT, a model adapted from Google's BERT to better reflect Korean linguistic characteristics, is used as the main analytical tool. Whereas BERT was primarily trained on English-language corpora, KoBERT was pretrained on datasets that include Korean comments and colloquial expressions and has been evaluated as showing relatively stable performance in the analysis of unstructured Korean text (SKT Brain, 2019).

Rather than relying on a simple positive–negative dichotomy, the study reconstructs security discourse using seven discrete emotions, including anger, fear, and sadness. It combines post hoc integration of emotional categories with a dual-classifier approach and employs the AI Hub Korean emotion dataset for training. The collected portal news comments and YouTube news comments were preprocessed and used for model training and comparative performance evaluation.

Applying sentiment analysis to the broader context of international politics and security discourse, rather than limiting it to technical classification, constitutes a central academic contribution of this study. In particular, by treating the emotional structure of the digital public sphere as a meaningful variable in explaining changes in security perception, the



study draws attention to emotional dynamics that have received limited attention in prior research.

Theoretical Background

Reconfiguring the Digital Public Sphere and Security Discourse

In its traditional sense, the public sphere has been structured around institutionalized actors—such as the press, political parties, and civil society organizations—that produce and mediate discourse (Habermas, 1989, p. 36; Kim Sujeong, 2021, p. 42). Within this space, political issues have typically been filtered and refined through established norms and formats, and citizens' views have tended to be expressed through limited channels. The spread of digital platforms, however, has fundamentally altered the very threshold of entry into the public sphere (Papacharissi, 2010, p. 74). News comments, YouTube reactions, and social media posts now operate not as peripheral opinions but as core discursive arenas through which the substantive meaning of events is constituted (Chadwick, 2013, p. 119).

The defining character of the digital public sphere extends beyond accessibility. The rapid circulation of information and the accumulation of reactions accelerate the diffusion of controversy, and a notable feature of this process is that emotional and intuitive interpretations often take precedence over carefully developed argumentation. This tendency becomes more pronounced in domains such as foreign policy and security, where informational asymmetries are substantial and direct experience is limited. Before encountering official policy documents or expert assessments, people often first register and interpret events through platforms in a sensory and immediate manner. In this respect, the digital public sphere is not simply a tool for measuring public opinion; it is a dynamic site in which events are translated into social meaning.

News comments provide a useful empirical window into the structure of public perception. Comments do more than signal agreement or disagreement with journalistic narratives; they also present competing emotional frames—such as empathy, vigilance, and cynicism—through which events are to be read. This space is thus less a mere aggregation of individual views than a setting in which an affective atmosphere around a given issue is formed and amplified. Analyzing the digital public sphere, therefore, is closely connected to tracing the pathways through which social interpretations of events take shape.

Security issues, in turn, tend to connect with more fundamental perceptions of threat and survival. Once a given fact is named and received as a "threat," emotional involvement becomes difficult to avoid; fear expands uncertainty, while anger intensifies demands for attribution of responsibility and encourages preferences for hardline responses. By contrast, solidarity can strengthen moral legitimacy, and cynicism may translate into declining trust in policy more broadly (Marcus et al., 2000, p. 54; Mercer, 2010, p. 8). These emotions should not be treated simply as obstacles to rational judgment. Rather, they often play a central role as cognitive cues through which the public seeks to make sense of complex international conditions.



Moreover, emotions continue to shift as events unfold. War is not a single, discrete incident but a prolonged process, within which informational framing and the direction of threat perception are repeatedly reorganized (Kim Dohyeon, 2022, p. 91). The affective texture of security discourse can, through repetition and accumulation, harden into a dominant interpretive frame or turn toward a new one. The digital public sphere is precisely where such perceptual shifts tend to be registered most quickly and most sensitively.

Emotional Politics and Emotional Framing

The conventional assumption that political judgment is primarily the product of rational calculation has been repeatedly revised in recent political communication research. The perspective commonly referred to as emotional politics does not treat emotion as an irrational residue to be excluded; instead, it understands emotion as a core resource that shapes political perception and choice (Nussbaum, 2013, p. 23; Seo Bokgyeong, 2019, p. 18). When the public seeks to grasp distant and complex events—such as war or economic sanctions—emotion often functions as the point at which information processing begins.

In this study, an emotional frame refers to a structural pattern of affect that is repeatedly invoked in the interpretation of a particular event. It is not the result of mechanically summing sentiment scores from individual sentences. Rather, it is an analytical concept designed to capture which emotions become dominant in a given period, and how those emotions come to function as the central axis of interpretation.

In protracted crisis contexts such as war, emotional frames do not remain fixed. Shifts in international responses, the dynamics of domestic politics, or unexpected external shocks can repeatedly relocate the center of gravity of public sentiment. For this reason, identifying emotional frames requires more than a snapshot at a single point in time; it calls for a time-series perspective capable of tracing structural change as it unfolds. This is also why relational analysis is necessary—for example, examining how initially diffuse fear may come to combine with anger, and how such affective combinations may be translated into concrete political attitudes, including support for or opposition to policies.

Linking to European Security Change and Korean Digital Discourse

For Korean society, the Ukraine war was not merely a conflict in a distant region; it was an event that could be readily connected to the existing security landscape shaped by the North Korean nuclear threat, alliance structures, and great-power rivalry. When public emotion shifts from humanitarian concern grounded in moral sympathy for others to an existential perception of threat tied to national survival, a rapid structural reconfiguration of the emotional frame becomes possible. This study concentrates on empirically tracing when such affective thresholds emerge and through what contexts they become reinforced.



At the same time, the war made visible a major turning point in European security order—marked by the renewed emphasis on military power, the reconfiguration of alliances, and the recalibration of threat perception. The intense political and social debates that followed within Europe are not simply consumed in Korea as external developments. Rather, they operate as a decisive reference point that confronts Koreans with the strategic choices states must make under conditions of extreme war, and with the opportunity costs entailed by those choices, thereby prompting renewed consideration of the substantive weight of security.

Accordingly, European responses can be interpreted in connection with the possibility of contingency on the Korean Peninsula. Once policy changes in Europe become objects of contestation in Korea's digital public sphere, the war is transformed from international news into a standard of comparison. This transformation becomes more explicit when it is coupled with affective structure.

Discourse surrounding the Ukraine war contains both normative and realist interpretations at the same time (Barbieri et al., 2023, p. 318). On one side, international norms and value-based solidarity are emphasized; on the other, a strong view persists that state choices are ultimately determined by national security and interests. This tension recurs within Korea's digital public sphere as well. Some comments underscore the imperative of solidarity, while others adopt a cynical posture grounded in calculations of cost and risk.

When value frames and national-interest frames coexist, emotions do not move along a single line. Even in periods when solidarity and empathy are dominant, fear and anger can move to the foreground once an external shock occurs or a linkage to threat becomes more salient. It is in this sense that the present study accounts for these dynamics as a shift in emotional framing.

Trends in Digital Sentiment Analysis

Advances in natural language processing have led to the rapid expansion of sentiment analysis research on Korean texts. Unstructured materials—such as comments, reviews, and social media posts—can be collected at scale, and sentiment classification models offer the advantage of rendering such data analyzable in structured form. In particular, the emergence of pretrained language models has substantially improved sentiment classification performance in Korean and enabled a broad range of applied studies (Lee et al., 2023, p. 104225; Park Jungeun, 2022, p. 506).

At the same time, sentiment analysis research has repeatedly exposed a gap between technical performance and social-scientific interpretation. The question of how accurately a model classifies texts is not identical to the question of what those results mean socially. When addressing high-level political phenomena such as security discourse, it is therefore necessary to combine interpretive frameworks capable of making sense of sentiment outputs with a carefully designed unit of analysis.

Much of the relevant literature has focused primarily on refining classification accuracy or improving model architecture in engineering terms. The orientation of this study,



however, does not rest on competition over technical superiority as such. Its central concern is to determine what substantive explanatory leverage sentiment analysis can secure within research on international politics and security perceptions. For this purpose, the analysis closely examines (1) how sentiment classification strategies are refined and (2) how differences in the unit of analysis (sentence-level versus context-level) generate variation in the interpretation of results. Ultimately, the focus of this study lies not only in “how accurately the model classifies” but in what can be brought into view about the underlying contours of Korean society through the data.

Research Methodology

This study seeks to empirically examine how the global security shock of the Ukraine war has generated emotional waves in Korea’s digital public sphere and how these, in turn, have redirected public security perceptions. To this end, the study moves beyond the classification of sentiment at the level of individual sentences and adopts a pretrained language model-based emotional discourse analysis (PLM-based Emotional Discourse Analysis) framework that considers how structural shifts in affect reflect changes in security perception paradigms. As the primary analytical model, KoBERT—a Transformer-based model optimized for Korean unstructured data—was selected in order to maintain analytical efficiency and precision while avoiding the high computational costs typically associated with large language models (LLMs).

The central premise guiding this study is that public perceptions of war do not remain fixed but are continuously reconfigured in emotional terms in response to the development of events and external shocks. In the Korean context, the Ukraine war was initially received largely as a humanitarian tragedy affecting others. As the conflict persisted, and especially with the introduction of the variable of North Korean troop deployment, it reached a critical turning point at which it came to be reinterpreted as a tangible threat directly linked to national security (Eom, 2022, p. 174). This study conceptualizes this perceptual shift as a dynamic movement from a phase of solidarity grounded in universal values to a phase of survival rooted in existential threat perception.

To examine this empirically, the research process was organized into four stages. First, digital text data related to the Ukraine war were collected and refined. Second, a KoBERT-based sentiment classification model tailored to security discourse was constructed. Third, the SSTI was calculated to quantify changes in public security perceptions based on sentiment distributions. Fourth, the structure of emotional discourse was compared across different phases of the war to identify patterns of perceptual transition.

Data Collection and Preprocessing

The dataset consists of portal news comments and YouTube news comments related to the Ukraine war, collected between February 2022 and December 2025. These materials represent core data from the digital public sphere that capture spontaneous and informal public perceptions not easily observed through conventional surveys. The initial dataset



comprised 101,900 entries and subsequently underwent multi-stage cleaning to ensure analytical reliability.

To mitigate data imbalance across major phases of the war (Periods A–D), stratified sampling was applied. Comments unrelated to security issues—including partisan attacks, purely personal emotional expressions, advertisements, and spam—were removed through regular-expression-based filtering. This step was taken to prevent distortion of sentiment analysis results by political noise or meaningless text.

During text preprocessing, special characters were removed and normalization procedures were applied, followed by tokenization using KoBERT's SentencePiece tokenizer. SentencePiece-based subword tokenization is well suited to processing Korean particles, colloquial forms, and neologisms, making it appropriate for analyzing unstructured texts such as news comments and comments.

Security-Oriented Sentiment Classification Strategy

Rather than directly adopting emotional categories commonly used in sentiment analysis, this study attempts to reclassify emotions in ways that reflect the specific nature of security discourse. This approach rests on the assumption that emotions function not merely as individual feelings but within broader political and security-related meaning systems.

The first strategy follows a baseline sentiment classification that applies the seven emotional categories in the AI Hub dataset (neutral, anger, disgust, fear, joy, sadness, and surprise) to identify overall sentiment distributions. This serves as a reference point for subsequent analyses.

The second strategy, termed security-driven consolidation, restructures functionally similar emotions in light of their political implications within security perception research. Fear and surprise were grouped as threat perception, given their shared role as immediate responses to perceived external danger. Anger and disgust were integrated under hostility, as both express outward rejection toward specific actors. Sadness, reflecting moral sympathy toward civilian suffering and the tragedy of war, was reinterpreted as an indicator of humanitarian solidarity.

This consolidation of categories is not a technical adjustment aimed at improving classification accuracy. Rather, it represents an analytical decision intended to more clearly capture the broader directional tendencies of security perceptions underlying fragmented emotional data.

The third strategy, contextual weighting, addresses limitations arising from treating individual comments as isolated units. Instead of analyzing each comment independently, original comments and their subsequent replies were grouped into a single discursive unit. This design reflects the observation that perceptions of security threats are shaped not only by individual reactions but also through interaction and debate with others. It allows the analysis to trace how particular emotions circulate and intensify within the public sphere. In this sense, the digital public sphere is approached



not as a static collection of opinions but as a dynamic discursive space where emotions and perceptions interact and evolve.

Development of the SSTI

To directly link the distribution of emotions in the data to structural changes in public security perceptions, this study develops and introduces the SSTI. SSTI quantifies how public cognitive frames shift from a normative phase grounded in universal values and moral sympathy toward an existential phase prioritizing national survival and material risk in response to exogenous shocks such as the Ukraine war. In other words, the index is designed to measure when and to what extent the perception of an external tragedy becomes internalized as one's own security concern. The formula for calculating the index is as follows.

$$SSTI = \frac{E_{Threat} + E_{Hostility}}{E_{Solidarity}}$$

The numerator, consisting of E_{Threat} and $E_{Hostility}$, captures the degree to which the external conflict is internalized as an existential risk connected to security on the Korean Peninsula, along with emotional expressions of fear and hostility toward perceived threat actors. The denominator, $E_{Solidarity}$, represents the emotional weight of moral sympathy that views the conflict as the tragedy of others from a universal human rights perspective.

A distinctive feature of the index is that neutral and cynical responses are treated as background values and excluded from the calculation to highlight substantive attitudinal change. This allows shifts in emotional dominance between value-based and survival-oriented orientations to appear more clearly. An SSTI value exceeding 1 indicates a structural break in which threat perception outweighs moral solidarity. This point is interpreted as a threshold of domestication, where an external security shock is translated into a personal or national concern.

For analysis, the pretrained KoBERT model was fine-tuned on a security discourse-specific dataset. Model performance was evaluated primarily using accuracy and recall. In the context of security discourse, the ability to detect subtle threat signals—such as fear or anger—is crucial for analytical validity. Recall is particularly important as it indicates how effectively the model captures emotionally charged signals during crisis situations without omission. This provides a basis for considering how the findings may inform crisis management policy and security communication strategies.

Results and Discussion

This chapter reports the empirical findings from applying KoBERT-based sentiment analysis and the SSTI to 101,900 portal news comments and YouTube comments related to the Ukraine war.



Table 1. Validity of Periodization and Data Composition

| Period | Phase | Key Events and Rationale | Core Keywords | Data Volume |
|--------|-----------------------|--|--|-------------|
| A | Outbreak phase | Russian invasion (Feb 2022). Discourse centered on humanitarian support and condemnation. | #peace, #refugees, #condemnPutin | 28,532 |
| B | Stalemate phase | Frontline stagnation (from Jan 2023). Growing fatigue as the war became normalized. | #prolongation, #ceasefire talks, #exhaustion | 24,456 |
| C | Economic crisis phase | Intensified inflation (from Jan 2024). Expansion of cynical, national-interest-oriented discourse. | #price surge, #gas bills, #oil prices | 22,418 |
| D | Deployment phase | Reports of North Korean troop deployment (from Nov 2024). Heightened perception of security threats. | #NK deployment, #participation, #security crisis | 26,494 |

The overall study period was divided into four phases based on points at which major international developments appeared to coincide with psychological thresholds among the public and with shifts in the tone of discourse.

Changes in data composition and dominant keywords across periods indicate how Korean society moved from observing the Ukraine war as an external tragedy affecting others toward gradually internalizing it as a threat more directly linked to national security. In this sense, both the quantitative distribution of data and the qualitative evolution of keywords provide an empirical basis for examining how public interpretive frames were restructured across turning points.

The number of data points shows a gradual decline from Period A (28,532) to Period C (22,418). This pattern is consistent with the accumulation of public fatigue and reduced attentiveness as the war became a routine news item. However, in Period D (26,494), following reports of North Korean troop deployment, the data volume rose again. This rebound indicates that public discourse, which had entered a relatively subdued phase, was reactivated when the conflict became linked to security concerns on the Korean Peninsula. This can be understood as a form of emotional re-ignition in public attention.

Shifts in high-frequency keywords suggest a three-stage qualitative evolution in public interpretive frames.

Stage 1 (Period A: Normative Response)

Keywords grounded in universal values, such as #peace and #refugees, were prominent. The war was frequently approached from a moral perspective, often framed as a violation of international norms.

Stage 2 (Periods B–C: National-Interest Reframing)

As the war prolonged, keywords directly referencing economic burdens—such as #gas bills and #price surge—became more visible. This indicates an early phase of



domestication in which the war was increasingly interpreted not as others' suffering but in terms of personal or national cost.

Stage 3 (Period D: Security Internalization)

Terms closely tied to survival and national defense—such as #NK deployment and #security crisis—became dominant. In this phase, the war was no longer treated primarily as a comparative case but was reinterpreted as a direct and material threat to the peace regime on the Korean Peninsula.

The periodization adopted in this study is not merely chronological. It corresponds to points at which public psychological thresholds appear to have shifted. The transition from Period C to Period D aligns with a structural break in the SSTI proposed in this study. It captures a moment when external shocks were increasingly translated into a national security narrative and therefore provides a meaningful unit of analysis for examining perceptual change.

Taken together, the dataset of approximately 100,000 entries displays distinct emotional structures across periods. This supports the analytical claim that public perception moved from solidarity-oriented interpretations toward survival-oriented ones, and that the dataset is sufficient in both scale and content to examine this transition.

The period-based analysis further shows that public attention in Korea's digital sphere declined after the initial surge in Period A and dropped notably during the stalemate phase (B). At the same time, once economic strain became more visible in Period C, the tone of discourse began to shift from sympathy toward others to concern about one's own situation. Period D represents a particularly consequential turning point, as the war was increasingly redefined not simply as external information but as a matter connected to survival and security on the Korean Peninsula.

Quantifying the Transfer of Security Perceptions Using SSTI

Table 2. SSTI Values by Period and Structural Break Interpretation

| Period | Numerator $\frac{E_{\text{Threat}}}{E_{\text{Hostility}}}$ | Denominator $E_{\text{Solidarity}}$ | SSTI | Analytical Interpretation |
|--------|---|--|------|--|
| A | 29.1% | 34.2% | 0.85 | Value-oriented (solidarity outweighs threat perception) |
| B | 32.1% | 24.6% | 1.30 | Perceptual reversal (security concerns become more prominent) |
| C | 36.3% | 18.1% | 2.01 | Internalized anxiety (war repercussions viewed as affecting national interests) |
| D | 59.5% | 12.4% | 4.80 | Survival-oriented response (existential concern dominates discourse) |



The time-series pattern of the SSTI indicates that security perceptions in Korea's digital public sphere do not change in a purely linear manner but exhibit structural breaks associated with events. Here, the term "structural break" is used descriptively to indicate discontinuous shifts in SSTI values across periods, rather than formal econometric break tests.

First, during Period A (the outbreak phase), the SSTI recorded 0.85, the only value below 1.0 across all periods. This reflects a situation in which humanitarian $E_{\text{Solidarity}}$ (34.2%) exceeded security-related threat factors (29.1%). At this stage, public engagement with the Ukraine war was largely framed in terms of moral sympathy and humanitarian solidarity toward a foreign tragedy, while security concerns remained relatively observational.

Second, across Periods B (stalemate) and C (economic crisis), the index rose stepwise to 1.30 and 2.01, respectively. This pattern corresponds to a cognitive shift in which the focal point of discourse moved from values to national interests and material costs. The fact that the SSTI exceeded 2.0 in Period C suggests that the economic repercussions of the war—such as inflation and rising energy prices—had entered domestic discourse as tangible concerns. At this stage, the war began to be internalized not merely as an external event but as a potential threat linked to Korea's own security and economic conditions.

Third, in Period D (deployment phase), when reports of North Korean troop involvement intensified, the SSTI rose sharply to 4.80—approximately 2.4 times higher than in the preceding period. This represents a marked change relative to earlier phases. Humanitarian solidarity $E_{\text{Solidarity}}$ which forms the denominator of the index, declined to roughly one-third of its initial level (12.4%), while threat and hostility factors (59.5%) became the dominant emotional components in public discourse.

Taken together, the sharp rise in SSTI suggests that when external security shocks intersect with the concrete variable of North Korean involvement, public perception tends to move away from normative or moral evaluation toward a survival-oriented frame. This pattern is consistent with the interpretation that Korea's digital public sphere functions as a space where international developments are interpreted and amplified through the particular security context of the Korean Peninsula.

Across all periods, the YouTube-based public sphere recorded higher SSTI values than portal news comments, with the gap reaching its maximum (1.90) in Period D. This pattern is consistent with the interpretation that YouTube's recommendation system may cluster users around highly arousing emotions such as fear and anger, a dynamic often discussed in relation to echo chamber effects.

Whereas text-centered portals tend to host relatively more policy-oriented criticism or reasoned concern, YouTube's reliance on visual immediacy can make threats appear more concrete, potentially heightening perceptions of risk and contributing to higher SSTI values.

To identify linguistic triggers associated with SSTI escalation, keywords linked to fear responses were extracted and their influence examined.



Table 3. Comparison of SSTI Across Platforms and Gap Analysis

To examine how media characteristics shape the formation and diffusion of security-related discourse, SSTI values were compared across platforms.

| Period | Portal News Comments | YouTube News Comments | Gap | Platform-Specific Emotional Mechanism |
|--------|----------------------|-----------------------|-------|---|
| A | 0.75 | 0.95 | +0.20 | Visual footage of invasion on YouTube appears to stimulate fear at an earlier stage |
| B | 1.10 | 1.50 | +0.40 | Amplified exposure to negative information through YouTube algorithms |
| C | 1.80 | 2.22 | +0.42 | Circulation of sensational economic crisis narratives on YouTube |
| D | 3.85 | 5.75 | +1.90 | On-site deployment footage appears to function as a catalyst for SSTI escalation |

Table 4. Keyword Weight Analysis Driving SSTI Increases

| Rank | Core Keyword | Weight (Standardized coefficient) | Interpretation Based on Observed Usage |
|------|--------------------------------------|-----------------------------------|---|
| 1 | Nuclear weapons / nuclear technology | 0.92 | Existential fear that deployment could accelerate nuclear advancement |
| 2 | Conscription / draft | 0.85 | Anxiety framed through family and military service concerns |
| 3 | World War III | 0.78 | Framing escalation as a global historical crisis |
| 4 | Russia–North Korea alliance | 0.71 | Hostility tied to perceived disruption of the security order |

The weighting analysis indicates that SSTI reacts more strongly to keywords linked to bodily safety (conscription) and catastrophic threat (nuclear risk) than to abstract geopolitical dynamics. This suggests that security discourse becomes more influential when threats are perceived as emotionally proximate.

The findings are consistent with the view that public communication on security issues may resonate differently depending on how directly messages address perceived risks to personal safety and survival.

**Table 5.** Velocity of SSTI Transfer

| Event | SSTI Before | SSTI After | Change | Time to Threshold and Characteristics |
|-------------------------------------|-------------|------------|--------|--|
| Energy price surge (C) | 1.45 | 2.01 | +0.56 | Approx. 3 months (economic strain gradually linked to security concerns) |
| North Korean deployment reports (D) | 2.01 | 4.80 | +2.79 | Within 48 hours (rapid surge associated with heightened alarm) |

Security sensitivity was assessed by measuring how rapidly SSTI values crossed critical thresholds following major events.

Economic threats in Period C were associated with gradual SSTI increases, whereas reports of direct military involvement by North Korea in Period D coincided with a sharp rise over a short time span. This pattern aligns with the interpretation that references to North Korea carry salience in the Korean context and can quickly reframe public perception toward security concerns.

Taken together, the findings suggest that Korea's digital public sphere underwent a process of domestication in its interpretation of the Ukraine war. What initially appeared as a distant conflict gradually became framed in relation to Korea's own security context.

By the later stage (Period D), the SSTI reached 4.80, indicating a marked shift in the emotional structure of discourse. This shift illustrates how moral or humanitarian frames can weaken when threats are perceived as personal or nationally relevant.

The results point to the importance of considering the emotional dynamics of digital discourse in national crisis management and risk communication.

Conclusion

The central finding of this analysis concerns how the external shock of the Ukraine war reshaped public security perceptions within Korea's digital public sphere. Tracing the discursive landscape from 2022 to 2025 shows that public sentiment moved from a phase of humanitarian solidarity grounded in universal values toward a phase in which existential concerns about survival became more salient.

This shift provides empirical support for the view that public security perceptions are influenced less by purely logical reasoning than by emotional thresholds. Normative discourses that dominated the early stage of the war gradually declined as the conflict prolonged and economic fatigue accumulated. When the direct variable of North Korean troop deployment entered discourse, public responses increasingly reflected survival-oriented interpretations rather than extended deliberation. This pattern is consistent with the interpretation that Korea's digital public sphere functions as a sensitive arena where international developments are interpreted and amplified through the particular security context of the Korean Peninsula.



The contribution of this study lies not in technical model competition but in adapting KoBERT as an analytical tool for research on international politics and security perceptions. The recategorization of emotions and the use of contextual weighting were designed to uncover the broader directional tendencies of security perception embedded in fragmented emotional data, thereby extending the analytical scope of unstructured data research.

The proposed SSTI further distinguishes this study by offering a quantitative way to trace when and to what degree international crises are internalized by the public. Treating comments not as isolated units but as interconnected discursive units reflects an effort to conceptualize the digital public sphere as a dynamic space where emotions and perceptions circulate and reinforce one another.

The empirical patterns observed here indicate that contemporary security discourse is closely intertwined with the emotional dynamics of digital platforms. Accordingly, security communication may be more effective when considering not only the transmission of situational information but also the public's perceived vulnerabilities, including concerns related to personal safety and military service.

This study does not incorporate detailed demographic characteristics of users, which remains a limitation. Nevertheless, given the evidence that digital discourse is associated with shifts in security perception, future research should examine how these emotional currents translate into voting behavior and concrete policy preferences.

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