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Hate speech and rage bait on social media in Greece: Prevalence and association with mental health

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Abstract

Background

Hate speech and rage bait content have become increasingly prevalent on social media platforms, raising concerns regarding their potential impact on psychological well-being.

Aim

To estimate the prevalence of hate speech and rage bait on social media in a Greek sample. Moreover, we examined the association between hate speech, rage bait, anxiety-like symptoms, depressive-like symptoms, and loneliness.

Methods

A cross-sectional study was undertaken using an online survey design. We collected our data from February to June 2026. The frequency of hate speech victimization on social media was assessed using a five-point Likert scale; never, rarely, sometimes, often, very often. Likewise, exposure to hate speech on social media as a bystander was measured using the same response format. Anxiety-like and depressive-like symptoms were assessed using the Patient Health Questionnaire-4. Loneliness was measured using the UCLA 3-Item Loneliness Scale.

Results

The lifetime prevalence of victims of hate speech on social media was 72.5%. Nearly all participants (99.1%) reported having witnessed hate speech directed at others on social media at least once during their lifetime. With respect to perceived targets of hate speech on social media, participants most commonly identified females (80.6%), sexual minority individuals (70.3%), individuals targeted because of their physical appearance (68.2%), individuals expressing political views (66.3%), individuals targeted because of their ethnicity (59.8%), and individuals expressing religious views (58.7%). Overall, 91.1% of participants reported engaging with rage bait content on social media at least rarely, whereas only 8.9% reported never engaging with such content. Multivariable regression analyses revealed that hate speech victimization, witnessing hate speech directed toward others, and engagement with rage bait content on social media were independently associated with increased levels of anxiety-like and depressive-like symptoms. In addition, participants who reported greater experiences of hate speech victimization exhibited higher levels of loneliness.

Conclusions

Prevalence of hate speech and rage bait is high in Greece. Exposure to hate speech on social media, whether as a victim or bystander, and engagement with rage bait content are independently associated with poorer

psychological well-being. These findings highlight the potential mental health consequences of harmful online experiences and underscore the need for interventions aimed at fostering safer and more supportive digital environments.

Introduction

Social media platforms have become integral to contemporary social interaction, communication, information sharing, and civic participation. Recent years have witnessed an unprecedented expansion in the use of social networking sites, with billions of individuals worldwide relying on digital platforms for interpersonal communication, entertainment, information, and political engagement (Statista., 2026). Although social media offer numerous benefits, including increased social connectivity and access to information, growing concerns have emerged regarding their potential adverse effects on mental health and well-being (Galanis et al., 2025; Keles et al., 2020; Orben, 2020; Valkenburg et al., 2022). Increasing attention has therefore been directed toward harmful online experiences and their implications for psychological health.

Among the most concerning forms of harmful online content is hate speech. The Council of Europe defines hate speech as expressions that spread, incite, promote, or justify hatred, discrimination, or hostility against individuals or groups based on characteristics such as race, ethnicity, religion, nationality, gender, sexual orientation, or other identity-related attributes (Council of Europe, 2026). The widespread adoption of social media has facilitated the rapid dissemination of hate speech by providing users with opportunities to communicate anonymously, reach large audiences, and interact within algorithmically driven information environments (Fortuna & Nunes, 2019; Matamoros-Fernández & Farkas, 2021). Consequently, hate speech has become a visible and persistent feature of many online spaces.

Previous research has demonstrated that exposure to online hate speech is common among social media users. Studies conducted across different countries have documented substantial levels of both direct victimization and bystander exposure to online hate speech, particularly among adolescents and young adults (Fulantelli et al., 2022; Wachs et al., 2022). Importantly, the impact of hate speech is not limited to individuals who are directly targeted. Exposure to hateful content may affect witnesses and broader online communities by fostering perceptions of threat, social exclusion, and hostility (Saha et al., 2019; Wachs et al., 2024). Such findings suggest that hate speech should be viewed not only as a social or legal issue but also as a public health concern with potential population-level consequences.

The adverse psychological consequences of discriminatory and hostile experiences are well established. For instance, theoretical frameworks such as the minority stress model propose that exposure to prejudice, stigmatization, and discrimination constitutes a chronic stressor that may negatively affect mental health (Meyer, 2003). Consistent with this perspective, systematic reviews and meta-analyses have shown that experiences of discrimination are associated with elevated levels of psychological distress, depression, anxiety, and poorer overall health outcomes (Pascoe & Smart Richman, 2009; Williams et al., 2019). Emerging evidence further suggests that online hate speech may be linked to increased stress, emotional distress, depressive symptoms, anxiety symptoms, and reduced well-being (Fulantelli et al., 2022; Saha et al., 2019). Nevertheless, the available literature remains relatively limited, and many studies have focused

primarily on adolescents or specific vulnerable populations rather than the general population of social media users.

Another emerging phenomenon within contemporary social media environments is so-called rage bait content. Rage bait refers to online content that is deliberately designed to provoke anger, outrage, or emotional reactions in order to maximize visibility, engagement, and dissemination across digital platforms (Oxford University, 2026). Although the scientific study of rage bait is still in its infancy, recent evidence suggests that outrage has become a central mechanism of online engagement. Social media platforms frequently reward emotionally provocative content through algorithmic systems that prioritize user interactions such as comments, shares, and reactions, thereby creating incentives for the production and dissemination of outrage-inducing material (Brady et al., 2021; Goldenberg & Willer, 2023). Research has demonstrated that social reinforcement processes encourage users to express increasing levels of outrage over time, while platform algorithms may further amplify such content because of its capacity to attract attention and engagement (Brady et al., 2021). Furthermore, social media users systematically overestimate the level of outrage expressed by others online, potentially contributing to cycles of hostility, polarization, and negative emotional contagion (Brady et al., 2023). Recent evidence has also highlighted the role of outrage in the dissemination of misinformation. Misinformation often exploits moral outrage to increase online sharing and diffusion, with outrage-evoking misinformation spreading at least as effectively as trustworthy information across social media platforms. In this context, users may be willing to share outrage-inducing content without carefully evaluating its accuracy, suggesting that emotional arousal may override information quality during online engagement (McLoughlin et al., 2024). These findings are particularly relevant to rage bait because they suggest that provocative and emotionally charged content can successfully attract attention irrespective of its informational value. More broadly, recent scholarship has emphasized that social media ecosystems create feedback loops in which algorithmic curation, user engagement, and emotional expression mutually reinforce one another. Such dynamics may contribute to increased exposure to hostility, affective polarization, online conflict, and hate speech (Bor et al., 2026; Goldenberg & Willer, 2023). Given that outrage-provoking content has become increasingly common within digital platforms, understanding its prevalence and potential implications for mental health represents an important research priority.

The association between social media experiences and mental health has attracted substantial scholarly attention. Previous studies have reported associations between various forms of negative online interactions -including cyberbullying, online harassment, discriminatory content, and problematic social media use- and anxiety-like symptoms, depression-like symptoms, psychological distress, and loneliness (Hamm et al., 2015; Kowalski et al., 2014; Lin et al., 2016; Primack, Shensa, Sidani, et al., 2017; Vannucci et al., 2017). Loneliness is of particular relevance because it represents a major public health challenge that has been linked to adverse physical and mental health outcomes across the lifespan (Hawkley & Cacioppo, 2010; Surkalim et al., 2022). Given the increasingly central role of digital environments in social interaction, understanding whether exposure to hate speech and engagement with outrage-driven content contribute to loneliness and psychological distress represents an important research priority.

Despite growing international interest in online harms, evidence regarding hate speech and rage bait remains limited in Greece. To the best of our knowledge, the prevalence of social media hate speech victimization,

bystander exposure to hate speech, and engagement with rage bait content among Greek social media users is unknown. Furthermore, until now no study in Greece has examined the associations between these online experiences and indicators of psychological well-being, including anxiety-like symptoms, depressive-like symptoms, and loneliness.

Therefore, the aims of the present study were twofold. First, we sought to estimate the prevalence of hate speech victimization, witnessing hate speech directed toward others, and engagement with rage bait content on social media in a Greek sample. Second, we examined the associations between hate speech victimization, bystander exposure to hate speech, engagement with rage bait content, anxiety-like symptoms, depressive-like symptoms, and loneliness. Given previous evidence linking online hostility and discrimination with adverse mental health outcomes, we hypothesized that greater exposure to hate speech and greater engagement with rage bait content would be associated with higher levels of anxiety-like symptoms, depressive-like symptoms, and loneliness.

Methods

Study design

A cross-sectional study was undertaken in Greece using an online survey design. We collected our data from February to June 2026. Data were collected through a structured questionnaire developed and administered via Google Forms. The survey was disseminated through Facebook, Instagram, and TikTok. The target population consisted of individuals with internet access who actively engaged with at least one social media platform. Recruitment was conducted through the dissemination of the survey link on publicly accessible social media pages as well as through personal and professional networks. To maximize study visibility and promote participation, recruitment posts were periodically reshared over a four-day period. No monetary or non-monetary incentives were offered to participants. Owing to the unrestricted availability of the survey link and the inability to ascertain the number of individuals exposed to the recruitment materials, a response rate could not be calculated.

Participation was voluntary, and respondents self-selected into the study by accessing the survey link and completing the questionnaire. Eligibility criteria required participants to (a) be adults, (b) maintain at least one active account on Facebook, Instagram, TikTok, X, or YouTube, and (c) provide informed consent prior to participation. Participants were recruited using a non-probability convenience sampling approach, resulting in the acquisition of a convenience sample. The study was designed, conducted, and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (Von Elm et al., 2008).

To minimize the risk of selection bias, the participant information sheet described the study broadly as an investigation of social media use rather than explicitly emphasizing hate speech and rage bait on social media. This strategy was implemented to encourage participation from individuals irrespective of their prior exposure to or experiences with these phenomena, thereby reducing the likelihood of disproportionately recruiting participants who had been affected by hate speech or rage bait. Consequently, the potential for

inflating prevalence estimates of exposure to hate speech and rage bait within the study sample was mitigated.

Sample size estimation was conducted using G*Power software (version 3.1.9.2). Based on a multivariable analytical model comprising nine variables (three independent predictors and six potential confounding variables), the minimum required sample size was calculated assuming a conservative small effect size ($f^2 = 0.01$), a significance level (α) of 0.05, and a statistical power of 95%. Under these assumptions, a minimum sample of 1302 participants was required. The selection of a conservative effect size was intended to ensure sufficient statistical power to detect small yet potentially meaningful associations between the predictor variables and the study outcomes.

Measurements

Sociodemographic characteristics

Participants provided information on a range of sociodemographic characteristics, including sex (males of females), age (continuous variable), educational level (years of education; continuous variable), work status (employed or not employed), and social media daily use (continuous variable). Additionally, subjective economic status was evaluated using a self-rated scale ranging from 0 (very poor) to 10 (excellent), with higher scores reflecting more favorable perceptions of personal economic circumstances.

Hate speech

The frequency of hate speech victimization on social media was assessed using a five-point Likert scale; never (1), rarely (2), sometimes (3), often (4), very often (5). Likewise, exposure to hate speech on social media as a bystander was measured using the same response format. Lifetime prevalence of victims and bystanders of hate speech on social media was operationalized as any reported observation of hate speech, defined by responses of rarely, sometimes, often, or very often. Prevalence rates were calculated as the proportion of participants reporting at least one lifetime experience relative to the total study sample. In addition, participants' behavioral responses to hate speech on social media were explored. Respondents were asked to indicate how they typically reacted when they personally experienced hate speech and when they witnessed hate speech targeting others. Response options included: (a) attempting to explain to the perpetrator, through reasoned arguments, why the expressed views or behavior were inappropriate; (b) responding aggressively to the perpetrator in self-defense; (c) reporting the perpetrator to the social media platform; (d) blocking the perpetrator on the social media platform; (e) discussing the incident with friends or family members; and (f) taking no action.

Participants were additionally asked to identify the groups they perceived as targeted by hate speech on social media. Response options included females, males, politicians, athletes, artists, journalists, influencers, sexual minority individuals, individuals targeted because of their ethnicity, individuals targeted because of their physical appearance (e.g., body weight, clothing, or other visible characteristics), individuals expressing

political views, individuals expressing religious views, individuals expressing views on health-related issues, and individuals with disabilities.

Rage bait

To assess participants' engagement in rage bait on social media, respondents were first provided with a definition of the term to ensure a common understanding of the concept. Specifically, the definition adopted was that provided by the Oxford English Dictionary, which designated rage bait as its Word of the Year in 2025. Participants were informed that "rage bait is defined as online content deliberately designed to elicit anger or outrage by being frustrating, provocative, or offensive, typically posted in order to increase traffic to or engagement with a particular web page or social media content" (Oxford University, 2026). Following presentation of the definition of rage bait, participants' engagement with this type of content was assessed through a single-item measure. In particular, engagement with rage bait content on social media was assessed using a single-item measure asking participants how often they clicked on posts designed to provoke anger or outrage. Responses were rated on a five-point Likert scale: never (1), rarely (2), sometimes (3), often (4), very often (5). Higher scores reflected more frequent interaction with content perceived as rage bait on social media platforms.

Anxiety and depression

Anxiety-like and depressive-like symptoms were assessed using the Patient Health Questionnaire-4 (PHQ-4), a brief self-report screening instrument comprising four items (Kroenke et al., 2009). The scale includes two items assessing anxiety-like symptoms and two items assessing depressive-like symptoms. Responses are recorded on a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Subscale scores for anxiety-like symptoms and depressive-like symptoms range from 0 to 6, with higher scores indicating greater symptom severity. The validated Greek version of the PHQ-4 (Karekla et al., 2012) was used in the present study. The internal consistency of the instrument was evaluated within the study sample. Cronbach's alpha coefficients were 0.776 for the anxiety-like symptoms subscale and 0.721 for the depressive-like symptoms subscale, indicating satisfactory reliability.

Loneliness

Loneliness was measured using the UCLA 3-Item Loneliness Scale (UCLA-LS-3), a widely used instrument assessing subjective experiences of loneliness (Hughes et al., 2004). The scale comprises three items rated on a three-point Likert scale ranging from hardly ever (1) to often (3). Total scores range from 3 to 9, with higher scores reflecting greater perceived loneliness. The validated Greek version of the UCLA-LS-3 (Katsiroumpa et al., 2025) was administered. The scale demonstrated excellent internal consistency in the present sample, as evidenced by a Cronbach's alpha coefficient of 0.829, indicating strong reliability for the measurement of loneliness in this sample.

Ethical issues

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (World Medical Association, 2013) and adhered to all applicable standards governing research involving human participants. The study protocol was reviewed and approved by the Ethics Committee of the Faculty of Nursing, National and Kapodistrian University of Athens (Approval No. 35/28.12.2025). Participation was entirely voluntary and anonymous. Before enrollment, eligible individuals were provided with comprehensive information regarding the study aims, procedures, voluntary nature of participation, and their right to withdraw at any stage without consequence. Electronic informed consent was obtained from all participants prior to survey initiation through the selection of an “I agree to participate” option. Data were collected through an anonymous online questionnaire, and no personally identifiable information was recorded. To ensure confidentiality and protect participants’ privacy, all study data were stored in password-protected electronic files, while IP addresses and other potentially identifying digital information were not collected. Furthermore, data were analyzed and reported exclusively in aggregate form, thereby minimizing the risk of participant identification and ensuring compliance with relevant ethical and data protection requirements. These procedures were implemented to maintain participant confidentiality and uphold the integrity of the research process.

Statistical analysis

Categorical variables are presented as absolute (n) and relative (%) frequencies, whereas continuous variables are summarized using means, standard deviations (SDs), medians, interquartile ranges (IQRs), and minimum and maximum values. The distribution of continuous variables was assessed using the Kolmogorov–Smirnov test and visual inspection of quantile–quantile (Q–Q) plots, which indicated that the variables were normally distributed. Three variables were examined as the primary independent predictors: (a) frequency of hate speech victimization on social media, (b) frequency of observing hate speech directed toward others on social media, and (c) engagement with rage bait content on social media. The dependent variables were anxiety-like symptoms, depressive-like symptoms, and loneliness scores. We considered sociodemographic characteristics (i.e., sex, age, educational level, work status, social media daily use, and self-reported economic status as potential confounders. As all outcome variables demonstrated normal distributions, linear regression analyses were deemed appropriate. Initially, univariate linear regression analyses were performed to examine the associations between each independent variable and the study outcomes. Subsequently, multivariable linear regression models were developed to estimate the independent effects of hate speech victimization, observation of hate speech, and engagement with rage bait content on anxiety-like symptoms, depressive-like symptoms, and loneliness after adjustment for potential confounding variables. Results are presented as unadjusted and adjusted beta coefficients (b), together with their corresponding 95% confidence intervals (CIs) and p-values. Standardized beta coefficients are also reported to facilitate comparison of effect sizes across predictors. Multicollinearity among the independent variables was assessed using the Variance Inflation Factor (VIF), with values greater than 5 considered indicative of substantial multicollinearity. The observed VIF values ranged from 1.020 to 1.092, suggesting the absence of problematic multicollinearity. Model assumptions were further evaluated through visual inspection of residual histograms to assess normality and scatterplots of standardized residuals against predicted values to examine linearity and homoscedasticity. Statistical significance was defined as a two-tailed p-value < 0.05.

All statistical analyses were performed using IBM SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, NY, USA).

Results

Sociodemographic characteristics

Study population included 1331 participants. In our sample, 78.0% were females, while 66.4% have been working. Participants had a mean age of 33.14 years (SD = 14.72), with a median age of 25 years (IQR = 26) and an age range of 18–66 years. Mean social media daily use was 3.77 hours (SD = 2.38), with a median score of 3 hours (IQR = 3) and a range of 1–14. Participants reported a mean self-reported economic status score of 6.07 (SD = 1.45), with a median score of 6 (IQR = 2) and a range of 0–10. The complete sociodemographic profile of the study sample is presented in Table 1.

Table 1
Sociodemographic characteristics of the sample (n = 1331).

Characteristics	N	%
Sex		
Males	293	22.0
Females	1038	78.0
Age (years)[a]	33.14	14.72
Educational level (years)[a]	15.06	2.48
Employees		
No	444	33.4
Yes	887	66.6
Social media daily use (hours)[a]	3.77	2.38
Self-reported economic status[a]	6.07	1.45
[a] mean, standard deviation		

Hate speech

Table 2 presents the descriptive statistics for the hate speech-related variables assessed in the study. The lifetime prevalence of victims of hate speech on social media was 72.5%. Among them, 46.4% attempted to discuss the assault with the perpetrator, 42.5% discussed the incident with friends or family members, 41.8% blocked the perpetrator on the social media platform, 36.4% reported the perpetrator to the social media platform, 11.4% attacked also to the perpetrator, and 6.3% taking no action. Among victims of hate speech, 46.4% reported attempting to discuss the incident with the perpetrator, 42.5% discussed the incident with

friends or family members, 41.8% blocked the perpetrator on the social media platform, and 36.4% reported the perpetrator to the platform. Also, 11.4% reported retaliating against the perpetrator, while 6.3% indicated that they took no action.

Nearly all participants (99.1%) reported having witnessed hate speech directed at others on social media at least once during their lifetime. Among these bystanders, the most frequently reported reaction was taking no action (32.4%). Reporting the perpetrator to the social media platform (29.3%) and attempting to engage the perpetrator in a reasoned discussion (27.3%) were also common responses, followed by blocking the perpetrator (23.6%) and discussing the incident with friends or family members (19.5%). Retaliatory responses toward the perpetrator were reported less frequently (6.8%).

With respect to perceived targets of hate speech on social media, participants most commonly identified females (80.6%), sexual minority individuals (70.3%), individuals targeted because of their physical appearance (68.2%), individuals expressing political views (66.3%), individuals targeted because of their ethnicity (59.8%), and individuals expressing religious views (58.7%). Nearly half of the participants also perceived influencers (48.9%), individuals with disabilities (45.7%), politicians (45.6%), and artists (42.2%) as frequent targets of hate speech.

Table 2
Descriptive statistics for the hate speech-related variables assessed in the study (n = 1331).

Victim of hate speech on social media	**N**	**%**
Never	366	27.5
Rarely	425	31.9
Sometimes	463	34.8
Often	64	4.8
Very often	13	1.0
Reaction as a victim		
Attempt for a rationale discussion with the perpetrator	448	46.4
Retaliation against the perpetrator	110	11.4
Report the perpetrator to the social media platform	351	36.4
Block the perpetrator on the social media platform	403	41.8
Discussion of the incident with friends or family members	410	42.5
No action	61	6.3
Exposure on hate speech on social media as a bystander		
Never	12	0.9
Rarely	133	10.0
Sometimes	322	24.2
Often	408	30.7
Very often	456	34.3
Reaction as a bystander		
Attempt for a rationale discussion with the perpetrator	360	27.3
Retaliation against the perpetrator	90	6.8
Report the perpetrator to the social media platform	387	29.3
Block the perpetrator on the social media platform	311	23.6
Discussion of the incident with friends or family members	257	19.5
No action	427	32.4
Groups perceived as targets of hate speech on social media		

Victim of hate speech on social media	N	%
Females	1063	80.6
Males	471	35.7
Politicians	602	45.6
Athletes	295	22.4
Artists	556	42.2
Journalists	384	29.1
Influencers	645	48.9
Sexual minority individuals	927	70.3
Individuals targeted because of their ethnicity	789	59.8
Individuals targeted because of their physical appearance	899	68.2
Individuals expressing political views	874	66.3
Individuals expressing religious views	774	58.7
Individuals expressing views on health-related issues	453	34.3
Individuals with disabilities	603	45.7

Rage bait

Engagement with rage bait content was common among participants. Overall, 91.1% (n = 1212) of participants reported engaging with rage bait content on social media at least rarely, whereas only 8.9% (n = 119) reported never engaging with such content. The largest proportion reported engaging with such content sometimes (32.4%, n = 431), followed by often (28.4%, n = 378), rarely (18.4%, n = 245), and very often (11.9%, n = 158).

Study scales

Mean anxiety-like symptoms and depression-like symptoms score was 2.51 (SD; 1.60), and 1.99 (SD; 1.58), respectively. Also, mean loneliness score was 4.96 (SD; 1.73). A comprehensive summary of descriptive statistics for all study scales is presented in Table 2.

Table 3
Descriptive statistics for the study scales (n = 1331).

Scale	Mean	Standard deviation	Median	Interquartile range	Minimum value	Maximum value
Patient Health Questionnaire-4						
Anxiety-like symptoms	2.51	1.60	2	2	0	6
Depression-like symptoms	1.99	1.58	2	2	0	6
UCLA 3-Item Loneliness Scale	4.96	1.73	5	3	3	9

Dependent variable: anxiety-like symptoms

Table 4 shows the association between hate speech, rage bait and anxiety-like symptoms. Multivariable model identified a positive association between hate speech victimization on social media and anxiety-like symptoms (adjusted beta = 0.225; 95% CI: 0.138 to 0.311; standardized beta = 0.131; $p < 0.001$). Additionally, exposure on hate speech on social media as a bystander was associated with increased anxiety-like symptoms (adjusted beta = 0.215; 95% CI: 0.135 to 0.296; standardized beta = 0.138; $p < 0.001$). Also, higher levels of engagement in rage bait on social media were significantly associated with higher levels of anxiety-like symptoms (adjusted beta = 0.177; 95% CI: 0.104 to 0.250; standardized beta = 0.125; $p < 0.001$).

Based on standardized coefficients, the association between exposure on hate speech on social media as a bystander and anxiety-like symptoms was stronger than that observed for hate speech victimization on social media and engagement in rage bait on social media. The multivariable regression model explained 14.8% of the variance in anxiety-like symptoms scores.

Assessment of multicollinearity revealed acceptable VIF values ranging from 1.020 to 1.092, indicating negligible collinearity among the predictors. Diagnostic evaluation further confirmed the adequacy of the model. Specifically, inspection of residual histograms and normal probability plots supported the assumption of normally distributed residuals (Supplementary Fig. 1), whereas the scatterplot of residuals versus fitted values indicated that the assumptions of linearity and homoscedasticity were met (Supplementary Fig. 2).

Table 4
Linear regression models with anxiety-like symptoms score (Patient Health Questionnaire-4) as the dependent variable (n = 1331).

Independent variables	Univariate models			Multivariable model[a]				
	Unadjusted coefficient beta	95% CI for beta	P-value	Adjusted coefficient beta	95% CI for beta	Standardized coefficient beta	P-value	VIF
Levels of hate speech victimization on social media	0.222	0.130 to 0.314	< 0.001	0.225	0.138 to 0.311	0.131	< 0.001	1.020
Levels of exposure on hate speech on social media as a bystander	0.243	0.160 to 0.326	< 0.001	0.215	0.135 to 0.296	0.138	< 0.001	1.092
Levels of engagement in rage bait on social media	0.263	0.188 to 0.337	< 0.001	0.177	0.104 to 0.250	0.125	< 0.001	1.072

[a] Model are adjusted for sex, age, educational level, work status, social media daily use, and economic status; R^2 for the final multivariable model = 14.8%; p-value for ANOVA < 0.001

CI: confidence interval; VIF: Variance Inflation Factor

Dependent variable: depression-like symptoms

Table 5 presents the associations between hate speech exposure, engagement with rage bait content, and depressive-like symptoms. In the multivariable analysis, hate speech victimization on social media was positively associated with depressive-like symptoms (adjusted beta = 0.256, 95% CI: 0.168 to 0.345; standardized beta = 0.151; p < 0.001). Similarly, observing hate speech directed at others on social media was significantly associated with higher depressive-like symptoms scores (adjusted beta = 0.199, 95% CI: 0.117 to 0.282; standardized beta = 0.130; p < 0.001). Moreover, greater engagement with rage bait content on social media was independently associated with increased depressive-like symptoms (adjusted beta = 0.100, 95% CI: 0.025 to 0.174; standardized beta = 0.072; p = 0.009).

Based on the standardized regression coefficients, hate speech victimization exhibited the strongest association with depressive-like symptoms, followed by exposure to hate speech as a bystander and engagement with rage bait content. Although the magnitude of these associations was comparable, hate speech victimization appeared to be the most influential predictor of depressive-like symptoms among the variables examined.

The final multivariable regression model explained 8.1% of the variance in depressive-like symptoms scores. Multicollinearity diagnostics indicated no evidence of problematic collinearity among the predictors, with

VIFs ranging from 1.020 to 1.092. Furthermore, diagnostic assessments supported the adequacy of the model. Visual inspection of residual histograms and normal probability plots suggested that the residuals were approximately normally distributed (Supplementary Fig. 3), while scatterplots of residuals against fitted values indicated that the assumptions of linearity and homoscedasticity were satisfactorily met (Supplementary Fig. 4).

Table 5
Linear regression models with depression-like symptoms score (Patient Health Questionnaire-4) as the dependent variable (n = 1331).

Independent variables	Univariate models			Multivariable model[a]				
	Unadjusted coefficient beta	95% CI for beta	P-value	Adjusted coefficient beta	95% CI for beta	Standardized coefficient beta	P-value	VIF
Levels of hate speech victimization on social media	0.267	0.177 to 0.357	< 0.001	0.256	0.168 to 0.345	0.151	< 0.001	1.020
Levels of exposure on hate speech on social media as a bystander	0.218	0.137 to 0.300	< 0.001	0.199	0.117 to 0.282	0.130	< 0.001	1.092
Levels of engagement in rage bait on social media	0.146	0.071 to 0.220	< 0.001	0.100	0.025 to 0.174	0.072	0.009	1.072

[a] Model are adjusted for sex, age, educational level, work status, social media daily use, and economic status; R^2 for the final multivariable model = 8.1%; p-value for ANOVA < 0.001

CI: confidence interval; VIF: Variance Inflation Factor

Dependent variable: loneliness

Table 6 presents the associations between hate speech exposure, engagement with rage bait content, and loneliness. In the multivariable analysis, the only predictor that was independently associated with loneliness score was hate speech victimization on social media. In particular, we found a positive association between hate speech victimization and loneliness score (adjusted beta = 0.399, 95% CI: 0.303 to 0.495; standardized beta = 0.215; p < 0.001).

The final multivariable regression model explained 9.1% of the variance in loneliness score. Multicollinearity diagnostics indicated no evidence of problematic collinearity among the predictors, with VIFs ranging from 1.020 to 1.092. Furthermore, diagnostic assessments supported the adequacy of the model. Visual inspection of residual histograms and normal probability plots suggested that the residuals were approximately normally distributed (Supplementary Fig. 5), while scatterplots of residuals against fitted

values indicated that the assumptions of linearity and homoscedasticity were satisfactorily met (Supplementary Fig. 6).

Table 6
Linear regression models with loneliness score as the dependent variable (n = 1331).

Independent variables	Univariate models			Multivariable model[a]				
	Unadjusted coefficient beta	95% CI for beta	P-value	Adjusted coefficient beta	95% CI for beta	Standardized coefficient beta	P-value	VIF
Levels of hate speech victimization on social media	0.400	0.302 to 0.498	< 0.001	0.399	0.303 to 0.495	0.215	< 0.001	1.020
Levels of exposure on hate speech on social media as a bystander	0.070	-0.021 to 0.161	0.130	0.052	-0.038 to 0.142	0.031	0.258	1.092
Levels of engagement in rage bait on social media	0.079	-0.003 to 0.162	0.059	0.056	-0.026 to 0.137	0.036	0.180	1.072

[a] Model are adjusted for sex, age, educational level, work status, social media daily use, and economic status; R^2 for the final multivariable model = 9.1%; p-value for ANOVA < 0.001

CI: confidence interval; VIF: Variance Inflation Factor

Discussion

To the best of our knowledge, the present study provides a first assessment of hate speech victimization, bystander exposure to hate speech, and engagement with rage bait content on social media in a Greek sample. The findings indicate that these experiences are highly prevalent among social media users and are associated with poorer psychological well-being. Nearly three-quarters of participants reported having been victims of hate speech, almost all had witnessed hate speech directed toward others, and more than 90% reported engaging with rage bait content at least occasionally. Moreover, we examined for first time in Greece the association between hate speech victimization, bystander exposure to hate speech, engagement with rage bait content and mental health. We found that hate speech victimization, witnessing hate speech, and engagement with rage bait were independently associated with increased anxiety-like and depressive-like symptoms, while hate speech victimization was additionally associated with greater loneliness.

The prevalence of hate speech victimization observed in the present study is consistent with growing evidence suggesting that online hate speech and other forms of online aggression represent widespread features of contemporary digital environments (Fulantelli et al., 2022; Saha et al., 2019; Wachs et al., 2022).

Research has increasingly recognized hate speech as a distinct form of online aggression that extends beyond traditional cyberbullying due to its targeting of individuals or groups based on identity characteristics such as sex, ethnicity, religion, sexual orientation, or political beliefs (Fulantelli et al., 2022; Wachs et al., 2022). The exceptionally high prevalence identified in our study may reflect the central role of social media in daily communication, the persistence and visibility of online content, and the algorithmic amplification of emotionally engaging material that can increase exposure to harmful communications (Brady et al., 2021; Goldenberg & Willer, 2023).

An important finding was that almost all participants reported witnessing hate speech directed toward others. Although much research has focused on direct victims, our results are consistent with emerging evidence suggesting that bystander exposure is itself an important experience with potential psychological consequences (Pabian, 2025; Wachs et al., 2024). Witnessing aggressive, discriminatory, or hateful interactions may evoke fear, anger, helplessness, or concerns regarding one's own vulnerability to future victimization. Consequently, the burden of hate speech may extend far beyond those who are directly targeted. From a public health perspective, this finding suggests that hate speech should not be viewed solely as an interpersonal problem affecting specific victims but rather as a population-level exposure capable of influencing the well-being of entire online communities.

Our participants most frequently identified females, sexual minority individuals, persons targeted because of their physical appearance, individuals expressing political views, ethnic minorities, and those expressing religious beliefs as common targets of hate speech. This pattern is broadly consistent with previous research demonstrating that online hate speech disproportionately affects socially marginalized or stigmatized groups (Fulantelli et al., 2022; Meyer, 2003; Naranjo-Pou & Zych, 2025; Pascoe & Smart Richman, 2009; Williams et al., 2019). Minority stress theory proposes that repeated exposure to prejudice, discrimination, and stigmatization can generate chronic stress responses that adversely affect mental health (Meyer, 2003). Similarly, a large meta-analysis found that perceived discrimination is consistently associated with poorer mental and physical health outcomes (Pascoe & Smart Richman, 2009). Our findings therefore support concerns that hate speech may contribute to social and health inequalities by disproportionately harming vulnerable populations.

The prevalence of rage bait engagement in our sample was also notably high. Research has demonstrated that expressions of moral outrage are amplified on social media through reinforcement learning and social feedback mechanisms, whereby users receive rewards in the form of visibility, engagement, and social approval for emotionally provocative content (Brady et al., 2021). Similarly, Goldenberg and Willer argued that social media platforms can systematically amplify emotional content, particularly anger and outrage, because such content generates elevated user engagement (Goldenberg & Willer, 2023). These mechanisms may help explain why engagement with outrage-provoking content has become such a routine feature of social media use.

Additionally, we found that hate speech victimization, witnessing hate speech, and engagement with rage bait content were independently associated with increased anxiety-like and depressive-like symptoms. These findings align with a substantial body of literature linking online victimization and harmful digital experiences to adverse mental health outcomes. Saha et al. demonstrated that exposure to online hateful speech was

associated with increased stress expression in online communities (Saha et al., 2019). Systematic reviews of cyberbullying and online hate speech have similarly reported associations with psychological distress, emotional problems, anxiety, depression, and reduced well-being (Fulantelli et al., 2022; Hamm et al., 2015; Kowalski et al., 2014). Furthermore, studies of social media use have consistently found associations between problematic online experiences and symptoms of depression and anxiety (Keles et al., 2020; Lin et al., 2016; Primack, Shensa, Escobar-Viera, et al., 2017; Vannucci et al., 2017). Moreover, a recent study found a positive association between online hate speech on social media networks and post-traumatic stress disorder symptom severity (Shmulewitz et al., 2025). Several mechanisms may explain these associations. Direct experiences of hate speech may generate feelings of rejection, humiliation, stigmatization, and social threat. Repeated exposure may activate chronic stress responses, increasing vulnerability to anxiety and depressive symptoms. At the same time, witnessing hostile interactions directed toward others may diminish perceptions of social safety and increase emotional burden. Emerging evidence has also suggested associations between online hate speech exposure and more severe psychological outcomes, including elevated stress and post-traumatic stress symptomatology (Saha et al., 2019). Collectively, these findings suggest that harmful online experiences may operate as chronic psychosocial stressors with potentially significant implications for mental health.

Another noteworthy finding is the association between hate speech victimization and loneliness. This observation extends current knowledge by suggesting that the effects of online hostility are not limited to emotional symptoms but may also affect social well-being. Individuals, who experience hate speech may withdraw from online interactions, participate less actively in digital communities, or feel excluded from social groups. Previous research has shown that greater social media exposure and negative online experiences may contribute to perceived social isolation and loneliness (Primack, Shensa, Sidani, et al., 2017). More broadly, loneliness has been identified as a significant public health concern associated with adverse physical and mental health outcomes across the lifespan (Hawkley & Cacioppo, 2010; Matthews et al., 2016; Surkalim et al., 2022). The association observed in the present study therefore highlights an additional pathway through which harmful online experiences may affect overall well-being.

We consider that our findings may have important implications for public health. First, they suggest that exposure to harmful online content should increasingly be considered a digital determinant of mental health. Traditionally, public health efforts have focused on social, economic, and environmental influences on health; however, digital environments now constitute a major context within which social interaction, identity formation, and information exchange occur (Orben, 2020). Consequently, online experiences such as hate speech and rage bait may represent emerging psychosocial risk factors that warrant inclusion within contemporary public health frameworks. Second, because witnessing hate speech was associated with poorer psychological well-being, interventions that focus exclusively on direct victims may be insufficient. Population-level prevention strategies aimed at reducing the overall visibility and normalization of hateful content could potentially benefit both victims and bystanders. Public health initiatives should therefore promote respectful digital communication, prosocial online behavior, and community norms that discourage hate speech. Educational interventions that enhance digital citizenship and empathy may be particularly valuable among younger populations. Third, the widespread engagement with rage bait content underscores the importance of digital literacy interventions. Social media users may benefit from learning how algorithms

prioritize emotionally provocative content and how such content may influence emotions, attitudes, and behavior. Improved awareness of manipulative engagement strategies could help reduce susceptibility to outrage-driven content and support healthier patterns of social media use. Fourth, healthcare professionals should increasingly recognize online experiences as potential contributors to psychological distress. Mental health assessments may benefit from considering exposure to online harassment, discrimination, online hate speech, and outrage-driven content, particularly among individuals presenting with symptoms of anxiety, depression, or loneliness. Such assessments may facilitate a more comprehensive understanding of psychosocial stressors affecting patients in the digital age. Finally, the findings support the need for collaboration among public health authorities, policymakers, educators, researchers, and social media companies. Effective moderation systems, transparent reporting mechanisms, anti-hate-speech initiatives, and digital well-being policies may contribute to reducing exposure to harmful online content. Given the scale of exposure observed in the current study, interventions targeting online environments could potentially generate meaningful population-level mental health benefits.

Limitations

Several limitations of this study should be considered when interpreting the findings. First, the use of a non-probability convenience sampling strategy may limit the representativeness of the study sample and the generalizability of the findings. Participants were recruited through social media platforms and volunteered to participate, which may have resulted in self-selection bias. Consequently, participants with greater interest in social media use or online behaviors may have been overrepresented in the sample. Second, all data were obtained through self-report measures, which are susceptible to several sources of bias, including recall bias, reporting bias, and social desirability bias. Participants may have underreported or overreported both their exposure to hate speech and rage bait content as well as their psychological symptoms. Third, the cross-sectional design precludes any conclusions regarding causality or the temporal direction of the observed associations. Although hate speech victimization, observation of hate speech, and engagement with rage bait content were associated with anxiety-like symptoms, depressive-like symptoms, and loneliness, it cannot be determined whether exposure to these online experiences contributed to poorer mental health outcomes or whether individuals experiencing greater psychological distress were more likely to perceive, encounter, or engage with such content. Fourth, recruitment was conducted exclusively through online platforms and required internet access and active social media use. Consequently, individuals with limited digital literacy, restricted internet access, or low engagement with social media may have been underrepresented. Fifth, although validated Greek versions of the PHQ-4 and UCLA-LS-3 were employed, the assessment of hate speech victimization, observation of hate speech, and engagement with rage bait content relied on single-item measures. Such measures may not fully capture the complexity, frequency, severity, context, or emotional impact of these experiences and may be associated with greater measurement error than multi-item validated instruments. Sixth, the study relied on participants' subjective interpretation of hate speech. Despite the provision of relevant definitions, perceptions of what constitutes hate speech may vary across individuals, potentially introducing variability in the measurement of exposure and victimization. Seventh, given the open distribution of the survey link through social media and the inability to determine the number of individuals who viewed the recruitment posts, a response rate could not be calculated. Therefore, the extent of potential non-response bias remains unknown. Finally, the study was

conducted exclusively in Greece, which may limit the applicability of the findings to populations from different cultural, social, and geographical contexts. Future research employing longitudinal designs, probability-based sampling methods, and more comprehensive measures of hate speech and rage bait exposure is warranted to confirm and extend the present findings.

Conclusions

Despite our limitations, the study has several important strengths, including a large nationwide sample of social media users, the examination of both direct and indirect exposure to hate speech, the assessment of the emerging phenomenon of rage bait, and the use of validated instruments to assess mental health outcomes. These strengths contribute to the growing evidence regarding the potential psychological consequences of harmful online experiences among social media users.

We found that hate speech victimization, bystander exposure to hate speech, and engagement with rage bait content are highly prevalent among social media users in Greece and are independently associated with poorer psychological well-being. These findings support the growing recognition of harmful online experiences as public health concerns and suggest that safer digital environments may represent an important target for mental health promotion efforts. By addressing both hateful content and the algorithmic amplification of outrage-driven interactions, future interventions may contribute to improved psychological well-being, greater social connectedness, and healthier online communities.

Declarations

Competing interests

None

Conflict of interest

All authors declare that they have no conflict of interest.

Ethical approval

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

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