


# Behind Blue Skies: A Multimodal Automated Content Analysis of Islamic Extremist Propaganda on Instagram

Lena Clever<sup>1</sup> , Tim Schatto-Eckrodt<sup>2</sup>,  
Nico Christoph Clever<sup>3</sup> , and Lena Frischlich<sup>1</sup>

Social Media + Society  
January-March 2023: 1–14  
© The Author(s) 2023  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/20563051221150404  
journals.sagepub.com/home/sms  


## Abstract

Social media platforms, such as Instagram, are regularly misused for spreading covert (Islamic) extremist propaganda. Affect and emotion are central tools used in extremist propaganda, but there is little research into the combined employment of different social media elements, such as hashtags, visuals, and texts, in the context of propaganda. This study contributes to closing this gap. Using the German group *Generation Islam* as a case study, we examined the group's Instagram activity ( $N = 1,187$  posts) over the course of 2 years. To reflect the platform users' logic, we (a) examined affect in hashtag networks in which users can come across propagandistic content, (b) employed deep learning to examine the emotional valence transmitted in the visuals, and (c) used automated linguistic analysis to describe collective action cues contained within the texts. The results are novel, as they provide nuanced insights into extremist propaganda's employment of affect and emotions across Instagram's affordances.

## Keywords

affect, automated content analysis, collective action, deep learning, emotions, Islamic extremism, Instagram, image analysis, hashtags, natural language processing, propaganda

## Introduction

Social media are widely popular among adolescents and young adults. In Germany, the context of this study, the visual-oriented platform Instagram is one of the most popular apps: 72% of German inhabitants aged 14–19 years use this app on a weekly basis. For 42% of the girls (boys: 31%), it is considered as the most important app on their phones (Rathgeb & Schmid, 2021). Instagram is also an attractive venue for political (DiResta et al., 2019) and extremist propaganda (Bloom & Moskalenko, 2021; DeCook, 2018; Frischlich, 2021). For instance, more than one-fifth of the cases (23%,  $n = 187$ ) processed in 2019 by Jugendschutz.net, a German institution for the protection of youth, were found on Instagram (Glaser, 2020), making it the second-most targeted platform.

Researchers repeatedly report that there is no single cause of radicalization (Alonso & Delgado, 2020; McCauley & Moskalenko, 2008) and that online media are not the trigger for the radicalization process (e.g., Gill et al., 2015; Schmidt-Kleinert, 2020). However, online media, including Instagram, offer enhanced opportunities for information dissemination

and connection and, as such, are able to catalyze the radicalization processes (for comprehensive reviews, see Meleagrou-Hitchens & Brun, 2013; Rothut et al., 2022). Although big tech companies, including Instagram's mother company Meta, have recently increased their attempts to remove and prevent extremist content using algorithmic and human moderation, and there are increased attempts to teach extremism-related media literacy (e.g., Bouko et al., 2020), social media provide a central contact point through which adolescents can make contact with extremism (Reinemann et al., 2019). Crucially, propaganda often covers its intent, making it hard for both users and moderators to identify it at first glance. Thus, a deeper understanding of covert propaganda strategies is needed to help develop both algorithm-based and user-centered approaches for dealing

<sup>1</sup>University of Münster, Germany

<sup>2</sup>University of Hamburg, Germany

<sup>3</sup>Fachhochschule Münster, Germany

### Corresponding Author:

Lena Clever, European Research Center for Information Systems, University of Münster, Leonardo Campus 3, Münster, 48149, Germany.  
Email: lena.clever@wi.uni-muenster.de



with extremist propaganda. This article contributes to this understanding by centering on one central characteristic of extremist propaganda: its emotional appeal.

Several scholars have referred to emotionality as a core element of extremist propaganda (Rothut et al., 2022). For instance, Biswas and Deylami (2019) argue that the emotional framing of their mission increases the effectiveness of ISIS mobilization attempts. Other authors have started to examine the role of specific emotions in this context (Maragkos & Maravelakis, 2022), as emotions are known to motivate deeper information processing (Nabi, 2003) and play a motivating role in collective action (van Zomeren et al., 2008). Among others, these studies show that propaganda is more engaging when emotions such as anger (Lee & Colautti, 2022), or the elicitors of self-transcending emotions, are included (Frischlich, 2021). Furthermore, extremist discourse can be distinguished from non-extremist content better when emotional terms are considered in attempts at automated classification (De Bruyn, 2021).

The aim of this study was to make a threefold contribution to this research field. First, we aimed to describe in greater detail the role of affect and emotions in Islamic extremist propaganda on Instagram. Scholarship on Instagram as a propaganda tool is still relatively rare (Frischlich, 2022; but see Speckhard & Ellenberg, 2020). Second, we broadened prior work focusing on the textual and visual elements of propaganda (e.g., Maragkos & Maravelakis, 2022) by taking the entire logic of an Instagram campaign into account, thus including the hashtags employed to reach new audiences, the visual first impressions, and the text itself. Third, we sought to understand the mobilizing potential of Islamic extremist online propaganda by examining the collective action cues contained within the propaganda campaign. To this end, the current study employed an innovative combination of different methods of automated content analysis, namely, semantic network analyses, deep learning, and linguistic dictionary-based analyses.

## Background

### *Islamic Extremist Online Propaganda*

Extremism and radicalization are contested terms. In this article, we understand extremism as the combination of a radical ideology and sympathy for or acceptance of ideologically motivated violence. Crucially, the acceptance of violence and its execution are not necessarily associated; therefore, extremism (i.e., the acceptance of violence on behalf of a radical ideology) needs to be distinguished from violent extremism (i.e., the execution of ideologically motivated violence) (see Khalil et al., 2022). Radicalization can be understood as the (nonlinear and idiosyncratic) process that leads individuals or groups to adopt extremist ideations (e.g., McCauley & Moskaleiko, 2008; Rothut et al., 2022).

We understand propaganda as a specific form of persuasive communication (Jowett & O'Donnell, 2012), as the strategic attempt to manipulate emotions and cognitions to motivate behavior in the acceptance of an ideology—often an ideology that claims absolute validity (Rieger et al., 2020a). Accordingly, we understand Islamic extremist propaganda as persuasive communication that expresses sympathy for or justifies violence through a narrow and radical interpretation of Islam. For instance, this may involve promoting violent (or “lesser”<sup>1</sup>) Jihad against “apostate” Muslims (all those who do not share their worldview) and infidels (mostly Jews and/or “crusaders”) or promoting anti-democratic and violent means as defense against an alleged “global war” against Muslims (Ebner, 2017).

Digitization has fundamentally altered the distribution of propaganda, including the staging, dissemination, and consumption of Islamic extremist propaganda (Rieger et al., 2020b). Nowadays, Islamic extremists use a wide range of *technical affordances*—action possibilities in the digital environment that emerge from the interplay of technical features (e.g., the uploading of recorded videos) and the usage of these features by the user (e.g., to upload propaganda versus a cooking tutorial; Evans et al., 2017)—for their propaganda dissemination. For instance, Islamic extremists have been found to create specific hashtags (Awan, 2017) to create text-based, visual, and audiovisual materials (Mehran et al., 2021; Winter, 2018) and to employ fake accounts to simulate popularity for their content (Stern & Berger, 2016).

Islamic extremists remain very active on social media (Ayad et al., 2022). A study by the Institute for Strategic Dialogue described an entire German language ecosystem of Salafis<sup>2</sup> (not all of them extremist) targeting young media users, with a 77% increase in posting activity between 2019 and 2021 (Comerford et al., 2021). The same study also shows that a substantial share of the examined posts transmitted extremist ideas, with Instagram being among the most toxic platforms. This is not to imply that most posts on Instagram express violence. A content analysis of an Islamic extremist Instagram Influencer account (Frischlich, 2021) shows that only a small share of posts were explicitly extremist. Instead, the posts tried to connect with the users' life-worlds and played with the users' emotions.

### *Affect and Emotions*

Emotions are specific affective states. Psychological appraisal theories (Scherer, 2005) postulate that emotions are triggered by personally meaningful appraisals of specific elicitors (stimuli or events, such as considering something purposefully unjust, which triggers anger; see Lazarus, 2001). They are characterized by the synchrony of specific bodily symptoms (e.g., a faster heartbeat), communication patterns (e.g., non-verbal grimacing and shouting), and action tendencies (e.g., to change the anger-eliciting condition), as well as subjective feelings that integrate the different responses.

Emotions are short-lived and consciously experienced (Fredrickson, 2004). Emotions can be categorized according to their valence as being positive (i.e., associated with pleasant states), negative, or mixed (e.g., nostalgia is a bittersweet state), as well as according to their intensity (e.g., being upset versus wrathful). Furthermore, emotions can be associated with both approach and avoidance behaviors (e.g., fear motivates avoidance). It is noteworthy that emotions' valence, expression, and action tendencies will vary depending on the context: what is considered appropriate in one context might be inappropriate in another.

Emotions can be distinguished from other affective states, such as mood or affect. For instance, moods are generally less intense, are not elicited by specific stimuli, and may last over hours or even days without a synchronized bodily, communicative, and motivational reaction. Affect has been described as a "pre-emotive intensity subjectively experienced and connected to [ . . . ] processes of premeditation or anticipation of events prior to their occurrence" (Papacharissi, 2016).

### *Affect, Emotions, and Collective Action*

Affect and emotions are important in propaganda, as they direct attention toward the media content, shape engagement with the content, and might potentially motivate *collective action*: actions on behalf of a collective intended to improve the status of that collective (Wright et al., 1990). Collective actions can be normative (e.g., signing a petition) or non-normative (e.g., executing violence; see Tausch et al., 2011), and they can happen offline as well as online.

Papacharissi (2016) argues that social media allow for the formation of *affective publics*: "networked publics that are mobilized and connected, identified, and potentially disconnected through expressions of sentiment" (p. 312). Thematic identifiers, such as hashtags, mediate feelings of connectedness and unite these affective publics. Notably, affective publics are assumed to support *connective action*, that is, digital political activities centering on personal expressions, placed at the blurred boundary between the public and the private (Bennett & Segerberg, 2012), but not necessarily *collective action*. Nevertheless, they play a crucial role in connecting digital extremist communities (Biswas & Deylami, 2019; Johnson, 2018).

The valence of emotions affects subsequent information processing. Media content that elicits negative emotions is more "attention-grabbing" (the so-called *negativity effect*; see Kleinnijenhuis, 2008), probably because negative emotions have a more immediate survival function. This general tendency is attenuated by distinct negative emotions: approach emotions, such as anger, motivate deeper information processing compared with avoidance emotions, such as fear (de los Santos & Nabi, 2019; Nabi, 2002). Positive emotions such as hope are generally associated with approach motivation and broaden people's momentary thought-action repertoires (Fredrickson, 2004).

Both valence and distinct emotions influence collective action. Research on collective action has shown that negative images are not only more attention grabbing but also increase willingness for collective action (Geise et al., 2021). The *social identity model of collective action* (van Zomeren et al., 2008) postulates that collective action, in general, has three main drivers: First, people must identify with their respective ingroup. Second, they must perceive an unjust deprivation of that ingroup, typically reflected in emotions of anger (e.g., Miller et al., 2009; Stürmer & Simon, 2009; van Zomeren et al., 2008). Finally, the type of collective action will depend on peoples' sense of collective efficacy: if legitimate collective action, such as protests, is perceived to be ineffective (i.e., hopeless), people are more likely to accept non-normative collective action, including violence (Tausch et al., 2011), while hope for the efficacy of the advertised collective action increases the motivation to participate (Włodarczyk et al., 2017).

Social media can mobilize collective action (Jost et al., 2018) through content that makes motivational factors salient. Such *collective action cues* have been documented in right-wing extremist videos (Hawkins & Saleem, 2021) and in conspiracy theory-endorsing online communities (Frischlich, 2022). In line with this, De Bruyn (2021) shows that including social identity and emotion-related terms improves the automated classification of extremist communication.

### *The Current Study*

Affect and emotions play a crucial role in extremist propaganda (for an overview, see Rothut et al., 2022). For instance, while right-wing extremists employ humor (Udupa & Pohjonen, 2019), Islamic extremists employ positive, self-transcending emotions (Frischlich, 2021) to veil their hate-filled ideologies. Bouko et al. (2022) show that Salafists express emotional hurt about the negative treatment of their ingroup, thereby potentially stirring up anger in their audience. A computational analysis of ISIS Al-Hayat Media Center magazines shows that similar emotions are evoked across languages: positive emotions of trust, joy, and anticipation are communicated together with negative emotions of fear and anger (Maragkos & Maravelakis, 2022). In the current study, we examined affect and emotions in Islamic extremist propaganda by studying three central affordances of Instagram: the hashtag, the image, and the text.

### *The Hashtag*

At the time of data collection, Instagram presented its users with a personalized feed that included the content of accounts and hashtags they followed as well as algorithmic recommendations of matching content and sponsored posts. New content could be discovered via the search function or in an algorithmically curated recommendations section. Consequently, hashtags allowed emergent communities and

ad hoc affective publics to form (Bruns & Burgess, 2015). Islamic extremists (like other extremist actors, see Johnson, 2018) and also many democratic social movements (see Freelon et al., 2020) create their own hashtags to unite their digital audiences (Awan, 2017). However, the extremists also hijack prominent hashtags to introduce radical content to new audiences (Farwell, 2014). For this reason, hashtags provide insights into the distinct publics that Islamic extremists address on Instagram. Consequently, we formulated our first research question (RQ):

*RQ1.* How do extremists employ hashtags to disseminate their content on Instagram?

### Images and Emotions

Images were the first impression that users got from an Instagram post at the time of data collection. Images generally leave deeper traces in people's memories than textual content (the so-called *picture superiority effect*; Paivio & Csapo, 1973), and their valence steers subsequent engagement (Geise et al., 2021). Visual material plays a crucial role in Islamic extremist propaganda (Kennedy-Boudali, 2006; Winter, 2018), as visuals are expected to contribute to the anchoring of (extremist) myths and worldviews (Hofmann & Ipsen, 2018). Positive images are thus typically used to frame the ingroup (Bouko et al., 2020) and to contrast the positive utopia within extremist-ruled regions to a dystopian world in which the ingroup suffers from cruelties imposed by its enemies (Winter, 2018). Thus, we formulated our second research question:

*RQ2.* Which emotions characterize extremists' visual communication?

### Texts and Collective Action Cues

Although visual content is the primary thing users see on Instagram, textual content can provide a more nuanced meaning to the posts. Textual references can stage a sense of community and meaning (Smith et al., 2020) and have been used to identify radical content on social media. For instance, Kursuncu et al. (2019) suggest using terms such as *jihad*, *infidel*, and *ISIS* in relation to other terms as markers for extremist narratives on Twitter. Moreover, textual elements, such as captions or texts within the images, often guide the interpretation of the images. For instance, an image of a woman with a hijab will probably be framed differently by right-wing extremists and Islamic extremists. Hence, it is likely that collective action cues are particularly present at the textual level. We thus asked the following:

*RQ3.* Which collective action cues are included in the textual elements?

## Method

We answered our research questions with a multimodal automated content analysis of a theoretically sampled case study. As we were specifically interested in Islamic extremist propaganda attempting to "mainstream" radical ideologies, we examined the Instagram account of *Generation Islam*, a German Islamic extremist group under observation by the German Federal Office for the Protection of the Constitution. The group is linked to the global Hizb ut-Tahir movement, which is forbidden in Germany. *Generation Islam* is infamous for its social media success (Bundesministerium des Inneren, 2021). On Instagram, the account has more than 69,500 followers (retrieved 23 May 2021).

### Database

We crawled all posts uploaded between January 2016 (the creation of the account) and 19 December 2018, using Instamancer ( $N=1,187$  posts).<sup>3</sup> In doing so, we covered the entire period before the account was mentioned for the first time in the German Protection of the Constitution extremism report (Bundesministerium des Inneren, für Bau und Heimat, 2019, p. 42). We stored images and captions for each post.

We created three datasets (see Figure 1): The *hashtag dataset* contains the hashtags included in the image caption. The *image dataset* contains the visual data for each post. The *text dataset* includes all captions for the images, apart from the hashtags. To account for the prominence of textual image content (i.e., text embedded as foreground in the images, see Figure 2), we extracted the image text using Google Vision API (Application Programming Interface).<sup>4</sup> The extracted text snippets were then added to the text dataset.

### Analytical Approach

Overall, our analysis entailed three strains that reflected our research questions. To examine extremist hashtag strategies (RQ1), we focused on the *hashtag network*. To answer RQ2 and RQ3 and to describe the extremists' use of emotions and collective action cues in their *textual* and *visual* propaganda, we employed natural language processing, image sentiment analysis, and deep learning (see Figure 2).

**Hashtag Network Analysis.** To gauge the hashtags' popularity, we extracted the number of public posts using this specific hashtag from Instagram. To account for the erroneous use of a hashtag, we focused on hashtags that were used at least five times ( $n=228$  out of  $n=1,719$  hashtags). Using *inductive coding* (i.e., the iterative qualitative distilling of overarching categories from the material, see Meyen et al., 2011), we extracted eight categories from the material using *religion* (e.g., references to Allah or Islam), *regional* (e.g., cities or places), *positivity* (positive affect and values such as truth), *community/family*, *politics* (e.g., political actors or elections),

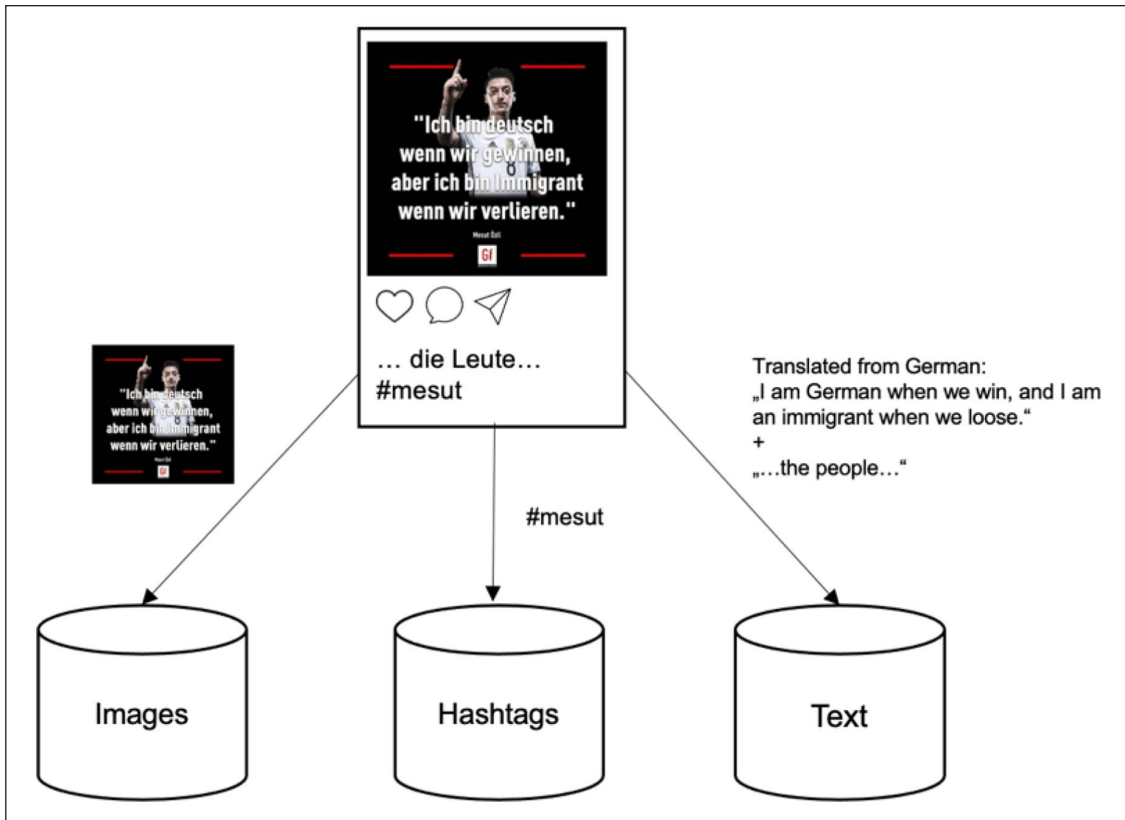


Figure 1. Creation of datasets. Post data is split into image, text, and hashtags.

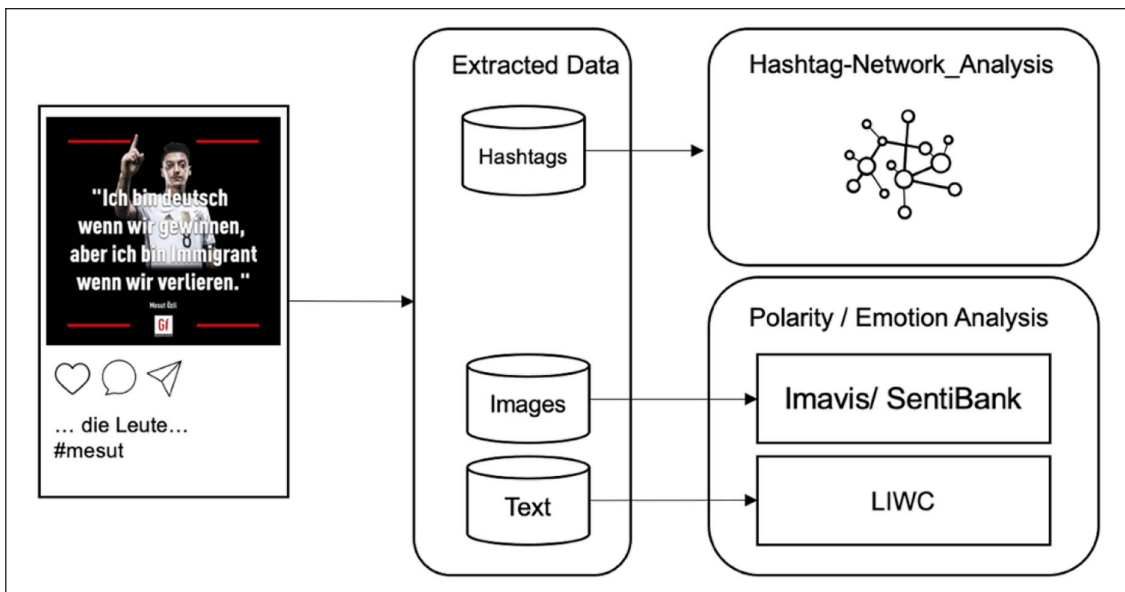


Figure 2. Process of data analysis. *Imavis* and *SentiBank* were employed for visual analysis. *LIWC* (short for: Linguistic inquiry word count) is the text analysis method employed.

*campaigns* (e.g., social media campaigns, such as #jesuis-muslim), *negativity* (negative affect or events such as war), and *miscellaneous* (covering various other topics). We manually coded all hashtags into these categories. To understand

the connection between the hashtags, we generated a network from the data, where nodes represented individual hashtags and edges represented the co-occurrence of two hashtags in the same post (see Table 1).

**Table 1.** Dominant Hashtags and Their Online Popularity.

Category	<i>n</i>	%	Average posts online	Top hashtags	Translation
Religion	4757	72.87	2,232,820.2	#muslim; #allah; #quran	#muslim; #allah; #quran
Regional	778	11.92	15,044,468.5	#deutschland; #hamburg; #medina	#Germany; #hamburg; #medina
Misc.	237	3.63	562,927.1	#medien; #zitat; #zeit; #football	#Media; #quote; #time; #football
Positivity	222	3.40	2,525,632.6	#vergebung; #wahrheit; #herz	#repentance; #truth; #heart
Community/family	170	2.60	2,579,116.5	#bruder; #ibn; #community	#brother; #ibn [Arabic name]; #community
Politics	144	2.21	1,623,121.8	#politik; #afd; #politiker	#politics; #afd [alternative for Germany]; #politician
Campaign	110	1.69	2,192.0	#gemeinsamgegenhetze #jesuismuslim; #nichtohneinkopftuch	#togetherAgainstAgitation #jesuismuslim; #NotWithoutMyHijab
Negativity	110	1.69	427,192.3	#tod; #hetze; #krieg	#Death; #Agitation; #War

Note. Reported are the absolute (*n*) and relative (%) frequencies of hashtags in our database and the average number of all posts using one of these hashtags on Instagram. Hashtags were translated for publication purposes.

**Image Analysis.** Based on the literature, we were particularly interested in the valence and emotions transmitted in Islamic extremist images. In computational social science, images' emotional valence can be examined using visual sentiment analysis (for an overview, see Ortis et al., 2019). Visual sentiment analysis is often done via deep learning, namely, through the use of *convolutional neural networks* (CNNs) (Ortis et al., 2019). One established CNN in the context of social media content is *Imavis* (Campos et al., 2017). *Imavis* analyzes raw image data and provides probability scores for both positive and negative sentiments at the level of single pixels. It provides an overall estimation of an image's sentiment, ranging from negative (=−1) to positive (=+1), and enables sentiment maps. These maps can be used to color the presumed positive and negative areas of an image, thereby allowing human validation of the algorithm's decision. We used *Imavis* to analyze the emotional valence of the images.

As we were also interested in distinct emotions, we combined the sentiment analysis of *Imavis* with an analysis based on distinct emotions. To this end, we used SentiBank (Borth et al., 2013).<sup>5</sup> SentiBank enables the detection of distinct emotions using *visual sentiment ontology* (VSO). The idea is that SentiBank maps emotions in images with the help of mid-level features: semantic objects consisting of adjectives and nouns, so-called *adjective noun pairs* (ANPs), such as “angry men,” which are derived from the manual coding of a large database. SentiBank has been shown to detect 1,200 validated adjective noun pairs, each with a classification accuracy above 60%, indicating satisfactory reliability. SentiBank can automatically generate adjective noun pair probability values from a given image dataset. Based on Plutchik's (2001) wheel of distinct emotions model, inferences about the basic emotions in these ANPs and the images can be made via the publicly available VSO website (see Note 5).

**Text Analysis.** To detect collective action cues, we used a prominent and psychologically grounded dictionary, the LIWC (linguistic inquiry and word count) by Pennebaker

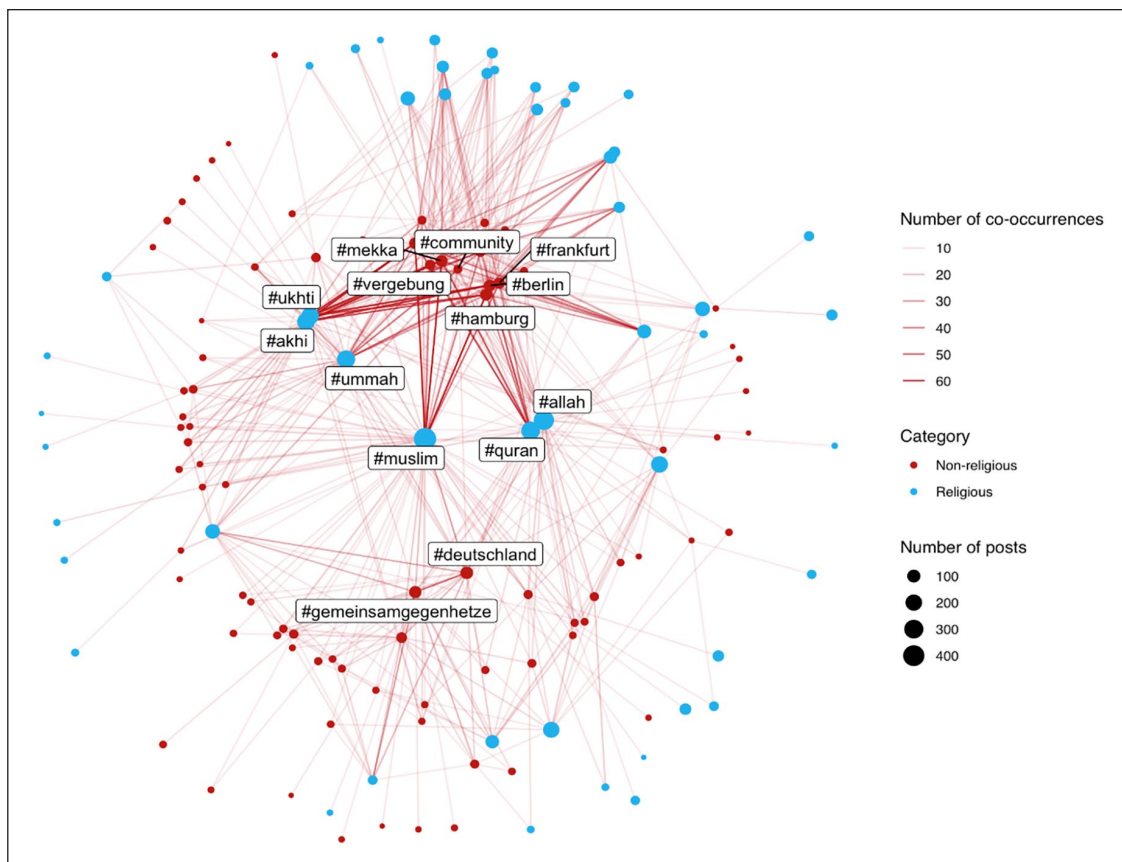
et al. (2001). The LIWC classifies words into 72 categories. The dictionary covers distinct emotions, such as “anxiety,” “anger,” “sadness,” and “optimism.” The LIWC also distinguishes between personal pronouns reflecting a more personal identity expressed in the posts (e.g., “I,” “self,” “you”), and collective pronouns (“we,” “they,” “other”), which reflect a group-based identity and require a level of understanding of the interpretation of the “we” and “them” referred to (Smith et al., 2020). The LIWC also covers “social” words related to addressing “family,” “friends,” and “humans,” and it includes labels for “inclusive” and “exclusive” formulations, indicating intergroup communication. For our analysis, we examined whether a post included the distinct negative emotions of *anger* (as a potential motivator of collective action), *sadness* or *anxiety* (as typical emotions expressed in extremist propaganda), or *optimism* (as an indicator of the transmitted efficacy of following the extremists' path). We also examined whether the posts referred to *religion*, a *social identity* (using the personal pronoun “we,” or “other references,” or using “including” or “excluding” language), or *personal identity* (“I,” “self,” or “you”).

## Results

### Hashtags and Affect

Most posts (75.42%) contained at least one hashtag, with an average of nine hashtags per post. Overall, 1,726 unique hashtags were found, covering a broad range of topics, such as sports (e.g., “#football”), hobbies (e.g., “#photography”), or politics (e.g., “#democracy”). The dominant category was (Islamic) religion (e.g., seasonal greetings such as “#eidmubarak”). The 15 most frequent hashtags all fell into this category (see Table 1).

Our qualitative coding showed that all categories included popular hashtags, with the average number of public Instagram posts using the same hashtags ranging from 500,000 to 15,000,000. Religious, regional, and positive



**Figure 3.** Hashtag graph with 134 nodes and 501 edges. Closeness centrality was used as the basis for the layout algorithm. The 14 hashtags with the highest closeness were labeled. [Translation: #vergebung = #forgiveness, #deutschland = #germany, #gemeinsamgegenhetze = #togetherAgainstAgitation, #ummah = #community, #ukhti = #sister, #akhi = #brother].

hashtags were particularly popular, as were hashtags from the *miscellaneous* category.

Supporting the idea of a strategic linking of the ideological to mundane topics, religious hashtags were often used in combination with non-religious hashtags, as apparent in the hashtag network (see Figure 3). Only 12.20% of all posts exclusively used religious hashtags. Answering RQ1, the affective publics addressed by Generation Islam through hashtags reflected a religious and/or local community and relied on positive affect. Furthermore, the hashtags were part of a larger networked public sphere in the users' lifeworlds.

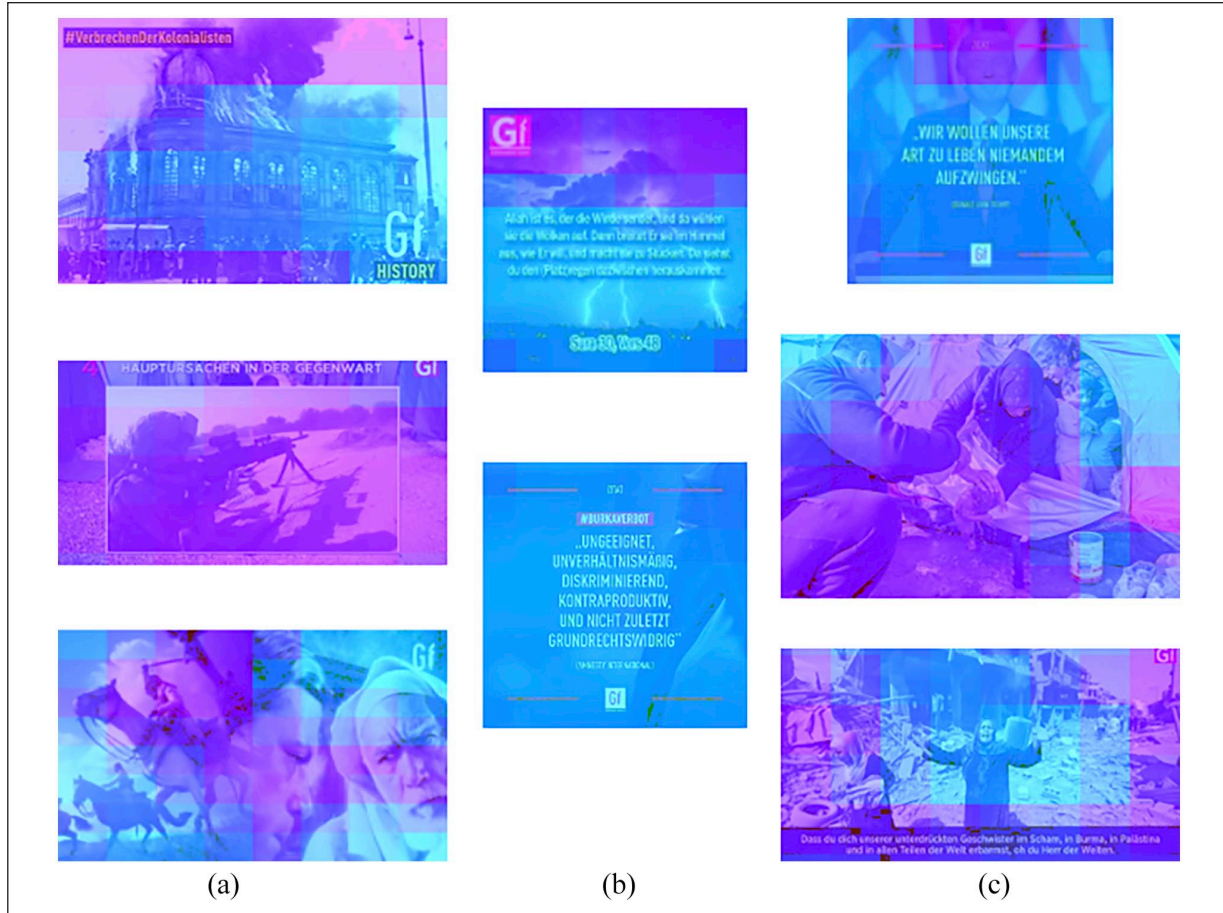
### Valence and Emotion in the Images

The Imavis (Campos et al., 2017) sentiments score showed that most of the images were classified as negative ( $Md = -0.87$ ,  $IR [-0.97, -0.60]$ ). A manual inspection of the sentiment maps (see Figure 4) largely confirmed this classification. Single negative artifacts, such as weapons, burning areas of a building, or negative facial expressions, were well recognized by the algorithm (see Figure 4a). However, text areas were mostly classified as "positive" (cf. Figure 4b), suggesting that the actual number of positively valenced

images might be lower. Furthermore, backgrounds were not well differentiated (see also Campos et al., 2017), which might lead to an overlooking of more subtle image cues (see Figure 4c). Overall, the images employed by the propagandists were likely to raise attention via a negativity bias (Kleinnijenhuis, 2008) and might lay the groundwork for larger collective action motivations (Geise et al., 2021).

To obtain a more detailed impression of the discrete emotions in the images, we used SentiBanks (Borth et al., 2013). Table 2 shows the most frequent adjective noun pairs. Providing nuance to the negativity detected by the Imavis analysis, anger (angry man), fear (dead terrorists), and defense-related images (dark fortress, amazing armor) dominated. Other images transmitted optimism (inspirational poster, victorious team) or referred to leisure-time activities (e.g., strong beer, which seems to be connected to images with bearded men from manual inspection not to alcohol consumption).

An inspection of the distinct emotions in the images (see Figure 5) showed that images entailing angry men were correctly classified as anger mixed with disgust and sadness, while visualizations of fortresses, dark nights, and "scary Halloween" were classified as fear-inducing images. "Inspirational" elements, such as bright cities and



**Figure 4.** (a–c) Exemplary results of the images' sentiment analysis. Positive image details are colored in light blue and negative ones in purple. Images are cited in accordance with the German copyright law §51 from @generation\_islam (2018).

**Table 2.** Top 20 ANP of the Generation Islam Image Corpus.

No.	ANP	M	No.	ANP	M
1	angry_men	0.81	11	strong_beer	0.74
2	dark_fortress	0.79	12	dark_wall	0.74
3	dead_terrorist	0.77	13	scary_halloween	0.74
4	super_food	0.77	14	bright_city	0.72
5	classic_coke	0.76	15	fat_loss	0.72
6	dark_night	0.76	16	victorious_team	0.72
7	outdoor_lights	0.76	17	great_night	0.71
8	favorite_team	0.75	18	excellent_book	0.71
9	inspirational_poster	0.74	19	favorite_band	0.70
10	amazing_armory	0.74	20	traditional_festival	0.70

ANPs = Adjective noun pairs provided by visual sentiment ontology. Note. Each image had a confidence value for each of the 1,200 ANPs. We extracted the top 20 ANPs that were predominant in our corpus. The mean (M) refers to the average confidence value of all images in which the particular adjective noun pair was detected.

inspirational posters, were classified as elicitors of joy and anticipation (i.e., hope or optimism). In answer to RQ2, overall, the images raised attention via negativity and

included a mixture of threat, anger, and optimism, probably intended to fuel collective actions.

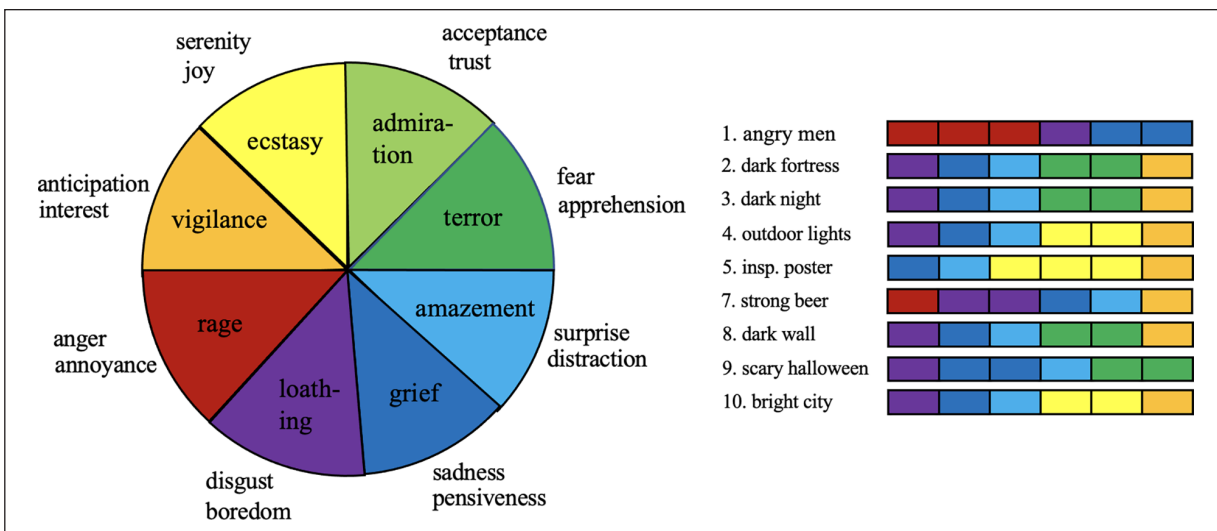
### Collective Action Cues in the Texts

We analyzed the textual content using the *quanteda* package for R (Benoit et al., 2018). Figure 6 provides a joint overview of word frequency in all categories.

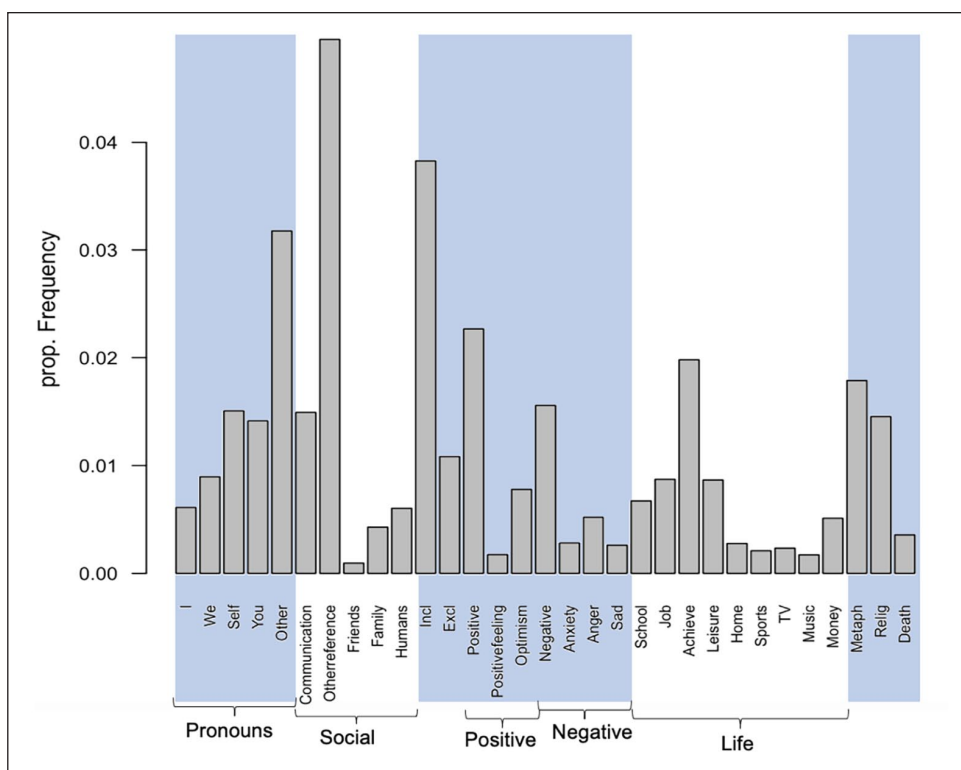
Consistent with the hashtag analysis and the ideological stance of the account, religion was a frequent topic. Nearly half of the posts (47.9%,  $n=569$ ) used a religious word. Based on our theoretical interest in elicitors of collective action, we were particularly interested in how far the posts addressed distinct emotions and group identities.

With regard to collective identities, the posts clearly differentiated between the ingroup and the outgroup. Most of the words contained in the LIWC (89.6%,  $n=1,064$ ) were categorized as either including or excluding language, and contained references to third-person pronouns (“we” and “other” references). References to participants' personal identities using first- and second-person pronouns, such as “I” and “you,” and references to the “self” were less frequent ( $n=644$ , 54.2%). In line with our





**Figure 5.** Breakdown of the top 10 adjective noun pairs in the analyzed images in relation to their basic emotions, as drawn from Plutchik's emotion wheel (2001) (Borth et al., 2013).



**Figure 6.** Text data presented in LIWC categories. For a better assessment, the absolute word frequencies were divided by the total number of words classified via the dictionary.

findings from the hashtag analysis, we also found many references in the image captions relating to themes of leisure, friendships, family, and also metaphors and references to religion. With regard to specific emotions, the LIWC showed that a relatively large share of posts transmitted optimism ( $n=347$ , 29.2%). Roughly half that

number of posts communicated anger ( $n=202$ , 17.0%). Answering RQ3, the textual elements anchored the social identities of users who were attracted by the religious hashtags, and although they also touched on negative emotions and mobilized anger, they mostly spread a positive view of the future if users followed the “right path.”

## Relationships Between Images and Text

To explore the relationships between the images and the textual information, we calculated Spearman correlations between the LIWC and the images' sentiments. This analysis showed that positively valenced images were used to anchor recipients' social identity ( $\rho = .11, p < .001$ ) and also to accompany texts that included negative emotions such as anger ( $\rho = .13, p < .001$ ), sadness ( $\rho = .09, p < .01$ ), and anxiety ( $\rho = .08, p < .01$ ). Overall, the negatively valenced images (see above) were accompanied less often by texts that addressed participants' social identity ( $\rho = -.11, p < .001$ ), or their lifeworlds ( $\rho = -.08, p < .01$ ), or texts that expressed negative emotions ( $\rho = -.12, p < .001$ ) such as anger ( $\rho = -.13, p < .001$ ), sadness ( $\rho = -.09, p < .01$ ), or anxiety ( $\rho = -.08, p < .01$ ). Thus, negative images seemed to be used to capture attention, while positive images seemed to be employed to create a positive affective community and inspire following the propagandists' path.

## Discussion

### Main Findings and Theoretical Implications

Overall, our results gave novel insights into the extremist propaganda strategies employed on Instagram, focusing on three central affordances: hashtags, images, and text. In answering RQ1, we found that hashtags were used to create affective communities around religious identities and local communities. Popular hashtags were hijacked to associate the extremists' pseudo-religious messages with multiple elements of the participants' lifeworlds. Overall, Generation Islam created networked publics (Papacharissi, 2016) that were connected via regional and mundane references to young peoples' lifeworlds, unified via a (narrowly interpreted) religious identity, and sugarcoated with positive affect (for similar observations, see Biswas & Deylami, 2019; Pearson, 2018).

Visuals conveyed the first impression users got from an Instagram post at the time of data collection. Answering RQ2, the images were mostly negative, capturing users' attention (Kleinnijenhuis, 2008), and likely to elicit emotions associated with collective action, such as anger (Cohen-Chen & Van Zomeren, 2018; Stürmer & Simon, 2009; Tausch et al., 2011) but also fear and optimism. Prior work has shown that negative (but not positive) images can increase (normative) collective action intention (Geise et al., 2021), while Winter (2018) argues that documenting the victimization and suffering of the ingroup makes the promise of the extremists' utopian vision even more powerful.

Textual elements can provide deeper meaning to the visuals on Instagram. Answering RQ3, we identified frequent collective action cues. In particular, textual elements were used to anchor users' social identities and to spread optimism if the users followed the "right path." In highlighting this, our study broadens prior work on collective action cues in

extremist propaganda (Frischlich, 2022; Hawkins & Saleem, 2021) by showing how different affordances are combined on Instagram. The Islamic extremist propaganda examined was found to lure members from broad and often positive affective publics, catching their attention via negative images while simultaneously providing "solutions" to the depicted problems through a positive community and in this way, inspiring adherence to a narrow, radical ideology.

Overall, our findings have significant theoretical and methodological implications, as they underscore the role of affect and emotion in modern extremist propaganda and call for a more nuanced examination of the different social media affordances exploited in extremist propaganda campaigns. By providing a crucial extension to prior work that used manual content analyses (e.g., Bouko et al., 2022; Wignell et al., 2018) or relied only on textual elements (Smith et al., 2020), our study demonstrates that combining multimodal automated content analysis tools can support such research at scale.

### Limitations and Directions for Future Research

Our study has several limitations that must be considered when evaluating its generalizability. First, we focused on only one German language account on Instagram. Germany has relatively harsh regulations against the dissemination of online hatred (the Network-Enforcement Act, Netz DG) through large-scale platforms, making it likely that propaganda in other languages, or on other platforms, is under less pressure by attempts at moderation (see also Frischlich et al., 2022). However, users are more likely to fall for covert propaganda (Reinemann et al., 2019); thus, it is plausible that propaganda directed toward new audiences will need to employ strategies that cover their extremist intent.

Second, we employed a case study methodology. Although the case study allowed us to gain deep and nuanced insights into a specific actor's strategy, and our findings match those of prior content analytical studies in this area (e.g., Bouko et al., 2020), future research replicating and extending our findings is needed to understand the generalizability of our observations. Furthermore, we focused only on Instagram. Generation Islam is also active on Facebook, YouTube, and TikTok. We deemed this decision justified, as the group has more followers on Instagram than on YouTube,<sup>6</sup> and their Facebook account links back to their Instagram account, underlining the centrality of the platform for them. Nevertheless, future research examining extremists' communication across platforms would provide meaningful insights into the use of different affordances in different contexts (e.g., hashtags might be used differently on Twitter than on Instagram).

Moreover, we focused only on Islamic extremism. Although Islamic extremism remains a viable threat, and Europe is regularly shaken by terror attacks inspired by a radical and narrow pseudo-religious understanding of Islam, it is not to say that other extremist movements are less

dangerous, and we explicitly call for research examining the employment of social media by other extremists too (for a similar call, see Conway, 2017). Such comparative research also promises meaningful insights into the different emotional patterns evident in the propaganda of Islamic extremists and, for instance, that of right-wing extremists.

Each of the methods employed had its own limitations. Imavis performed less effectively when the images contained a lot of text. Thus, using the method for images with many embedded citations should be interpreted with care. SentiBank provided a range of valuable information. However, as the algorithm does not provide a direct assignment to distinct emotional states, they must be inferred from the homepage. This means that SentiBank is currently not entirely scalable. Furthermore, dictionaries such as LIWC miss nuanced relationships between words. Consequently, if future research can employ more advanced natural language processing tools (e.g., co-occurrences and topic models), it is likely that it will provide additional insights. Overall, although we are confident that our multimethod approach allowed us to compensate for the weaknesses of single methods, future research on the optimal combination of methods and automated tools is needed.

Finally, we focused purely on an analysis of extremists' propaganda strategies. Thus, our study does not allow for causal conclusions regarding the reception or the effects of Generation Islam's Instagram strategy or of extremist propaganda in general. Future research examining the consumption of extremist propaganda on Instagram and testing the effects of such consumption is needed to examine the propaganda's potential for radicalization.

### Practical Implications and Conclusion

Nevertheless, our study provides novel insights into the affective and emotional strategies of extremist propaganda that exploit Instagram's affordances. The results are important in terms of further algorithmic considerations and automated detection, and also in terms of creating awareness in social media users. Most relevant, they demonstrate that consideration of different affordances and their combinations, as well as consideration of distinct affective and emotional states, are needed to understand propaganda campaigns.

For platforms, covert propaganda increases the challenge of distinguishing between legitimate political discourse and propaganda, and it underlines the need for nuanced and context-sensitive moderation. For users, an awareness of these covert propaganda strategies is crucial, and targeted interventions are needed to build extremism literacy. Such strategies could follow the example of PRECOBIAS,<sup>7</sup> a campaign that teaches users about cognitive biases in extremist propaganda. Research into cognitive inoculation has shown that preemptively confronting people with small doses of a persuasive message and activating their cognitive defenses can help them handle extremist propaganda better (Lewandowsky & Yesilada, 2021). Our research shows that highlighting the risk

of finding extremism behind seemingly innocuous blue skies on Instagram should be part of such an inoculation campaign.

### Declaration of Conflicting Interests


The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The authors acknowledge support by the German Ministry of Culture and Science of the German State of North Rhine-Westphalia (FKZ 005-1709-0001) and the European Research Center for Information Systems (ERCIS).

### ORCID iDs

Lena Clever  <https://orcid.org/0000-0003-0926-6326>

Nico Christoph Clever  <https://orcid.org/0000-0002-4347-9029>

### Notes

1. Jihad means struggle. Islam distinguishes between the "great Jihad" against oneself in an attempt to become a better person and the "lesser," violent, Jihad against others, which is the dominant interpretation of the word by Islamic extremists, as well as the usual non-Muslim reading.
2. "Salafism is a branch of Sunni Islam whose modern-day adherents claim to emulate "the pious predecessors" (*al-salaf al-ṣāliḥ*; often equated with the first three generations of Muslims) as closely and in as many spheres of life as possible" (Wagemakers, 2016, p. 1).
3. See <https://github.com/ScriptSmith/instamancer>. Please note, that this tool is no longer maintained due to platform changes.
4. See: <https://cloud.google.com/vision>.
5. See <https://visual-sentiment-ontology.appspot.com>
6. As of today (21 September 2022), the group ties with 51,600 followers on YouTube, 73,000 followers on Facebook and 66,900 followers on Instagram.
7. See <https://www.precobias.eu/online-course/>

### References

- Alonso, R., & Delgado, P. (2020). The radicalization of young jihadi convicted of membership of terrorist organization in Spain: Analyzing the pieces of the puzzle. *Studies in Conflict & Terrorism*. Advance online publication. <https://www.tandfonline.com/doi/abs/10.1080/1057610X.2020.1780025>
- Awan, I. (2017). Cyber-extremism: ISIS and the power of social media. *Society*, 54(2), 138–149. <https://doi.org/10.1007/s12115-017-0114-0>
- Ayad, M., Harrasy, A., & Abdullah, A. M. (2022). *Under-moderated, unhinged and ubiquitous: Al-Shabaab and the Islamic state networks on Facebook*. Institute for Strategic Dialogue.
- Bennett, W. L., & Segerberg, A. (2012). The logic of connective action: Digital media and the personalization of contentious politics. *Information, Communication & Society*, 15(5), 739–768. <https://doi.org/10/f2znbx>
- Benoit, K., Watanabe, K., Wang, H., Nulty, P., Obeng, A., Müller, S., & Matsuo, A. (2018). Quanteda: An R package for the

- quantitative analysis of textual data. *Journal of Open Source Software*, 3(30), 774. <https://doi.org/10.21105/joss.00774>; <https://quanteda.io>
- Biswas, B., & Deylami, S. (2019). Radicalizing female empowerment: Gender, agency, and affective appeals in Islamic State propaganda. *Small Wars & Insurgencies*, 30(6–7), 1193–1213. <https://doi.org/10.1080/09592318.2019.1649831>
- Bloom, M., & Moskalenko, S. (2021). *Pastels and pedophiles: Inside the mind of Qanon*. Stanford University Press.
- Borth, D., Chen, T., Ji, R., & Chang, S. F. (2013). SentiBank: Large-scale ontology and classifiers for detecting sentiment and emotions in visual content. In *Proceedings of the 21st ACM international conference on Multimedia (MM'13)* (pp. 459–460). <https://doi.org/10.1145/2502081.2502268>
- Bouko, C., Carton, J., Naderer, B., Rieger, D., Van Ostaeyen, P., & Voué, P. (2020). *Prevention of youth radicalisation through self-awareness on cognitive biases*. <https://www.precobias.eu/wp-content/uploads/2020/08/PRECOBIAS-867186-D2.1-Executive-Report.pdf>
- Bouko, C., Naderer, B., Rieger, D., Ostaeyen, P. V., & Voué, P. (2022). Discourse patterns used by extremist Salafists on Facebook: Identifying potential triggers to cognitive biases in radicalized content. *Critical Discourse Studies*, 19(3), 252–273. <https://doi.org/10.1080/17405904.2021.1879185>
- Bruns, A., & Burgess, J. (2015). The use of twitter hashtags in the formation of ad hoc publics. In N. Rambukkana (Ed.), *Hashtag publics: The power and politics of discursive networks* (pp. 13–27). Peter Lang Publishing.
- Bundesministerium des Inneren. (2021). *Verfassungsschutzbericht 2020* [Report on the Protection of the Constitution 2020]. Bundesamt für Verfassungsschutz.
- Bundesministerium des Inneren, für Bau und Heimat. (2019). *Verfassungsschutzbericht 2018* [Report on the Protection of the Constitution 2018]. Bundesamt für Verfassungsschutz.
- Campos, V., Jou, B., & Giró-i-Nieto, X. (2017). From pixels to sentiment: Fine-tuning CNNs for visual sentiment prediction. *Image and Vision Computing*, 65, 15–22. <https://doi.org/10.1016/j.imavis.2017.01.011>
- Cohen-Chen, S., & Van Zomeren, M. (2018). Yes we can? Group efficacy beliefs predict collective action, but only when hope is high. *Journal of Experimental Social Psychology*, 77, 50–59. <https://doi.org/10.1016/j.jesp.2018.03.016>
- Comerford, M., Ayad, M., Guhl, J., Panditj, R., & Ali, R. (2021). *Generation Z & Das Salafistische Online- Ökosystem* [Generation Z & the Salafii online-ecosystem]. Institute for Strategic Dialogue.
- Conway, M. (2017). Determining the role of the internet in violent extremism and terrorism: Six suggestions for progressing research. *Studies in Conflict & Terrorism*, 40(1), 77–98. <https://doi.org/10/gfgnmw>
- De Bruyn, P. C. (2021). Evidence to explain violent extremist communication: A systematic review of individual-level empirical studies. *Perspectives on Terrorism*, 15(4), 76–110.
- DeCook, J. R. (2018). Memes and symbolic violence: #proudboys and the use of memes for propaganda and the construction of collective identity. *Learning, Media and Technology*, 43(4), E485–E504. <https://doi.org/10.1080/17439884.2018.1544149>
- de los Santos, T. M., & Nabi, R. L. (2019). Emotionally charged: Exploring the role of emotion in online news information seeking and processing. *Journal of Broadcasting & Electronic Media*, 63(1), 39–58. <https://doi.org/10/gf8pzn>
- DiResta, R., Shaffer, D. K., Ruppel, B., Matney, R., Fox, R., Albright, D. J., & Johnson, B. (2019). *The tactics & tropes of the Internet Research Agency* (p. 101). New Knowledge.
- Ebner, J. (2017, November 14). How Jihadism and the far right have more in common than you'd think. *Independent*, 1–9.
- Evans, S. K., Pearce, K. E., Vitak, J., & Treem, J. W. (2017). Explicating affordances: A conceptual framework for understanding affordances in communication research. *Journal of Computer-Mediated Communication*, 22(1), 35–52. <https://doi.org/10.1111/jcc4.12180>
- Farwell, J. P. (2014). The media strategy of ISIS. *Survival*, 56(6), 49–55. <https://doi.org/10/gfkjcb>
- Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London*, 359(1449), 1367–1377.
- Freelon, D., Marwick, A., & Kreiss, D. (2020). False equivalencies: Online activism from left to right. *Science*, 369(6508), 1197–1201. <https://doi.org/10/gghjcpj>
- Frischlich, L. (2021). #dark inspiration: Eudaimonic entertainment in extremist Instagram posts. *New Media & Society*, 23(3), 554–577. <https://doi.org/10/gghnhr>
- Frischlich, L. (2022). “Resistance!” Collective action cues in conspiracy theory-endorsing Facebook groups. *Media and Communication*, 10(2), 130–143. <https://doi.org/10.17645/mac.v10i2.5182>
- Frischlich, L., Schatto-Eckrodt, T., & Völker, J. (2022). *Rückzug in die Schatten? Die Verlagerung digitaler Foren zwischen Fringe Communities und „Dark Social“ und ihre Implikationen für die Extremismusprävention* [Withdrawal to the shadows? Digital Forums' shift between fringe communities and dark social and its implications for extremism prevention] (Nr. 4). CORE Network.
- Geise, S., Panke, D., & Heck, A. (2021). Still images—Moving people? How media images of protest issues and movements influence participatory intentions. *The International Journal of Press/Politics*, 26(1), 92–118. <https://doi.org/10.1177/1940161220968534>
- Gill, P., Corner, E., Thornton, A., & Conway, M. (2015). *What are the roles of the Internet in terrorism?* [http://voxpath.eu/wp-content/uploads/2015/11/DCUJ3518\\_VOX\\_Lone\\_Actors\\_report\\_02.11.15\\_WEB.pdf](http://voxpath.eu/wp-content/uploads/2015/11/DCUJ3518_VOX_Lone_Actors_report_02.11.15_WEB.pdf)
- Glaser, S. (2020). *Jugendschutz im Internet: Risiken und Handlungsbedarf* [Youth protection on the net: Risks and action needs]. Jugendschutz.net.
- Hawkins, I., & Saleem, M. (2021). Rise UP! A content analytic study of how collective action is discussed within white nationalist videos on YouTube. *New Media & Society*. Advance online publication. <https://doi.org/10.1177/14614448211040520>
- Hofmann, I., & Ipsen, F. (2018). Extremismus und Popkultur. Aktuelle Erscheinungsformen islamistischer und rechtsextremer Propaganda im Social Web [Extremism and popculture. Current forms of islamist and right-wing extremist propaganda in the social web]. *JMS Report*, 3, 2–4.
- Johnson, J. (2018). The self-radicalization of white men: “Fake news” and the affective networking of paranoia. *Communication, Culture and Critique*, 11(1), 100–115. <https://doi.org/10.1093/ccc/tcx014>
- Jost, J. T., Barberá, P., Bonneau, R., Langer, M., Metzger, M., Nagler, J., Sterling, J., & Tucker, J. A. (2018). How social media facilitates political protest: Information, motivation, and

- social networks. *Political Psychology*, 39(3), 85–118. <https://doi.org/10/gc3m4d>
- Jowett, G. S., & O'Donnell, V. (2012). *Propaganda and persuasion* (5th ed.). SAGE.
- Kennedy-Boudali, L. (2006). *Islamic imaginary project—Visual motifs in jihadi Internet propaganda*. The Combating Terrorism Center, Department of Social Sciences, United States Military Academy. <https://css.ethz.ch/en/services/digital-library/publications/publication.html/19674>
- Khalil, J., Horgan, J., & Zeuthen, M. (2022). The attitudes-behaviors corrective (ABC) model of violent extremism. *Terrorism and Political Violence*, 34(3), 425–450. <https://doi.org/10.1080/09546553.2019.1699793>
- Kleinnijenhuis, J. (2008). Negativity. In *The international encyclopedia of communication*. John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781405186407.wbiecn005>
- Kursuncu, U., Gaur, M., Castillo, C., Alambo, A., Thirunarayan, K., Shalin, V., Achilov, D., Arpinar, I. B., & Sheth, A. (2019). Modeling Islamist extremist communications on social media using contextual dimensions: Religion, ideology, and hate. In *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW) (pp. 151:1–151:22). <https://doi.org/10/gg4gvw>
- Lazarus, R. S. (2001). Relational meaning and discrete emotions. In K. R. Scherer, A. Schorr, & T. Johnston (Eds.), *Appraisal processes in emotion* (pp. 37–67). Oxford University Press.
- Lee, C. S., & Colautti, J. D. (2022). ISIS's COVID-19 messaging on Twitter: An analysis of tweet sentiment and emotions. *Crime & Delinquency*, 68(8), 1347–1370. <https://doi.org/10.1177/00112872211083881>
- Lewandowsky, S., & Yesilada, M. (2021). *Inoculating against the spread of Islamophobic and radical-Islamist disinformation*. Center for Research and Evidence on Security Threats.
- Maragos, K. E., & Maravelakis, P. E. (2022). Extracting primary emotions and topics from the Al-Hayat Media Center magazine publications, using topic modelling and lexicon-based approaches. *Social Science Computer Review*. Advance online publication. <https://doi.org/10.1177/08944393211061272>
- McCauley, C., & Moskaleiko, S. (2008). Mechanisms of political radicalization: Pathways toward terrorism. *Terrorism and Political Violence*, 20(3), 415–433. <https://doi.org/10/d8nxv9>
- Mehran, W., Al Bayati, U., Mottet, M., & Lemieux, A. F. (2021). Deep analysis of Taliban videos: Differential use of multimodal, visual and sonic forms across strategic themes. *Studies in Conflict & Terrorism*. Advance online publication. <https://doi.org/10.1080/1057610X.2020.1866739>
- Meleagrou-Hitchens, A., & Brun, H. (2013). *A neo-nationalist network: The English defence league and Europe's counter-Jihad movement*. The International Center for Study of Radicalization and Political Violence.
- Meyen, M., Löblich, M., Pfaff-Rüdiger, S., & Riesmeyer, C. (2011). *Qualitative Forschung in der Kommunikationswissenschaft* [Qualitative research in communication studies]. Springer.
- Miller, D. A., Cronin, T., Garcia, A. L., & Branscombe, N. R. (2009). The relative impact of anger and efficacy on collective action is affected by feelings of fear. *Group Processes & Intergroup Relations*, 12(4), 445–462. <https://doi.org/10.1177/1368430209105046>
- Nabi, R. L. (2002). Anger, fear, uncertainty, and attitudes: A test of the cognitive-functional model. *Communication Monographs*, 69(3), 204–216. <https://doi.org/10/dchzh4>
- Nabi, R. L. (2003). Exploring the framing effects of emotion: Do discrete emotions differentially influence information accessibility, information seeking, and policy preference? *Communication Research*, 30(2), 224–247. <https://doi.org/10/b6gwnr>
- Ortis, A., Farinella, G. M., & Battiato, S. (2019). An overview on image sentiment analysis: Methods, datasets and current challenges. In *16th International Conference on Signal Processing and Multimedia Applications*. <https://www.scitepress.org/Papers/2019/79096/79096.pdf>
- Paivio, A., & Csapo, K. (1973). Picture superiority in free recall: Imagery or dual coding? *Cognitive Psychology*, 5(2), 176–206. [https://doi.org/10.1016/0010-0285\(73\)90032-7](https://doi.org/10.1016/0010-0285(73)90032-7)
- Papacharissi, Z. (2016). Affective publics and structures of storytelling: Sentiment, events and mediality. *Information, Communication & Society*, 19(3), 307–324. <https://doi.org/10/gc6xxz>
- Pearson, E. (2018). Online as the new frontline: Affect, gender, and ISIS-take-down on social media. *Studies in Conflict & Terrorism*, 41(11), 850–874. <https://doi.org/10.1080/1057610X.2017.1352280>
- Pennebaker, J. W., Francis, M. E., & Booth, R. J. (2001). *Linguistic inquiry and wordcount: LIWC 2001* (71: 2001). Lawrence Erlbaum.
- Plutchik, R. (2001). The nature of emotions: Human emotions have deep evolutionary roots, a fact that may explain their complexity and provide tools for clinical practice. *American Scientist*, 89(4), 344–350.
- Rathgeb, T., & Schmid, T. (2021). *JIM-Studie 2021: Jugend, Information, Medien* [JIM 2021: Youth, information, media]. Medienpädagogischer Forschungsverbund Südwest.
- Reinemann, C., Ninierza, A., Fawzi, N., Riesmeyer, C., & Neumann, K. (2019). *Jugend—Medien—Extremismus* [Youth—Media—Extremism]. Springer Fachmedien VS.
- Rieger, D., Frischlich, L., & Bente, G. (2020a). Dealing with the dark side: The effects of right-wing extremist and Islamist extremist propaganda from a social identity perspective. *Media, War & Conflict*, 13, 280–299. <https://doi.org/10/gf3gmz>
- Rieger, D., Frischlich, L., Rack, S., & Bente, G. (2020b). Digitaler Wandel, Radikalisierungsprozesse und Extremismusprävention im Internet [Digital change, radicalization processes and extremism prevention]. In B. Ben Slama & U. Kemmesies (Eds.), *Handbuch Extremismusprävention* (pp. 351–388). Bundeskriminalamt.
- Rothut, S., Schulze, H., Hohner, J., Greipl, S., & Rieger, D. (2022). *Radikalisierung im Internet* [Radicalization on the internet]. Bonn International Center for Conversion.
- Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Science Information*, 44(4), 695–729. <https://doi.org/10/fwmgvv>
- Schmidt-Kleinert, A. (2020, May 25). The great divide? The online-offline nexus and insights from research on the far-right in Germany. *PRIF BLOG*. <https://blog.prif.org/2020/05/25/the-great-divide-the-online-offline-nexus-and-insights-from-research-on-the-far-right-in-germany/>
- Smith, L. G. E., Wakeford, L., Cribbin, T. F., Barnett, J., & Hou, W. K. (2020). Detecting psychological change through mobilizing interactions and changes in extremist linguistic style. *Computers in Human Behavior*, 108, 106298. <https://doi.org/10.1016/j.chb.2020.106298>
- Speckhard, A., & Ellenberg, M. (2020, December 30). ISIS and the militant Jihad on Instagram, part II: Terrorist propagandizing

- and recruitment strategies. *VOX—Pol*. <https://www.voxpol.eu/isis-and-the-militant-jihad-on-instagram-part-ii-terrorist-propagandizing-and-recruitment-strategies/>
- Stern, J., & Berger, J. M. (2016). *ISIS: The state of terror* (2nd ed.). Ecco.
- Stürmer, S., & Simon, B. (2009). Pathways to collective protest: Calculation, identification, or emotion? A critical analysis of the role of group-based anger in social movement participation. *Journal of Social Issues, 65*(4), 681–705. <https://doi.org/10/d3nfv3>
- Tausch, N., Becker, J. C., Spears, R., Christ, O., Saab, R., Singh, P., & Siddiqui, R. N. (2011). Explaining radical group behavior: Developing emotion and efficacy routes to normative and non-normative collective action. *Journal of Personality and Social Psychology, 101*(1), 129–148. <https://doi.org/10/cdtf2s>
- Udupa, S., & Pohjonen, M. (2019). Extreme speech and global digital culture. *International Journal of Communication, 13*, 3049–3067.
- van Zomeren, M., Postmes, T., & Spears, R. (2008). Toward an integrative social identity model of collective action: A quantitative research synthesis of three socio-psychological perspectives. *Psychological Bulletin, 134*(4), 504–535. <https://doi.org/10.1037/0033-2909.134.4.50410/c6hxx7>
- Wagemakers, J. (2016). Salafism. In *Oxford research encyclopedia of religion*. <https://doi.org/10.1093/acrefore/9780199340378.013.255>
- Wignell, P., O'Halloran, K. L., Tan, S., Lange, R., & Chai, K. (2018). Image and text relations in ISIS materials and the new relations established through recontextualisation in online media. *Discourse & Communication, 12*(5), 535–559. <https://doi.org/10.1177/1750481318766938>
- Winter, C. (2018). Apocalypse, later: A longitudinal study of the Islamic State brand. *Critical Studies in Media Communication, 35*(1), 103–121. <https://doi.org/10/gf3gn9>
- Wlodarczyk, A., Basabe, N., Páez, D., & Zumeta, L. (2017). Hope and anger as mediators between collective action frames and participation in collective mobilization: The case of 15-M. *Journal of Social and Political Psychology, 5*(1), 200–223. <https://doi.org/10.5964/jspp.v5i1.471>
- Wright, S. C., Taylor, D. M., & Moghaddam, F. M. (1990). Responding to membership in a disadvantaged group: From acceptance to collective protest. *Journal of Personality and Social Psychology, 58*(6), 994–1003. <https://doi.org/10/br7zjn>

## Author Biographies

**Lena Clever** completed her bachelor's and master's degrees in Information Systems at the University of Münster. Her main research areas are unsupervised and supervised learning methods, with a focus on the detection of Social Bots and the (semi-) automated analysis of texts. She has participated in the Propstop project, funded by the German Federal Ministry of Education and Research and is part of the junior research group “Democratic Resilience in Times of Online Propaganda, Fake News, Fear and Hate Speech (DemoRESILdigital)” headed by Dr Lena Frischlich.

**Tim Schatto-Eckrodt** completed his bachelor's and master's degrees in Communication Studies in the Department of Communication at the University of Münster. His master's thesis dealt with the diffusion and acceptance of new technologies. He joined the BMBF-project “PropStop,” where he researched methods to identify attempts to influence public opinion through online propaganda. Since May 2019 he works as a Research Assistant in the junior research group “Democratic Resilience in Times of Online Propaganda, Fake News, Fear and Hate Speech (DemoRESILdigital)” headed by Dr Lena Frischlich.

**Nico Christoph Clever** is Professor for Digital Real Estate and Facility Management at the Department of Food · Nutrition · Facilities of the FH Münster University of Applied Sciences. He received his Master's degree in Information Systems from the University of Münster in 2011. In his professorship, Nico especially covers the topics of Information Management, Data Management, and Data Science in the domain of Real Estate and Facility Management. His additional research interests lie in the areas of Business Intelligence, Software Engineering, and Virtual Reality, as well as a strong focus on teaching proper scientific work to his students.

**Lena Frischlich** completed her Diploma in Psychology at the University of Cologne. She worked as a Research Associate (post-graduate level) at the University of Cologne for the Institute of Social Psychology II: Media and communication (Prof. Gary Bente). Since July 2016, she is the post-doc for the Institute for Communication Science of the University of Münster in a project about the “recognition, proof and combating of covert propaganda attacks via online media.” In January 2018, she started leading her own junior research group called “Democratic Resilience in Times of Online Propaganda, Fake News, Fear and Hate Speech (DemoRESILdigital).”