# 10,000 Social Media Users Can(not) Be Wrong: The Effects of Popularity Cues and User Comments on Sharing Controversial Social Media News Stories

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Building on the literature about online opinion expression and social influence biases, this study reports the results of a preregistered experiment of 1,225 Danish Facebook users studying how popularity cues and user comments affect people's willingness to like, share, and comment on a social media news post about a controversial topic. Exposure to likeminded user comments triggered a spiral of empowerment making it more likely to share posts one agrees with and to speak out in a user comment. This effect was mediated by perceived support among Facebook users. Contrary to the logic of the spiral of silence, reading a discordant post with high popularity cues made people more willing to speak out.

Keywords: Facebook, online opinion expression, social influence bias, popularity cues, comments

Compared to traditional news consumption, news use on social media like Facebook is a much more social experience (Dvir-Gvirsman, 2019; Messing & Westwood, 2014). On the one hand, news stories on social media are accompanied by cues of how the content was perceived and appreciated by other users, in the form of user comments and popularity cues (such as the number of likes, shares, and comments on Facebook). On the other hand, social media users can express their opinions about news posted on social media by liking, sharing, or commenting on these news posts. Connecting the social cues accompanying news on social media with social media use as a form of opinion expression, I ask how do popularity cues and user comments affect people's willingness to comment on a news story about a controversial topic on social media? Building on the literature on online opinion expressions and social influence biases and previous empirical findings, I expect that these social cues affect the opinions that are expressed on social media. When people see that many other people have expressed their support or disapproval of a news story, a bandwagon effect can be triggered where people align their own perceptions of the support for the story with the approval indicated by the popularity cues (Sundar, 2008; Xu, 2013). This could, in turn, affect their willingness to express their own opinions by liking and commenting. Johnen, Jungblut, and Ziegele

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(2018) and Zerback and Fawzi (2017) have shown that user comments affect people's willingness to express their opinions. At the same time, people might actively refrain from expressing their opinions if they fear that others may disagree (e.g., Neubaum & Krämer, 2018). This is important to study since, in turn, it influences which information shows up in other people's social media feeds, in combination with factors like active curation by the individuals and social media algorithms (e.g., Thorson & Wells, 2016).

Previous research has shown mixed evidence for an effect of popularity cues and user comments on the willingness to comment on social media news stories or to share such stories (e.g., Eilders & Porten-Chee, 2022; Neubaum & Krämer, 2018; Ordoñez & Nekmat, 2019; Wu, Oeldorf-Hirsch, & Atkin, 2020; Zerback & Fawzi, 2017). Research generally shows that user comments have more effect on perceived public opinion than popularity cues (e.g., Boot, Dijkstra, & Zwaan, 2021; Dvir-Gvirsman. 2019; Neubaum & Krämer, 2017). Still, other studies have shown that popularity cues, like the number of people who have previously commented, affect willingness to express one's opinion on social media and compliance with prevalent opinion of a discussion (e.g., Johnen et al., 2018; Kim, 2018; Leong & Ho, 2021).

To address this mixed evidence, the study reports the results of a preregistered experiment. Inspired by the research design used in Neubaum and Krämer (2017), 1,225 Danish Facebook users got to see a Facebook post about the legalization of euthanasia with varying message valence (pro- or coneuthanasia), either low or high popularity cues, and either pro- or con- user comments. After people were exposed to the post their willingness to like, share, and comment on the post was measured. The experiment found that user comments affect sharing and willingness to express one's opinion in a comment. Contrary to the logic of the spiral of silence, reading a discordant post with high popularity cues made people more willing to speak out.

# Liking, Sharing, and Commenting as Opinion Expression

Liking, sharing, and commenting are ways in which people can express agreement or dislike for a position expressed in a social media post (Wu et al., 2020). Such forms of opinion expression on social media are often referred to as "click speech" (Pang et al., 2016), "because opinion expressions happen with simple clicks, and do not require users to produce their own content" (p. 899). There is scholarly debate on the question of whether click speech, in particular, "liking," is comparable to regular opinion expression or whether the effort involved is so small that the more diminutive term "slacktivism" is more appropriate (e.g., Gil de Zúñiga, Molyneux, & Zheng, 2014; Ohme, de Vreese, and Albæk, 2018). This study sees click speech as a relevant way of opinion expression. As Ohme and colleagues (2018) showed, boundaries between online and offline political behaviors have become blurred, and speech acts should not be dismissed based on that they take place on social media. Huang (2013) showed that an important motivation behind liking and sharing posts on Facebook is the desire to "endorse and promote the post" (p. 38). Johnson and Ranzini (2018) also point to self-presentation as an important motivation behind the type of information shared and posted on social media. Expressing one's opinion on social media is connected to a stronger perceived lack of control over how others will react compared to offline communication (Neubaum & Krämer, 2018). In turn, people's fears of being personally attacked are particularly strong on social media, which decreases willingness to express their opinions. Thus, the motivation behind liking posts on social media, in combination with the obstacles that need to be overcome, speaks in favor of seeing click speech as a relevant form of opinion expression.

Still, there are relevant distinctions between liking, sharing, and commenting (see Ohme et al., 2018, for a discussion). Although liking a news post is a simple means of endorsing or approving what others have said, sharing or commenting is a more direct form of self-expression that requires more effort (Wu et al., 2020, pp. 2687–2688) and therefore can be seen as more in line with traditional forms of political opinion expression (Ohme et al., 2018). When people comment on a news post, a distinction can be made between speaking up and speaking out (McDevitt, Kiousis, & Wahl-Jorgensen, 2003; Zerback & Fawzi, 2017). When participants in a discussion write a comment on the topic without expressing a clear opinion, they merely speak up. A stronger form of opinion expression is speaking out by clearly taking a stand on an issue (Zerback & Fawzi, 2017).

Seeing social media behavior as a form of opinion expression is particularly relevant in relation to social media posts about morally loaded, two-sided controversial issues, like the legalization of euthanasia or gun laws (e.g., Neubaum & Krämer, 2017; Winter, Metzger, & Flanagin, 2016). For such issues, people will be more concerned about the impression they make on other social media users and about the negative reactions they might receive from others. One's position on a moral issue is strongly connected to one's worldview and personal values. For such issues, the personal opinions of social media users on the topic are expected to have a strong influence on their interactions with the post. Prior opinions are expected to influence the willingness to endorse an opinion expressed in a social media post on a controversial topic. Since liking, sharing, and commenting on social media posts is seen as a way of opinion expression, people are expected to express their support for a post by sharing, liking, or commenting when the information confirms their worldviews and identities.

H1: People are more likely to (a) like, (b) share, and (c) comment on a news story about a controversial topic on social media that is concordant with their preexisting opinion than a news story which is discordant.

# Popularity Cues, User Comments, and Click Speech

As will be argued in the following section, it can be expected that popularity cues and user comments accompanying a post affect willingness to express one's support for the post because these cues affect perceived support by other Facebook users.

Several theoretical perspectives suggest that perceived public support for a post matters for the willingness to express one's opinion. Following the logic of the *spiral of silence*, people have a quasistatistical sense and continuously gauge their surroundings to find out what the dominant opinion is on a topic (Noelle-Neumann, 1974). For controversial and morally loaded topics, this, in turn, influences whether people are willing to voice their opinions. People fear being isolated and not belonging to social groups and are willing to self-censor when they believe they deviate from the majority's viewpoint. Therefore, people who perceive that they hold a minority position are, on average, less willing to voice this opinion than people who perceive that they hold a majority position (e.g., Chan, 2018; Matthes, Knoll, & von Sikorski, 2018).

Neubaum and Krämer (2018) showed that this effect is even stronger on social media than in reallife settings. They compared people's willingness to speak out on controversial topics in four settings: offline with strangers, offline with acquaintances, in an anonymous online discussion forum, or on Facebook. Of these four settings, Facebook was the setting in which people were least willing to express a minority opinion and most likely to remain silent. People were more worried about being personally attacked online than offline, which Neubaum and Krämer (2018) attribute to people's awareness of the online disinhibition effect (Suler, 2004). Respondents were more concerned about the opinions of others on Facebook than in faceto-face meetings with acquaintances. Here, Facebook's architecture might play a role, which makes it difficult to assess who will be exposed to one's opinion and whether they will approve of one's opinion.

Perceived public opinion on social media does not only limit the willingness of people who hold a minority opinion to speak out. It can also encourage people to speak out. Lee and Chun (2016) talk about a "spiral of empowerment" (p. 479) on social media (see also Chun & Lee, 2022). They showed that people are more willing to speak out on social media when they see that other social media users support their points of view, possibly because they feel connected to like-minded people who share the same opinions. Soffer (2019) argues that social media lead to an epistemological shift in the way people assess public opinion "from a secondary observation, in which people scan journalistic reports and observations of social reality, to direct observation of the mass' comments, which reflect the opinion climate on news topics" (p. 785). In the current study, the impact of two sources of public opinion information on social media is studied: popularity cues and user comments.

The number of likes, shares, and comments that a Facebook post received are examples of socalled popularity cues. Haim, Kümpel, and Brosius (2018) define these popularity cues as "metric information about users' behavior or their evaluations of entities" and argue that these cues "serve as social signals for users who are confronted with them" (p. 188). Popularity cues can be seen as an indication of relevance or informational value of a social media post and make it more likely that a news post is read (e.g., Knobloch-Westerwick, Mothes, Johnson, Westerwick, & Donsbach, 2005; Messing & Westwood, 2014; Winter et al., 2016). In line with this finding, popularity cues (or popularity metrics) can be seen as a cognitive heuristic (e.g., Sundar, 2008) that indicates collective behavior and may serve as a shortcut to assess public opinion on the post (e.g., Porten-Cheé, Haßler, Jost, Eilders, & Maurer, 2018). Empirical evidence for the influence of social media popularity cues on public opinion perceptions is mixed, though. Porten-Cheé and Eilders (2019) found that a high number of likes accompanying a Facebook post leads people to infer public opinion in line with the position expressed in the news post. However, this effect was found only for people who were highly concerned about social isolation. Boot and colleagues (2021), Lee and Jang (2010), and Neubaum and Krämer (2017) did not find an effect of popularity cues on the perceived public-opinion climate. This might be related to the fact that not everybody pays attention to popularity cues (e.g., Dvir-Gvirsman, 2019) and that the interpretation of popularity cues is highly context-specific (Neubaum & Krämer, 2017).

Even when popularity cues are not seen as an indicator of broader public opinion on a controversial issue, they might still affect how social media users interact with the post through a normative social influence which leads us to do as others have done. Hogg and Lerman (2015) showed that high numbers of prior recommendations of news stories did not only lead people to select these stories more often but also let them to rate these stories more positively when asked to evaluate them. Similarly, when we see that many other people have liked, shared, or commented on a social media post that we agree with, this might give us a push across the threshold to also show our support for the post, even though we might not believe that this support on social media is representative for the broader public opinion climate. Kim (2021) indeed found that popularity cues affect news sharing intentions.

Like popularity cues, user comments are expected to affect people's willingness to express their support for a social media post by liking, sharing, or commenting. Lee and Jang (2010), Neubaum and Krämer (2017), Winter, Brückner, and Krämer (2015), as well as Zerback and Fawzi (2017) showed that social media users see the opinions expressed in user comments as a proxy for the broader public opinion climate. Following Zerback and Fawzi (2017), user comments serve as representative heuristics and affect people's perceptions of support for the opinions expressed in a social media post (Kim, Han, & Seo, 2020). When confronted with comments that support the position expressed in a post, social media users generalize this support and see it as an expression of the broader dominant opinion, in particular on Facebook or among an online public (Boot et al., 2021; Neubaum & Krämer, 2017; Zerback & Fawzi, 2017). Eilders and Porten-Chée (2022) confirmed these results in an experiment in South Korea, although they did not find the same results in Germany.

In sum, it is expected that popularity cues and user comments on social media affect perceived support among social media users for a position in a morally loaded debate. Following the logic of a spiral of empowerment, perceiving that other social media users support one's position is expected to make people more willing to express their support for an opinion expressed in a social media news post by liking, sharing, and commenting on the post.

- H2: People are more likely to (a) like, (b) share, and (c) comment on a concordant news story about a controversial topic on social media when the story is accompanied by high popularity metrics compared to when it is accompanied by low popularity metrics.
- H3: People are more likely to (a) like, (b) share, and (c) comment on a concordant news story about a controversial topic on social media when the story is accompanied by concordant user comments compared to when it is accompanied by discordant user comments.

# Popularity Cues, User Comments, and Speaking Out

It is expected that popularity cues and user comments also influence people's willingness to speak out about controversial and morally loaded topics on Facebook since they give an indication of the public opinion climate on Facebook, as argued above. It is expected that when people read a discordant news story with high popularity metrics, they will see this as an indication that many endorse an opinion that goes against their personal values. In other words, they perceive the public opinion climate on Facebook to be hostile to their opinion. Debate on Facebook can be heated, with an uncivil tone (e.g., Galarza Molina & Jennings, 2018). Fear of being personally attacked should make commenters hesitant to speak out when popularity cues indicate a hostile public opinion climate (Neubaum & Krämer, 2018).

Chun and Moon (2017), as well as Zerback and Fawzi (2017), showed that exposure to user comments affects perceived opinion climate and willingness to speak out. When people read congruent user comments, they are more likely to write a comment that expresses this opinion. According to Chun and Moon (2017), this is because of perceived support by others (see also Chun & Lee, 2022). They argue that "on social media, each individual tends to find a group of people who share similar opinions through online comments" and that this makes it "more likely to perceive social support from others' comments, leading to a stronger sense of control or empowerment to express his/her own opinion" (Chun & Moon, 2017, p. 121; Lee & Chun, 2016). A sense of social support can be triggered not only by the people in one's social media network but can already be affected by simply reading a few user comments from strangers accompanying a social media post (e.g., Zerback & Fawzi, 2017). The relevance of perceived public support for willingness to voice one's opinion on social media leads to the following hypotheses about the effects of popularity cues and user comments on willingness to speak out:

- H4: Speaking out is less likely after exposure to a discordant social media news story accompanied by high popularity metrics than after exposure to a discordant social media news story accompanied by low popularity metrics.
- H5: Speaking out is more likely after exposure to concordant user comments than after exposure to discordant user comments.

### Method

The hypotheses were tested in a 2 x 2 x 2 experiment. Inspired by the research design by Neubaum and Krämer (2017), participants got to see a Facebook post about the legalization of euthanasia with varying message valence (pro- or con-euthanasia), either low or high popularity metrics, and either pro- or conuser comments. After exposure to the Facebook post, participants indicated their willingness to like, share, and comment on the post, and were asked to write a comment. Data were collected through an online survey that was completed by 1,225 Danish Facebook users between April 15 and April 30, 2020. The data were collected by polling company Epinion, which recruited participants from Norstat's Online panel. All respondents were in the age between 18 and 65 and use Facebook at least once a month. The gender, age, and regional distribution of the survey participants were representative of the Danish population. The completion rate of the survey was 85%. Before starting the experiment, participants were informed about the purpose and topic of the study, and their consent was obtained. The experiment was approved by the University of Southern Denmark's ethical board and hypotheses and method of analysis were preregistered.<sup>2</sup> Once the project that this study was part of is finalized, all data will be made available with the Danish national data archive.

<sup>&</sup>lt;sup>2</sup> Ethical approval by the Research Ethics Committee of the University of Southern Denmark (Case nr. 19/78417); preregistration: https://aspredicted.org/blind.php?x=by3b5j. Compared to the preregistration, one hypothesis has been reworded to improve readability. The preregistration also included a hypothesis about selective exposure, which is not reported because of a lack of space and because it is less central to the focus of this study.

### Stimulus Materials

The stimulus material consisted of a Facebook news post attributed to Danish public service broadcaster DR where a doctor argued either in favor or against the legalization of euthanasia (see Appendix). Approximately 75% of the participants in the experiment trust DR (the sender of the news story); 19% had neither high nor low trust, and 6% had low or no trust. Before the experiment, 75 university students (age M=22 years, SD=3.93; 47% female) were asked how controversial they rated 15 topics that were high on the public agenda in Denmark at the time. Responses showed that 81% answered that the legalization of euthanasia was a (highly) controversial topic. The legalization of euthanasia is regularly debated in the Danish media, in particular when celebrities discuss euthanasia or when doctors are taken to court for help with euthanasia (Albæk, Green-Pedersen, & Larsen, 2014; Baun, 2021). Since the legalization of euthanasia is a moral issue that can be framed as a two-sided issue, it was seen as a suitable topic. In Denmark, moral issues like the legalization of euthanasia are depoliticized (Albæk et al., 2012). Danish parties do not campaign on such issues, and there are no clear political divides across parties on this issue. When voting on moral issues, Danish members of parliament do not have to follow the party line.

To vary the message valence two versions of the news post were created, using actual quotes from Danish doctors: one in which a doctor argues in favor of the legalization of euthanasia (Læger for aktiv dødshjælp, 2019) and one where the doctor argues against it (Søndergaard & Funch, 2017). Popularity metrics were varied by creating a low-popularity metrics condition with 47 likes, 11 comments, and 6 shares, and a high-popularity metrics condition with 9,200 likes, 2,300 comments, and 1,200 shares. The number of likes, shares, and comments in the high-popularity metrics condition reflects the highest number of likes, shares, and comments received by any Danish news post between October 7 and November 7, 2019, according to analysis of data from CrowdTangle. CrowdTangle is a public insight tool owned and operated by Facebook (CrowdTangle Team, 2019) that tracks the number of likes, shares, and comments received by Facebook posts. On November 7, 2019, all news posts by the main seven mainstream news outlets were analyzed to find the highest number of likes, shares, and comments that any post received over the previous month.

A pretest among 92 university students (age M = 24 years, SD = 3.88; 59% female) showed that the manipulation of the message valence was successful. This pretest also showed that the low number of popularity cues were indeed considered low for a DR news post on Facebook, while the high number of popularity cues were considered high. In the experiment, two comments in favor of the legalization or two comments against the legalization of euthanasia were shown, reflecting the default way in which Facebook displayed comments in people's timeline at the time of the experiment. These comments were not pretested.

### Power Test

Before the experiment, a power test was done to determine the number of participants in the experiment. Based on a review of previous studies (Kim, 2018; Lee & Jang, 2010; Neubaum & Krämer, 2017; Stavrositu & Kim, 2014; Waddell, 2018, Winter et al., 2016; Xu, 2013) and the results of the pretest, it is expected that the effect in the manipulation of popularity cues will be between small and medium

### Measures

The following questions were asked to measure the dependent variables (adapted from Pang et al., 2016; Xu, 2013): "How likely are you to like this news post?"; "How likely are you to share this Facebook post on your Facebook wall?"; "How likely are you to share this Facebook post with others through Facebook messenger or other private messenger apps?"; "How likely are you to write a comment under this news post?" (All questions ranged from 1 = highly unlikely to 5 = highly likely.) Following Johnen and colleagues (2018) and Zerback and Fawzi (2017), people who answer 3 or higher for the last question also got to answer the following open question: "If you were to write a comment under this post, what would you write?" One hundred and ninety-nine respondents wrote a comment to the post. The valence of these comments was rated on a scale from 1 (against the legalization of euthanasia) to 5 (in favor of legalization of euthanasia). An intercoder reliability test for 54 comments between two coders showed a Krippendorff's alpha score of .74 as interval scale. Although this is lower than the customary threshold of .8, is it is above the threshold of .67, which allows for tentative conclusions (Krippendorff, 2004).

Before exposure to the stimulus materials respondents indicated whether they think that Denmark should maintain a ban on euthanasia in the legislation. Of the respondents, 17.7% answered yes, 63.3% no, and 18.9% do not know. For further exploratory analysis, respondents were asked after exposure to the stimulus material to estimate on a scale from 0% to 100% the share of the Danish population (M = 50.64, SD = 17.84) and of Danish Facebook users (M = 52.54, SD = 18.60) who agree that Denmark should legalize euthanasia (see Zerback & Fawzi, 2017, for similar questions). Based on their own opinions on the issue, it was calculated which share of other Facebook users the respondents believe supports their position on the issue. This allows testing of the theoretical argument for hypotheses 2 to 5.

# Results

### Views on the Issue and Manipulation Check

A large number of respondents, 78.2%, thought the legalization of euthanasia is a controversial topic on which there is a lot of disagreement, while 56.9% believed that it is important for many, and 42.2% believed it to be a topic they have strong opinions about; 58.9% find the topic interesting, and 71.8% find the topic important, while 26% believed that the topic is too touchy to share their opinions with people they do not know well. Here, it needs to be considered that this question asks about sharing opinions with people in general. Previous research suggests that people are more concerned with sharing their opinions on social media like Facebook (Neubaum & Krämer, 2018). In sum, the topic is seen as suitable for this study, although fear of isolation could have been higher (see discussion).

Discordant of Concordant Facebook News Post.				
	Discordant	Concordant		
Like the post	1.74a (1.17)	2.04b (1.32)		
Share a post on Facebook wall	1.50a (.95)	1.59a (1.03)		
Share a post on a private Messenger app	1.63a (1.00)	1.65a (1.00)		
Comment on a post	1.58a (.97)	1.61a (1.03)		
n	480	513		

Table 1. The Likelihood of Liking, Sharing, and Commenting on a Discordant or Concordant Facebook News Post.

*Note.* Scale from 1 (highly unlikely) to 5 (highly likely). Mean scores in the same row that do not share subscripts differ at p < .05 (t-test).

Manipulation checks showed that the experimental manipulations were successful. People rated the post in favor of legalization of euthanasia as significantly more positive toward euthanasia (M=3.95, SD=1.03, on a scale from 1 to 5) than the post against the legalization of euthanasia (M=2.07, SD=1.05; t(1223) = -31.67, p < .001, Cohen's d=-1.81). A large share of the respondents, 78.9%, remembered that the posts included comments. Those who saw comments in favor of the legalization of euthanasia rated them as significantly more positive toward euthanasia (M=3.68, SD=1.04, on a scale from 1 to 5) than those who saw comments against the legalization of euthanasia (M=1.92, SD=1.08, t(965) = -25.71, p < .001, Cohen's d=-1.67). Less participants (41.9%) remembered that the posts included popularity cues. For these participants, the popularity cues manipulation was successful (see Neubaum & Krämer, 2017, for similar results). The posts with high numbers of likes, shares, and comments were rated as having significantly higher popularity metrics (M=3.26, SD=.91) than the posts with fewer likes, shares, and comments (M=2.70, SD=.85, t(411) = -7.10, p < .001, Cohen's d=-.64).

# Liking, Sharing, and Commenting

To test whether people are more likely to like, share, and comment on concordant than discordant social media stories (Hypothesis 1), the study conditions were recoded into concordant (if the position expressed in the article is in line with the respondent's position toward the legalization of euthanasia) or discordant (if the position expressed in the article goes against the respondent's position toward the legalization of euthanasia).

In line with H1a, participants were significantly more likely to like concordant than discordant posts (t(991) = -3.60, p < .001, Cohen's d = .23; see Table 1). Contrary to H1b and H1c, whether a post is discordant or concordant had no significant effect on willingness to share a post or to comment on a post.

### Effects of Popularity Cues and Comments on Liking, Sharing, and Commenting

To test the effect of popularity cues on interacting with concordant posts (H2) and user comments on interacting with concordant posts (H3), only those respondents who were exposed to concordant posts are considered (n = 513). These hypotheses are tested using between group 2 x 2 ANOVA. To test H3, the experimental comments conditions were recoded into concordant (if the position expressed in the comments

is in line with the respondent's opinion on euthanasia) or discordant (if the position expressed in the comments goes against the respondent's opinion).

Across the three dependent variables (liking, sharing, and commenting), there is no effect of popularity cues (see Table 2). Contrary to H2a, H2b, and H2c respectively, whether a post has high or low popularity cues does not affect respondents' willingness to like, share, or comment on a post. Exploratory analysis revealed that popularity cues had no influence on perceived support for legalization of euthanasia among the general population, nor among Facebook users (results not shown). The lack of effect of popularity cues was further supported by the finding that there were no significant interaction effects between popularity cues and whether comments were concordant or discordant (see Table 2).

Table 2. Effects of Popularity Cues and Comments on Liking, Sharing, and Commenting on a Concordant News Post on Facebook.

Concordant News Post on Facebook.								
	Like post	Like post						
Predictor	Df	Mean Square	F	р				
Intercept	1	2128.47	1224.58	.00				
High popularity cues	1	.11	.06	.80				
Concordant comment	1	6.28	3.61	.06				
High popularity cues x Concordant comment	1	.03	.02	.88				
Error	509	1.74						
	Share pos	st						
Predictor	Df	Mean Square	F	р				
Intercept	1	1296.00	1218.83	.00				
High popularity cues	1	.02	.02	.89				
Concordant comment	1	5.92	5.57	.02				
High popularity cues x Concordant comment	1	.82	.77	.38				
Error	509	1.06						
	Comment	Comment on post						
Predictor	Df	Mean Square	F	р				
Intercept	1	1307.19	1241.42	.00				
High popularity cues	1	.51	.49	.49				
Concordant comment	1	1.53	1.46	.23				
High popularity cues x Concordant comment	1	.28	.27	.60				
Error	509	1.05						

Contrary to H3a, whether comments are concordant or discordant does not have a significant effect on liking a post, although the results were close to reaching statistical significance (p = .058). Concordant comments made it more likely to share a post on one's Facebook wall (in line with H3b) according to regular levels of significance, although results failed to reach significance when Bonferroni correction is applied.

Exploratory analysis (not shown) revealed that the effect of user comments on sharing concordant posts is mediated by perceived support for one's position among Facebook users (B = .05, SE = .02, lower 95% CI = .003, upper 95% CI = .10; Hayes, 2017, model 4). Contrary to H3c, concordant versus discordant comments did not have an effect on willingness to comment on a post.

# Effects of Popularity Cues and Comments on Speaking Out

Finally, it was tested whether popularity cues and user comments affect willingness to speak out. Willingness to speak out was recorded in two ways (see Table 3). First, the valence of the comments written by the participants was recoded to a five-point scale ranging from 1 (going fully against one's opinion) to 5 (fully in line with one's opinion). The respondents with an opinion on euthanasia who wrote a comment predominantly wrote comments supporting their preexisting opinions on the legalization of euthanasia (M = 3.83; SD = .94, n = 140). Second, a dummy variable was created for all respondents with an opinion on euthanasia. Those among them who wrote a comment in line with their opinions received a value of 1, while all others received a value of 0. Nine percent of all participants with an opinion about the legalization of euthanasia spoke out and expressed their own opinions in a comment. There is significant variation in the degree to which respondents expressed their positions in a comment across the experimental conditions. Fifteen percent of those who read a concordant post with high cues and concordant comments expressed their opinions in a comment. For those who read a discordant post with low popularity cues and discordant comments, this was less than 5%.

Table 3. Effect of Experimental Conditions on Writing a Comment in Line With One's Opinion.

	Valence concordant*		Writes concordant comment **	
	M (SD)	Ν	%	n
Concordant post, high cues, concordant comment	4.38 (.71)	24	15.00	140
Discordant post, high cues, concordant comment	4.18 (.88)	17	9.68	124
Discordant post, high cues, discordant comment	3.81 (.93)	21	12.82	117
Concordant post, low cues, discordant comment	3.77 (.93)	13	6.56	122
Concordant post, high cues, discordant comment	3.71 (.91)	14	5.71	140
Concordant post, low cues, concordant comment	3.68 (.89)	19	10.81	111
Discordant post, low cues, concordant comment	3.48 (1.12)	21	8.40	119
Discordant post, low cues, discordant comment	3.27 (.79)	11	4.17	120
Total	3.83 (.94)	140	9.16	993

*Note.* \*On a five-point scale from 1 (comment going fully against one's opinion) to 5 (comment fully in line with one's opinion) for respondents who wrote a comment.

 $<sup>\</sup>ensuremath{^{**}\%}$  of all participants with an opinion about euthanasia.

It was expected that people who read a discordant post with high popularity cues are less likely to express their opinions in a comment than people who read a discordant post with low popularity cues (H4). H4 is not supported. There is a significant difference (t(68) = 2.46, p < .05) in the concordance of the comments from respondents who read a discordant post with high popularity cues (M = 3.97, SD = .91, n = .91= 38) versus low popularity cues (M = 3.41, SD = 1.01, n = 32), but this difference is in the opposite direction than hypothesized. A chi-square test also indicates that respondents were more likely to express their opinions when they saw a discordant post with high popularity cues compared to low popularity cues  $(\chi 2(1) = 3.65, p = .056, n = 480).$ 

H5 expects that people are more likely to express their opinions in a user comment when they are exposed to concordant user comments than when they are exposed to discordant user comments. There is no significant difference (t(138) = -1.62, p = .11) in the concordance of user comments written by respondents who read a post with comments supporting their opinions (M = 3.68, SD = .90, n = 59) versus comments against their opinions (M = 3.94, SD = .97, n = 81). When looking at all respondents, we find a significant effect of user comments on willingness to speak out. While 11.1% of all respondents with an opinion on euthanasia wrote comments supporting their positions after reading user comments that support their positions, this was the case for only 7.2% of those who read user comments going against their positions. This difference is significant ( $\chi 2(1)=4.58$ , p=.032, n=993, r=.07). Thus, H5 is partially supported.

In line with the theoretical explanation, exploratory analysis showed that perceived support for one's opinion among Facebook users mediates the effect of concordant user comments on willingness to speak out. Table 4 shows the results of simple mediation analysis (Hayes, 2017, model 4). The direct effect of exposure to concordant user comments on speaking out in a comment is no longer significant after controlling for perceived support among Facebook users, while the indirect effect is significant. Respondents who were exposed to user comments in line with their opinions estimated the share of Facebook users who agree with them as significantly higher (M = 57,69, SD = 17.10) than respondents who saw user comments going against their opinions (M = 50.65, SD = 18.56, t(991) = -6.22, p < .001).

Table 4. Regression Results for Simple Mediation.

Effect	В	SE	р
Exposure to user comments on writing a concordant comment (total	.48	.23	.03
effect)			
Exposure to user comments on perceived support among Facebook	7.05	1.13	.00
users			
Perceived support among Facebook users on writing a concordant	.03	.01	.00
comment			
Exposure to user comments on writing a concordant comment	.32	.23	.16
(direct effect)			
	Effect	SE	95% CI
Indirect effect (bootstrap 10,000)	.18	.05	[.0829]

Note. N = 993. Unstandardized coefficients; 10,000 bootstraps for the indirect effect analysis (Hayes, 2017).

### **Discussion**

This study sees liking, sharing, and commenting on news on social media as a form of public opinion expression, influenced by people's perceptions of support among other social media users. Based on this, a preregistered experiment was conducted to study how popularity cues and user comments affect Facebook users' willingness to like, share, and comment on a news story about the morally loaded and controversial topic of the legalization of euthanasia. The results show that people's opinions on a controversial topic affected their willingness to like a news post. Those respondents who indicated that they want to like a post were asked to indicate why. Around one-third of the respondents who liked a post agreed with the statement that they did so to make their positions in the debate about euthanasia known (34.8%), and 40.6% agreed that they did so to give support for and help to promote the post. This suggests that liking a news post should indeed be seen as a type of political expression.

User comments affected perceived support for one's opinion among Facebook users and made people more willing to express their opinions on social media. Respondents were more likely to share a post supporting their opinions on euthanasia when this post is accompanied by user comments supporting their positions. Furthermore, respondents were more likely to write a comment in line with their opinions when others have done the same. This stands in contrast to the lack of effect of the valence of the post. Whether the doctor in the news story supports one's position on the legalization of euthanasia does not affect perceived public support for one's position on euthanasia or one's willingness to speak out (results not shown). This supports research by Lee and Chun (2016) that accompanying comments have a stronger effect on public opinion perceptions than the actual news story. Although Lee and Chun (2016) showed that this is true when the news story reports the results of an opinion survey, this study shows that comments also trump an expert source in the news post.

The study found no expected effects of popularity cues on willingness to like, share, or comment on a news post. The manipulation check showed that less than half of the respondents remembered that the experimental conditions included popularity cues by showing the number of people who liked, shared, or commented on the post. This was much lower than the number of people who remembered the presence of user comments. This is in line with previous research which found weaker effects of popularity cues than comments on public opinion perceptions (e.g., Neubaum & Krämer, 2017). The manipulation checks showed that respondents who are aware of the presence of popularity cues did perceive a significant difference between the high and low popularity cues. However, these differences were rather small even though the number of likes, shares, and comments were chosen based on the most liked, shared, and commented news posts in a month before the experiment. Contrary to the theoretical expectations, the exploratory analysis did not show an effect of popularity cues on perceived support for euthanasia among the broader population or among Facebook users. This reveals an interesting paradox. On the one hand, people who like a post on Facebook seem to see this as a way to express their opinions. On the other hand, when popularity cues indicate that many have liked, shared, or commented, this is hardly noticed and does not affect perceived support.

A limitation of the study is that the experimental design included only one negative and one positive comment condition. The power test suggested that including more experimental conditions with the same number of participants would lead to an underpowered design. Future research should include conditions

combining positively and negatively valenced comments, since Ordoñez and Nekmat (2019) showed that the ratio of positive versus negative comments matters for willingness to express one's opinion. Similarly, including only one low- and one high-popularity cue condition is a limitation, and future research should include a condition with medium numbers of popularity cues. Johnen and colleagues (2018) showed that very high popularity numbers might actually decrease willingness to participate because people might expect less social recognition when they join. Still, this does not explain the low number of participants who remembered that popularity cues were present, or the lack of effect on perceived public support. Surprisingly, participants were more willing to speak out when they were confronted with a discordant news post with high popularity cues compared to low popularity cues. One explanation for this is that people are more willing to speak out when they see that many others have commented on a post, in line with the normative influence argument. Future research could try to separate the effect of the number of likes, the number of shares, and the number of comments to study this further. An alternative explanation could be that these people engage in corrective action (Rojas, 2010): When a lot of people voice another opinion, one might be more inclined to speak out to balance this public opinion that can be perceived as biased. This could be related to the finding that, although the topic was seen as divisive and people had strong opinions, participants agreed less with the statement that the topic is too sensitive to share their opinions with people they do not really know. This reflects the outspoken political culture of Denmark where people may be less susceptible to spiral of silence dynamics than in more collectivistic countries (e.q., Eilders & Porten-Cheé, 2022). Following Eilder and Porten-Cheé (2022), more systematic cross-national comparative research is needed to understand where holding a minority opinion makes it either less or more likely to speak out on social media. Additionally, the trustworthiness of the sender might have affected the results of the experiment. Public service broadcaster DR is a highly trusted source. For less-well-known and less-credible sources, popularity cues and user comments might have more effect. Whether the source of the news post moderates the effects of popularity cues user comments should be topic of further research (Leong & Ho, 2021). Here it also needs to be considered that people's willingness to speak out might be affected more in a real-world Facebook setting than in an experiment.

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# **Appendix: Stimulus Material**



Figure 1a. Experimental condition: Against legalization of euthanasia, low popularity metrics, comments in favor of legalization. Translation: [Posted] 23 hours [ago]. Politicians disagree when it comes to the legalization of euthanasia. What is your opinion? Doctor against the legalization of euthanasia: "Legalizing euthanasia is a slippery slope, that risks putting pressure on the seriously ill." Comments: There are no good arguments against the legalization of euthanasia; Denmark should follow the example of other countries. Yes, to the legalization of euthanasia!



Figure 1b. Experimental condition: In favor of legalization of euthanasia, high popularity metrics, comments against the legalization of euthanasia. Translation: [Posted] 23 hours [ago]. Politicians disagree when it comes to the legalization of euthanasia. What is your opinion? Doctor in favor of the legalization of euthanasia: "We have a moral obligation to help the seriously ill out of their suffering when they ask for it themselves. Comments: There are no good arguments in favor of the legalization of euthanasia; Denmark should not make the same mistake as other countries. No, to the legalization of euthanasia!