

The Impact of Meme Type and Source Credibility on Perceived Mental Health Knowledge

Bachelor Thesis

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Introduction

Memos in Health Communication

Memos have become an essential part of any social media platform. More than just a form of entertainment, they have become a cultural and communicative tool. Even for less inherently humorous topics, such as health communication, memos have emerged as an important medium on social media (Chou et al., 2009; Guidry et al., 2021). In an era of informational overload, memos combine visual appeal with cultural resonance, which makes them particularly effective in capturing attention from users (Occa et al., 2025). Originally, memos have been defined as "unit of human cultural transmission that can be reproduced and propagated [...]" (Dawkins, 1978). Later, they are adapted and reproduced by other members of the community to promote specific ideas. They are characterised by their image and text format, and with their simplicity, they leverage humour, irony or other concepts to simplify complex ideas (Occa et al., 2025). Additionally, they foster emotional connections and simplify the sharing of ideas across social networks (Thackeray et al., 2013; Chen & Wang, 2021), which both are benefits for health communication. In the field of health communication, which is focused on sharing health-related messages in order to influence the behaviour and attitudes of people regarding different health-related topics, memos can be a vital part of the communication strategy as they offer viral potential and relatability. Particularly, the younger demographic that predominantly can be found on Instagram and TikTok are seen to engage with content concerning health topics (Naslund et al., 2020; Pöyry et al., 2022). This content combines visual appeals with easily digestible information. For instance, during the COVID-19 pandemic, health organisations used memos to inform users about preventive measures and mental health resources (Chou et al., 2021; Akram et al., 2021). This content humanised the scientific content and made it more accessible for a wider audience.

As memos are a rather new phenomenon, many aspects are still not sufficiently researched across all academic domains. This is especially the case for health-related memos and even more so for mental health-related memos (Occa et al., 2025). The effectiveness of memos in improving the perceived knowledge about the topic at hand, in this case, anxiety, is still unexplored. Perceived knowledge is the individual's self-assessed understanding of a topic and can shape the behaviour intentions, and attitudes towards the topic (Jorm, 2012). Even though the implications would be considerable, this has not been researched yet. The academic research gap also poses threats to society as a whole. As memos are a widely used

communication strategy, especially in the domain of health communication (Occa et al., 2025), the use of ineffective or even harmful memes could influence perceived knowledge and, inherently, behaviour intentions and attitudes in a negative way. It is still unclear which, if any, effect the memes have on the audience. To find this effect, participants will be exposed to different memes from different sources. They will be asked to rate the effect the different memes have on their perceived knowledge. Different source types and different types of memes could have different effects on the users. How their perceived knowledge is then affected by those factors will be analysed in the following.

Mental health memes and source credibility

Source credibility is defined as the perceived trustworthiness and expertise of the message's origins and has been studied as a vital part of persuasion research by Hovland and Weiss (1951). This concept is a vital part of Hovland's Source Credibility Theory, which states that credible sources enhance the acceptance of a message by the audience and reduce their scepticism. They have demonstrated in experiments that messages with expert sources, like messages from scientists and medical professionals, are perceived as more persuasive and trustworthy than those from non-experts. It was argued that this effect is caused by heuristic processing. Users would then extend the trustworthiness they attribute to the source to the message itself and accept it without further critical evaluation.

Heuristic processing comes from the Heuristic-Systematic Model (HSM) and was proposed by Chaiken (1980). Two distinct processing pathways are described. These include heuristic processing, which relies on superficial cues, such as message length or source credibility, and systematic processing, which involves careful, effortful evaluations of the message content. Heuristic processing is triggered when individuals are not motivated or lack the ability to process a message deeply. Readers of a message, therefore, rely on cues such as the source's credibility to assess the message. Similar to the HSM, the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) is another processing model. Individuals process messages either through the central route, which is similar to the systematic processing route from the HSM, and carefully evaluate the content of the message. Then, focus on the quality of arguments and their factual accuracy. On the other hand, when individuals use the peripheral route, which can be compared to the heuristic processing route, they rely on superficial cues, such as the source of the message, and make quick judgments without deep engagement with the message. Especially concerning health communication, users often lack the expertise to evaluate the message independently and process it systematically (Jorm,

2012). Users often prioritise the entertainment value of the message over the informational value and focus on the humour or relatability rather than the factual information (Blanc & Brigaud, 2014; Xiao et al., 2018). The audience, in this case, then lacks the motivation to process the message with a systematic processing path, which aligns with the Heuristic-Systematic Model (Chaiken, 1980).

Especially with the digital age and its information overload, source credibility remains a key determinant in health message effectiveness. In prior studies, it was found that corrections of misinformation from experts were more effective than non-expert corrections (Vraga & Bode, 2017). The expert messages were shown to significantly improve the participants' perceptions regarding the messaging. Similar effects were shown by Greer (2003). Credible sources were shown to enhance the persuasiveness of complex health messages, and users perceived them to be more authoritative and reliable.

However, the social media landscape complicates this dynamic. Through the rise of non-expert sources, such as influencers or peers, parasocial connections are being fostered, which makes messages feel more relatable and enhances message engagement (Pöyry et al., 2022). This has also been tested in several prior studies. For instance, in a study with messages about Zika prevention, it was found that relatable messages from non-expert sources were shared more often than those from institutional accounts (Guidry et al., 2019). These authors were perceived as having less expertise, still their messages earned more engagement. This suggests that while expert sources are perceived as more accurate and persuasive, many non-expert sources are seen as more relatable.

In mental health contexts, this dynamic is especially important. Expert messages are more accurate, which is critical for reducing stigma around different mental health issues and improving recognition of symptoms (Jorm, 2012). A meme about anxiety symptoms from an expert source, such as a licensed psychologist, is perceived as more credible than a similar message from an influencer (Naslund et al., 2020). However, a message from non-experts was shown to be more effective in reducing stigma by framing anxiety as a shared and relatable experience.

Despite prior research on source credibility in mental health communication, specifically relating to anxiety, no studies have tested its impact on perceived knowledge. However, this has been researched in other contexts. Recent research has shown that source credibility can directly influence the perceived knowledge of the audience (Springer, 2024). Their findings have aligned with the source credibility Theory by Hovland and Weiss (1951) and showed that messages with sources that seemed highly credible were more likely to

change beliefs and correct false information. On the other hand, less credible sources were less likely to change the participants' minds. Similarly, Vraga and Bode (2017) showed that expert corrections of health misinformation were found to significantly improve the accuracy perceptions of users.

These findings suggest that expert sources can amplify the effectiveness of content and foster systematic processing and knowledge retention (Petty & Cacioppo, 1986). In contrast, non-expert sources could prioritise relatability, which could encourage heuristic processing or superficial engagement with the message (Pöyry et al., 2022). Since the credibility of expert sources has shown persuasive power (Hovland & Weiss, 1951) and can enhance the trustworthiness of a message (Vraga & Bode, 2017), it is hypothesised:

H1: Memes from expert sources will enhance the perceived knowledge about anxiety compared to non-expert sources.

Humour in mental health memes

While source credibility can shape the reception of the message, the content itself also plays a critical role in shaping perceived knowledge. Mental health memes can be very varied in the way they express the message. For once, they can focus on humour and use exaggeration or irony to make mental health problems, such as anxiety, more relatable. On the other hand, informational memes directly state facts and explain symptoms, reasons, or other aspects of mental health.

Humour in health communication, particularly through memes regarding mental health, such as anxiety, presents a complex tradeoff between engagement and knowledge outcomes. Memes have the ability to blend humour with cultural references and, through that, have great potential in normalising mental health discussions (Pavlova & Berkers, 2020; Naslund et al., 2021). Through the use of cultural references, clinical experiences can be made easily understandable, which amplifies relatability with those individuals and at the same time reduces stigma (Akram & Drabble, 2022).

Another positive aspect has been shown by Blanc and Brigaud (2018) in their study. They have shown that humorous health advertisements could increase the engagement of viewers. Similar results have been documented by Xiao et al. (2018). They found that humorous content on social media was shared more often than non-humorous content. Regarding mental health communication, humorous content regarding anxiety was found to normalise discussions, but at the same time was found to oversimplify symptoms (Naslund et al., 2021). During COVID-19, memes related to the pandemic were found to serve as a coping

mechanism and could have reduced anxiety by fostering a sense of shared experience (Akram et al., 2021), which further shows how humorous memes can make mental health a more relatable topic. Experiments by Banas et al. (2020) have shown that humour could increase knowledge retention by reducing cognitive tension. At the same time, the use of humour would foster engagement, particularly when combined with clear educational goals. While these findings suggest improving knowledge acquisition under specific conditions, this has not been researched in the context of mental health communication.

While humour can be beneficial, it can sometimes have negative effects. For example, humour can also undermine informational goals of posts. Studies have shown that humour could also reduce the retention of factual content (Blanc & Brigaud, 2014). It could also downplay the severity of risks and could have led to complacency (Xiao et al., 2018).

Instead of humorous content, informational content could be used to get the information across. Informational content prioritises the accuracy of factual information and evidence-based advice. In prior research on obesity policies, it has been found that informational content could improve the integration of complex health information and risks (Niederdeppe et al., 2014). It was suggested that those messages were engaging the systematic processing of the participants. Similarly, Chou et al. (2018) found that factual health posts on social media were perceived as more credible while also being less engaging than humorous ones. In mental health contexts, informational memes could clarify complex clinical distinctions but were shown to be less engaging than humorous memes (Pavlova & Berkers, 2020).

These dynamics, shown in prior research, could be explained by the Heuristic-systematic Model (Chaiken, 1980). It could be that humorous content triggered the heuristic processing, in which users focus more on superficial cues, in this case, entertainment value, rather than deep engagement with the message's factual content. In contrast to humorous content, informational content would encourage systematic processing. Users would carefully evaluate the facts of the message rather than only focusing on the entertaining value of the message (Petty & Cacioppo, 1986). Similar to the HSM, the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) can be used to explain the results found in prior research. When users engage in the systematic processing route or the central route, they actively process the information, which leads to a deeper understanding of the topic. Given the complex dynamic between humorous and informational framing of memes and the connection to the ELM and HSM, it is hypothesised:

H2: Informational memes will lead to higher perceived knowledge of anxiety than humorous memes.

The interaction of Meme type and Source credibility

While the meme type may play a critical role in shaping the perceived knowledge about anxiety, the effectiveness may also depend on the credibility of the source. The effectiveness of the meme likely depends on the interaction between meme type and source credibility. For example, an informational meme from an expert source could amplify the perceived knowledge gains by combining factual content with the persuasiveness and trustworthiness of credible expert sources. On the other hand, non-expert sources might undermine the message's educational value by prioritising relatability over accuracy.

Vraga and Bode (2017) found that expert sources could significantly improve the accuracy of users' perceptions when correcting misinformation. The combination of expert sources and factual content, in this case, enhanced the systematic processing of the message. This could let the expert source validate the informational content more and lead to a deeper integration of the knowledge. Similarly, Greer (2003) showed that expert sources were more persuasive when endorsing health-related messages that were paired with factual arguments, leading to similar outcomes.

Guidry et al. (2019) showed in their research that non-expert sources excelled in engaging users with humorous content but risked perpetuating misinformation due to a lack of expertise and authority. In addition to that, Xiao et al. (2018) found that humorous crisis responses from non-experts were shared more than other sources, but at the same time, they were found to downplay risks. These studies show that the relatability of the message and the engagement with it can come with different trade-offs. In this case, the risk of misinformation or the downplaying of risks.

These interactions could be explained by the ELM (Petty & Cacioppo, 1986) and the HSM (Chaiken, 1980). Both models suggest that the persuasive outcome of the message depends on both the content of the message and the contextual cues. Informational memes would encourage users to carefully evaluate the factual content of the message, which could foster a deeper understanding of the message (Niederdeppe et al., 2014), leading to the central route or the systematic processing. Using expert sources could act as a heuristic cue and could enhance the message's trustworthiness without requiring deep engagement and processing of the message (Hovland & Weiss, 1951), which could lead to the peripheral route or heuristic processing. Combined, these pathways could create a synergistic effect and enhance each

other. Expert sources could lend credibility and trustworthiness to the informational content and amplify the impact on perceived knowledge. At the same time, humorous memes from non-expert sources could prioritise relatability over accuracy and encourage only superficial engagement (Xiao et al., 2018). This would result in a lack of understanding and would not influence the perceived knowledge as much as the informational meme could.

Given this theoretical and empirical foundation, the following is hypothesised:

H3: Informational memes from expert sources will yield higher perceived knowledge than other combinations.

Methodology

In order to test for the different variables, an experimental study is the most suitable approach. This experiment will test the effect of the independent variables, meme type with the two factors humorous and informative, and source with two factors, expert source and non-expert source, on the dependent variable perceived knowledge.

Design

This study will use a 2 (meme type: humorous vs informative) x 2 (source credibility: expert vs non-expert) between-subject factorial design. Each participant will only be exposed to one of the conditions, resulting in 30 participants per condition. There was no control group.

Materials

Each participant will randomly be assigned to one of the following conditions: Humorous + Expert source, Humorous + Non-expert source, Informative + Expert source, Informative + Non-expert source. With this design, each participant will be shown one meme. Together with the meme, the participants will also be shown the profile of the "author" of the meme. All the different memes include the same picture and only vary in the text itself. All versions of the meme, as well as the profiles, are included in the appendix.

The humorous meme includes a joke about anxiety, saying: "When you think... The fifth time you turned off the oven may have actually turned it back on.". The informative meme will include the same image and the text: "When you realize... You are one of the 15% of the Dutch population that suffers from an anxiety disorder".

The Instagram layout is used to include the source. The handle of the author is shown above the post with a name clearly linking to an expert or non-expert source. The handle of the expert source is @worldhealthorganization and has a blue checkmark. The non-expert source handle is @meme.anxiety and does not include a blue checkmark. The pictures of the profiles show the name of the account, the number of followers, and the number of posts.

To ensure that the IV manipulations worked, a pre-test was designed. It showed statistically relevant differences between the conditions. Based on the results of the pre-test, the profiles of the authors were included.

Through the between-subjects design, we ensure that participants will not be able to compare the different memes with each other and also ensure the validity of our independent variable, perceived knowledge.

The independent variables, meme type and source credibility, were tested during the questionnaire. First, participants were informed about the experiment and asked for consent. After giving consent, the participants were allowed to continue with the questionnaire. They were first asked about their demographics, followed by questions about their prior knowledge and exposure to anxiety and social media.

Subjects

The participants of the study were recruited through the researchers' networks. In total, 121 participated and finished the survey. The humorous-expert meme, informational-non-expert meme, and the informational-expert meme conditions had each 30 participants. The humorous-non-expert meme condition had 31 participants (Table 1). The age of the participants ranged from 18 to 55, and the mean age was 23 ($M = 23.3$, $SD = 5.42$). A one-way analysis of variance showed no significant distribution of age across the different conditions ($F(3, 117) = 0.26$, $p = .856$) (Table 6). 88 of the participants would describe themselves as female, 28 identified as male, three as non-binary or third gender, and two preferred not to say (Table 2). Gender was equally distributed across the different conditions, which was tested through a chi-square test ($\chi^2(12) = 12.91$, $p = .375$) (Table 4). Most of the Participants finished upper secondary school ($N = 64$), followed by participants with a Bachelor's degree or equivalent ($N = 43$) (Table 3). Only 9 participants had a Master's degree or equivalent ($N = 9$), four had finished lower secondary school ($N = 4$), and only one had no formal education or diploma ($N = 1$). The distribution of educational level across the different conditions was also tested through a chi-squared test and was not statistically relevant ($\chi^2(12) = 9.07$, $p = .697$) (Table 5). All characteristics of participants were equally or not statistically relevant distributed across the conditions.

Instruments

The independent variables and manipulation checks were measured through several questions. The yes/no question "Are you familiar with anxiety and its symptoms?" was adapted from Thackeray et al. (2013). This was followed by questions about their social media use, with questions adapted from Chen and Wand (2021). These included a seven-point semantic differential scale and questions such as "How often do you use Instagram or

TikTok?" or "How often do you encounter health-related content on social media?". The scales will range from never to always.

After being exposed to the meme, participants were asked about the meme. Participants were asked to rate their agreement on a seven-point Likert scale with statements that were adapted from Blanc and Brigaud (2014) and Niederdeppe et al. (2014), such as "I find this meme funny." or "This post was informational.". The statements regarding the informativeness of the meme have been combined into the variable perceived informativeness. The reliability of perceived informativeness was assessed through Cronbach's alpha, and the reliability of the variable comprising two items was good: $\alpha = .83$ (Table 20). The perceived source credibility of the meme was tested through two statements based on Greer (2003) and Hovland and Weiss (1951), such as "The creator of this post seems knowledgeable about anxiety.". These statements were combined in the compound variable perceived source credibility. The reliability of 'perceived source credibility' comprising two items was acceptable: $\alpha = .71$ (Table 21).

The dependent variable, perceived knowledge, was tested with four seven-point Likert scales adopted from Jorm's (2012) health literacy framework and Thackeray et al. (2013). These will include items such as "I feel more confident explaining anxiety to someone else after viewing this post." or "I understand how to recognize anxiety symptoms in myself or others.".

The reliability of perceived knowledge was assessed through Cronbach's alpha. The reliability of 'perceived knowledge' comprising four items was acceptable: $\alpha = .71$ (Table 7).

Procedure

Before exposing participants to the meme, they will be asked to answer preliminary questions regarding their demographics and prior knowledge. After seeing the meme, they will again fill out a questionnaire regarding the new knowledge gained after the meme and other attitudes regarding the image. The full questionnaire will be added to the appendix. The experiment was conducted online over Qualtrics. Participants were recruited through the personal network. There were no financial or other incentives to take part in the experiment offered to participants. At the end of the questionnaire, the participants were debriefed and thanked. All the participants were exposed to the same questionnaire. It took participants on average 7 min to complete the questionnaire ($M = 429.25$, $SD = 243.96$) (Table 8).

Statistical treatment

For the statistical treatment, the data was collected in Qualtrics and exported to the 27th version of SPSS. The data was then cleaned, and demographics were analysed. Through chi-square tests and ANOVA's the distribution of demographics across groups was analysed. Further t-tests and descriptive analysis were conducted. The hypotheses were tested through several ANOVA's. The hypothesis regarding the effects of Meme Type and Source credibility on perceived knowledge was tested through a 2x2 between-subjects factorial analysis of variance. Because of the results of that ANOVA, no post-hoc tests were necessary.

Results

Participants were asked to answer questions about their prior exposure and their knowledge about anxiety. Most of the participants recorded that they are familiar with anxiety and its symptoms ($M = 1.12, SD = 0.33$) (Table 9). Most participants recorded that they would use Instagram often ($M = 5.36, SD = 1.52$) and they would sometimes encounter health-related content on social media ($M = 4.02, SD = 1.38$) (Table 9).

A two-way analysis of variance with meme type and source type as factors showed no significant main effect of source type on perceived humour ($F(1, 117) < 1$). There was a significant main effect of meme type on perceived humour ($F(1, 117) = 6.53, p = .01$) (Table 10). Participants rated the informative meme ($M = 4.42, SD = 1.48$) as funnier than the humorous meme ($M = 3.74, SD = 1.48$) (Table 11). There was a significant interaction of meme type and source type on perceived humour ($F(1, 117) = 6.53, p = .01$) (Table 10). A one-way analysis of variance showed a significant effect of meme type on perceived humour for non-expert memes ($F(1, 59) = 16.95, p < .001$) (Table 12). The informative meme from the non-expert source ($M = 4.8, SD = 1.38$) was rated funnier than the humorous meme from the non-expert source ($M = 3.45, SD = 1.18$) (Table 13). A second one-way analysis of variance showed no significant effect of meme type on perceived humour for expert memes ($F(1, 59) < 1$) (Table 10d).

A two-way analysis of variance with meme type and source type as factors showed no significant main effect of source type on perceived informativeness ($F(1, 117) = 1.63, p = .31$). However, there was a significant main effect of meme type on perceived informativeness ($F(1, 117) = 3.86, p = .05$). The interaction between meme and source type was not significant ($F(1, 117) = 3.61, p = .06$) (Table 14). Participants rated the informative meme ($M = 3.66, SD = 1.33$) as more informative than the humorous meme ($M = 3.22, SD = 1.21$) (Table 15).

A two-way analysis of variance with meme type and source type as factors showed no significant main effect of meme type on perceived source credibility ($F(1, 117) = < 1$). However, the two-way analysis of variance with meme type and source type as factors showed a significant main effect of source type on perceived source credibility ($F(1, 117) = 30.96, p < .001$). Participants rated the expert meme ($M = 3.15, SD = 1.35$) lower on perceived source credibility than the non-expert meme ($M = 4.46, SD = 1.26$) (Table 17). There was no significant interaction between meme type and source type on perceived source credibility ($F(1, 117) = 2.94, p = .09$) (Table 16).

Lastly, a two-way analysis of variances with meme type (humorous vs informative) and source type (expert vs non-expert) as factors should test the hypothesis that expert memes would increase the perceived knowledge of participants regarding anxiety more than non-expert memes and the hypothesis that informative memes would increase the perceived knowledge more than humorous memes. Contrary to the hypothesis, Source type did not have a significant effect on perceived knowledge ($F(1, 117) = 1.63, p = .204, \eta^2 = .01$) (Table 18). Participants rated expert source memes ($M = 4.47, SD = 1.04$) similarly to non-expert source memes ($M = 4.73, SD = 1.2$) (Table 19). The two-way analysis of variances showed also no significant main effect of meme type on perceived knowledge ($F(1, 117) = 0.62, p = .482, \eta^2 = .00$). Humorous memes ($M = 4.67, SD = 1.04$) were rated to have a similar impact on perceived knowledge as informative memes ($M = 4.53, SD = 1.22$). There was no significant interaction of meme type and source type on perceived knowledge ($F(1, 117) = 2.52, p = .115, \eta^2 = .02$). Overall, participants reported only a neutral learning outcome after viewing the memes ($M = 4.6, SD = 1.13$), meaning that it did not affect their perceived knowledge.

Conclusion and discussion

Results

The findings reveal that meme type, humorous or informative memes, has no significant effect on the perceived knowledge of the participants. The same applies to the source type, expert or non-expert. There has been no significant interaction between those two factors. The descriptive statistics have further revealed that the differences between the groups are rather minimal. These findings show that neither the meme type nor the source type, as they are operationalised in this study, have a significant effect on the perceived knowledge about anxiety.

Potential Reasons for Null-Results

The results do contrast with the findings of prior research. Hovland and Weiss (1951) suggested that source credibility would shape knowledge outcomes more significantly than shown in this study. Their study focused on traditional media, which could lead to differences in findings. As memes operate in a more saturated and virtual environment, they might not be processed as deeply as articles or imagery in traditional media. However, here participants did find the expert source only slightly more credible than the non-expert sources. One explanation for this might be in the nature of memes. Memes are limited in length and therefore depth, and prioritise entertainment. This might have limited the capacity of the images to convey knowledge, regardless of humour or source credibility.

The lack of effect of source type on perceived knowledge aligns with findings by Greer (2003), who noted that general scepticism against social media content could diminish the source effects. Even expert sources, such as the World Health Organisation in this case, might not be perceived as authoritative in meme-based contexts. The associations participants have with memes and Instagram as a whole might have diminished the authority of the organisation. On top of that, Metzger and Flanagin (2013) argued that digital audiences prioritise relatability over expertise.

Niederdeppe et al. (2014) showed that emotional framing could boost engagement. Ahmed et al. (2022), on the other hand, have shown during their study with COVID-19 memes that humour does increase shares but not exactly knowledge retention. This might be similar here. While intention to share and engagement were not measured, the results regarding knowledge retention could be similar. Myrick and Oliver (2015) observed that humour can also be distracting and limit the depth of processing. The joke in the humorous

meme could have overshadowed the implicit anxiety messaging. The informational meme included the same picture and could be affected by the same distraction effect as the humorous meme. This issue should be further researched and kept in mind when designing the stimulus material. Extended exposure to the stimulus material could mitigate the effect, but it needs to be researched further.

Another reason for the lack of significance might be the high familiarity with anxiety among the participants. This might have reduced the meme's potential to influence the perceived knowledge, as they likely already knew the facts mentioned in the memes. The stimulus material could include lesser-known facts instead of general statistics. They would then improve the perceived knowledge of participants further. In that case, they would have been familiar with anxiety but would still learn something new, which would then improve their perceived knowledge more than just information they were already familiar with. Additionally, testing for perceived knowledge instead of actual knowledge could have introduced an overconfidence bias (Norman et al., 2020). Because most participants said that they were familiar with anxiety in the first place, their perceived knowledge might have been inflated, resulting in falsified answers given in the questionnaire.

Limitations

Besides the reasons above, other limitations could have led the results to be insignificant. The sample group consisted mostly of young, well-educated women. This limits the generalizability of the study. A broader and bigger sample group would not only improve ecological validity but could also make the results more significant, as other demographics might not be as familiar with the topic.

The stimulus design could be another limitation of this study. Even though a pre-test was conducted, the stimulus material might not have been different enough from each other. The humorous meme about checking the oven could still implicitly convey symptoms, and with that, would blur the line between informative and humorous. On top of that, the humorous memes have not been perceived as more humorous than the informative memes. This could have falsified the results heavily, as the stimulus material was not distinct enough.

For future research, the suggestions above could be implemented, and the same could be tested again. Additionally, there are many research topics that could be adapted from this study. Instead of studying the perceived knowledge, in a study with a bigger scope, the actual knowledge of the participants could be tested. This would give deeper insight into the effect of the meme.

In studies with a bigger scope, other attributes of the meme could be tested. Testing memes with a stronger contrast between conditions could show a more statistically relevant effect. This could be combined with different stimulus materials that also focus on aspects other than just text. For instance, the imagery could be varied, and sound could be included.

To improve the contrast between the different source types, it would be possible to include other credibility markers, for example, user comments or other endorsements. Through these, the credibility of the sources would be easier to understand. The source credibility could then also have a stronger effect on the perceived knowledge and might also overcome the issues mentioned by Greer (2003).

Suggestions for future research

The limitations as well as the reasons for the Null-results mentioned above should be kept in mind when conducting future research on this topic. These suggestions can be implemented in several forms. First of all, the memes could have included more detailed information about anxiety, being more informative in the informative version and funnier in the humorous version. This would increase the contrast between the different conditions and could lead to more diverse responses from participants. For this, future research should be conducted with more pre-testing and a bigger group of participants in said pre-test. Additionally, the questions could be more adapted to the actual information of the meme. Instead of asking about the symptoms or treatment options, broader questions might have influenced participants to be more confident in their responses. That way, they might have perceived their knowledge to be more relevant than they did for this version of questioning.

In order to increase the authority of the sources, participants could have been given more information about the different sources. Also, the stimulus material could be calling more attention to the source than it was done in this survey. This could combat the general scepticism as mentioned by Greer (2013).

In contrast to this, the non-expert course could also include more context. This way, the author would seem more relatable, which was mentioned as a relevant factor by Metzger and Flanagin (2013).

Lastly, to focus more on actual knowledge instead of perceived knowledge, it would be beneficial to include factual quizzes. Through that, the research will be able to combat the confidence bias (Norman et al., 2020), and they would be better equipped to test for actual changes.

Societal relevance

While memes in the context of this study were not found to have a significant impact on perceived knowledge, they do remain a powerful tool for raising awareness. Even though the findings were not significant, the pairing of factual and informative content with expert sources could be a promising strategy for public health campaigns. Memes on social media could be a cost-effective and, if further researched, an effective way to improve the perceived knowledge of the public. However, creators or organisations should contain their expectations, because, as shown through this study, not all types of memes and sources will have significant results on the viewers.

This study has contributed to the growing literature about social media's role in health communication and highlighted challenges both researchers and organisations might face. By addressing these complexities, future researchers and creators can better understand the potential social media has in engaging the viewers in a meaningful way and improving not only their perceived knowledge but also their actual understanding of anxiety or other health-related topics.

Appendix

Memes

Profile – Non-Expert



meme.anxiety [Follow](#) ...

7 posts 0 followers 0 following

Memes

Here who you can read meme of every type enjoy!

Profile – Expert

Instagram biography:



who  [Follow](#) [Message](#)  ...

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World Health Organization

 who

We are the United Nations' health agency. We are committed to achieve better health for everyone, everywhere. Health For... [more](#)

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Meme – Humorous Expert



world health organisation



5,197 42 638



World Health Organisation Anxiety is a feeling of fear, dread, and uneasiness. It might cause you to sweat, feel restless and tense, and have a rapid heartbeat. It can be a normal reaction to stress. For people with anxiety disorders, the fear is not temporary and can be overwhelming.

4 hours ago



Meme – Humorous Non-expert



meme.anxiety



meme.anxiety Anxiety is a feeling of fear, dread, and uneasiness. It might cause you to sweat, feel restless and tense, and have a rapid heartbeat. It can be a normal reaction to stress. For people with anxiety disorders, the fear is not temporary and can be overwhelming.

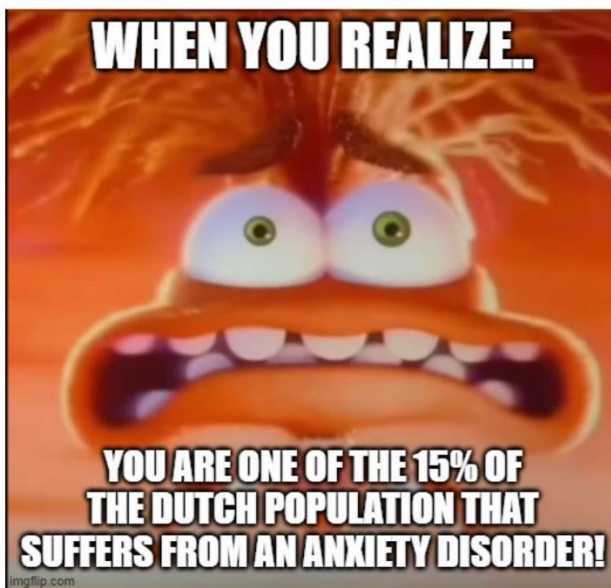
4 hours ago



Meme – Informative – Expert



world health organisation



5,197 42 638

World Health Organisation Anxiety is a feeling of fear, dread, and uneasiness. It might cause you to sweat, feel restless and tense, and have a rapid heartbeat. It can be a normal reaction to stress. For people with anxiety disorders, the fear is not temporary and can be overwhelming.

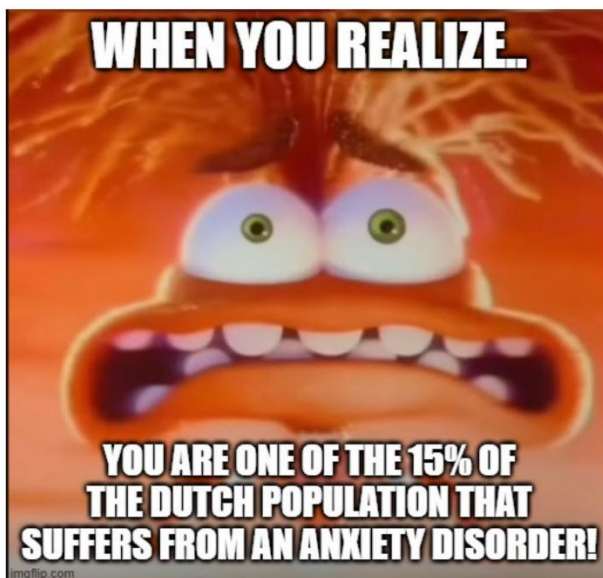
4 hours ago



Meme – Informative – Non-expert



meme.anxiety



2



meme.anxiety Anxiety is a feeling of fear, dread, and uneasiness. It might cause you to sweat, feel restless and tense, and have a rapid heartbeat. It can be a normal reaction to stress. For people with anxiety disorders, the fear is not temporary and can be overwhelming.

4 hours ago



Questionnaire

Q7 To what extent do you agree with the following statements? I find this meme funny.

- Strongly disagree (15)
 - Disagree (14)
 - Somewhat disagree (13)
 - Neither agree nor disagree (12)
 - Somewhat agree (11)
 - Agree (10)
 - Strongly agree (9)
-



Q8 This post was informational.

- Strongly disagree (15)
 - Disagree (14)
 - Somewhat disagree (13)
 - Neither agree nor disagree (12)
 - Somewhat agree (11)
 - Agree (10)
 - Strongly agree (9)
-



Q9 The information in this post was clear and educational.

- Strongly disagree (15)
 - Disagree (14)
 - Somewhat disagree (13)
 - Neither agree nor disagree (12)
 - Somewhat agree (11)
 - Agree (10)
 - Strongly agree (9)
-



Q10 The creator of this post seems knowledgeable about anxiety.

- Strongly disagree (15)
 - Disagree (14)
 - Somewhat disagree (13)
 - Neither agree nor disagree (12)
 - Somewhat agree (11)
 - Agree (10)
 - Strongly agree (9)
-



Q11 I would trust this creator to provide accurate mental health information.

- Strongly disagree (15)
- Disagree (14)
- Somewhat disagree (13)
- Neither agree nor disagree (12)
- Somewhat agree (11)
- Agree (10)
- Strongly agree (9)

End of Block: About the meme

Start of Block: Perceived knowledge

Introduction Here we would like to know about the knowledge you might have gained from this post



Q12 I feel more confident explaining anxiety to someone else after viewing this post.

- Strongly disagree (15)
 - Disagree (14)
 - Somewhat disagree (13)
 - Neither agree nor disagree (12)
 - Somewhat agree (11)
 - Agree (10)
 - Strongly agree (9)
-



Q13 I understand how to recognise anxiety symptoms in myself or others.

- Strongly disagree (15)
 - Disagree (14)
 - Somewhat disagree (13)
 - Neither agree nor disagree (12)
 - Somewhat agree (11)
 - Agree (10)
 - Strongly agree (9)
-



Q14 This post improved my understanding of anxiety causes.

- Strongly disagree (15)
- Disagree (14)
- Somewhat disagree (13)
- Neither agree nor disagree (12)
- Somewhat agree (11)
- Agree (10)
- Strongly agree (9)



Q15 I feel better informed about treatment options for anxiety.

- Strongly disagree (15)
- Disagree (14)
- Somewhat disagree (13)
- Neither agree nor disagree (12)
- Somewhat agree (11)
- Agree (10)
- Strongly agree (9)

End of Block: Perceived knowledge

Tables

Table 1*Meme condition*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HE	30	24,8	24,8	24,8
	HN	31	25,6	25,6	50,4
	IE	30	24,8	24,8	75,2
	IN	30	24,8	24,8	100,0
	Total	121	100,0	100,0	

Table 2*Descriptive Statistics - Age of Participants*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age	121	37,00	18,00	55,00	23,2975	5,41702
Valid N (listwise)	121					

Table 3*Level of Education of Participants*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No formal education or diploma	1	,8	,8	,8
	Lower secondary school (middle school or equivalent)	4	3,3	3,3	4,1
	Upper secondary school (high school or equivalent)	64	52,9	52,9	57,0
	Bachelor's degree or equivalent	43	35,5	35,5	92,6
	Master's degree or equivalent	9	7,4	7,4	100,0
	Total	121	100,0	100,0	

Table 4

Chi-Square Tests - Gender across conditions

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	12,911 ^a	12	,376
Likelihood Ratio	13,150	12	,358
Linear-by-Linear Association	1,361	1	,243
N of Valid Cases	121		

^a. 12 cells (60,0%) have expected count less than 5. The minimum expected count is ,25.

Table 5

Chi-Square Tests - Distribution of educational level across conditions

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	9,071 ^a	12	,697
Likelihood Ratio	9,491	12	,661
Linear-by-Linear Association	1,238	1	,266
N of Valid Cases	121		

^a. 12 cells (60,0%) have expected count less than 5. The minimum expected count is ,25.

Table 6*ANOVA - Age across different conditions*

Age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	23,089	3	7,696	,257	,856
Within Groups	3498,200	117	29,899		
Total	3521,289	120			

Table 7*Reliability Statistics -**Cronbach's alpha - Perceived**knowledge*

Cronbach's Alpha	N of Items
,711	4

Table 8*Time spend on the**questionnaire*

Duration (in seconds)

N	Valid	121
	Missing	0
Mean		429,2479
Median		353,0000
Std. Deviation		243,96367
Range		1389,00
Minimum		150,00
Maximum		1539,00

Table 9

Descriptive Statistics - Prior Exposure and Knowledge

	N	Minimum	Maximum	Mean	Std. Deviation
Are you familiar with anxiety and its symptoms? yes/no question, 1=yes, 2=no	121	1	2	1,12	,331
How often do you use Instagram?	121	1	7	5,36	1,522
How often do you encounter health-related content on social media?	121	1	7	4,02	1,384
Valid N (listwise)	121				

Table 10

Descriptive Statistics - Perceived Humor

Dependent Variable: To what extend do you agree with the follow

Meme_Type	Source_Type	Mean	Std. Deviation	N
Humorous	Expert	4.03	1.712	30
	Non-Expert	3.45	1.179	31
	Total	3.74	1.482	61
Informative	Expert	4.03	1.497	30
	Non-Expert	4.80	1.375	30
	Total	4.42	1.476	60
Total	Expert	4.03	1.594	60
	Non-Expert	4.11	1.439	61
	Total	4.07	1.512	121

Table 11

Two-way ANOVA of Meme Type and Source Type on Perceived Humor

Dependent Variable: To what extend do you agree with the following statements?I find this men

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	27.920 ^a	3	9.307	4.419	.006	.102
Intercept	2013.384	1	2013.384	955.989	.000	.891
Meme_Type	13.747	1	13.747	6.527	.012	.053
Source_Type	.259	1	.259	.123	.727	.001
Meme_Type * Source_Type	13.747	1	13.747	6.527	.012	.053
Error	246.411	117	2.106			
Total	2283.000	121				
Corrected Total	274.331	120				

a. R Squared = .102 (Adjusted R Squared = .079)

Table 12

ANOVA - Meme Type on Perceived Humor^a

To what extend do you agree with the following statements?
I find this meme funny

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27.719	1	27.719	16.952	.000
Within Groups	96.477	59	1.635		
Total	124.197	60			

a. Source_Type = Non-Expert

Table 13

Descriptives - Perceived Humor for Non-Expert Memes^a

To what extend do you agree with the following statements?
I find this meme funny

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean			
					Lower Bound	Upper Bound	Minimum	Maximum
Humorous	31	3.45	1.179	.212	3.02	3.88	1	6
Informative	30	4.80	1.375	.251	4.29	5.31	3	7
Total	61	4.11	1.439	.184	3.75	4.48	1	7

a. Source_Type = Non-Expert

Table 14*Descriptive Statistics - Perceived Informativeness*

Dependent Variable: Perceived Informativeness

Meme_Type	Source_Type	Mean	Std. Deviation	N
Humorous	Expert	3.7667	1.31131	30
	Non-Expert	3.5645	1.35857	31
	Total	3.6639	1.32829	61
Informative	Expert	2.8833	1.13474	30
	Non-Expert	3.5500	1.20595	30
	Total	3.2167	1.20861	60
Total	Expert	3.3250	1.29479	60
	Non-Expert	3.5574	1.27508	61
	Total	3.4421	1.28483	121

Table 15*Meme Type x Source Type ANOVA on Perceived Informativeness*

Dependent Variable: Perceived Informativeness

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	13.341 ^a	3	4.447	2.816	.042
Intercept	1432.517	1	1432.517	907.175	.000
Meme_Type	6.095	1	6.095	3.860	.052
Source_Type	1.631	1	1.631	1.033	.312
Meme_Type * Source_Type	5.707	1	5.707	3.614	.060
Error	184.754	117	1.579		
Total	1631.750	121			
Corrected Total	198.095	120			

a. R Squared = .067 (Adjusted R Squared = .043)

Table 16

ANOVA of Meme Type and Source Type on Perceived Source Credibility

Dependent Variable: Perceived Source Credibility

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	56.776 ^a	3	18.925	11.248	.000	.224
Intercept	1752.577	1	1752.577	1041.652	.000	.899
Meme_Type	.001	1	.001	.000	.985	.000
Source_Type	52.089	1	52.089	30.959	.000	.209
Meme_Type * Source_Type	4.944	1	4.944	2.938	.089	.024
Error	196.852	117	1.682			
Total	2010.000	121				
Corrected Total	253.628	120				

a. R Squared = .224 (Adjusted R Squared = .204)

Table 17

Descriptive Statistics Perceived Source Credibility

Dependent Variable: Perceived Source Credibility

Meme_Type	Source_Type	Mean	Std. Deviation	N
Humorous	Expert	3.3500	1.39673	30
	Non-Expert	4.2581	1.10959	31
	Total	3.8115	1.32967	61
Informative	Expert	2.9500	1.28888	30
	Non-Expert	4.6667	1.37924	30
	Total	3.8083	1.58138	60
Total	Expert	3.1500	1.34763	60
	Non-Expert	4.4590	1.25597	61
	Total	3.8099	1.45381	121

Table 18

Tests of Between-Subjects Effects

Dependent Variable: Perceived Knowledge

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5,783 ^a	3	1,928	1,538	,208	,038
Intercept	2556,255	1	2556,255	2039,591	<,001	,946
Meme_Type	,623	1	,623	,497	,482	,004
Source_Type	2,048	1	2,048	1,634	,204	,014
Meme_Type * Source_Type	3,158	1	3,158	2,519	,115	,021
Error	146,638	117	1,253			
Total	2709,563	121				
Corrected Total	152,421	120				

^a R Squared = ,038 (Adjusted R Squared = ,013)

Table 19

Descriptive Statistics

Dependent Variable: Perceived Knowledge

Meme_Type	Source_Type	Mean	Std. Deviation	N
Humorous	Expert	4,7000	,98129	30
	Non-Expert	4,6371	1,10272	31
	Total	4,6680	1,03654	61
Informative	Expert	4,2333	1,05441	30
	Non-Expert	4,8167	1,31295	30
	Total	4,5250	1,21667	60
Total	Expert	4,4667	1,03689	60
	Non-Expert	4,7254	1,20390	61
	Total	4,5971	1,12702	121

Table 20

*Reliability Statistics of
Perceived
Informativeness*

Cronbach's Alpha	N of Items
.833	2

Table 21

*Reliability Statistics of
Perceived Source
Credibility*

Cronbach's Alpha	N of Items
.707	2

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