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The Anxiety Threshold: Exploring the Relationship Between Discrete Emotions and Information-seeking Repertoires During a Societal Crisis

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ABSTRACT

Appraisal theory suggests that emotions with similar valence can lead to distinct information-seeking behaviors during crises, driven by unique cognitive appraisals. Previous research has predominantly concentrated on the role of affective states, focusing largely on how much time individuals spend seeking information about a threat. However, this approach overlooks the potential impact of specific emotions on source preferences. This study examines the link between particular emotions and the source combinations people use to gather information about COVID-19. It hypothesizes that anxiety is linked to broad repertoires including a wide variety of sources, while anger is associated with narrow repertoires including fewer sources. RQs address the relationship with sadness and happiness. Employing multinomial regressions on latent classes, the findings show that both anger and anxiety are positively associated with broader source repertoires, while low levels of anxiety are linked to narrower repertoires. Sadness and happiness appear to have limited significance in this context. The results suggest an "anxiety threshold," indicating that both low and high levels of anxiety can pose challenges for crisis communication.

KEYWORDS: appraisal theory, discrete emotions, information-seeking repertoires, crisis communication

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Introduction

During societal crises, threats are evaluated both cognitively and emotionally (Loewenstein et al., 2001). The emotional experience of a threat has a direct influence on different coping behaviors, such as crisis-related information-seeking (Ahn et al., 2021; Dillard et al., 2021). Currently, crisis communication research has primarily analysed the influence of affective states (e.g., indices of positive or negative emotions) on individuals' overall time spent seeking information or their willingness to do so. Findings indicate that negative emotions are linked to an increase in information-seeking about a threat, whereas positive emotions are associated with a reduction in this behavior (Yang et al., 2014).

The emphasis on affective states may however lead scholars to underestimate the influence of emotions on information-seeking behavior in high-threat situations (Yang et al., 2014). According to appraisal theory, emotions within the same affective state (e.g., with the same valence) may have different effects on behaviors due to their unique cognitive appraisals (Lazarus, 1982). In line with this perspective, empirical evidence indicates that negative emotions tied to cognitive appraisals of uncertainty, such as anxiety, are associated with increased information-seeking about a threat, while negative emotions linked to appraisals of certainty and other control (e.g., where someone else is perceived as responsible for the situation), like anger, are associated with decreased information-seeking. (Ahn et al., 2021; Valentino et al., 2008).

Another shortcoming in existing research is that previous studies have largely focused on individuals' intent to seek information, or their overall time spent doing so (see, for example, Ahn et al., 2021; Dillard et al., 2021; Yang & Kahlor, 2013). However, emotions might play a more complex role in information-seeking practices within the contemporary information landscape. They affect not only the frequency with which individuals seek information but also may have a greater impact on their source preferences. When experiencing high levels of anxiety, individuals may not only increase the consumption of sources they already use but incorporate additional information sources into their repertoire. Conversely, anger might not only lead to a general decrease in information-seeking frequency (Valentino et al., 2008), but

also to an exclusion of information sources consisting of counter-attitudinal information, thereby leading to selective exposure to a mix of sources which confirm expressions of anger and claims of responsibility. Both selective exposure to alternative sources and broadness may be problematic from a crisis communication standpoint, potentially leading to an increased exposure to misleading or false information (Benkler et al., 2018, 2020; McDowell-Naylor et al., 2023; Motta et al., 2020; Rocha et al., 2021). To fully grasp the influence of emotions on information-seeking practices during crises, it is thus not enough to explore the connection between emotions and the use of individual information sources. Instead, it is key to take the combination of information sources, known as *information seeking repertoires,* into account. Yet, it remains largely unknown whether and how specific emotions impact source preferences, and more specifically, how they impact individuals' information-seeking repertoires.

To remedy this, the study at hand investigates the relationship between specific emotions and how individuals combine information sources to seek information about a threat, using survey data collected during the second wave of the COVID-19 pandemic in Sweden (N = 13718). To this end, weighted multinomial logistic regressions, using classes derived from a cross-sectional latent class analysis, will be applied to explore the relationship between anxiety, anger, sadness, and happiness, on one hand, and information-seeking repertoires, on the other. In doing so, this study establishes a foundation for theoretical development regarding the influence of emotions on information-seeking repertoires and a better understanding about how crisis messages can be designed and distributed considering the interplay of citizens' emotions and information-seeking in contemporary high-choice information environments.

Emotions in Crisis Communication Research

During a crisis, threats are both cognitively appraised and emotionally felt (Slovic et al., 2005). In contrast to moods which are experienced during a longer period, emotions are relatively unstable and experienced as a response to external stimuli (Batson et al., 1992). The *risk-as-feelings hypothesis* suggests that people process risks in two ways: intuitively and analytically. The intuitive approach

involves rapid and instinctive reactions to threats, while the analytical approach relies on logic and deliberation (Loewenstein et al., 2001; Slovic et al., 2005). This framework is based on dual-process theories of judgment and decision-making that propose the coexistence of system 1 (analytical, deliberate) processing with system 2 (heuristic-based, less deliberate) thinking (Kahneman, 2003; Stanovich & West, 2000). In reality, these processes cannot be easily separated, but are intertwined and take place simultaneously (Slovic et al., 2005).

Given the role of emotions in evaluating threats, scholars are increasingly studying how emotions impact decision-making during crises. Jin et al. (2007, 2012) developed the Integrated Crisis Mapping Model (ICM), which categorizes audience emotions during different types of crises based on Lazarus's cognitive appraisal theory from 1982. According to Lazarus (1982), events that align with goals and well-being evoke positive emotions, while those incongruent with goals and well-being elicit negative emotions such as fear, anxiety, sadness, anger, guilt, and shame. The ICM model proposes that during natural disasters, individuals experience four of the main negative emotions: anxiety, fear, sadness, and anger. Empirical testing of the model indicates that anxiety is the default emotion experienced by audiences during crises (Jin et al., 2012). However, other emotions are also experienced depending on contextual and individual factors. For example, fear tends to co-occur with anxiety when there is uncertainty and threats to important goals like safety and health (Frijda et al., 1989; Lazarus, 1991; Mauro & Sato, 1992; Scherer et al., 2001; Smith & Ellsworth, 1985). In contrast, anger tends to increase as certainty about the cause of the crisis or threat grows (Frijda et al., 1989; Lerner & Keltner, 2001). Thus, anger often arises when blame is assigned to governments or other entities for causing or mishandling crises (Coombs & Holladay, 2005). Sadness may emerge in response to loss, such as that of family members or friends (Lazarus, 1992), and is therefore closely related to the severity of the event (Coombs & Holladay, 2005).

The four emotions identified by the ICM are likely applicable to other types of societal crises as well. For instance, the uncertainty, threat, and significant efforts required from authorities to

mitigate the spread of the COVID-19 virus had the potential to trigger all four emotions outlined by the ICM. Moreover, previous research suggests that positive emotions like hope and happiness can also emerge in uncertain situations, such as a public health crisis (Folkman & Moskowitz, 2000; Griffin et al., 2008). Later versions of the ICM have incorporated this understanding, emphasising the role of sympathy, hope, and relief in crises (Jin et al., 2014). Among these emotions, the authors suggest that sympathy is the primary positive emotion experienced during crises (Jin et al., 2014).

The influence of discrete emotions on information-seeking during crises

In broad terms, information seeking refers to "*planned scanning of the environment for messages about a specified topic*" (Clarke & Kline, 1974, p. 233). During crises, people may seek specific information as a coping strategy to manage negative emotions (Schramm & Cohen, 2017). Building on this perspective, this study views emotions as drivers of information-seeking, which is broadly supported by empirical evidence (Yang et al., 2014). However, it is also worth noting that research supports the idea that emotions can be outcomes of information-seeking practices (Dillard et al., 2021). Specifically, prior research indicates the existence of a reinforcing spiral in which negative emotions influence information-seeking practices which, in turn, reinforces individual's emotional state (Dillard et al., 2021).

Studies exploring the relationship between emotions and information-seeking about threats can generally be divided into two categories: one focusing on the impact of affective states, known as valence-based approaches, and the other examining the effect of specific emotions, known as discrete approaches. Valence-based approaches assume that emotional responses primarily differ in terms of negative or positive valence. Measurements are constructed by combining discrete emotions into additive indices based on their valence. This approach is commonly used in risk and crisis communication research, and frequently tested in the risk information seeking and processing (RISP) model (Yang et al., 2014). Such studies often depart from self-reported data,

showing that individuals in a negative emotional state are more likely to seek information about a threat, while those in a positive emotional state are less inclined to do so (for an overview of RISP research, see Yang et al., 2014). For example, Yang and Kahlor (2013) found that individuals in a negative affective state had lower perceived knowledge about climate change but were more likely to seek information on the topic. Conversely, individuals in a positive affective state reported higher perceived knowledge yet tended to avoid seeking additional information. Similarly, Austin et al. (2023) examined how emotional responses and risk perceptions affect information-seeking behavior related to a natural disaster. The study found that negative affect mediated the relationship between perceived threat severity and increased information-seeking about the event from multiple sources.

One limitation of valence-based approaches is that they assume emotions with the same valence have similar effects on judgment and behavior. As Yang et al. (2014) argued, focusing solely on affective states may result in an underestimation of the influence of emotions on information-seeking in high-threat situations. In contrast, appraisal theory suggests that emotions with the same valence may have different effects on behavior due to their unique cognitive appraisals (Frijdah et al., 1989; Lazarus, 1982; Lerner & Keltner, 2001). According to appraisal theory, an emotional episode includes several components, such as evaluations of the environment, action tendencies or action readiness, physiological responses, behavior, and subjective experience or emotions. Assessments of environmental changes that may satisfy or obstruct concerns are generally referred to as cognitive appraisals, which may result in distinct emotional experiences (Moors et al., 2013). Discrete emotions can thus differ along different appraisal criteria, including agency, control, and certainty (Smith & Ellsworth, 1985). Anger is associated with cognitive appraisals of certainty (e.g., being sure about how the situation will develop) and other control (e.g., perceiving a third party as in control of the outcome), while fear, anxiety, and sadness are linked to appraisals of uncertainty (e.g., being unsure about how the situation will develop) and situational control (e.g., perceiving oneself and others to be unable to control the situation). Happiness shares similarities with

anger in terms of being related to a sense of certainty and individual control (Frijda et al., 1989; Lerner & Keltner, 2001; Roseman, 2004; Sherer, 1984; Smith & Ellsworth, 1985).

In line with appraisal theory, discrete emotions should influence judgment and behavior differently, such as information-seeking in high-threat situations, in accordance with their associated cognitive appraisal. For example, a study by Valentino et al. (2008) found that individuals experiencing anger were less likely to seek additional information about a political threat, while those feeling anxious were more inclined to engage in information-seeking. However, this was only the case when individuals were in an environment resembling an online news environment. When people were limited to reading one page of information at a time, both anxiety and anger had similar effects, reducing the time spent searching for information. Conversely, when participants could select from different types of information, anxiety increased the number of news stories they engaged with, while anger decreased such engagement.

While the study by Valentino et al. (2008) departed from a political threat, the results seem to be applicable in other types of threatening situations as well. Previous studies investigating the influence of discrete emotions on information-seeking about a threat have predominantly analysed the effect on individuals' overall time spent seeking information (e.g., constructing indices of reported information-seeking across several sources). For instance, a study by Ahn et al. (2021) on the mediating role of emotions on governmental trust and coronavirus-related information-seeking shows that fear and anxiety were positively related to increased information-seeking, while anger was associated with avoiding information about the COVID-19 pandemic. The study also found that fear was related to increased information-seeking about the COVID-19 virus. Likewise, a longitudinal study conducted by Dillard et al. (2021) analyzing the association between fear and information-seeking behavior regarding the Zika virus shows that individuals experiencing higher levels of fear searched for information more frequently from multiple sources. Indeed, information-seeking about the Zika virus, prompted by heightened fear, further increased participants' fear at later points in time (Dillard et al., 2021).

Turning to positively valenced emotions, research is thus far limited (but see Ahn et al., 2021 & Xu & Yue, 2022). Sympathy and hope are among the most studied positive emotions, demonstrating similar effects by increasing overall information-seeking (Ahn et al., 2021; Xu & Yue, 2022). This is in line with previous research, indicating that positively valenced emotions are less differentiated compared to negative ones. While negative emotions can be clearly distinguished into specific categories, positive emotions tend to create an overall sense of positivity (Ellsworth & Smith, 1988; Frijda et al., 1989). It is therefore possible that there are minimal or no significant differences between various types of positive emotions regarding their impact on behavioral outcomes like information-seeking in high-threat situations.

As mentioned above, previous studies have primarily examined participants' intent to seek information about a threat or the total time they spend doing so, rather than focusing on the specific sources they use. These studies indicate that anxiety and fear motivate individuals to engage in information-seeking about a threat as a means of dealing with uncertainties, while anger seems to make individuals less motivated to seek information due to confidence in their current understanding of the situation. It should be noted that some scholars argue that anger may have similar effects as fear and anxiety in motivating information-seeking. For example, Griffin et al. (2008) found that anger directed at managing agencies for not minimizing flood risks was positively associated with both the desire for additional information and active information-seeking about a flood. However, it remains uncertain whether these findings are applicable to other types of crises or if they are unique to specific situations where the crisis is perceived as highly preventable. The impact of sadness and happiness on information-seeking in high-threat situations remains unknown, mainly due to the lack of studies including them as variables.

Information-seeking during crises in a high-choice information environment

Considering the contemporary high-choice information environment, the relationship between discrete emotions and crisis-related information-seeking may be more complex than previously

acknowledged. In the contemporary information environment, individuals have access to numerous channels and sources for staying informed during crises. These sources may include experts, politicians, family members, or friends and can be accessed through various platforms, such as social media networks, government websites, or news outlets. Emerging evidence shows that citizens combine information sources in similar ways to cope with high threat situations — referred to as information-seeking repertoires or clusters (Authors, 2023; Houston et al., 2021; Kuttschreuter et al., 2014; Lee & Jin, 2019; Sommerfeldt, 2015; Wang & Ahern, 2015). Some individuals prefer a wider range of sources that serve complementary functions while others rely on a narrower set of convergent sources (Anthony et al., 2013; Yuan, 2011; Zhao et al., 2022). The mix of information sources individuals use matter beyond the use of individual sources. Specifically, repertoires have been shown to be associated with different attitudes and behavioral outcomes (Strömbäck et al., 2018; Verboord, 2022). Understanding the factors driving source combinations is thus vital to understand the relationship between information-seeking, perceptions, and behavioral outcomes during a crisis.

Departing from cognitive appraisal theory (Lazarus, 1982), discrete emotions may not only influence individuals' overall time spent on seeking information but exert a more substantial influence on source preferences and, thus, on which information sources individuals include in, or exclude from, their information-seeking repertoires. The appraisals of uncertainty associated with anxiety may not only influence individuals to search for information about a threat more frequently (Ahn et al., 2021), but also lead them to consult a wider range of sources, resulting in broader information-seeking repertoires. In contrast, the appraisal of certainty linked to anger (Frijda et al., 1989) may make individuals inclined to exclude information sources, resulting in narrow information-seeking repertoires. Based on these premises, two hypotheses regarding the role of discrete emotions with distinct cognitive appraisals are posed:

H1. Individuals who experience high levels of anxiety are more likely to have broad information-seeking repertoires.

H2. Individuals who experience high levels of anger are more likely to have narrow information-seeking repertoires.

In addition to investigating the impact of discrete emotions with different cognitive appraisals, the role of sadness needs to be more thoroughly analysed. Following the same logic as above, the cognitive appraisal of uncertainty associated with sadness (Smith & Ellsworth, 1985) might result in an increased tendency to search for information across different information sources. However, as mentioned above, research analysing the relationship between sadness and information-seeking about threats are scarce, resulting in the following research question:

RQ1. Do high levels of sadness make individuals more likely to have broad information-seeking repertoires?

As discussed previously, positively valenced emotions are less differentiated than negative emotions (Ellsworth & Smith, 1988; Frijda et al., 1989) and tend to influence on information-seeking in the same direction (Ahn et al., 2021; Xu & Yue, 2023). Therefore, this study chooses to focus on only one positively valenced emotion: *happiness*. Departing from cognitive appraisal theory, high levels of happiness might lead to an exclusion of several information sources due to an appraisal of certainty (Smith & Ellsworth, 1985). However, like sadness, studies examining the role of happiness in information-seeking about threats are few, leading to a second research question:

RQ2. Do high levels of happiness make individuals more likely to have narrow information-seeking repertoires?

Methods: A Case Study of Sweden's Second Phase of COVID-19

The present study is based on a survey conducted in Sweden during the second phase of the COVID-19 pandemic (December 2020). Trust towards mainstream media remains high in Sweden (Andersson, 2021; Ihlen et al., 2022), making it a unique case compared to studies conducted in the U.S (Uslaner, 2018).

However, like many other countries, Sweden is experiencing changes in media consumption patterns with declining readership of mainstream news and increased use of social media for news consumption (Newman et al., 2021). A societal crisis may further accelerate such trends, making the COVID-19 pandemic an interesting context to explore how emotions influence source preferences in the contemporary media system.

Phase two of the COVID-19 pandemic in Sweden saw elevated mortality and infection figures around Christmas time 2020. Authorities expanded restrictions to minimize transmission risks, but the emergence and spread of the Delta variant prolonged the second wave throughout spring 2021. With increasing vaccinations, infection rates gradually decreased by the summer of 2021, prompting governmental authorities to lift several restrictions (Folkhälsomyndigheten, 2021, 2023a, 2023b).

Data

The analysis was conducted using the Citizen Panel at the SOM-institute, a research institute connected to the University of Gothenburg. The panel survey consists of four survey waves that were sent out during the COVID-19 pandemic and includes both randomly selected individuals and individuals who voluntarily opted into the study. Respondents for the random sample were recruited through a probability sample divided by sex, age, and education. The sample is generally representative of the Swedish population, although the elderly and highly educated are somewhat overrepresented. The non-probability sample consists of individuals who voluntarily signed up to be part of the larger panel on the research institute's website. The Swedish Ethical Review Authority gave the panel survey ethical approval on January 15, 2020 (Dnr 2019-04,339). Before answering the survey, every respondent had to give written consent to participate. The survey wave used for this study was sent out during the second infection wave in December 2020 and consisted of a total sample size of 13,718 participants. In line with the skewness of the panel survey overall, the sample was skewed towards middle-aged (60%), older individuals (30%), males (66%), and individuals with higher levels of education (68%). Due to employing listwise deletion in the LCA analysis (described

below), the final analysed dataset comprised 4,305 participants. The skewness characteristic remained (see Table 2 in Appendix).

Measurements

Dependent variables

Classes of information-seekers identified in a previous study (see Johansson et al., 2023) were used as dependent variables. In the aforementioned study, the classes were derived from a set of items measuring how often participants sought information from different sources. Specifically, participants were asked to rate how often they searched for information about COVID-19 from Swedish news media (M = 2.34, SD = .97), foreign news media (M=3.74, SD = 1.10), social media platforms (M= 3.98, SD =1.11), government websites (M=3.73, SD= .85), family and friends (M=3.42, SD= .95), and alternative media outlets (M=4.44, SD= .93). A 5-point scale was employed for each item ranging from 1) "Several times a day" to 5) "Never" (see Appendix Table 1). No specific outlets were measured (e.g., the indicators were measured on a general level). In contexts where mainstream media outlets, such as public-service media, have relatively strong support (Andersson, 2021) and the media system is not as politicized, such as in Sweden, broad categories may work better. Still, it should be noted that not specifying specific sources are likely to increase measurement error.

The five classes used in the multinomial regressions (but identified in the previous study) were the *mainstream pluralists (FU and LFU)*, *news junkies, news-oriented traditionalists,* and *selective minimalists* (for visualization of classes, see Figure 1). The *mainstream pluralists* had a comparatively high likelihood to use of all information sources when searching for information about COVID-19, although they were slightly more likely to use Swedish news media. Besides the differences in frequency of information-seeking between the frequent users (FU) and less frequent users (LFU), the LFU's were slightly more likely to use alternative media ("once or more times a week"). Like the *mainstream pluralists*, the *news junkies* did not exclude any sources. However, they stood out with their high likelihood to seek information about COVID-19 in Swedish news media ("several times a day"). They also had a

higher probability to seek information frequently from alternative and foreign sources, as well as on social media. In comparison to the *news junkies* and the *mainstream pluralists*, the *minimalists* were less likely to use any of the sources for information-seeking purposes. Although they rarely sought for information about COVID-19, they were slightly more likely to use Swedish news media when doing so. Finally, the *news-oriented traditionalists* shared features with both the *minimalists* and the *mainstream pluralists* in that they used some of the sources for information-seeking purposes but excluded others. They were more likely to use Swedish news media, government websites, and family or friends for information-seeking, but less likely to use social media, foreign media, and alternative sources (for more details about the classes, see Johansson et al., 2023).

Independent variables

The predictors included subjective experiences of anxiety, sadness, anger, and happiness. The discrete emotions were measured using single-items, which have shown to be effective in previous studies (for discussion about this, see Harmon-Jones et al., 2016). Nevertheless, it should be noted that measuring discrete emotions with single-items might increase measurement error (Harmones-Jones et al., 2016). To be precise, participants were asked "When you think about the emotions that you experience today, to what extent do you feel the following?" for each emotion. The question was followed by five different response categories: 1) "to a very large extent", 2) "to a fairly large extent", 3) "to neither a large nor a small extent", 4) "to a rather small extent" and 5) "to a very small extent" (reverse coded).[1] The item was thus constructed with the aim to measure emotion, as opposed to mood, which is typically experienced over a longer period (Batson et al., 1992). However, emotions specifically related to COVID-19 were not measured,

[1]Anxiety: M=2.71, SD=1.13
Anger: M= 2.24, SD= 1.12
Sadness: M =2.38, SD=1.11
Happiness: M= 3.49, SD= 0.88

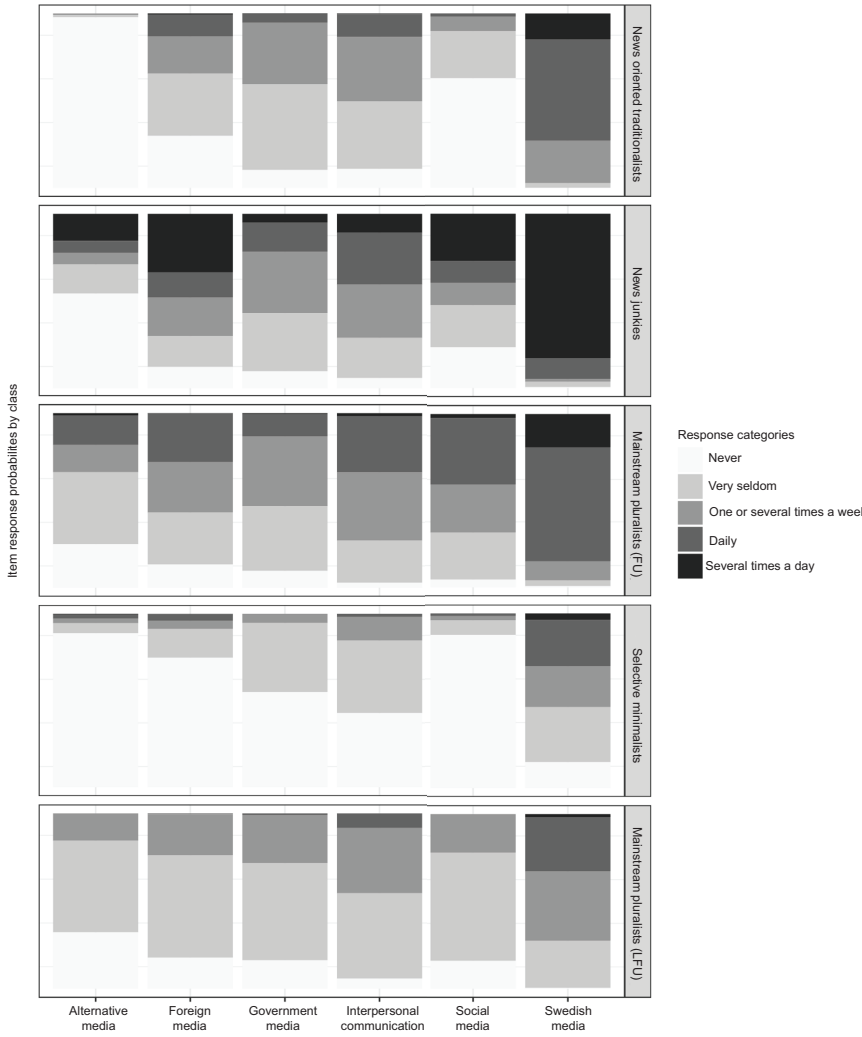

FIGURE 1 Visualization of latent classes (dependent variables)
Note: The latent classes were identified in the second phase of the COVID-19 pandemic in Sweden (December 2020). Darker colour = higher probability of use, lighter colour = lower probability of use. Computed with listwise deletion. Total *N* = 4,476.

but emotions experienced by participants during the second wave of infections. However, negative emotions tend to increase as individuals perceive greater threat, which was observed during the second wave of the COVID-19 pandemic (Canet-Juric et al., 2020). It is therefore likely that individuals' emotions were, to some

degree, directed towards the pandemic. That said, the measurement does not distinguish between emotions caused by the COVID-19 pandemic or other external factors. Participants may have been happy when conducting the survey due to other external factors – but at the same time felt angry about COVID-19. Since the emotions were measured on a 5-point scale, they were treated as categorical and categorized into two groups: low (1-2) and neutral to high (3-5) (for discussion about treating Likert scales with fewer response options as continuous or ordinal in correlation and regression analysis, (see Norman 2010).

Control variables

To account for the influence of trust in mainstream media, ideology, age, and education—which were found to be linked to the identified information-seeking repertoires in a previous study (see Johansson et al., 2023)—these variables were included as control variables. The level of trust in different mainstream media outlets was measured by asking participants to rate their degree of trust in each outlet on a scale ranging from 5 (very little trust) to 1 (a lot of trust), with Sveriges Television (Swedish Public Service Television), Sveriges Radio (Swedish Public Service Radio), and TV4 (Channel 4) being the outlets considered. Principal component analysis indicated that all items loaded onto one factor, explaining 75% of the variability observed. Thus, the items were rescaled and made into an additive index of mainstream media trust, ranging from 0 to 1 (M = .69; SD = .23; $\alpha\acute{a}$ = .90) (see Table 3 in Appendix). To assess participants' political ideology, they were asked to place themselves on a scale ranging from 0 (far-left) to 10 (far-right). Their responses were then recoded into a factor variable consisting of three levels: "left" (0-4), "right" (6-10) and "centre" (5). The respondents' age was measured by asking them which year they were born. Responses were grouped into three categories: 16–39 years old, 40–69 years old, and 70+ years old. Finally, participants' educational level was assessed using a scale that ranged from 1 (not completed elementary school) to 9 (PhD degree). It was transformed into a factor variable with three levels: "low" (elementary schooling or less), "middle" (high school diploma or post-secondary education), and "high" (undergraduate or graduate studies) (see Appendix Table 2).

Analytical strategy

To explore the relationship between the emotions (anxiety, anger, sadness, happiness) and information-seeking repertoires in phase two of the COVID-19 pandemic, weighted multinomial logistic regressions were conducted. The information-seeking repertoires used in the analysis were identified in a previous paper through a three-step cross-sectional latent class analysis (LCA) applied across four waves during the first year of the COVID-19 pandemic. LCA is a person-centred mixture-modelling method aimed at identifying subgroups which share certain characteristics within a larger population. Such subgroups, referred to as latent classes, are identified through analysis of response-pattern probabilities to observed variables. First, individuals are categorized into latent classes based on their probabilities of responding to specific items. Subsequently, conditional probabilities for each class are computed, allowing for an examination patterns of response probabilities within the identified groups (McCutcheon, 1987; Weller et al., 2020). By examining various information criteria, the five-class solution was identified as the best fitting-solution in all four waves (for details about the analysis, see Johansson et al., 2023).

In this paper, the same dataset and classes derived from it are used to conduct weighted multinomial logistic regressions with emotions as predictors. To be precise, the dependent variables in the regressions constitutes of the five classes identified in the previous paper, and the independent variables are the emotions listed above. To address the issue of distortion in standard errors resulting from treating modal assignments as precise measurements, the posterior probabilities were used as weights in the regressions. Although this approach is acknowledged as one of the most suitable methods for relating covariates to latent classes, it's important to note that the errors will still be distorted to some extent (Bukk & Kuha, 2020; Clark & Muthen, 2009). First, a narrow repertoire with fewer sources was used as a reference category. After that, the reference category was changed to a broader repertoire including a wide variety of sources. This rotation was applied to discover interesting differences relating to the influence of emotions on repertoire broadness and narrowness.

Results

In this section, the results concerning emotions as predictors of information-seeking repertoires are presented. First, a model including only the control variables (mainstream media trust, ideology, age, and education) was run (*Nagelkerke* $R^2 = 0.14$). When the predictors were added (anxiety, sadness, anger, and happiness) the explained variance increased (*Nagelkerke* $R^2 = 0.18$). However, it should be noted that the R^2 is still rather low. Table 1 and 2 shows the results of the multinomial regressions for each predictor, holding all other variables constant. In the first table, the *news-oriented traditionalists* are the reference category (e.g., a narrow repertoire). In the second table, the *news junkies* are the reference category (e.g., a broad repertoire).

Starting with anxiety, the results indicate that individuals with high anxiety levels were more likely to be associated with

TABLE 1 Weighted multinomial logistic regression with a narrow repertoire as reference category

	News junkies		Mainstream pluralists (FU)		Selective minimalists		Mainstream pluralists (LFU)	
Variable	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Anxiety								
Neutral to high	1.778	1.233–2.565	1.599	1.293–1.978	0.610	0.478-0.780	1.115	0.840–1.479
Anger								
Neutral to high	1.427	1.020–1.997	1.426	1.169–1.739	1.184	0.935-1.498	1.126	0.857–1.479
Sadness								
Neutral to high	0.860	0.597–1.239	1.063	0.857–1.319	1.076	0.832-1.391	0.877	0.652–1.180
Happiness								
Neutral to high	1.098	0.694–1.738	1.446	1.086–1.924	0.833	0.606-1.144	1.100	0.755–1.602

Note: the predictors were coded into factors variables with two levels, ranging from low (response levels 1-2) to neutral to high (response levels 3-5). The news-oriented traditionalists are reference category, *Nagelkerke* $R^2 = 0.179$, $N = 4305$. For lower sig. likelihood: the lower and upper CI should be below 0, for higher sig. likelihood: the lower and upper CI should be above 1. The control variables (mainstream media trust, ideology, education, age) were excluded from the table although included in the final model. For the association with control variables, see table 4 in Appendix A.

TABLE 2 Weighted multinomial logistic regression with a broad repertoire as reference category

Variable	News-oriented traditionalists		Mainstream pluralists (FU)		Selective minimalists		Mainstream pluralists (LFU)	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Anxiety								
Neutral to high	0.562	0.390–0.811	0.899	0.615–1.315	0.343	0.230-0.513	0.627	0.411–0.955
Anger								
Neutral to high	0.701	0.501–0.980	0.999	0.708–1.410	0.829	0.573-1.200	0.789	0.534–1.165
Sadness								
Neutral to high	1.163	0.807–1.676	1.237	0.851–1.798	1.252	0.836-1.875	1.020	0.667–1.561
Happiness								
Neutral to high	0.910	0.575–1.441	1.316	0.822–2.109	0.758	0.462-1.245	1.001	0.590–1.699

Note: the predictors were coded into factors variables with two levels, ranging from low (response levels 1-2) to neutral to high (response levels 3-5). The *news junkies* are reference category, *Nagelkerke* $R^2 = 0.179$, $N = 4305$. For lower sig. likelihood: the lower and upper CI should be below 0, for higher sig. likelihood: the lower and upper CI should be above 1. The control variables (mainstream media trust, ideology, education, age) were excluded from the table although included in the final model. For the association with control variables, see table 5 in Appendix A.

broad information-seeking repertoires, providing support for H1. Specifically, those in a high-anxiety state were more likely to be identified as either *mainstream pluralists (FU)* or *news junkies*. Notably, the odds of being identified as a *news junky* increased by 77% and the odds of being identified as a *mainstream pluralists (FU)* increased by 59% at high levels of anxiety in reference to the *news-oriented traditionalists* (*OR*= 1.77, *CI*= 1.233-2.565, *OR*= 1.59, *CI*=1.293-1.978). Similarly, individuals in the low-anxiety state were more likely they were to be identified as *selective minimalists* or *news-oriented traditionalists*. Specifically, the odds of being a *selective minimalist* decreased by 66% at high levels of anxiety in reference to the *news junkies* and by 39% in reference to the *news-oriented traditionalist* (*OR*= 0.61, *CI*= 0.478 -0.780,

OR= 0.34, *CI*= 0.230 -0.513. Following a similar pattern, the odds of being identified as a *news-oriented traditionalists* decreased by 44% at high levels of anxiety in reference to the *news junkies (OR*= 0.56, *CI*= 0.390 -0.811).

Turning to H2, the results show an opposite trend as to what was hypothesized: anger seem to be associated with broad information-seeking repertoires. Specifically, individuals in the low-anger state were more likely to be identified as *news-oriented traditionalists*, while individuals in the high-anger state had a higher probability of being identified as *news junkies* and *mainstream pluralists (FU)*. The association was equally strong for both classes. However, it is worth noting that it was slightly weaker than that observed for anxiety. The odds of being identified as *mainstream pluralists (FU)* and of being identified as a *news junkie* increased with 42% at high levels of anger in reference to the *news-oriented traditionalists (OR*= 1.42, *CI*= 1.169 -1.739, *OR*= 1.42, *CI*= 1.020-1.997).

In terms of the RQs, sadness did not yield any significant result for any of the information-seeking repertoires (RQ1). Regarding the role of happiness (RQ2), the results only showed significance for one class: *the mainstream pluralists (FU),* who are happier than the *news-oriented traditionalists*. Specifically, the odds of being identified as a *mainstream pluralist (FU)* is 44% higher at high levels of happiness in refence to *the news-oriented traditionalists (OR*= 1.44, *CI*= 1.086-1.924). Thus, more research is needed to confirm whether happiness is significantly associated with broadness.

Conclusions

Emotions experienced during a high-threat situation have a direct impact on behavioral outcomes, such as information-seeking practices. Previous studies have predominantly focused on affective states and the influence on an individual's overall time spent on seeking information about a threat across sources (Ahn et al., 2021; Dillard et al., 2021; Yang et al., 2014). Nonetheless, in the modern high-choice information landscape, discrete emotions may not only affect the total time spent seeking information about a threat, but also have a more pronounced impact on source preferences. Emotions may therefore play a more complex role, impacting not only the amount of information gathered about a threat, but also

the type of content to which individuals are exposed. The present study aimed at shedding light on this issue by examining the association between discrete emotions (anxiety, anger, sadness, and happiness) and the combination of sources individuals use to seek information about the COVID-19 pandemic (e.g., their information-seeking repertoires).

Departing from ICM model (Jin et al., 2007, 2012) and in line with appraisal theory (Lazarus, 1992), it was hypothesized that anger and anxiety would lead to distinct source combinations. It was predicted that anxiety would be positively linked to broad information-seeking repertoires characterized by a greater number of sources (H1), while anger would be associated with narrow information-seeking repertoires characterized by fewer information sources (H2). However, only H1 received support. Individuals who expressed high levels of anxiety were more likely to be classified as *pluralists* or *news junkies*. Conversely, those with low levels of anxiety had a higher likelihood of being identified as *minimalists*. The findings also revealed that participants categorized as *traditionalists* fell somewhere in between these two groups — they were less anxious than the *pluralists* and *news junkies* but more anxious than the *minimalists*. In contrast to expectations, individuals who reported higher levels of anger had a higher probability of being identified as *news junkies* and *pluralists*, while individuals who were less angry were more likely to be identified with traditional information-seeking repertoires. A research question was posed to investigate the potential influence of sadness on how individuals combine information sources. However, the results did not indicate a significant relationship between sadness and an increased likelihood of having either broad or narrow information-seeking repertoires. Additionally, a research question was raised about the link between happiness and various types of information-seeking repertoires. Nevertheless, happiness showed significance for only one type of repertoire, making it challenging to draw any clear conclusions. Although happiness showed no significant association, it is possible that hope or sympathy would have yielded significant results (Ahn et al., 2021; Xu & Yue, 2022). Future research should therefore explore the relationship between other positive emotions and information-seeking repertoires.

By moving beyond analyses on the impact of emotions on individuals' overall time spent on information-seeking about a threat (Yang et al., 2014), and instead investigating the impact of emotions on source preferences (e.g., information-seeking repertoires), this study offers a unique contribution to existing literature on the role of emotions in coping behaviors during high-threat situations. Based on the results, two main takeaways can be highlighted. First, both anxiety and anger were associated with broad information-seeking repertoires (although the association with anxiety was stronger), suggesting a valenced-based perspective may be a fruitful way forward in understanding the impact of emotions on source combinations in high-threat situations. The fact that anger and anxiety were associated with broad information-seeking repertoires with higher use of alternative media and social media is problematic for two reasons. First, it suggests that angry and anxious individuals may be exposed to a larger amount of false and misleading information (Benkler et al., 2018, 2020; McDowell-Naylor et al., 2023; Motta et al., 2020). Secondly, extensive information-seeking and exposure to conflicting information may prolong the convergence process (e.g., the process of reconciling messages to make sense of the situation) (Anthony et al., 2018). In turn, this may also be related to what is referred to as "milling"; a process during which citizens seek complementary or confirmatory information instead of taking necessary action to protect themselves (Wood et al., 2017). Negative emotions may thus be a driver of these processes–prolonging sense-making efforts and decision-making during a crisis by extending information-seeking across channels and sources. Future studies should therefore investigate the causal direction of the relationship and the effects of broadening of information-seeking repertoires because of increased anxiety and anger on convergence and behavioral outcomes. However, it should be noted that the results may have been different if emotions directed towards the COVID-19 pandemic were measured, mainly due to the political dimension of the issues related to the crisis, such as vaccines for instance, which may increase anger and thus preference for pro-attitudinal information (Carnahan et al., 2023).

Turning to the second takeaway, the findings suggest that there may be a point at which anxiety leads individuals to expand their information-seeking practices beyond established and official sources, potentially turning to less reliable sources. While moderate levels of anxiety were related to information-seeking from mainstream and expert sources, high levels of anxiety were associated with broad repertoires, including frequent usage of social media and alternative media. By seeking information frequently from multiple sources, anxious individuals might further reinforce their level of anxiety, which in turn may make them more likely to broaden their repertoire beyond expert sources (Dillard et al., 2012; Slater, 2015). Crisis communication practitioners should thus be mindful not to portray a threat in a way that makes individuals too anxious, as it may lead to higher reliance of less trustworthy sources. In line with the idea of an anxiety threshold, however, crisis messages need to elicit some (moderate) levels of anxiety to not make individuals abstain entirely from seeking additional information. Therefore, additional studies are needed to confirm the existent of such a threshold. As an example, experimental research on the impact of inducing anxiety through crisis messages on individuals' information-seeking practices from multiple sources is needed. Moreover, longitudinal studies investigating the potential reinforcing relationship between individuals' source combinations and negative emotions towards a threat, including potential mediators such as recall and attention biases (Gadarian & Albertson, 2014), is needed to understand the causal mechanisms in this process.

Although this study sheds light on some key theoretical takeaways, it is important to acknowledge its limitations. First, discrete emotions directly related to the COVID-19 pandemic were not measured, but emotions experiences by individuals on the day they conducted the survey. As such, the study only shows the relationship between experienced emotions during the second wave of the COVID-19 pandemic and information-seeking repertoires. Future studies should therefore analyse the influence of emotions directed towards a threat and different source combinations. Related to this, it remains unknown whether individuals

who generally are more anxious or angry tended to have broad information-seeking repertoires, or whether the crisis had an impact on individuals' emotions which influenced how many sources they included in their repertoire. Future research should therefore investigate the relationship longitudinally and the causal direction of the relationship. Finally, the information-seeking repertoires used in the analysis may not be representative since the sample was skewed towards older, more educated, and male individuals.

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Appendix A Summary statistics

TABLE 1 **Central tendencies LCA indicators**

Indicators	Mean	Trimmed mean	SD	Min	Max	Range	Skewness	Kurtosis
Swedish news media	2.34	2.33	0.97	1	5	5	0.69	3.10
Foreign news media	3.74	3.74	1.10	1	5	5	-0.55	2.40
Social media	3.98	3.98	1.11	1	5	5	-0.88	2.76
Alternative media	4.44	4.44	0.93	1	5	5	-1.80	5.64
Government media	3.73	3.73	0.85	1	5	5	-0.31	2.80
Interpersonal communication	3.42	3.42	0.95	1	5	5	-0.14	2.38

Note: The indicators are coded as in the LCA analysis. Range is from high to low: 1 = several times a day; 5 = never.

TABLE 2 **Central tendencies of control variables (entire survey sample)**

Indicators	Mean	Median	SD	Min	Max	Skewness	Freq	Percentage	Kurtosis
Age									
16-39		2		1	3		1335	0.09	
40-69					3		8264	0.60	
70+							4119	0.30	
Education									
Low		3		1	3		424	0.03	
Middle					3		3956	0.28	
High							9334	0.68	
Ideology									
Left		1		1	3		6061	0.44	
Right							5718	0.41	
Center				1			1864	0.13	
Media trust index (re-scaled)	0.69		0.23	0	1	−1.12			3.99

Note: The control variables are coded as in the analysis. Age ranges: 1 = (16–39); 2 = (40–69), 3 = (70+). Sex ranges: 1 = female; 2 = male. Education ranges: 1 = low; 2 = middle; 3 = high. Ideology ranges: 1 = left; 2 = right; 3 = center.

TABLE 3 **Cronbach's alpha and reliability test: Constructed index of mainstream media trust**

	α	Average IC	Item-test C	Item-rest C	Sign
All indicators	0.90	0.69			
Swedish public service television (national)	0.88	0.66	0.90	0.85	+
Swedish public service television (regional)	0.88	0.66	0.90	0.83	+
Swedish public service radio (national)	0.89	0.67	0.88	0.81	+
Swedish public service radio (local)	0.90	0.69	0.86	0.78	+
Channel 4 (TV4)	0.92	0.75	0.77	0.65	+

TABLE 4 **Weighted multinominal regression results: Association between control variables and information-seeking repertoires with a narrow repertoire as reference category**

	News junkies		Mainstream pluralists (FU)		Selective minimalists		Mainstream pluralists (LFU)	
Variable	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Media trust	0.073	0.036–0.149	0.083	0.053–0.131	0.098	0.058–0.164	0.032	0.019– 0.056
Ideology								
Right	1.312	0.923–1.865	1.580	1.289–1.936	1.119	0.884–1.415	1.666	1.248–2.225
Center	1.057	0.640–1.744	1.195	0.896–1.592	1.189	0.867–1.630	1.878	1.302–2.709
Age								
L	1.089	0.687–1.726	1.635	1.202–2.226	1.253	0.881-–1.784	0.709	0.482–1.042
Q	1.030	0.756–1.404	0.991	0.811–1.212	0.887	0.706–1.115	0.818	0.636–1.051
Education								
L	3.184	0.437–23.179	0.501	0.326–0.769	0.428	0.269–0.681	0.312	0.190–0.512
Q	0.520	0.159–1.697	0.977	0.730–1.306	0.962	0.701–1.320	1.065	0.755–1.502

Note: Since *age* and *education* are ordered categorical variables, they are treated as factors and both the linear (L) and the cubic (Q) odds are displayed. The *news-oriented traditionalists* are reference category, *Nagelkerke* $R^2 = 0.179$, $N = 4305$. For lower sig. likelihood: the lower and upper CI should be below 0, for higher sig. likelihood: the lower and upper CI should be above 1.

TABLE 5 **Weighted multinominal regression results: Association between control variables and information-seeking repertoires with a broad repertoire as reference category**

	News-oriented traditionalists		Mainstream pluralists (FU)		Selective minimalists		Mainstream pluralists (LFU)	
Variable	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Media trust	13.616	6.700–27.672	1.134	0.569–2.259	1.3435	0.637–2.796	0.437	0.206–0.926
Ideology								
Right	0.762	0.536–1.083	1.204	0.836–1.734	0.853	0.580–1.254	1.270	0.835–1.931
Center	0.946	0.573–1.561	1.130	0.672–1.900	1.125	0.655–1.931	1.777	1.008–3.133
Age								
L	0.918	0.579–1.456	1.502	0.911–2.478	1.151	0.676–1.962	0.651	0.376–1.126
Q	0.971	0.712–1.323	0.962	0.690–1.342	0.861	0.605–1.225	0.794	0.552–1.141
Education								
L	0.313	0.043–2.289	0.157	0.022–1.134	0.134	0.018–0.980	0.098	0.013– 0.717
Q	1.926	0.589–6.303	1.881	0.579–6.117	1.854	0.565–6.080	2.052	0.622–6.764

Note: Since *age* and *education* are ordered categorical variables, they are treated as factors and both the linear (L) and the cubic (Q) odds are displayed. The *news junkies* are reference category, *Nagelkerke* $R^2 = 0.179$, $N = 4305$. For lower sig. likelihood: the lower and upper CI should be below 0, for higher sig. likelihood: the lower and upper CI should be above 1.