1 **Scrolling to wisdom: the impact of social media news exposure on**
2 **knowledge perception**
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5

6 **Abstract**
7 The present study aims to test the effect of exposure to news in a social media environment on people's
8 perceived knowledge of selected topics and on the "illusion of knowledge" effect, i.e., the
9 overestimation of one's perceived knowledge relative to one's actual knowledge. We furthermore
10 investigate how the effect of exposure varies depending on the level of self-involvement in the topics
11 covered by the news.

12 The research protocol consists of an online study composed of pre- ~~test~~ exposure assessment, stimuli
13 presentation, and brief post-exposure questionnaires. The study employs a mixed design, and it is
14 divided into two sessions, scheduled two weeks apart. Participants will be randomly assigned to one of
15 three experimental groups, characterized by the content of the newsfeed they will scroll through.
16 Participants will be asked to assess their perceived knowledge of several topics, before (T_1) and after
17 (T_2) having scrolled through a mock social media news feed resembling Facebook's, where they will
18 find news articles about two of those topics. In addition, perceived knowledge will be compared to a
19 standardised test of factual knowledge to measure the possible presence of the illusion of knowledge.

20 We hypothesize that social media exposure will increase participants' perceived knowledge and that
21 such an increase will be greater for participants exposed to topics perceived as more involving. We
22 further expect participants' perceived knowledge to be unmatched by their actual knowledge, thus
23 observing illusion of knowledge, and that this phenomenon will be similarly affected by exposure and
24 perceived involvement in the topic. This discrepancy will be tested across groups to check whether it is
25 enhanced by news exposure.

26 ~~Subjects~~
27 ~~Psychology, Cognitive & Behavioral Sciences~~

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Table of contents

Introduction

The present study analyses perceived knowledge and the "illusion of knowledge" effect – the overestimation of one's perceived knowledge relative to one's actual knowledge – in social media environments, focusing on how these phenomena are modulated by news exposure. We also examine how the effect of exposure varies with the level of self-involvement in the topics covered by the news.

Perceived knowledge and the "illusion of knowledge" effect

The research in metacognition over the past decades has highlighted a distinction between what is knowledge and what is the mere feeling of knowledge (Koriat & Lieblich, 1974). The familiarity with an object or a topic, and the accessibility that follows, is often used as a heuristic to evaluate our own knowledge; in other words, when asked to evaluate our knowledge about something, instead of meticulously going through the information stored in our memory, we are more likely to rely on a subjective feeling of knowing, activated by cues of familiarity (Koriat, 2000). Usually, this metacognitive process of knowledge assessment results in an overestimation of one's perceived knowledge relative to one's actual knowledge, leading to a false sense of understanding known in the literature as the illusion of knowledge (Glenberg et al., 1982).

Such a psychological effect has been first operationalized by Glenberg and colleagues (1982). In an empirical study about text understanding, these researchers observed that many of the participants overrated their comprehension whilst failing to detect the contradictions in the text, even when explicitly instructed to search for them. Similar findings have been obtained by further empirical studies. In a series of experiments, for example, Rozenblit & Keil (2002) asked participants to rate their own knowledge of several topics used as stimuli (devices, natural phenomena, geography) at different times. The comparison of the ratings between time stops revealed that participants' perceived knowledge had a significant decrease after they were instructed to provide a detailed explanation of the topic and after being asked to answer a closed-ended question about it. The result was particularly strong for familiar topics, like devices and objects commonly used by participants.

The differences in the ratings were explained by the researchers in terms of availability effects: when faced with a cue, in this case, a label for a topic or a phenomenon, people tend to build a mental representation of it. This mental image can thus be easily accessed through a perception-like rather than an inferential process (Rozenblit & Keil, 2002); the ease with which people access information, either due to familiarity or ease of interpretation (fluency), is thought to trigger heuristic processes and biases (Kahneman & Tversky, 1982). However, when asked to provide a detailed explanation, individuals must engage in inference and reasoning to process the relevant information. This interpretation has also been corroborated by the evidence that participants with a more analytical reasoning style, who are more likely to engage in inferential processes, are less susceptible to the illusion of knowledge: the higher their score in the cognitive reflection task (Frederick, 2005), a task measuring analytical reasoning, the more accurate their assessment of perceived knowledge (Fernbach, Sloman, et al., 2013). Low scores in Need for Cognition (Cacioppo & Petty, 1982) were also found to be correlated with greater and unjustified overconfidence (Weber & Koehler, 2017).

The illusion of knowledge effect has been consistently found in several domains, concerning, for instance, scientific topics (Rozenblit & Keil, 2002), policy understanding (Rabb et al., 2021), political competence (Leonhard et al., 2020; Weber & Koehler, 2017), mental disorders (Zeveney & Marsh, 2016), action performance (Kardas & O'Brien, 2018), GM foods (Fernbach et al., 2019), consumer preferences (Fernbach, Sloman, et al., 2013), and also COVID-19 (Granderath et al., 2021).

Illusion of knowledge and news exposure

The illusion of knowledge effect becomes particularly relevant in the context of political discourse and media studies in order to assess the ability of news media to influence public opinion and convey knowledge. The relationship between news exposure and perceived versus actual knowledge was at the

centre of a correlational study about a gubernatorial election campaign in Michigan (Park, 2001). As well as confirming the effect and detecting a discrepancy between factual and perceived knowledge, the author found a correlation between news consumption and the illusion of knowledge, suggesting that news consumption per se does not increase political knowledge, but it is likely to increase the misperception of being well-informed. A further interesting result from this analysis is that participants who felt more involved in the issues covered by the media had a stronger overestimation of their knowledge.

More recently, research has focused on testing whether the effect of traditional news exposure on the illusion of knowledge also translates in social media environments. It is reasonable to expect that in environments such as social media, where attention is constantly challenged by a large amount of information, people are cognitively impoverished (Simon, 1971) and, therefore, more likely to use mental shortcuts in their reasoning. Social media are thought to represent a unique environment for users' reasoning and judgment (Lorenz-Spreen et al., 2020): the overabundance of information on the web is an amount of data impossible to handle for human attention, challenging the quality of users' decisions (Hills, 2019). For example, it has been shown that the increase in the information flow corresponds to a rapid and steep rise and downfall of collective attention, resulting in a shortening of the attention span (Lorenz-Spreen et al., 2019).

For these reasons, social media environments may increase the susceptibility to cognitive biases in general and to the illusions of knowledge in particular. Indeed, there is robust evidence of such a link in the form of an inconsistent relationship between online news exposure and increased political knowledge that should follow. Gil de Zúñiga and colleagues (2017), for example, hypothesized that many individuals might have a perception of being well-informed by the mere passive exposure to the news shared by their connections on social media. They also proposed that this perception (labeled "News-Finds-Me") prevents people from actively seeking for news from other sources of information, e.g., traditional media. The results of their study confirmed the hypothesis, showing that participants who had the perception of being well-informed were actually less knowledgeable than those who did not hold such belief.

This finding has been further explored and validated by survey data that examined the correlation between social media use and political knowledge and whose results convert towards the evidence that social media use hinders, rather than enhances, users' learning while, at the same time, fostering a misperception of their knowledge (Cacciatore et al., 2018; Lee, 2020; Leonhard et al., 2020).

Experimental evidence linking news exposure and illusion of knowledge
While the above-mentioned studies suggest a correlation between news exposure on social media and the illusion of knowledge effect, there have been only a few attempts to investigate this link using an experimental design. A first study aimed to explore whether people could learn through social media by comparing participants' recall of political versus non-political news after scrolling through a Facebook newsfeed. The results indicated that participants were able to remember the type of video they watched, but they struggled to recall the details of the content (Bode, 2016). Similar results of lack of political learning were obtained by Feezell & Ortiz (2019) in an experiment that measured pre- and post-measures of factual knowledge after news scrolling. In their work, the authors also proposed the exploratory hypothesis that exposure to political news on social media might increase confidence in one's knowledge without increasing their actual understanding, as Park (2001) found for the consumption of traditional media. Their study, however, did not include measures of perceived knowledge.

As far as we are aware, only two experimental studies have been carried out to examine the relationship between news media exposure, perceived knowledge, and its discrepancy with actual knowledge (Anspach et al., 2019; Schäfer, 2020). Both experiments were implemented as between-subjects designs where participants were first exposed to a newsfeed or a news article and then asked about their

perceived and factual knowledge. The topics of investigation were artificial sweeteners in one case and GM foods in the other. The results indicated that participants who scrolled through many article previews had a significantly higher perceived knowledge that did not match their actual knowledge, compared to subjects who scrolled through only two headlines (Schäfer, 2020) or no news at all (Anspach et al., 2019; Schäfer, 2020).

A crucial limitation of the experimental protocol of Anspach and colleagues was that the measure of perceived knowledge was only included subsequent to the actual knowledge assessment, and not before it. From the protocol described by Schäfer it is not possible to infer the sequence of these passages. Studies on the illusion of knowledge indicate that responding to questions related to the target topic results in a decreased confidence, that is in the expressed perception of one's knowledge (Rozenblit, 2002). Consequently, the absence of a pre-test makes the estimation of perceived knowledge obtained after the actual knowledge test susceptible to manipulation and influenced by this intervention, potentially causing individuals to express lower confidence compared to an assessment conducted prior to any questioning about the topic.

Another gap that we identified in the literature, as suggested by Schäfer (2020) in the discussion, is the limited variety of empirically tested topics employed as stimuli. Many of the studies mentioned above focused on political versus non-political information conveyed through social media (Bode, 2016; Feezell & Ortiz, 2019; Weber & Koehler, 2017). Moreover, the research on the illusion of knowledge has drawn a relationship between this psychological effect and extreme attitudes (Fernbach et al., 2019; Fernbach, Rogers, et al., 2013), suggesting that controversial and non-controversial topics might lead to different magnitudes of the effect. Following Park's intuition (2001) we believe that the key characteristic that might inflate perceived knowledge is the personal involvement of the responding individual, regardless of the topic being assessed: whether it is political, scientific, health-related, and so on.

Social media and self-involvement: the present study
In this study, we build on the existing literature connecting social media, perceived knowledge and the illusion of knowledge by directly testing the effect of news exposure. We assess the illusion of knowledge effect by measuring the discrepancy between participants' perceived knowledge and actual knowledge as elicited through questionnaires on selected topics. Two elements of novelty of the present study are worth-noting. The first is the introduction of an element of within-subject design where participants' assessments are recorded before and after exposure to a Facebook-like news feed implemented on a mock-social media website. Secondly, in order to shed light on the effect of personal involvement, we introduce a classification of topics based on this variable: as many political topics may be, indeed, quite controversial for the general public (e.g., GM foods), not all political topics are equally involving (e.g., election procedures), and not all the controversial topics are strictly political (e.g., evolution, vaccination).

To validate our classification, we conducted a preliminary screening to determine the experimental topics. We asked a sample of participants about their perceived knowledge and self-involvement in a selection of thirty topics, from which we selected six that covered the whole spectrum of both dimensions (the stimuli selection is thoroughly discussed in Appendix A). The variable self-involvement was computed as the average of the answers to two questions about each topic: a first about a general involvement ("How much do you feel emotionally involved by the topic?"), and a second about the willingness to engage a discussion about it ("How much would you be willing to participate in a discussion about this topic?"). This procedure allowed us to classify the six topics into three different categories: low, medium, and high self-involving topics. This classification then served to design three experimental groups, each associated to one of the three categories.

1 ~~Design plan~~
2

Figure 1. An example of newsfeed with three articles

Hypotheses

To ensure the effectiveness of our manipulation, it is essential that the initial categorization of topics by self-involvement aligns with participants' perceptions. Therefore, our primary hypothesis posits that the self-involvement levels, as measured during the preliminary screening, closely correspond to the self-involvement ratings at T_1:

> H_0: For each topic, there is no significant difference between the preliminary screening self-involvement ratings and the ratings before exposure.

Hypotheses regarding perceived knowledge and news exposure

The first experimental hypothesis predicts the effect of exposure on perceived knowledge:

> H_1: Perceived knowledge of topics in the news feed will increase more than perceived knowledge of topics not in the news feed.
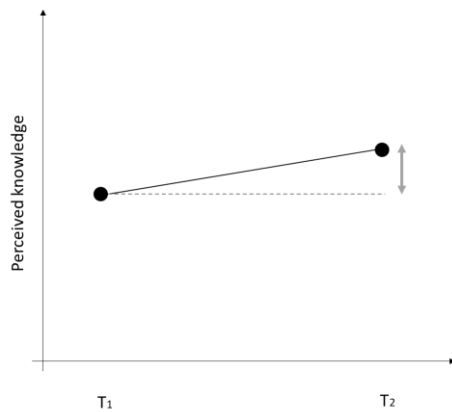

Figure 3. The solid line follows the expected trend of the variable perceived knowledge for exposed topics, whereas the flat dashed line represents the trend of non-exposed topics (since we do not have a clear prediction whether perceived knowledge will increase or decrease). The black dots indicate the average of perceived knowledge for exposed topics.

Moreover, we predict that not all the topics will affect subjects' knowledge assessments to the same extent. We predict a difference in perceived knowledge across the experimental groups who have been exposed to low, medium, or high involving topics in their newsfeed. In other words, perceived knowledge will increase differently across groups.

> H_2: The effect of the news feed on perceived knowledge will be greater in the high self-involvement group compared to the low and medium self-involvement groups,
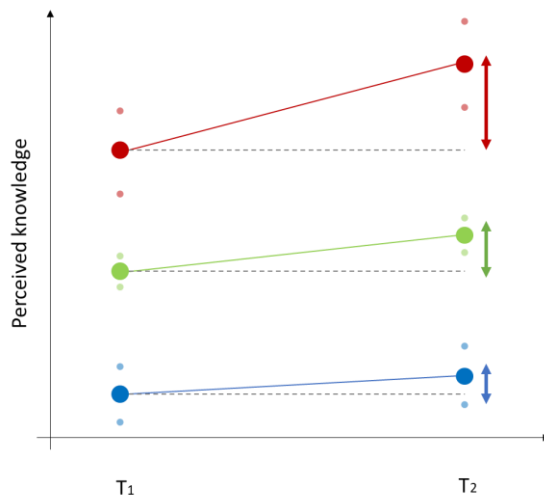
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Figure 4. The three colours indicate the three groups, respectively: red indicates the high involving group, green the medium involving group, and blue the low-involving group. The big dots represent the whole group averages, whereas the smaller dots indicate the group averages for each of their topic. We did not include any representation of non-exposed topics besides the dashed line, as we expect the average to be consistent between T_1 and T_2.

Hypotheses regarding the Illusion of Knowledge and self-involvement

A second group of hypotheses refers to the Illusion of Knowledge. We predict that the perceived knowledge will not correspond to factual knowledge, and therefore we expect to detect an illusion of knowledge effect:

> H_3: The discrepancy between the reported perceived knowledge and the measured actual knowledge will be positive and significantly different from zero.

Secondly, following the H_1 and H_2 hypotheses for perceived knowledge, we expect that the illusion of knowledge will be greater for topics present in the news feed, and that the effect of the news feed will differ depending on the level of self-involvement of the topic:

> H_4: The illusion of knowledge will be greater for topics present in the news feed compared to topics not present in the news feed.

> H_5: The effect of the news feed on the illusion of knowledge will be greater in the high self-involvement group compared to the low and medium self-involvement groups, and in the medium self-involvement group compared to the low self-involvement group.

6

Methods

Study type

Online experiment. We will randomly assign participants to three different experimental groups, characterized by the stimuli they will be exposed to.

Study design

This research protocol consists of a mixed design (between- and within-subjects), two-stage study composed by stimuli presentation and brief post-exposure questionnaires (see fig. 2). Participants will be randomly assigned to one of three experimental groups, characterized by the content of the newsfeed they will scroll through.

Experimental protocol

The experiment is organized into two sessions (figure 2). The first session will collect self-reports and questionnaires, and it will be the same for all participants. They will be asked to estimate their knowledge about six topics. Topics vary by how personally involving they are perceived to be, as measured in a preliminary screening (see appendix A). In addition, participants will be asked to assess how much they feel involved by each topic, and to express their attitude towards them. Afterwards, a psychometric assessment will follow: scales will be administered to measure participants' cognitive style, political orientation, and social media use (see Appendix D). Finally, demographics information will be collected.

The second session will be scheduled two weeks after the first one. First, participants will be randomly assigned to one of three experimental groups, characterized by the different content of the news headlines they will be exposed to: low, medium, or highly self-involving group. We will stratify the randomization to ensure that each group is balanced in terms of gender, age, and education. We will furthermore control whether randomization leads to unbalanced distributions of the psychometric variables (cognitive style, political position), and correct for potential distortions.

Participants will be redirected towards a mock social media news feed (Jagayat et al., 2021) that resembles that of Facebook. (see fig. 1). There, they will scroll a series of news posts about the two topics assigned to their experimental group and a series of unrelated

Figure 2. An example of newsfeed with three articles

posts (see Table 1). The news headlines will be composed by a title, an image, and a short description of the content. Users will be able to react or comment under the news posts but they will not be allowed to open the original articles. Posts in the news feed will be displayed in random order.

After the exposure to the news feed, participants will be asked again to fill up self-reports of perceived knowledge, self-involvement, and attitudes about all the six topics, not only those they were exposed to. Finally, their factual knowledge will be measured with 10 True/False/Don't know statements for every subject to compute the illusion of knowledge.
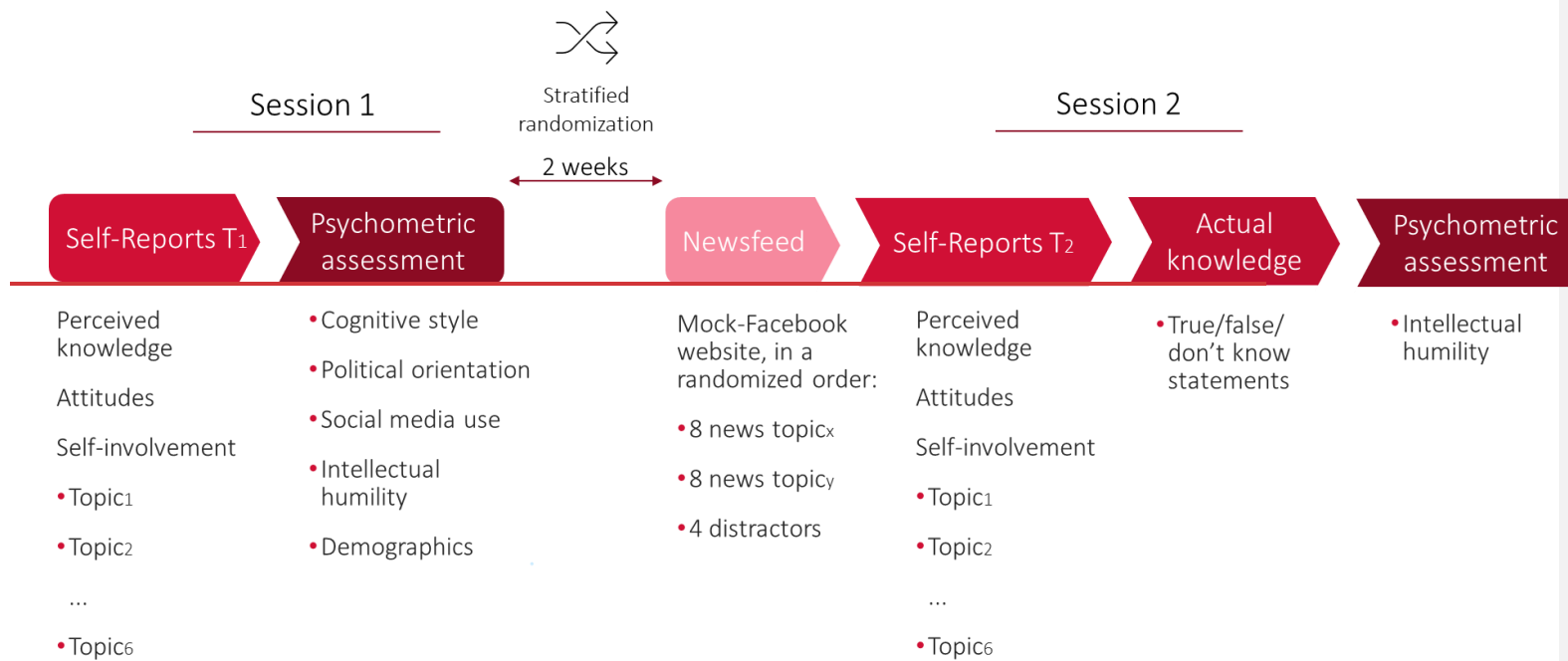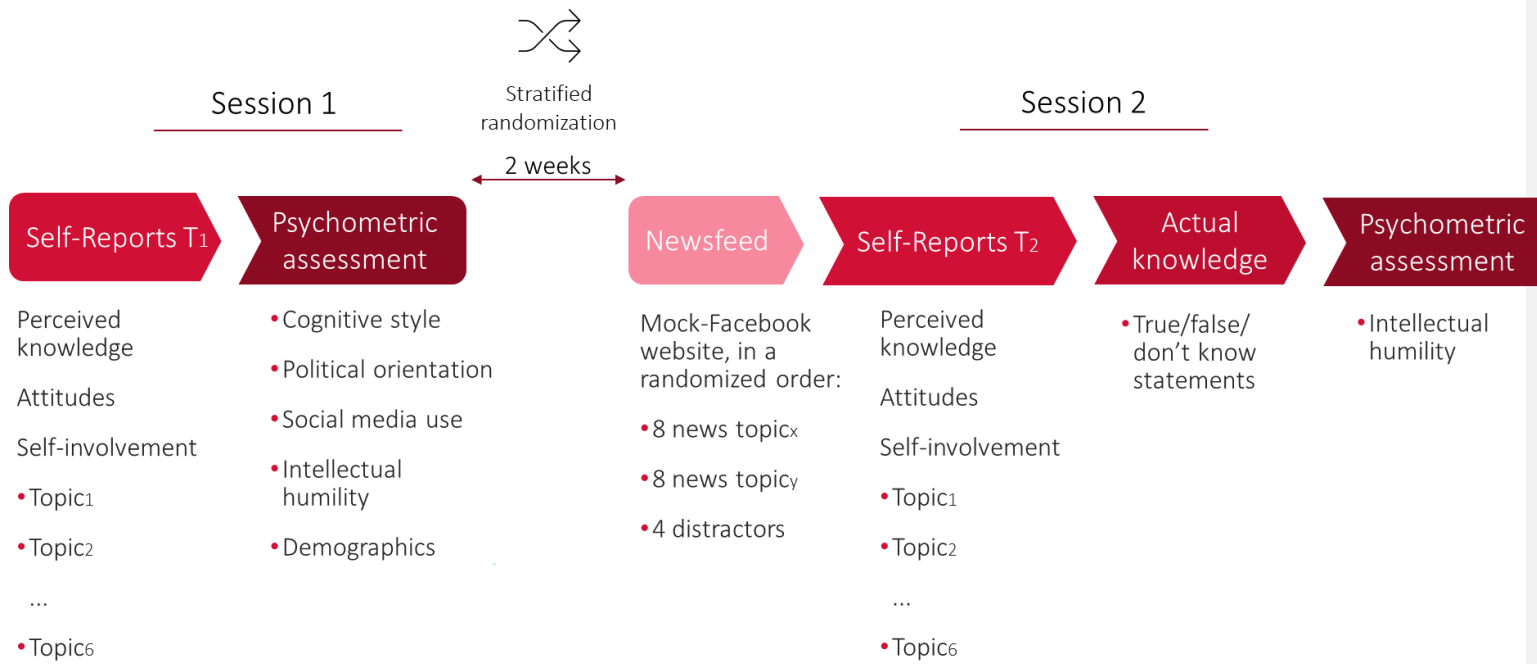
Figure 2. The experimental protocol.

Figure 2. The experimental protocol.

Variables

Manipulated variables

The manipulated variables will be the content of the experimental stimuli for each group.

Table 1. The experimental groups and the assigned topics.

Low self-involvement	Medium self-involvement	High self-involvement
Feline immunodeficiency	Anxiolytics	Abortion
I Promessi Sposi	Evolutionism	Climate change

Measured variables and indices

- **Perceived knowledge (pk)**. We will measure perceived knowledge with one item for each of the six topics, asking participants "How much do you think you know about [this topic]?", and they will answer using a 0 – 100 VAS, going from 0 = *Nothing* to 100 = *Everything*. The score of perceived knowledge will be computed as the participants' evaluation/100, resulting in an index with a 0 – 1 range.

- **Factual knowledge (fk)**. Participants' actual knowledge will be computed as the proportion of correct answers in the knowledge assessment at T2. For each topic, they will read 10 statements, and for each statement they will provide an answer among the options: True; False; I don't know. Such assessment is thoroughly discussed in Appendix B. The score of factual knowledge will be computed as the proportion of correct answers: number of correct answers/10, resulting in an index with a 0 – 1 range.

- **Illusion of knowledge (ki)**. The perceived and the actual knowledge will be standardized and combined to compute an index of illusion of knowledge. The index will be calculated as the difference between the perceived knowledge at T_2 and actual knowledge, that is the proportion of correct answers: $ki = pk_{T2} - fk$. For example, participants who scored 50 on perceived knowledge will receive a score of 0.5. If they had 5 correct answers, their actual knowledge score would be 0.5, resulting in an illusion of knowledge score of 0, as they accurately assessed their level of knowledge. This means that the ki values range from 1 (i.e., the person reports maximum knowledge, but scores 0 on the knowledge test) to -1 (i.e., the person reports not having any knowledge on the topic but gives only correct answers on the knowledge test).

~~Hypotheses~~

~~To ensure the effectiveness of our manipulation, it is essential that the initial categorization of topics by self-involvement aligns with participants' perceptions. Therefore, our primary hypothesis posits that the self-involvement levels, as measured during the preliminary screening, closely correspond to the self-involvement ratings at T₁:~~

Attitudes and psychometric assessments

Secondary variables will be included to test exploratory analyses listed below. Each item of the selected scales will be framed as follows: "How much do you agree with the following statements?", and participants will be asked to answer using a 0 – 100 VAS going from 0 = *Totally disagree* to 100 = *Totally agree*. All the items are available in appendix D at the end of the document, and the assessment within the experimental protocol is described in figure 2.

The following three measures will be taken only at T_1:

- ***Cognitive style***. To capture participants' cognitive style, we will use the Rational-Experiential Inventory short (REI-10), a combination of 5 items taken from the Need for Cognition (Cacioppo & Petty, 1982) and 5 items from the Faith in Intuition (Epstein et al., 1996). This scale was designed to assess preferences for information processing, and to distinguish between an analytical versus affective approaches.

- ***Cultural worldview***. To assess the political view of the participants, we will use the short version of the Cultural Cognition Worldview Scale (CCWS) (Kahan, 2012), that will allow us to measure the predispositions onto two sub-scales: 6 items to identify the position on the individualism/communitarianism axis, and 6 items for hierarchy/egalitarianism.

- ***Social media use***. To estimate how intense is participants' use of social media, we will adapt The Multidimensional Facebook Intensity Scale (Orosz et al., 2016). The scale captures four main facets of Facebook use: boredom, self-expression, over-use, and persistence. We first will ask participants' which is their most used social media, and then use their answer to articulate the questions.

The following three measures will be recorded both at T_1 and T_2:

- ***Strength of attitude***. For each topic, participants will be requested to express their attitude. We will ask them to answer to two items per theme: one framed in a positive valence, e.g. "I think we should spread more information about Evolutionism", and one framed with the opposite valence, e.g. "I think that schools are spending too much time teaching Evolutionism", computed with a reverse score. All the items were formulated taking inspiration from the common formulas used to measure explicit attitudes in health and social psychology (Eldredge et al., 2016). The strength of the attitude will be calculated as the distance of the result from 50, the centre of the scale.

- ***Self-involvement***. To record participant's self-involvement, they will answer to two items regarding their perceived involvement and their willingness to discuss the topic. The formulation of this question will be the same as the one used in the pre-test (see Appendix A). The self-involvement score will be computed as the average between the two items.

- ***Intellectual humility***. We will measure participants' intellectual humility using the General Intellectual Humility Scale (Leary et al., 2017).

Attention and manipulation checks

Some additional control questions will be administrated to check whether subjects had paid attention to the experimental stimuli and environment. As a robustness check, we will repeat all the pre-registered analyses excluding those participants who failed all the attention and manipulation checks.

- ***Attention check***. Within the administered questionnaire for psychometric assessment, we will include items aimed to test whether the participant is actually reading the questions or not, like: "Please answer "Totally disagree" to this question". Similar checks will be included in the knowledge tests.

- ***Manipulation check***. After scrolling through the social media feed, participants will be asked to recall the news posts present in the news feed. This helps ensure that participants have been actively processing and retaining information. In particular, we will ask them if they remember to have seen news about two topics, one actually belonging to their experimental group, and one randomly taken from the other groups.

Sampling plan

Data collection procedures

To be eligible to participate in this study, subjects must be Italian native speakers and above 18 years old. No further restrictions are required for this study. Subject will be recruited through Bilendi, an online labour market platform. Once the experiment is ready to run, Bilendi will send an invitation email to all potential participants-i.e., people who meet the aforementioned eligibility criteria.

Sample size and rationale

Our aim is to obtain 800 complete submissions for the whole experiment. Given that the experiment is conducted at two time points, we also considering an attrition rate of 15% based on conservative estimates from a previous longitudinal study with a similar gap between sessions (Ronzani et al., 2022). Based on this estimate, we plan to recruit roughly 950 participants, which should ensure the minimum sample size of N = 800.

In the unlikely event that our recruitment service partner is unable to reach this minimum sample size of 800, we will disclose this information in the discussion, but still conduct the analyses as pre-registered.

The estimation of the sample size was based on budget constraints. This notwithstanding, we performed a series of power analyses for the perceived knowledge hypotheses (H_1 and H_2) based on a series of simulations of the experiment (see Script_PA attached). The simulations build on the sample size, an α of 5% (unidirectional), and a series of plausible values of the main variables, including the effect size (the increase in pk) and the standard deviation of the effect size. Results of the simulations are summarised in the Table 2:

Table 2.

H_1		ES *pk increase on a [0–1] scale*				
		0.01	0.02	0.03	0.04	0.05
	$\frac{1}{2}$ ES	51%	98%	≈100%	≈100%	≈100%
σ_{ES}	1 ES	55%	96%	≈100%	≈100%	≈100%
	2 ES	48%	96%	99%	≈100%	≈100%

H_{2A}		ES *pk increase on a [0–1] scale*				
		0.01	0.02	0.03	0.04	0.05
	$\frac{1}{2}$ ES	18%	71%	91%	≈100%	≈100%
σ_{ES}	1 ES	16%	67%	82%	96%	≈100%
	2 ES	26%	55%	62%	61%	55%

H_{2B}		ES				
		pk increase on a [0–1] scale				
		0.01	0.02	0.03	0.04	0.05
	$\frac{1}{2}ES$	17%	31%	47%	62%	72%
σ_{ES}	$1\,ES$	14%	33%	36%	43%	39%
	$2\,ES$	20%	19%	15%	19%	29%

H_{2C}		ES				
		pk increase on a [0–1] scale				
		0.01	0.02	0.03	0.04	0.05
	$\frac{1}{2}ES$	19%	27%	39%	67%	88%
σ_{ES}	$1\,ES$	17%	30%	42%	64%	83%
	$2\,ES$	14%	23%	42%	66%	75%

Exclusion criteria

Demographics mismatch: we will compare the demographics provided by the participant at T_1 and T_2 (gender, age, education). Mismatched submissions will be deleted and thus excluded from the analyses. This criterion will reduce the likelihood that we will receive responses from two different respondents associated with the same participant id. Moreover, accurate demographics will help stratifying the sample for randomisation after T_1.

Incomplete responses: according to the consent form, participants who leave the study are considered to have withdrawn their consent for the use of their data. For this reason, we will exclude participants who leave the study before completion.

Missing data

All the questions will be administered via Qualtrics, and each page will have a force-answer setting; this means that participants will not be allowed to skip questions. The submissions by participants that will abandon the study before the end will be considered incomplete. These submissions will be deleted and not included in the analysis. Abandoning the study before the completion of it will count as a removal of the consent, as specified in the informed consent module showed at the beginning of the study.

Funding and ethical approval

Analysis plan

All analyses are conducted using a 5% significance threshold. Multiple comparisons are corrected using the false discovery rate method.

H_0: For each topic, there is no significant difference between the preliminary screening self-involvement ratings and the ratings before exposure.

To evaluate H_0, we will conduct an equivalence test (Two One-Sided Tests or TOST) for each topic. Specifically, we will examine whether the self-involvement mean of each topic falls within a specified range of +/- 10 points from the ~~median~~mean value ~~derived from~~in the preliminary screening.

This analysis serves to ensure that none of the topics are inadvertently misclassified within an incorrect category, safeguarding the integrity of our study.

Hypotheses regarding perceived knowledge

This group of hypotheses concern the dependent variable perceived knowledge. For a sample of the analysis pipeline, please refer to the R script the simulates the analyses for computing a power analysis (**Script_PA**).

The first experimental hypothesis predicts the effect of exposure on perceived knowledge:

H_1: Perceived knowledge of topics in the news feed will increase more than perceived knowledge of topics not in the news feed.
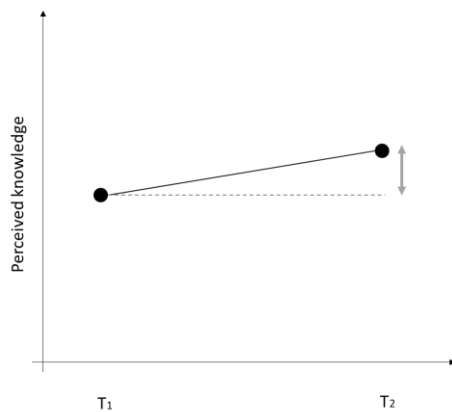

Figure 3. The solid line follows the expected trend of the variable perceived knowledge for exposed topics, whereas the dashed line represents the expected trend of non-exposed topics. The black dots indicate the average of perceived knowledge for exposed topics. We predict no change in non-exposed topics between T_1 and T_2.

To test for H_1, we will compute a difference in differences contrast between perceived knowledge ratings of topics inside/outside the news feed, at T_1 and at T_2:

$$\beta_{feed \times T2} - \beta_{feed \times T1} > \beta_{no\ feed \times T2} - \beta_{no\ feed \times T1}$$

We will then perform six post-hoc equivalence tests, one for each topic, to confirm that the perceived knowledge of participants at T_1 did not differ between the three experimental groups (e.g., one group displaying higher perceived knowledge about one topic than the other two groups). This will ensure that any effects of exposure did not load on pre-existing differences among groups. In particular, we

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will check whether the average perceived knowledge of a topic will fall in the same +/- 10 points range in each experimental group.

H$_{1bis}$: Perceived knowledge at T$_0$ will not differ significantly between exposed and non-exposed topics.

~~Moreover, we predict that not all the topics will affect subjects' knowledge assessments to the same extent. We predict a difference in perceived knowledge across the experimental groups who have been exposed to low, medium, or high involving topics in their newsfeed. In other words, perceived knowledge will increase differently across groups.~~

H$_2$: The effect of the news feed on perceived knowledge will be greater in the high self-involvement group compared to the low and medium self-involvement groups, and in the medium self-involvement group compared to the low self-involvement group.
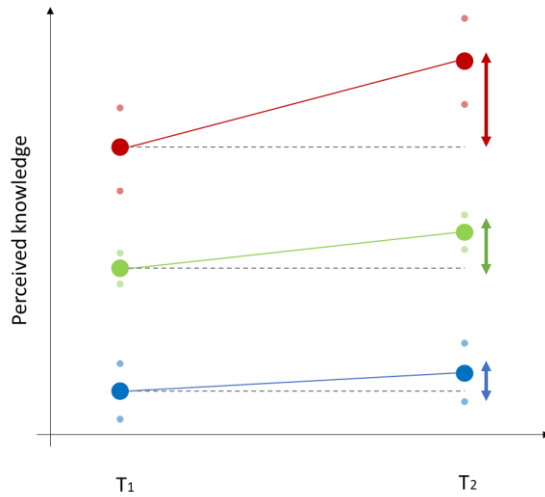

Figure 4. The three colours indicate the three groups, respectively: red indicates the high involving group, green the medium involving group, and blue the low-involving group. The big dots represent the whole group averages, whereas the smaller dots indicate the group averages for each of their topic. We did not include any representation of non-exposed topics besides the dashed line, as we expect the average to be consistent between T$_1$ and T$_2$.

To test for H$_2$, we will compute a third-level contrast, testing for differences in the H$_1$ contrast between topics of different levels of self-involvement, namely:

H$_{2A}$: $\left[\left(\beta_{feed \times T2} - \beta_{feed \times T1}\right) - \left(\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1}\right)\right]_{high} >$

$\left[\left(\beta_{feed \times T2} - \beta_{feed \times T1}\right) - \left(\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1}\right)\right]_{med}$

H$_{2B}$: $\left[\left(\beta_{feed \times T2} - \beta_{feed \times T1}\right) - \left(\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1}\right)\right]_{high} >$

$$\left[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})\right]_{low}$$

$$H_{2C}: \left[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})\right]_{med} >$$

$$\left[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})\right]_{low}$$

Tests of H_1 and H_2 we will employ a mixed-effects linear regression with self-reported perceived knowledge as dependent variable, and the following independent variables:

- **Topic** (6 levels: FIV, PP, ANS, DAR, GW, IVG). Given that the topics selected differed in terms of perceived knowledge in the preliminary screening, it is likely that this variable will significantly predict perceived knowledge on its own, but we do not propose a specific hypothesis on this relation.

- **Time** of reporting (0 if T_1, 1 if T_2). Time should not be a significant predictor of perceived knowledge if not in interaction with the news feed. In other words, if a topic is not covered in the news feed, we do not expect any systematic change in perceived knowledge between T_1 and T_2.

- Presence of the topic in the **news feed** (0 if present, 1 if absent). Topic exposure should not be a significant predictor of perceived knowledge at T_1 (since exposure did not happen yet, in line with H_{1bis}), but only at T_2. Thus, the effect of exposure should be significant only in interaction with time.

- **Interaction** between **time** and **news feed** exposure, required for the second-level contrasts (difference in differences) that test for H_1.

- **Interaction** between **time** and **topic**, which we expect to be non-significant, unless a topic is covered in the news cycles occurring between T_1 and T_2.

- **Interaction** between **news feed** exposure and topic, which we expect to be non-significant.

- **Interaction** between **time, news feed** exposure, and **topic**, required for the third-level contrasts that test for H_2.

The regression will include by-participant random intercepts and random slopes for time, news feed and topic.

Hypotheses regarding the Illusion of Knowledge
A second group of hypotheses refers to the Illusion of Knowledge. We predict that the perceived knowledge will not correspond to factual knowledge, and therefore we expect to detect an illusion of knowledge effect:

H₃: The discrepancy between the reported perceived knowledge and the measured actual knowledge will be positive and significantly different from zero.

Secondly, following the H₁ and H₂ hypotheses for perceived knowledge, we expect that the illusion of knowledge will be greater for topics present in the news feed, and that the effect of the news feed will differ depending on the level of self-involvement of the topic:

H₄: The illusion of knowledge will be greater for topics present in the news feed compared to topics not present in the news feed.

H₅: The effect of the news feed on the illusion of knowledge will be greater in the high self-involvement group compared to the low and medium self-involvement groups, and in the medium self-involvement group compared to the low self-involvement group.

Hypotheses H_3, H_4 and H_5 will be tested using a mixed-effects linear regression with illusion of knowledge as predicted variable with independent variables topic, news feed and their interaction (time is not included as the illusion of knowledge is measured only at time T_2), and with by-participant random intercepts and slopes for time and news feed exposure. H_3 will be tested with the contrast $\beta_{no\ feed} > 0$, where $\beta_{no\ feed}$ is the aggregated coefficient of all topics in the absence of the news feed. H_4 will be tested with the contrast $\beta_{feed} > \beta_{no\ feed}$, and H_5 will be tested with the second-level contrasts:

$$H_{5A}: \left(\beta_{feed} - \beta_{no\ feed}\right)_{high} > \left(\beta_{feed} - \beta_{no\ feed}\right)_{med}$$

$$H_{5B}: \left(\beta_{feed} - \beta_{no\ feed}\right)_{high} > \left(\beta_{feed} - \beta_{no\ feed}\right)_{low}$$

$$H_{5C}: \left(\beta_{feed} - \beta_{no\ feed}\right)_{med} > \left(\beta_{feed} - \beta_{no\ feed}\right)_{low}$$

Attitudes and psychometric assessments

Secondary variables will be included to test exploratory analyses listed below. Each item of the selected scales will be framed as follows: "How much do you agree with the following statements?", and participants will be asked to answer using a 0 – 100 VAS going from 0 = *Totally disagree* to 100 = *Totally agree*. All the items are available in appendix D at the end of the document, and the assessment within the experimental protocol is described in figure 2.

The first three measures will be taken only at T_1, whereas the latter (attitudes, self involvement, intellectual humility) will be recorded both at T_1 and T_2.

- *Cognitive style*. To capture participants' cognitive style, we will use the Rational-Experiential Inventory short (REI 10), a combination of 5 items taken from the Need for Cognition (Cacioppo & Petty, 1982) and 5 items from the Faith in Intuition (Epstein et al., 1996). This scale was designed to assess preferences for information processing, and to distinguish between an analytical versus affective approaches.

- *Cultural worldview*. To assess the political view of the participants, we will use the short version of the Cultural Cognition Worldview Scale (CCWS) (Kahan, 2012), that will allow us to measure the predispositions onto two sub scales: 6 items to identify the position on the individualism/communitarianism axis, and 6 items for hierarchy/egalitarianism.

- *Social media use*. To estimate how intense is participants' use of social media, we will adapt The Multidimensional Facebook Intensity Scale (Orosz et al., 2016). The scale captures four main facets of Facebook use: boredom, self expression, over use, and persistence. We first will ask participants' which is their most used social media, and then use their answer to articulate the questions.

- *Strength of attitude*. For each topic, participants will be requested to express their attitude. We will ask them to answer to two items per theme: one framed in a positive valence, e.g. "I think we should spread more information about Evolutionism", and one framed with the opposite valence, e.g. "I think that schools are spending too much time teaching Evolutionism", computed with a reverse score. All the items were formulated taking inspiration from the common formulas used to measure explicit attitudes in health and social psychology (Eldredge et al., 2016). The strength of the attitude will be calculated as the distance of the result from 50, the centre of the scale.

- *Self involvement*. To record participant's self involvement, they will answer to two items regarding their perceived involvement and their willingness to discuss the topic. The

18

Exploratory research questions
In the following section, we list and briefly describe the effects that we aim to explore with combinations of the main and secondary variables, even if they are not part of the experimental hypotheses.

- o Informed by the preliminary screening we conducted (see appendix A), we will explore at T_1 whether assessments of perceived knowledge and self-involvement reported by the subjects are correlated. We will run 6 correlation tests, one for each topic.

- o We will conduct six equivalence tests, one for each topic, to compare perceived knowledge of participants at T_1 with the evaluations obtained from the preliminary screening (see appendix A).

- o For each topic, we will measure whether strength of attitude towards the topic correlates with self-involvement at T_1.

- o We will examine potential gender differences in the magnitude of the illusion of knowledge by adding gender and its interactions with the other variables as covariates to test H_1.

- o Although participants will not be able to open the news articles, we will record their attempts to click on the links. We will investigate possible correlations between click rates on the article and both perceived knowledge and illusion of knowledge at T_2.

- o Toplak and colleagues (2014) found that a reflective cognitive style is associated with reduced biases and more accurate judgement. We will test whether the score of reflective thinking predicts the illusion of knowledge by adding cognitive style as a covariate in the linear regression testing the effect of news feed exposure and self-involvement on the illusion of knowledge. We will similarly add social media use as an additional covariate of illusion of knowledge.

- o The literature about confirmation bias, the propensity to seek and interpret information to confirm rather than dis-confirm our prior beliefs, suggests that an attitude towards a topic can be strengthened after being exposed to arguments and statements about that matter (Lord et al., 1979). Following H_1, we will then test an effect of news feed exposure on the strength of attitudes.

- o We will test whether it is possible to detect a shift in other variables (self-involvement and intellectual humility) between T1 and T2. In particular, we expect that answering knowledge tests will increase this measure.

Sampling plan

Data collection procedures

To be eligible to participate in this study, subjects must be Italian native speakers and above 18 years old. No further restrictions are required for this study. Subject will be recruited through Prolific, an online labour market platform (https://www.prolific.co). Once the experiment is ready to run, Prolific will send an invitation email to all potential participants i.e., people who meet the aforementioned eligibility criteria.

Sample size and rationale

Our aim is to obtain 800 complete submissions for the whole experiment. Given that the experiment is conducted at two time points, we also considering an attrition rate of 15% based on conservative estimates from a previous longitudinal study with a similar gap between sessions (Ronzani et al., 2022). Based on this estimate, we plan to recruit roughly 950 participants, which should ensure the minimum sample size of N = 800.

In the unlikely event that our recruitment service partner is unable to reach theis minimum sample size of 800, we will disclose this information in the discussion, but still conduct the analyses as pre-registered.

The estimation of the sample size was based on budget constraints. This notwithstanding, we performed a series of power analyses for the perceived knowledge hypotheses (H_1 and H_2) based on a series of simulations of the experiment (see attached). The simulations build on the sample size, an α of 5% (unidirectional), and a series of plausible values of the main variables, including the effect size (the increase in pk) and the standard deviation of the effect size. Results of the simulations are summarised in the Table 2:

Table 2.

Exclusion criteria

Demographics mismatch: we will compare the demographics provided by the participant and match them with the ones provided by prolific. We will collect this information twice, at T_1 and T_2. Mismatched submissions will be deleted and thus excluded from the analyses. The case of a mismatch might suggest that someone is participating by using someone else's account. This criterion will reduce the likelihood that we will receive responses from two different respondents associated with the same participant id. Moreover, accurate demographics will help stratifying the sample for randomisation after T_1.

Incomplete responses: according to the consent form, participants who leave the study are considered to have withdrawn their consent for the use of their data. For this reason, we will exclude participants who leave the study before completion.

Table 3. Summary of hypothesis and research questions

All the data will be shared on OSF together with the code for preprocessing and analysis. We will use R statistics to conduct the analysis and Python to preprocess them.

Missing data

All the questions will be administered via Qualtrics, and each page will have a force-answer setting; this means that participants will not be allowed to skip questions. The submissions by participants that will abandon the study before the end will be considered incomplete. These submissions will be deleted and not included in the analysis. Abandoning the study before the completion of it will count as a removal of the consent, as specified in the informed consent module showed at the beginning of the study.

Funding and ethical approval

The study proposed under this research protocol has already obtained funding from the research activities of the Neuroscience LAB of Intesa Sanpaolo Innovation Center. The proposed research protocol has furthermore received the ethical approval on August 5, 2022 by the Joint Ethical Committee for Research of Scuola Normale Superiore and Scuola Superiore Sant'Anna, with the notification code n.25/2022.

Table 3. Summary of hypothesis and research questions

Question	Hypothesis	Sampling plan	Analysis Plan	Interpretation given different outcomes
Is the experimental sample comparable to the one recruited for the preliminary screening?	H0: For each topic, there is no significant difference between the preliminary screening self-involvement ratings and the ratings before exposure.	All analyses will be conducted on an estimated sample of 800 respondents for a total of 9600 unique data points (6 responses per participant, per time point). Power analyses for the given sample size and various parametrizations of the effect size and other variables are presented in **Script_PA**.	To test for H0, we will run an equivalence test (TOST) for each of the six topics.	In case of non-significance, we will rearrange the groups in low-, medium-, and high-involvement groups based on the newly collected data.
Does social media exposure to news affect people's perceived knowledge?	H1: Perceived knowledge of exposed topics in the news feed will increase more than perceived knowledge of non-exposed topics not in the news feed. $\beta_{feed \times T2} - \beta_{feed \times T1} > \beta_{no\,feed \times T2} - \beta_{no\,feed \times T1}$		Mixed-effects linear regression. R formula: `pk ~ time*feed*topic + (time + feed + topic | participant)` All tests and contrasts are unidirectional and use a 5% significance threshold.. Multiple comparisons are corrected using the false discovery rate method.	If the contrast is significant, we will test hypothesis H_{1b} (see main text) to make sure that any increase is not due to differences in baseline. Conditional on this test being significant, we will interpret the results as evidence that news exposure increases the perception of knowledge. We will not draw conclusions based on a null finding given the multiple explanations that could be attributed to it.
Do people experience an increase in perceived knowledge depending on their involvement in the topic?	H2: The effect of the news feed on perceived knowledge will be greater in the high self-involvement group compared to the low and medium self-involvement groups, and in the medium self-involvement group compared to the low self-involvement group. A: $[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})]_{high} >$ $[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})]_{med}$ B: $[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})]_{high} >$ $[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})]_{low}$ C: $[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})]_{med} >$ $[(\beta_{feed \times T2} - \beta_{feed \times T1}) - (\beta_{no\,feed \times T2} - \beta_{no\,feed \times T1})]_{low}$			If the contrasts turn out to be significant, we will conclude that there is a differential effect of news feed exposure based on the personal involvement attached to topics. In case of a null finding, we will not draw any conclusions due to the multiple explanations possible.

Do people overestimate their knowledge?	H3: The discrepancy between the reported perceived knowledge and the measured actual knowledge will be positive and significantly different from zero. $\beta_{no\ feed} > 0$ (equivalent to a one-sample t-test against constant)		Mixed-effects linear regression. R formula: `ki ~ feed*topic + (feed + topic | participant)` All tests and contrasts are unidirectional. Multiple comparisons are corrected using the false discovery rate method and use a 5% significance treshold.	If our test fails to detect a significant illusion of knowledge effect, we will proceed as it follows: 1. First, we will check whether it is possible to identify the effect for individual topics. As the literature shows, different topics can lead to different degrees of illusion of knowledge. 2. In case none of the analyses will go in the expected direction, it might be possible that our selected topics are not subject to the illusion of knowledge effect.
Does social media exposure to news elicit an illusion of knowledge?	H4: The illusion of knowledge will be greater for topics present in the news feed compared to topics not present in the news feed. $\beta_{feed} > \beta_{no\ feed}$ (equivalent to a two-sample t-test)			In case of a significant contrast, and if H3 is supported, we will interpret this finding as evidence that news exposure accentuates the illusion of knowledge phenomenon. If either results are not significant or H3 is not supported, we will abstain to draw any definitive conclusion on the results.
Does the emotional intensity of the topics people see in a social media affect their illusion of knowledge?	H5: The effect of the news feed on the illusion of knowledge will be greater in the high self-involvement group compared to the low and medium self-involvement groups, and in the medium self-involvement group compared to the low self-involvement group. A: $\left(\beta_{feed} - \beta_{no\ feed}\right)_{high} > \left(\beta_{feed} - \beta_{no\ feed}\right)_{med}$ B: $\left(\beta_{feed} - \beta_{no\ feed}\right)_{high} > \left(\beta_{feed} - \beta_{no\ feed}\right)_{low}$ C: $\left(\beta_{feed} - \beta_{no\ feed}\right)_{med} > \left(\beta_{feed} - \beta_{no\ feed}\right)_{low}$			If the results are significant, we will conclude that there is a differential effect of news feed exposure on the illusion of knowledge based on the personal involvement attached to topics. In case of a null finding, we will not draw any conclusions due to the multiple explanations possible.

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Appendix A – Preliminary classification of topics

A preliminary study has been conducted to select the content of the experimental stimuli. A total of 100 participants has been recruited through Prolific and asked to participate in a survey. The sample was balanced for gender.

The survey requested them to evaluate a selection of thirty topics on the dimensions of: emotional involvement, willingness to discuss the topic, and perceived knowledge. The topics were taken from many different domains, like science, politics, literature, health, law, ethics. All the themes were selected to be tested as objectively as possible in a knowledge test, with little room for partial or ideological interpretations.
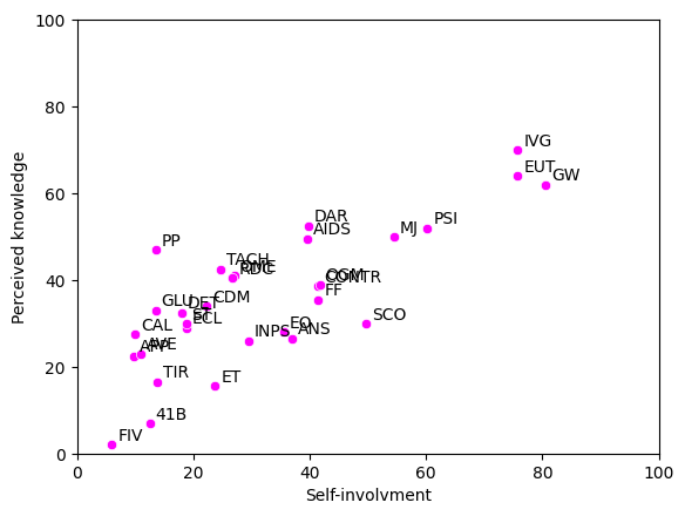
Figure 5. The scatter plot showing the medians of perceived knowledge and self-involvement.

Given the strong correlation between emotional involvement and willingness to discuss (Cronbach's alfa = 0.88), we decided to combine the two measures into the variable self-involvement, which informed our decision for the stimuli selection: the medians of perceived knowledge and self-involvement were used to classify the topics (fig 5).

We selected six topics, two with low, two with medium, and two with high self-involvement. The two topics for each level were selected to differ as much as possible on the dimension of perceived knowledge, in order to de-correlate as much as possible the two variables. The selection process resulted in the following topics:

- Feline immunodeficiency (FIV) and I Promessi Sposi (PP) classified as having low self-involvement;

- Evolutionism (DAR) and Anxyiolitics (ANS) as medium self-involvement;

- Global warming (GW) and abortion (IVG), as high self-involvement;

The selected topics will be included in the different news feeds in the form of news articles (see Appendix C).

Appendix B – Standardisation of knowledge assessment

For all the six selected topics, we created a scale of ten questions to test participants' knowledge of each topic. The set of ten questions derived from an original list of about 20 questions per topic taken and adapted from the literature or based on online scientific and news materials.

The original list of questions was administered to a sample (n = 100) of participants recruited on the online platform Prolific. The sample consisted of Italian respondents and was balanced for gender. For each statement, participants could select an option among True / False / I don't know.

The ability of respondents to answer the questions informed the final selection of items. For each topic, we first identified the questions with a high discrimination index, that is those items that were often correctly answered by the best-performing participants (the top 27%), and, at the same time, often missed by the worse-performing participants (the bottom 27%). When the discrimination index was comparable among items, qualitative considerations guided the final choice, for example: proportion of true and false statements, similarities among items, proportions of correct answers, and so on.

The final scales are the following:

	Cambiamenti climatici	Climate change (GW)
1	L'anidride carbonica (CO2) è un gas a effetto serra	Carbon dioxide (CO2) is a greenhouse gas
2	Il buco dell'ozono è la causa principale dell'effetto serra	The hole in the ozone layer is the main cause of the greenhouse effect
3	Nelle stesse quantità, la CO2 è più dannosa per il clima del metano	In the same quantities, CO2 is more harmful to the climate than methane
4	Per i prossimi decenni, la maggior parte della comunità scientifica si aspetta che il clima cambi in modo uniforme in tutto il mondo	For the next few decades, most of the scientific community expects the climate to change uniformly across the world
5	L'accordo di Parigi del 2015 segna l'impegno di 195 nazioni a mantenere l'aumento della temperatura media mondiale al di sotto di 2 °C rispetto ai livelli preindustriali	The 2015 Paris Agreement marks commitment by 195 nations to keep global average temperature increase below 2°C above pre-industrial levels
6	I cambiamenti climatici provocheranno un aumento dei casi di cancro	Climate change will cause an increase in cancer cases
7	Più del 10% della comunità scientifica nega la responsabilità umana nel riscaldamento globale	More than 10% of the scientific community denies human responsibility for global warming
8	Più della metà degli scienziati che sono scettici sul cambiamento climatico sono specializzati in climatologia	More than half of the scientists who are climate change skeptics specialize in climatology
9	Gli scienziati ritengono che i cambiamenti climatici aumenteranno il rischio di epidemie di infezioni virali	Scientists believe that climate change will increase the risk of an epidemic of viral infections
10	Il trasporto aereo è uno tra i settori più inquinanti in termini di emissioni di gas serra	Air transport is one of the most polluting sectors in terms of greenhouse gas emissions

	Aborto	Abortion (IVG)
1	L'assunzione del farmaco per l'aborto farmacologico avviene tramite iniezione	The drug for medical abortion is taken by injection
2	I farmaci utilizzati per l'aborto farmacologico possono essere utilizzati anche per coadiuvare il completamento di un aborto spontaneo	Drugs used for medical abortion can also be used to help complete a miscarriage
3	In Italia è ammessa l'interruzione volontaria di gravidanza entro 90 giorni dal concepimento	In Italy, voluntary termination of pregnancy is permitted within 90 days of conception
4	L'attuale legge che regolamenta l'interruzione volontaria di gravidanza è stata approvata alla fine degli anni '70	The current law regulating the voluntary termination of pregnancy was approved in the late 1970s
5	Aborto farmacologico e aborto chirurgico hanno lo stesso limite temporale, ovvero si può ricorrere all'uno o all'altro con le stesse tempistiche	Pharmacological abortion and surgical abortion have the same time limit, i.e. one or the other can be used with the same timing
6	Prima dell'approvazione dell'attuale legge sull'aborto, una donna che interrompeva volontariamente la gravidanza poteva essere punita con la reclusione in carcere.	Before the current abortion law was passed, a woman who voluntarily terminated her pregnancy could be punished with imprisonment
7	Agli inizi degli anni '80 un referendum proposto dal Partito Radicale propose di facilitare le procedure di accesso all'aborto	In the early 1980s, a referendum proposed by the Radical Party proposed facilitating the procedures for access to abortion
8	L'aborto si definisce terapeutico quando viene eseguito al fine di preservare la salute della madre	Abortion is defined as therapeutic when it is performed in order to preserve the health of the mother
9	La fertilità risulta compromessa per un certo periodo successivo all'aborto chirurgico	Fertility is impaired for a certain period following the surgical abortion
10	Nella fase di espulsione dell'embrione a seguito dell'intervento di aborto, il personale medico è obbligato a fornire assistenza sanitaria, anche se obiettore di coscienza	In the phase of expulsion of the embryo following the abortion, medical personnel are obliged to provide health care, even if they are conscientious objectors

	I Promessi Sposi (PP)	
1	I bravi sono due fedeli servitori dell'Innominato	The *bravi* are two faithful servants of the Unnamed
2	Don Abbondio è un personaggio contraddistinto da una spiccata devozione religiosa	Don Abbondio is a character characterized by a marked religious devotion
3	Il primo personaggio a comparire nel romanzo è Padre Cristoforo	The first character to appear in the novel is Father Cristoforo
4	Perpetua è la domestica di Don Rodrigo	Perpetua is Don Rodrigo's maid

5	Manzoni dice di aver tratto le vicende raccontate nel romanzo da un manoscritto di autore anonimo	Manzoni says he took the events told in the novel from a manuscript by an anonymous author
6	Sebbene il tema della peste domini gran parte della narrazione, nessuno tra i personaggi principali decede a causa della malattia	Although the theme of the plague dominates much of the narrative, none of the main characters die of the disease
7	Gertrude, la Monaca di Monza, scelse di prendere i voti per la sua grande vocazione religiosa	Gertrude, the Nun of Monza, chose to take her vows for her great religious vocation
8	L'Innominato si pente delle proprie malefatte e si converte in seguito al suo incontro con la Monaca di Monza	The Unnamed repents of his misdeeds and converts following his meeting with the Nun of Monza
9	Padre Cristoforo scelse di diventare frate per espiare il proprio passato di violenze	Father Cristoforo chose to become a friar to atone for his past of violence
10	Dal romanzo traspare la fede di Alessandro Manzoni nella Provvidenza divina	The novel reveals Alessandro Manzoni's faith in Divine Providence

	Ansiolitici	Anxiolytics (ANS)
1	Le benzodiazepine, al contrario di altri farmaci ansiolitici, non provocano dipendenza o assuefazione	Benzodiazepines, unlike other anti-anxiety drugs, are not addictive or habit-forming
2	La sigla SSRI è un acronimo che significa Selective Serotonin Reuptake Inhibitors.	The abbreviation SSRI is an acronym which stands for Selective Serotonin Reuptake Inhibitors
3	Non è necessario interrompere l'assunzione di benzodiazepine in modo graduale, poiché si tratta di farmaci che non comportano scompensi fisiologici.	It is not necessary to discontinue the intake of benzodiazepines gradually, since these are drugs that do not cause physiological derangements.
4	Le benzodiazepine possono restare in circolo nel sangue per giorni	Benzodiazepines can stay in the bloodstream for days
5	I farmaci ansiolitici possono essere prescritti dal medico di base	Anti-anxiety medications can be prescribed by your primary care physician
6	L'assunzione di benzodiazepine è sicura anche in compresenza di altre sostanze sedative, come ad esempio l'alcol	Taking benzodiazepines is safe even in the presence of other sedative substances, such as alcohol
7	I farmaci ansiolitici sono l'unico rimedio efficace contro il disturbo d'ansia	Anti-anxiety drugs are the only effective remedy for anxiety disorder
8	I barbiturici sono spesso utilizzati nell'eutanasia animale, umana, e per eseguire condanne a morte tramite iniezione letale.	Barbiturates are often used in animal and human euthanasia, and to carry out death sentences by lethal injection.
9	Il Prozac è un farmaco consigliato anche per le donne in gravidanza	Prozac is a drug recommended for pregnant women as well
10	Gli ansiolitici sono utilizzati anche nel trattamento dell'insonnia	Anxiolytics are also used in the treatment of insomnia

	Evoluzionismo	Evolution (DAR)
1	Le fessure branchiali e un accenno di coda sono presenti nell'embrione di tutti i vertebrati	The gill slits and a hint of a tail are present in the embryo of all vertebrates
2	L'homo di Neanderthal è una specie di homo più antica dell'homo erectus	Neanderthal homo is a species of homo older than homo erectus
3	Facendo accoppiare tra loro individui che casualmente mostrano una caratteristica fisica (ad esempio una forma speciale delle piume di un colombo) un allevatore può ottenere animali con le caratteristiche desiderate	By mating individuals that randomly show a physical characteristic (for example a special shape of a pigeon's feathers) a breeder can obtain animals with the desired characteristics
4	L'homo sapiens discende dall'uomo di Neanderthal	Homo sapiens descends from Neanderthal man
5	Il creazionismo è l'interpretazione per cui le specie viventi sono rimaste inalterate dal momento della loro apparizione.	Creationism is the interpretation that living species have remained unchanged since their appearance.
6	Il primo naturalista a proporre l'idea di una graduale modificazione delle specie fu Lamarck	The first naturalist to propose the idea of a gradual modification of species was Lamarck
7	Più gli embrioni di due specie diverse si somigliano, più è stretta è la loro vicinanza in termini evoluzionistici	The more similar the embryos of two different species are, the closer their proximity is in evolutionary terms
8	È grazie al contributo del naturalista Linneo e a il suo studio delle piante di pisello che si è iniziato a capire come le caratteristiche ereditarie si trasmettono dai genitori alla prole.	It is thanks to the contribution of the naturalist Linnaeus and his study of pea plants that we have begun to understand how hereditary characteristics are transmitted from parents to offspring.
9	Il fenotipo è l'espressione visibile del genotipo, ovvero l'insieme delle caratteristiche visibili che si manifestano nell'individuo	The phenotype is the visible expression of the genotype, i.e. the set of visible characteristics that manifest themselves in the individual
10	A un animale che nuota molto potrebbero venire le zampe palmate; la sua prole erediterebbe allora le zampe palmate	An animal that swims a lot might develop webbed feet; her offspring would then inherit webbed feet

	Immunodeficienza felina	Feline Immunodeficiency (FIV)
1	Il virus che causa l'AIDS felina può trasmettersi anche all'uomo	The virus that causes feline AIDS can also be transmitted to humans
2	Dopo la diagnosi di immunodeficienza felina, al gatto restano pochi mesi di vita	After the diagnosis of feline immunodeficiency, the cat has a few months left to live

3	Il virus che causa l'AIDS felina si trasmette con lo scambio di fluidi organici, come il sangue	The virus that causes feline AIDS is transmitted by the exchange of body fluids, such as blood
4	Il virus che causa l'AIDS felina resiste nell'ambiente: ci si può quindi contagiare entrando a contatto con un ambiente contaminato	The virus that causes feline AIDS resists in the environment: one can therefore become infected by coming into contact with a contaminated environment
5	Tutti i gatti con immunodeficienza felina mostrano sintomi legati alla malattia	All cats with feline immunodeficiency show symptoms related to the disease
6	L'AIDS felina è più frequente nei gatti interi rispetto ai gatti castrati	Feline AIDS is more common in intact cats than in neutered cats
7	Per diagnosticare l'immunodeficienza felina è necessario un esame delle urine	A urine test is needed to diagnose feline immunodeficiency
8	I gatti con immunodeficienza felina possono contagiare i cani con cui vivono	Cats with feline immunodeficiency can infect the dogs they live with
9	Una gatta potrebbe risultare sieropositiva per aver sviluppato gli anticorpi, pur senza avere più il virus in circolo	A cat could be FIV positive for having developed the antibodies, even though she no longer has the virus in her circulation
10	Il virus della FIV si trasmette frequentemente durante le zuffe territoriali	The FIV virus is frequently transmitted during territorial fights

Appendix C – Stimuli

Participants will be exposed to two of the three following blocks of news articles. If by the time of data collection a post has become outdated, it will be replaced with a news post with similar content but more recent. Furthermore, they will see four extra Facebook posts, consisting of pictures of animals, working as distractors. All the posts will be presented in a randomized order.

High self-involvement.

Climate change (GW)

https://www.liberoquotidiano.it/news/commenti-e-opinioni/28857250/greta-thunberg-se-stai-con-lei-stai-con-rincari-danni-collaterali-lotta-ambiente.html

https://www.fanpage.it/esteri/clima-polizia-vieta-le-proteste-di-extinction-rebellion-a-londra-gia-1-400-arresti/

https://www.ilfattoquotidiano.it/2022/05/20/perquisizioni-ai-giovani-di-fridays-for-future-a-milano-dopo-denuncia-gazprom-fatto-spogliare-e-obbligato-a-fare-anche-piegamenti-durante-blitz-dei-carabinieri/6598678/

https://palermo.repubblica.it/cronaca/2021/08/11/news/a_siracusa_48_8_gradi_mai_una_temperatura_cosi_alta_in_europa-313709104/

https://www.repubblica.it/green-and-blue/2021/08/04/news/siberia_serbatorio_di_metano_il_caldo_aumenta_le_fuoriuscite_dal_permafrost-312843405/

https://www.repubblica.it/green-and-blue/2022/03/03/news/clima_australia_alluvione_inondazioni_eventi_meteo_estremi-340097347/

https://www.nationalgeographic.it/ambiente/2021/04/26-modi-per-ridurre-il-nostro-impatto-sul-pianeta

Abortion (IVG)

El Salvador, condannata a 30 anni per un aborto spontaneo (nextquotidiano.it)

Giorgia Soleri, fidanzata di Damiano dei Maneskin: «Ho abortito a 21 anni», chi era il padre del bambino? - DonnaPOP

In Italia ci sono almeno 31 strutture con il 100% di medici obiettori - Il Post

https://www.ilmessaggero.it/mondo/amazon_stati_uniti_aborto_rimborso-6668091.html

Il potere delle multinazionali: Amazon pagherà le donne che abortiscono (provitaefamiglia.it)

Diritto all'aborto. L'arcivescovo di San Francisco attacca Nancy Pelosi e le nega la comunione (rainews.it)

"L'aborto non è un contraccettivo ma rimane un diritto delle donne" - La Ragione

https://www.wired.it/attualita/politica/2020/10/01/cimitero-feti-roma/

Medium Self-Involvement.

Evolutionism (DAR)

https://www.corriere.it/tecnologia/22_febbraio_11/darwin-day-2022-12-febbraio-213-anni-fa-nasceva-padre-evoluzionismo-6b6c2408-89d9-11ec-ab70-14f9e3dc0d34.shtml

https://www.rivieraoggi.it/2011/02/01/112597/sempre-meno-evoluzionismo-nelle-scuole-usa-e-in-italia/

https://pikaia.eu/ci-risiamo-il-ministro-delleducazione-indiano-rinnega-la-teoria-dellevoluzione/

https://www.lastampa.it/cronaca/2019/11/07/news/l-anello-mancante-tra-scimmie-e-uomini-e-stato-scoperto-in-germania-1.37872096/

https://www.nationalgeographic.it/scienza/2021/06/trovati-in-cina-i-fossili-di-un-rinoceronte-gigante

https://www.lescienze.it/mind/2022/03/15/news/recettori_odore_corpo_muschio_ridotta_sensibilita_olfatto_evoluzione_geni-8958374/

https://www.lescienze.it/news/2015/07/18/news/evoluzione_confutazione_obiezioni_creazioniste_creazionismo-2694916/

Anxyolitics (ANS)

https://www.federfarma.it/Edicola/Filodiretto/VediNotizia.aspx?id=22353#:~:text=A%20causa%20della%20pandemia%20da,e%20Umbria%20(%2B73%25).

https://www.fanpage.it/attualita/lacquisto-online-di-farmaci-per-ansia-insonnia-e-stress-e-raddoppiato-con-la-pandemia-di-covid/

https://www.fanpage.it/attualita/ansiolitici-nel-cappuccino-alla-collega-rivale-temeva-tagli-del-personale-condannata/

https://www.corriere.it/salute/neuroscienze/14_settembre_29/rischio-alzheimer-aumenta-se-si-prendono-troppi-ansiolitici-0c3f3316-47d4-11e4-85be-0ddddac1a56f.shtml

https://www.aboutpharma.com/scienza-ricerca/benzodiazepine-ad-alte-dosi-labuso-si-diffonde-tra-medici-e-professionisti/

https://www.repubblica.it/salute/2021/12/13/news/prigionieri_degli_ansiolitici_la_dipendenza_da_benzodiazepine-329689036/

https://www.vice.com/it/article/kz5edx/consumo-di-xanax-cosa-sapere

https://psicoadvisor.com/ansiolitici-e-alzheimer-le-benzodiazepine-aumentano-il-rischio-di-demenza-29309.html

https://www.openpolis.it/numeri/il-portogallo-e-primo-in-europa-per-prescrizioni-di-ansiolitici/

Low Self-Involvement
I Promessi Sposi (PP)

https://www.corriere.it/scuola/universita/15_novembre_28/promessi-sposi-manzoni-mostra-virtuale-universita-sapeinza-tablet-smartphone-movio-cf3141c4-95c7-11e5-8b73-dd829849c746.shtml

https://www.repubblica.it/serietv/schede/i-promessi-sposi/2651/

https://www.repubblica.it/serietv/2021/06/19/news/una_serie_prequel_dei_promessi_sposi_e_provvidenza_idea_del_produttore_del_trono_di_spade_-306774776/

https://www.eccolecco.it/arte-cultura/musei-gallerie/museo-manzoniano-lecco/

https://www.chiesadimilano.it/news/arte-cultura/la-monaca-di-monza-la-vera-storia-tra-arte-e-letteratura-33678.html

https://www.lavocedeltrentino.it/2020/04/01/coronavirus-e-peste-nei-promessi-sposi-alcune-analogie-che-fanno-riflettere/

https://www.raicultura.it/letteratura/articoli/2018/12/Affinati-e-lInnominato-de-I-Promessi-Sposi-51f560c0-900d-4360-b8aa-b06f959a3b7c.html

https://www.raicultura.it/letteratura/articoli/2018/12/I-promessi-sposi-in-tv-lassalto-ai-forni-a722db9d-9e5d-4414-a52b-b0ccb02369d4.html

https://www.leccotoday.it/notizie/costumi-promessi-sposi.html

Feline Immunodeficiency (FIV)

Accudire un gatto con la FIV, tutti i consigli (ilmiogattoeleggenda.it)

Il parassita della Toxoplasmosi ci rende più belli? | Wired Italia

https://www.corriere.it/animali/18_luglio_18/io-milo-casetta-gatti-4fe2c03c-8a11-11e8-8bbc-b107b233a106.shtml

https://www.corriere.it/tecnologia/22_febbraio_18/morta-pot-roast-gatta-piu-amata-tiktok-8fd28646-90bb-11ec-9e8a-badec6e7adb8.shtml

https://ricerca.repubblica.it/repubblica/archivio/repubblica/2017/05/20/per-i-gatti-antirabbica-e-fiv-da-sapereBologna21.html

https://www.veggieanimals.com/it/blog/post/DIETA-VEGANA-NELLA-FIV-E-NELLA-FELV.html

https://www.amoreaquattrozampe.it/gatti/convivenza-gatto-fiv-gatto-sano-strategie/118268/

https://www.kodami.it/addio-a-pot-roast-famosissima-gatta-su-tiktok-ha-perso-la-battaglia-contro-laids-felina/

https://www.ilpescara.it/attualita/gatto-micio-gino-peritonite-infettiva-felina-raccolta-fondi.html

Appendix D – Questionnaires and assessments

Participants will be asked to fill up the following questionnaires, administrated in a faithful Italian translation.

Each item of the selected scales will be framed as follows: "How much do you agree with the following statements?", and participants will be asked to answer using a 0 – 100 VAS going from 0 = *Totally disagree* to 100 = *Totally agree*.

Cognitive style (Cacioppo & Petty, 1982; Epstein et al., 1996)

I don't like to have to do a lot of thinking.	Non mi piace dover pensare molto
I try to avoid situations that require thinking in depth about something.	Cerco di evitare situazioni che richiedono riflessioni approfondite
I prefer to do something that challenges my thinking abilities rather than something that requires little thought.	Preferisco fare qualcosa che sfida le mie capacità di ragionamento piuttosto che qualcosa che richiede poca riflessione
I prefer complex to simple problems.	Preferisco i problemi complessi a quelli semplici
Thinking hard and for a long time about something gives me little satisfaction.	Pensare intensamente e a lungo a qualcosa mi dà poca soddisfazione
I trust my initial feelings about people.	Mi fido delle mie impressioni iniziali sulle persone
I believe in trusting my hunches.	Credo molto nel mio intuito.
My initial impressions of people are almost always right.	Le mie prime impressioni sulle persone sono quasi sempre giuste
When it comes to trusting people, I can usually rely on my "gut feelings."	Se devo fidarmi delle persone, di solito posso affidarmi alle mie sensazioni di pancia.
I can usually feel when a person is right or wrong even if I can't explain how I know	Di solito riesco a intuire quando una persona ha ragione o torto, anche se non riesco a spiegare come lo so

Political view (Kahan, 2012)

Il governo interferisce troppo nella nostra vita quotidiana.	The government interferes far too much in our everyday lives.
A volte il governo ha bisogno di fare leggi che impediscano alle persone di farsi del male.	Sometimes government needs to make laws that keep people from hurting themselves.
Il governo dovrebbe smettere di dire alla gente come vivere la propria vita.	It's not the government's business to try to protect people from themselves.
Il governo dovrebbe fare di più per portare avanti gli obiettivi della società, anche se questo significa limitare la libertà e le scelte degli individui.	The government should do more to advance society's goals, even if that means limiting the freedom and choices of individuals.
Per il bene della società, il governo dovrebbe porre dei limiti alle scelte che gli individui possono compiere.	Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.
Siamo andati troppo oltre nel promuovere uguali diritti in questo Paese.	We have gone too far in pushing equal rights in this country.
La nostra società sarebbe migliore se la distribuzione della ricchezza fosse più equa.	Our society would be better off if the distribution of wealth was more equal.
Dobbiamo ridurre drasticamente le disuguaglianze tra ricchi e poveri, bianchi e persone di colore, uomini e donne.	We need to dramatically reduce inequalities between the rich and the poor, whites and people of color, and men and women.
La discriminazione contro le minoranze è ancora un problema molto serio nella nostra società.	Discrimination against minorities is still a very serious problem in our society.
Sembra che le persone di colore, le donne, gli omosessuali e altri gruppi non vogliano diritti uguali, ma vogliano diritti speciali solo per loro.	It seems like blacks, women, homosexuals and other groups don't want equal rights, they want special rights just for them.
La società nel suo complesso è diventata troppo morbida e accomodante.	Society as a whole has become too soft and feminine.

Social media use (Orosz et al., 2016)

If I could visit only one site on the Internet, it would be Facebook.	Se potessi visitare un solo sito su internet, quel sito sarebbe Facebook.
I feel bad if I don't check my Facebook daily.	Mi sento a disagio se non controllo il mio Facebook ogni giorno.
Before going to sleep, I check Facebook once more.	Controllo Facebook prima di andare a dormire.
I spent time on Facebook at the expense of my obligations.	Passo il mio tempo su Facebook al posto di fare quello che devo.
I spend more time on Facebook than I would like to.	Passo su Facebook più tempo di quanto vorrei.
It happens that I use Facebook instead of sleeping.	Mi capita di stare su Facebook invece di dormire.

Intellectual humility (Leary et al., 2017)

I question my own opinions, positions, and viewpoints because they could be wrong	Metto in dubbio le mie opinioni, posizioni e punti di vista perché potrebbero essere sbagliati
I reconsider my opinions when presented with new evidence	Riconsidero le mie opinioni quando mi vengono presentate nuove prove
I recognize the value in opinions that are different from my own	Riconosco il valore delle opinioni diverse dalle mie
I accept that my beliefs and attitudes may be wrong	Accetto che le mie convinzioni e i miei atteggiamenti possano essere sbagliati
In the face of conflicting evidence, I am open to changing my opinions	Di fronte a prove contrastanti, sono disposto a cambiare le mie opinioni
I like finding out new information that differs from what I already think is true.	Mi piace scoprire nuove informazioni che differiscono da ciò che già penso sia vero.

Attitudes

Penso sia fondamentale controllare i propri gatti per ogni possibile malattia felina	I think it is essential to check your cats for any possible feline diseases
L'immunodeficienza felina è meno grave di quello che sembra	Feline immunodeficiency is less serious than it seems
Penso che I Promessi Sposi siano una delle opere più importanti della storia della letteratura italiana	I think that The Betrothed is one of the most important works in the history of Italian literature
Penso che lo studio (insegnamento) de I Promessi Sposi andrebbe sostituito con lo studio di altre opere più interessanti	I think that the study (teaching) of The Betrothed should be replaced with the study of other more interesting works
A scuola c'è troppa insistenza sulle teorie evoluzionistiche	At school there is too much insistence on evolutionary theories
Penso che la conoscenza dell'evoluzionismo andrebbe diffusa di più	I think that knowledge of evolutionism should be spread more
Penso che gli ansiolitici siano da usare con molta attenzione	I think anxiolytics should be used very carefully

Penso che gli ansiolitici rendano molto più facile la vita delle persone	I think anti-anxiety medications make people's lives a lot easier
Penso che si debba compiere ogni sforzo possibile per contrastare i cambiamenti climatici	I think every possible effort should be made to combat climate change
Penso che la situazione climatica sia meno grave di quel che si dice	I think the climate situation is less serious than people say
L'aborto è una pratica eticamente sbagliata	Abortion is an ethically wrong practice
Penso sia necessario facilitare l'accesso all'aborto	I think it is necessary to facilitate access to abortion

Self-involvement

- Quanto ti senti coinvolto/a dall'argomento? (How much do you feel involved by the topic?)
  Per nulla coinvolto/a – Estremamente coinvolto/a

- Quanto ti impegneresti in una discussione online sull'argomento? (How much would you be willing to discuss the topic in an online conversation?)

  Per nulla - Totalmente

Perceived knowledge

- Quanto pensi di saperne sull'argomento? (How much do you think you know about the topic?)
  Nulla – Tutto