Folk Psychological Attributions of Consciousness to Large Language Models

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**Abstract**

Technological advances raise new puzzles and challenges for cognitive science and the study of how humans think about and interact with artificial intelligence (AI). For example, the advent of Large Language Models and their human-like linguistic abilities has raised substantial debate regarding whether or not AI could be conscious. Here we consider the question of whether AI could have subjective experiences such as feelings and sensations ("phenomenological consciousness"). While experts from many fields have weighed in on this issue in academic and public discourse, it remains unknown how the general population attributes phenomenology to AI. We surveyed a sample of US residents (N=300) and found that a majority of participants were willing to attribute phenomenological consciousness to LLMs. These attributions were robust, as they predicted attributions of mental states typically associated with phenomenology – but also flexible, as they were sensitive to individual differences such as usage frequency. Overall, these results show how folk intuitions about AI consciousness can diverge from expert intuitions – with important implications for the legal and ethical status of AI.

**Introduction**

One of the most prominent technological advances of the past decade is the development of generative large language models (LLMs). With their ability to respond to queries with coherent and relevant answers in natural language, LLMs such as ChatGPT are able to provide advice, summarise text, write code, and even produce poetry. These human-like capabilities have raised profound questions about the nature of artificial intelligence, and in particular, whether artificial intelligence (AI) is capable of having subjective experiences or 'phenomenal consciousness' (Nagel, 1974; Chalmers, 1996). This debate on consciousness in AI has been at the forefront of mainstream media and academic discourse (Chalmers, 2023; Shardlow & Przybyła 2022; Wiese, 2023) from all areas of cognitive science (LeDoux et al., 2023).

While normative accounts and expert opinions are helpful for developing theories and potential tests of AI consciousness, an equally important question remains regarding whether and how people attribute phenomenal consciousness to LLMs. Investigating folk attributions of consciousness to AI is important for two reasons. First, folk psychological attributions of consciousness may mediate future moral concern towards AI, regardless of whether or not they are actually conscious (Mazor et al., 2023; Shepherd, 2018). Second, any current or future scientific determination of phenomenal consciousness in AI is likely to be "theory-heavy", and therefore deal in probabilities or credences, rather than definite statements (Butlin et al., 2023). The impact of such research on the public perception of AI consciousness is therefore critically dependent on a thorough understanding of people's folk psychological beliefs.

To investigate this question, we drew on insights from a rich tradition in experimental philosophy and social psychology showing how people attribute consciousness and other mental states to other agents (for a review, see Sytsma, 2014). Indeed, past work has shown that nonexperts employ the concept of phenomenal consciousness, and differently ascribe mental states that involve phenomenology (e.g., feeling joy, getting depressed) from those that do not (e.g., making a decision, forming a belief; Knobe & Prinz, 2008). These findings also mirror work showing that attributions of mental states to other agents can be well captured by two underlying dimensions related to "Experience" (e.g., the capacity to feel pain, fear) and "Agency" (e.g., the capacity to have self-control, morality; Gray, Gray, & Wegner, 2007; for a review, see Waytz et al., 2010).

To investigate folk psychological attributions of consciousness in LLMs, we recruited a nationally representative sample of U.S. adults (N=300) and elicited attributions of phenomenology via a well-validated measure of phenomenological attributions (Peressini, 2014). In particular, we focused on ChatGPT as one of the most well-known and widespread LLMs, and asked participants to rate how capable they thought ChatGPT was of having subjective experience. We also measured various other attitudes, including confidence in consciousness attributions, attributions of other mental states, usage habits, and predictions of public opinion regarding AI consciousness. This set of questions thus allowed us to probe the correlates and underlying structure of folk psychological intuitions about consciousness in LLMs.

## Method and Materials

This study was approved by the UCL Research Ethics Committee, and was conducted in July 2023. Experimental materials, anonymized raw data, and analysis code are openly available on the Open Science Framework (OSF) website at https://osf.io/49w7m/?view_only=277d40847f9f4b6cb71af19911c0dd85.

### Participants

A sample of 300 participants from the U.S. was recruited from Prolific Academic (Prolific.co). Participants were recruited via proportional stratified random sampling, with age and gender quotas representative of the U.S. population based on U.S. Census Bureau data. The sample size was chosen arbitrarily to allow for a minimum of 20 participants in each stratum. No participants reported having encountered technical difficulties during the experiment, and no participants took the survey more than once. All participants were thus included in the analyses (N female=152; N male=142; mean age=46.13).

### Procedure

After consenting to participate in the study, participants were told that they would be asked about their opinions regarding ChatGPT, and read a short description of the chatbot: "ChatGPT is an artificial intelligence chatbot developed by OpenAI and released in November 2022. The name 'ChatGPT' combines 'Chat', referring to its chatbot functionality, and 'GPT', which stands for Generative Pre-trained Transformer, a type of large language model (LLM)."

They were then introduced to the concept of phenomenological experience via a short description adapted from a study of folk phenomenality (Peressini, 2014):

> "As we all know, each of us as conscious human beings have an 'inner life.' We are aware of things going on around us and inside our minds. In other words, there is something it is like to be each of us at any given moment: the sum total of what we are sensing, thinking, feeling, etc. We are experiencers.
>
> On the other hand, things like thermostats, burglar alarms, and bread machines do not have an inner life: there is not anything it is like to be these objects, despite the fact that they can monitor conditions around them and make appropriate things happen at appropriate times. They are not experiencers."

They were then asked to rate the extent to which ChatGPT is capable of having conscious experience on a scale from 1 to 100 (with 1="clearly not an experiencer", 50="somewhat an experiencer", and 100="clearly an experiencer"). They also reported their confidence in this judgment ("How confident are you about your judgment about ChatGPT being an experiencer?") on a scale from 1 ("not confident at all") to 100 ("very confident"), and their intuitions about how other people would judge ChatGPT ("How much of an experiencer do you think most people think ChatGPT is?") on a scale from 1 to 100 (with 1="most people think it is clearly not an experiencer", 50="most people think it is somewhat an experiencer", and 100="most people think it is clearly an experiencer").

Next, they answered a series of questions about ChatGPT's mental capacities. These were compiled based on a literature review: we started from a comprehensive review (Sytsma, 2014) and identified 22 manuscripts investigating mind perception and consciousness attributions. For the full list, see Supplementary References. We then compiled a list of all attributes explored in the experiments reported in these previous studies—for a total of 254 stimuli, which we then reduced to 65 unique mental states. Participants saw each of these 65 attributes one at a time, and rated the extent to which ChatGPT was capable of exhibiting them, from 1 to 100 (with 1="not at all", 50="somewhat", and 100="very much"), and how confident they were in their response from 1 ("not confident at all") to 100 ("very confident").

Finally, they answered some questions about their demographics (age and gender), and their experience with ChatGPT, namely whether they had heard about ChatGPT prior to the experiment ("Yes" or "No"), whether they had used ChatGPT in the past ("Yes" or "No"), how often they had used ChatGPT ("More than once a day", "About once a day", "About once a

week", "About once every two weeks", or "About once a month"), and for what purpose they had used ChatGPT ("General knowledge", "Coding", "Writing", or "Other"). For full text, see materials on the OSF repository.

## Results

While a third of participants (33%) reported that ChatGPT was not an experiencer, the majority (67%) attributed some phenomenal consciousness (mean[M]=25.56; median=16.00, standard deviation[SD]=27.36, range=1-100, where 1="clearly not an experiencer", and 100="clearly an experiencer"; Figure 1A). Participants who gave more extreme judgments (in either direction) were also more confident (quadratic regression B=178.25, SE=24.43, t=7.30, p<.001, CI=[130.18, 226.33], with a quadratic relationship between confidence and consciousness attributions yielding a better fit than a linear function, F(1, 297)=53.24, p<.001).

Next, we investigated potential determinants of consciousness attributions, starting with familiarity. The majority of participants had heard about ChatGPT (97%), and most had also used it at least once before (57%). Participants who had experience using ChatGPT attributed higher levels of consciousness (M=29.59) than those who never used it (M=19.37; t(287)=3.33, p<.001). Attributions of consciousness were correlated with usage, with a linear increase from "never" to "more than once per day" (B=4.94, SE=0.99, t=4.99, p<.001, 95% CI=[2.99, 6.88]; Figure 1B). These data thus suggest a strong link between familiarity with a LLM and consciousness attributions, such that those who interact with ChatGPT more frequently are also more likely to believe it has subjective experiences.
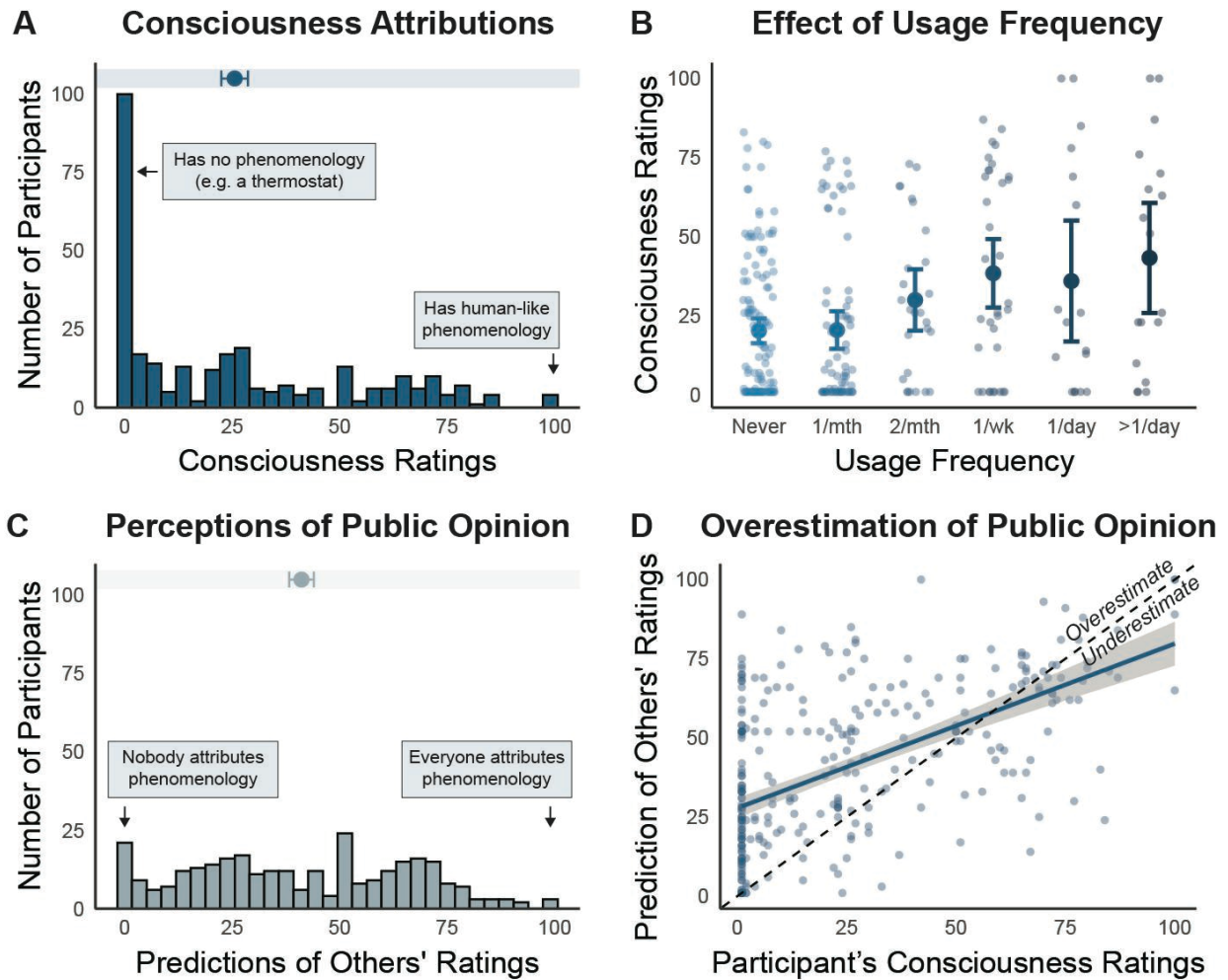
Figure 1. Attributions of Consciousness in a Large Language Model. Participants attributed varying levels of consciousness to ChatGPT (A), and these attributions increased with usage frequency (B). When asked to predict the extent to which other people on average would think ChatGPT is conscious (C), participants consistently overestimated public opinion (D). Error bars and bands represent 95% CIs.

We next examined attributions of specific mental states, and their relationship to attributions of consciousness. Based on a literature review of experimental investigations of folk psychological attributions of consciousness (Sytsma, 2014), we identified 65 mental states encompassing various aspects of mental life—from sensory experiences (e.g., seeing or smelling) to cognitive processes (e.g., paying attention or exercising self-control), emotions (e.g., feeling depressed or relieved), and other complex capacities (e.g., acting morally or self-

reflecting). Participants' ratings for each of these 65 traits (Figure S1A) were then reduced via a principal component analysis to two main dimensions, which together explained 58% of the variance (Figure S1B) and mapped onto previously identified dimensions of "experience" (e.g., experiencing pleasure, feeling fearful) and "intelligence" (e.g., knowing things, making choices; Grey et al., 2007).

We then asked which mental state dimensions participants thought ChatGPT was capable of having. Overall, ChatGPT was seen as more capable of intelligence than experience: attributions of mental states were positively correlated with their loadings on the intelligence dimension (r=0.95, p<.001, CI=[0.92, 0.97]), and negatively with the experience dimension (r=-0.94, p<.001, CI=[-0.96, -0.91]; Figure 2A). Next, we asked which mental states predicted consciousness attributions. Here, in contrast, we found a key role for experience: participants who attributed more phenomenal consciousness to ChatGPT also attributed more mental states related to experience (r=0.65, p<.001, CI=[0.58, 0.71]), but not those related to intelligence (r=0.03, p=.596, CI=[-0.08, 0.14]; Figure 2B). In other words, despite ChatGPT being seen on average as more capable of intelligence than experience, mental states related to experience were still the main driver of consciousness attributions.
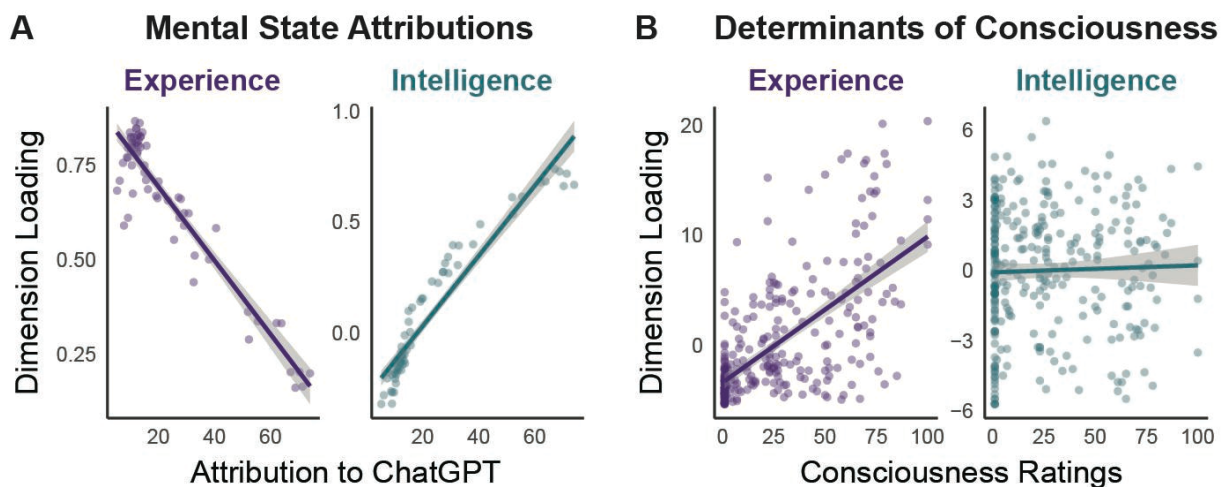


Figure 2. Structure of Mental State Attributions to ChatGPT. Participants' ratings of ChatGPT's mental capacities mapped onto two dimensions – Experience and Intelligence. While ChatGPT was seen as more capable of mental states related to Intelligence than Experience (A), only those related to Experience were predictive of phenomenal consciousness attributions (B).

Finally, we probed participants' intuitions about public attitudes towards consciousness in AI by asking them to predict other people's attributions, using the same scale used to self-report their own attitudes. As depicted in Figures 1C and 1D, predictions of others' opinions were correlated with participants' own opinions (r=0.56, p<.001, CI=[0.48, 0.63]), but they were also consistently higher (M=41.11; median=39.50, SD=25.28, range=1-100; t(299)=10.90, p<.001). In other words, participants systematically overestimated how much other people would see ChatGPT as being conscious.

## Discussion

Overall, our results reveal that a substantial proportion (67%) of people attribute some degree of phenomenal consciousness to ChatGPT, and believe that most other people would as well. Strikingly, these attributions of consciousness were positively related to usage frequency, such that people who were more familiar with ChatGPT, and used it on a more regular basis (whether for assistance with writing, coding, or other activities) were also more likely to attribute some degree of phenomenology to the system. Thus, independent of ongoing academic discussions about the potential for and possibility of artificial consciousness (eg Butlin et al., 2023; Chalmers, 2023), the recent emergence and widespread uptake of powerful large language models may be associated with a majority of people perceiving some degree of consciousness in these systems.

An obvious limitation is that these attributions of consciousness were measured via a single question and might differ with different experimental measures and prompts. For example, it remains unclear how folk conceptions of phenomenology correspond to the relevant philosophical constructs (Huebner, 2010; Talbot, 2012; Peressini, 2014), and how well self-reported measures capture such intuitions, as opposed to more indirect behavioural markers which may be less subject to response biases (Scholl & Gao, 2013). However, an analysis of the underlying structure of mental state attributions suggested that attributions of phenomenology were a robust feature of our data, and covaried with attributions of other mental states deemed to have subjective qualities such as emotions or sensations. We also note converging evidence from studies employing different materials and measures (Scott et al., 2023).

Of course, these attitudes were measured in a stratified sample of the U.S. population, and it remains unclear whether they would generalize across different samples and cultures. In

fact, the effect of usage suggests that consciousness attributions might be higher in participants recruited online, who likely use computers on a daily basis, and might be reduced in participants who are less familiar with computing and AI. Similarly, the preferences we report reflect attitudes at a specific moment in time and may change as LLMs become more widespread and advanced. The relationship between usage frequency and consciousness attributions suggests that familiarity with the technology may lead to higher attributions of consciousness – or vice versa, that higher attributions of consciousness may lead people to make greater use of LLMs. Future investigations may probe these attitudes longitudinally or via an experimental intervention, to explore the possible causal links between usage of AI and folk psychological attributions of consciousness.

Future work may also investigate specific characteristics of AI and human-AI interactions that might influence consciousness attributions. For example, attributions of mental states may depend on superficial appearance (Bainbridge et al., 2011) as well as observed behavioural profiles (Colombatto & Fleming, 2023). Conversely, future work may also explore characteristics of the perceivers - such as a tendency to engage in spontaneous theory of mind - that may lead to increased consciousness attributions. Beyond opening up these new avenues for future research, our results are also relevant to current controversies in public discourse and policy regarding the ethical and legal status of AI, given that folk ascriptions of consciousness, both now and in the future, may be a significant driver of societal concern for artificial systems.

## Conclusions

In summary, our investigation of folk psychological attributions of consciousness revealed that most people are willing to attribute some form of phenomenology to LLMs: only a third of our sample thought ChatGPT did not have subjective experience, while two-thirds of our sample thought ChatGPT had varying degrees of phenomenological consciousness. The relatively high rates of consciousness attributions in this sample are somewhat surprising, given that experts in neuroscience and consciousness science currently estimate that LLMs are highly unlikely to be conscious (Butlin et al., 2023; LeDoux et al., 2023). These findings thus highlight a discrepancy between folk intuitions and expert opinions on artificial consciousness—with significant implications for the ethical, legal, and moral status of AI.

## Acknowledgements

## Author Contributions

All authors designed research; CC conducted the experiment, analyzed data, and wrote the manuscript with input from SMF.

## Declaration of Interests

The authors declare no competing interests.

## Open Practices Statement

Materials, data, and analysis code are openly available on the Open Science Framework (OSF) website at this link:

https://osf.io/49w7m/?view_only=277d40847f9f4b6cb71af19911c0dd85

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**Supplementary Figure**



Supplementary Figure 1. Dimensionality Reduction on Mental States. Participants rated ChatGPT's capacity for 65 different mental states (A). A Principal Component Analysis of these ratings revealed two underlying dimensions, which seemed to map onto the capacity for feelings and sensations ("Experience"; left) and that for thinking and acting ("Intelligence"; right).

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