Dean&Francis
ISSN 2959-6149

# Multiple Constraints on Objectivity Existing in the Mind

**Jacie Yuxuan Liu**

**Abstract:**

Whether the human brain has completely retained the objective reality from the outside world at some point during information processing is a question that awaits discussion. Answering this question can not only provide necessary supplementation and evaluation for the relevant evidence of information processing, but also enrich the research related to cognitive psychology.

To explore whether objectivity and objective reality exist in the human brain, this article studies multiple classic literatures and the experiments therein, and claims that (1) inattentional blindness and the human brain's reconstruction of memory to some extent filter external reality; (2) functional interference at the neural level of the cerebral cortex prevents information from remaining as it is during processing. (3) pre-distinctions in language and culture also lead to different interpretations of objective reality among individuals. Therefore, this article holds that objective reality does not exist within the human brain; what can be presented in the brain is merely a subjective reality that is subject to multiple interference and filters.

**Keywords:** Objectivity; Subjectivity; Cognitive constraints; Neurological limits; Cultural constraints

"Behold! human beings living in [an] underground cave" (Plato, 2007, p.1).

About 1,500 years ago, Plato's allegory proposed that a group of people imprisoned in a cave since childhood, with their necks locked, regarded reflections of objects and artificial sounds as reality, but had no idea that there was a real world illuminated by sunlight outside (Plato, 2007, pp. 1-3). Although Plato's original intention was to discuss the acquisition of truth through education, when blurred shadows are seen as prisoners' subjective cognition constructed through sensory stimulation; and the world outside the cave as objective reality, his allegory in *Republic* indicates that mind's propensity for objectivity has profound limitations.

Today, contemporary research demonstrates that subjectivity—the influence of personal beliefs or feelings, rather than facts—is at odds with the pursuit of objectivity—the ability to perceive and reproduce external reality without any bias—in the mind, where cognition is formed (*Cambridge Dictionary*, 2025). Exploring the limitations of human cognitive objectivity has been a foundational challenge for psychologists attempting to remove their biased perspectives

ISSN 2959-6149

from adulterating the validity of their research (Fresco, 2021, pp. 1, Pérez-Montoro 2007, p. 10, Zaliwski 2011, p. 77). While an external reality objectively exists, the human mind does not process it as an absolute state of mind-independent truth, but rather a dynamic cognitive and perceptual achievement, continually negotiated between cognitive filtering, prejudiced neural mechanisms, and culturally learned schemas.

## Cognitive Psychology: Information Filtering

The human cognitive system constructs subjective perception from external, objective stimuli through multiple layers of filters, including inattentional blindness and defective memory retrieval and reconstruction. In addition, one's subjective perception of external reality is prone to further alteration into subjectively processed knowledge, leading to cognitive biases and non-objective beliefs. Under the influence of these filters, our mind is no longer objective.

## Inattentional Blindness

The first filter that prevents objectivity from existing in the mind is inattentional blindness, a byproduct of selective attention that occurs "[when people] sometimes fail to notice a salient and fully visible, but unexpected object or event" no matter how conspicuous it is (Kreitz et al, 2015, p.1). "The Invisible Gorilla" experiment exemplified the mechanism behind inattentional blindness (Simons & Chabris, 1999). During the experiment, the subjects were tasked to count the number of ball-passes made in a 75-second video that included a palpable gorilla passing through the scene (Fig. 1). When participants were later asked if they noticed any abnormal phenomena, and even directly probing "did you see the gorilla?" (p. 9), 46% of the subjects were unaware, even though the gorilla never went unnoticed without a task that demands selective attention (p. 10). The data from subsequent experiments demonstrated that the more demanding the counting task is, the greater proportion of subjects, up to 60%, are likely to ignore the gorillas (p. 3). Even if the exposure time to gorillas is prolonged and the significance of their movements is increased, the phenomenon of inattentiveness and blindness remains significant, indicating the limited-capacity of human attention (p.11-12).

**Fig. 1. "The Invisible Gorilla" experiment.**

The human cognitive system is incapable of accepting the full extent of objective reality, and instead selectively filters information depending on the subjective allocation of attention. Under the limits of inattentional blindness, the human brain cannot objectively construct reality from their own perception without omitting information during the filtering process.

## Memory Retrieval and Reconstruction

Furthermore, human memory is reconstructive, meaning people often fill gaps with assumptions. Thus, when people attempt to objectively recount situations during memory retrieval, the human brain undergoes another filter, exacerbating the deviation from objectivity in the mind. Experimental studies demonstrated false evidence leads to confabulation, the iteration of fictive memories (Kassin & Kiechel, 1996, pp. 1-2). In one such study, researchers assigned typing tasks to subjects, warning them that pressing "ALT" causes the computer to crash. However, the computer was pre-programmed to crash, and all subjects were falsely accused of pressing ALT. Despite being innocent, an average of 50% of the subjects chose to sign their confessions (pp. 3-4). Additionally, the subjects tampered with and fabricated their memories under high pressure, stating fictional details such as when they pressed the ALT key or that they pressed the key with specific parts of their hands (pp. 3-5). High-pressure environments, severe accusations, and fear distort memories, causing the mind to drift away from objective facts once again.

## Neurological Limits on Objectivity

Even some brain regions, such as the prefrontal cortex, that are attributed to rational objective thought are subject to filters that prevent objectivity. Neuroscientists proffer confirmation bias and functional interference hinder the

cognitive system from objectively evaluating external information and making decisions.

## Confirmational Bias

Confirmation bias, people's tendency of looking for, or interpreting, information that is consistent with their existing beliefs, can serve as an example of human brain's subjective filters. Neurologically, the influence of confirmation bias is shown in functional magnetic resonance imaging (fMRI). While an increase in posterior medial prefrontal cortex (pMFC) activity indicates that the brain is conducting error detection and decision-making adjustment, its inactivity when facing confirming or disconfirming evidence suggests that the brain has confirmed the decisions (Kappes et. al., 2019, pp. 1-2). In one such fMRI study, subjects were tasked to invest in a property (1 to 60 cents) and adjusted their investment amount according to additional feedback from an investment partner (Kappes et. al., 2019, pp. 3-7). The pMFC activity observed decreased not only when the partner confirmed the subjects' investment, but also when it disconfirmed (pp. 8-10). Confirmation bias made participants more likely to substantially add to their investment when the partner confirmed it and when contradicted, participants' investment decisions remained unchanged or underwent only minor adjustments (pp. 3-7). Thus, when the mind receives unfavorable information, the brain's sensitivity to contradiction is reduced to maintain inherent beliefs, resulting in confirmation bias. Even when people refer to other's opinions to make objective decisions, confirmation bias prevents people from doing so objectively.

## Functional Interference

In many cases, even if an individual has no subjective intention, the brain sends out neural signals that interfere with the mind's subjective judgment of its objective state. The phantom limb phenomenon is a telling clinical example: patients who have undergone amputation surgery still perceive the presence or even feel intense pain from amputated limbs. As Blumberg and Dooley (2017) argued, although the limb is removed, the sensory-motor network responsible for the limb in the brain, that is, the pathway from the spinal cord to the thalamus and then to the sensory and motor cortex, remains intact. These residual neural circuits remain activated continuously, enabling patients to still perceive the presence of phantom limbs such as pain, movement, and even touch (pp. 5-6). As this sensation occurs, one's experience of their objective reality is obfuscated by incorrect neural signals.

Linguistic and Cultural Constraints on Objectivity

One's cultural background and language further prevents objectivity from existing in the mind. Language categories shape perception by presetting the border of each concept, while perception is subconsciously regulated by cultural experiences, leaving a profound impact on individuals' judgment and processing of objective reality.

## Color Identification and Discrimination

By measuring the average time participants took to name a color, Stroop (1935) proved that subjects identify words they knew before the colors that the words were printed in (p. 650). Although people eventually can discern the colors, the delayed reaction time shows that objective reality is subjectively perceived in individuals' mind due to linguistic factors.

In the US military's adaptation of Stroop's experiment during the Cold War, subjects suspected of being Soviet spies were provided with a document containing a list of Russian words and required to name the colors that words were printed in as quickly as possible. When words like красный, meaning "red" in Russian, were printed in blue ink, native English speakers were not delayed by Russian word stimuli and named the colors of the words correctly and in a short time. On the contrary, Soviet spies, who were fluent in Russian, would recognize both the word stimuli and color stimuli simultaneously. Two contradictory signals made the subjects hesitate, and precisely this moment of hesitation exposed their identities.

The influence of language on attention distribution and, consequently, the formation of cognition is also reflected in the sensitivity to the tint and shade of a color. While the English term "blue" can describe all colors that fall in this category, Russian makes an obligatory distinction between светло-голубой (light blue) and синий (dark blue).

ISSN 2959-6149

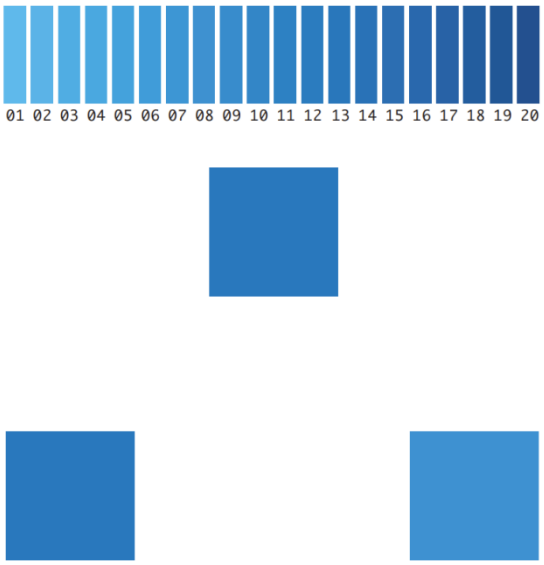


**Fig. 2. The 20 blue colors and an example triad of color squares used in this study.**

In experiments conducted by Winawer and Witthoft (2007), "[subjects who spoke Russian and English respectively] were shown [blue of different shades] arranged in a triad; their task was to indicate as quickly and accurately as possible which of the two bottom color squares was identical to the top square" (Fig. 2) (p. 7781). The research team found that the time required to discriminate between two colors depends on if they represent different linguistic categories. The reaction time for Russian speakers who lingually differentiate the colors (light blue and dark blue) is significantly shorter than if the two colors were from the same category (both light blue or both dark blue). English speakers, however, required longer reaction time on average and didn't showcase obvious variation no matter which linguistic category the colors come from (p. 7783).

The wavelengths of colors, tint, and shade are all external realities independent of subjectivity. Yet, subjective interpretations to name the color are yielded varied reaction times in naming and distinguishing this objective reality. In this case, preset language categories are yet another filter that prevents objectivity from existing in the mind.

Cultural Dimensions

Cultural dimensions, frameworks utilized to understand the differences in culture across countries, account for variation in cognition, leading to biased tendencies when allocating attention and forming subjective judgments. For example, in high-context cultures, such as East Asian ones, people rely more on implicit communication involving interpersonal relationships and interactions between objects than in low-context cultures, such as in North American society (Tella, S. 1996, p. 1).

To identify how distinct cultural dimensions play a role in classification abilities and concentration tendency with regard to visual stimuli, the research team presented animated vignettes to Japanese and American participants, and asked them what they had seen (Fig. 3) (Masuda & Nisbett, 2001, pp. 922-934). According to the data, American participants frequently began their statements with salient objects, such as the fish in the animation. In contrast, 65% more descriptions of the surroundings and roughly twice as many relations between the object and the surroundings were mentioned by Japanese participants (Masuda & Nisbett, 2003, pp. 10-11). Americans paid more attention to the prominent individuals in the picture, while the Japanese tended to focus on the connection between the environment and the individuals. As is the case with linguistic constraints on objectivity, people perceive external reality subjectively by allocating attention according to culture-related tendencies, failing to achieve homogenized objectivity.

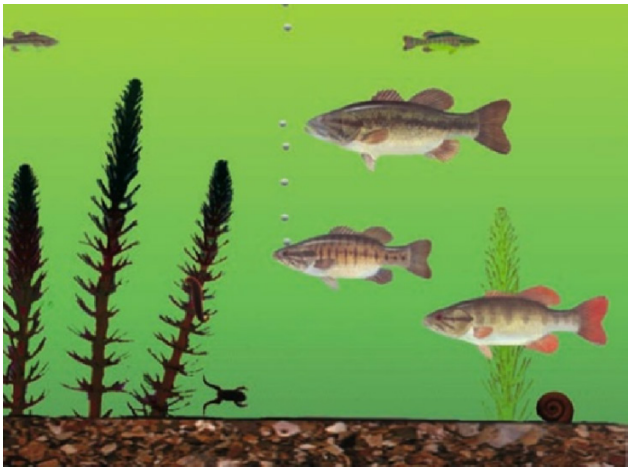

**Fig. 3. Still photo from animated underwater vignette.**

The above experimental results have been verified by multiple parties. Norenzayan et al. (2002) performed a similar experiment which involved not only East Asians and North Americans, but also Asian Americans who were intermediate in their responses, showcasing the dual influence of the two cultural dimensions in an individual's attention and cognitive formation. (pp. 653-684). Asian Americans' intermediate performance does not indicate an objective achievement, as they too are cognitively restricted by the dual cultural contexts. Regardless of cultural background, people cannot generate objective assessments as everyone is prone to overlook or dwell on different aspects of the same picture. Thus, high and low-context tendencies of allocating attention demonstrate that one's impression of objective reality is clearly influenced by cultural dimensions.

## Conclusion

While an objective reality exists independent of human perception, our understanding of it is fundamentally mediated by cognitive limitations, biological constraints, and cultural frameworks. Inattentional blindness and memory reconstruction work as the initial cognitive filters that prevents objectivity from existing in the mind, while the inactivity of pMFC and residual neural circuits reveal human neurological structures are incapable of producing reliably objective cognition, and cultural presupposition further limits objective assessments in the mind. What people perceive in our mind, as a result, is not raw objectivity, but rather the brain's most plausible reconstruction of it.

The lack of objectivity in the human mind is inevitable. While humans have the propensity to get closer to objectivity, exposing our mind completely to the sunlight outside Plato's cave faces numerous obstacles.

## References

Blumberg, M. S., & Dooley, J. C. (2017). Phantom limbs, neuroprosthetics, and the developmental origins of Embodiment. *Trends in Neurosciences*, *40*(10), 603–612. https://doi.org/10.1016/j.tins.2017.07.003

*Cambridge Dictionary | English Dictionary, Translations & Thesaurus*. (2025). https://dictionary.cambridge.org/

Fresco, N. (2021). INFORMATION, COGNITION, AND OBJECTIVITY. *American Philosophical Quarterly*, *58*(3), 251–268. https://doi.org/10.2307/48616059

Kassin, S. M., & Kiechel, K. L. (1996b). The social psychology of false confessions: Compliance, Internalization, and confabulation. *Psychological Science*, *7*(3), 125–128. https://doi.org/10.1111/j.1467-9280.1996.tb00344.x

Kappes, A., Harvey, A. H., Lohrenz, T., Montague, P. R., & Sharot, T. (2019). Confirmation bias in the utilization of others' opinion strength. *Nature Neuroscience*, *23*(1), 130–137. https://doi.org/10.1038/s41593-019-0549-2

Kreitz, C., Furley, P., Memmert, D., & Simons, D. J. (2015). Inattentional blindness and individual differences in cognitive abilities. *PLOS ONE*, *10*(8). https://doi.org/10.1371/journal.pone.0134675

Masuda, T., & Nisbett, R. E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, *81*(5), 922–934. https://doi.org/10.1037//0022-3514.81.5.922

Nisbett, R. E., & Masuda, T. (2003). Culture and point of view. *Proceedings of the National Academy of Sciences of the United States of America*, *100*(19), 11163–11170. https://doi.org/10.1073/pnas.1934527100

Norenzayan, A., Smith, E. E., Kim, B. J., & Nisbett, R. E. (2002). Cultural preferences for formal versus Intuitive Reasoning. *Cognitive Science*, *26*(5), 653–684. https://doi.org/10.1207/s15516709cog2605_4

Ortiz-Catalan, M. (2018). The stochastic entanglement and Phantom Motor Execution hypotheses: A theoretical framework for the origin and treatment of Phantom Limb Pain. *Frontiers in Neurology*, *9*. https://doi.org/10.3389/fneur.2018.00748

Plato. (2007). *The Republic*. (D. Lee, Trans.; 2nd ed.). Penguin.

Pérez-Montoro, M. (2007). The phenomenon of information: a conceptual approach to information flow. *Choice Reviews Online*, *45*(04), 45–2081. https://doi.org/10.5860/choice.45-2081

Simons, D. J., & Chabris, C. F. (1999). Gorillas in our midst: Sustained inattentional blindness for dynamic events. *Perception*, *28*(9), 1059–1074. https://doi.org/10.1068/p2952

Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*(6), 643–662. https://doi.org/10.1037/h0054651

Tella, S. (1996). The High Context vs. Low Context Cultures. Tella, S. (Ed.) Two Cultures Coming Together. Part 3. Theory and Practice in Communicative Foreign Language Methodology. University of Helsinki Department of Teacher Education & University of Helsinki Vantaa Continuing Education Centre. Studia Paedagogica 10, 22–28.

Winawer, J., Witthoft, N., Frank, M. C., Wu, L., Wade, A. R., & Boroditsky, L. (2007). Russian blues reveal effects of language on color discrimination. *Proceedings of the National Academy of Sciences*, *104*(19), 7780–7785. https://doi.org/10.1073/pnas.0701644104

Zaliwski, A. S. (2011). Information – is it Subjective or Objective? *tripleC Communication Capitalism & Critique Open Access Journal for a Global Sustainable Information Society*, *9*(1), 77–92. https://doi.org/10.31269/triplec.v9i1.250