



# Perceiving the Link between Cognitive Science and Buddhism



Buddhism and the Cognitive Sciences have independently arrived at the same conception of perception.

## Change Blindness

Change blindness is the inability to detect large changes in a visual scene, due to an inadequate retention of details (1). This phenomenon has been shown to be highly pervasive both within and outside of lab settings.

- 0% of participants gazing at an image of two men wearing prominent hats noticed that the hats had swapped places, even when participants were informed that the image may change (2)
- When watching a modified film clip, 77% of participants did not notice that a central actor had been replaced (3)
- 67% of university students did not notice that a stranger, with whom the participants had been discussing directions, had been replaced with an individual wearing different clothing (4)
- The phenomenon of change “blindness” extends beyond the sense modality of vision. In the auditory domain, it has been experimentally demonstrated that 60% of individuals cannot correctly determine the changing auditory stimulus among six sounds (5)

Thus, across modalities and settings it has been reliably shown that perception is impoverished when adequate details are not retained. This implies that if one were to deliberately sustain attention across multiple details in a visual scene one could reduce change blindness. By enhancing one’s sensitivity to change via active participation in perception one would begin to form more accurate representations, subsequently refining perception.



## Cognitive Science: Perception is a graded phenomenon contingent on an agent’s effort

Experiments demonstrating change blindness, inattention blindness, and perceptual biases indicate that automatic and non-deliberate perceptual processing results in perceptions that are out of touch with reality. By establishing passivity as the source of impoverished perception, these experiments imply that active perception is a means to resolving perceptual gaps. The Buddhist meditative practices of Samādhi, Sampajañña, and Viññāna are active perceiving practices that enable one to overcome the following sources of impoverished perceptions:

### Inattention Blindness

Inattention blindness refers to the complete failure to notice an unexpected object or event when focusing on another object or event, as a result of attentional rigidity (6). Whereas change blindness refers to a gap in perception at the level one is attending to, inattention blindness refers to a lack of perception concerning a level which is not immediately attended to. Like change blindness, inattention blindness has been established as a multi-modal phenomenon across settings.

- When focused on tracking a distinct object in an artificial environment, 75% of participants failed to notice an unexpected object that appeared in their fixation point (7)
- When attending to a video of basketball passes among a group of students, 73% of participants failed to notice a woman in a gorilla suit walk into the scene, beat her chest, and walk off (8)
- Inattention deafness: when focusing on a message being played in one ear, 71% of participants failed to notice that the message in the opposite ear was played backwards (9)

Thus, across senses and environments, the perceptual deficit induced by rigid focus on stimuli has been reliably demonstrated. This data implies that if one were more proficient at deliberately flipping between levels of attention, he or she would be less susceptible to inattention blindness. Active attentional directing, then, would afford a more multi-dimensional representation of the environment and thus refine one’s perception.

## Perceptual Biases

Perceptual biases are systematic errors in perception caused by reliance on heuristics – general principals which reduce the complexity of judgement tasks to a set of simple operations (10). Because heuristics are not applicable cross-contextually, and because they are employed automatically, they inevitably distort the accuracy of perceptual experiences.

- Judgments concerning ambiguous images tend to be directed by preferences (11), readily accessible concepts (12) and environmental regularities (13).
- Judgments concerning the incline of slopes seem to be guided by physiological conditions, as hills appear steeper for tired, elderly, unfit, and unhealthy people, as well as people wearing a heavy load (14)
- Judgments concerning the severity of a threat are influenced by the self-relevance of said threat, as individuals who tend to fear heights perceive ledges as taller than people with less fear (15)

Because biases skew actual perceptual information, biases corrupt the accuracy of perception. This implies that if one were to deliberately prevent automatic heuristic processing, subsequent biases would be prevented, and perception would be refined.



## Samādhi

Samādhi refers to the practice of deliberately sustaining attention on an object or a scene.

- To practice samādhi is to be like an air traffic controller closely monitoring a runway
- Training such sustained attention enables meditators to focus on more details of a scene at once, thereby increasing their ability to detect change:
- Regular meditators detect more changes than non-meditators on change blindness tasks, and meditators detected changes more quickly than non-meditators on these same tasks (16)

Thus, the deliberate practice of samādhi increases one’s capacity for sustained attention thereby enriching perceptual experience by detecting otherwise overlooked changes.

## Sampajañña

Sampajañña refers to the practice of being present of mind and vigilant of goings-on.

- To practice sampajañña is to “Be like a medieval knight walking weaponless in a forest of swords“ (17)
- Training such vigilance enables meditators to aptly switch between objects of focus, thereby decreasing the odds of overlooking stimuli:
- 42% of regular meditators noticed the unexpected stimulus in an inattention blindness task, compared to 23% of non-meditators (18)

Thus, deliberate practice of sampajañña decreases one’s attentional rigidity thereby enriching perceptual experience by providing a more detailed representation of the environment.

## Viññāna

Viññāna refers to the practice of deliberately interfering with automatic cognitive responses by taking note of reflexive thoughts rather than relying on them.

- To practice viññāna is to supervise your own mind, making note of both what impresses and the content of said impressions
- Training such metacognition affords resistance to automatic processing thereby undermining perceptual biases:
- Regular meditators significantly outperform non-meditators on the Stroop task, indicating that the normal bias to name visible colors rather than read color words is overcome (19)

Thus, deliberate practice of viññāna increases one’s resistance to perceptual biases thereby enriching perceptual experience by affording a more accurate representation

## Conclusion

- Both Buddhism and Cognitive Science regard perception as a process that can be refined via deliberate action
- Because both groups have independently arrived at the same model of perception, and because Buddhist practices can verify active-perception hypotheses, both groups can co-develop:
- The rich collection of meditative methods found across Buddhist schools provide a large set of active perceiving practices which can be used in experimentation in order to uncover a more nuanced model of perception in the cognitive sciences
- Uncovering a more nuanced model of perception could foster new techniques for perceptual refinement that could be utilized by meditators to cultivate insight into reality and subsequent well-being

## Buddhism: Perceptual synchronization with the environment is attained and maintained deliberately

Meditation is a central element in Buddhism used as a means of attaining insight into reality to ultimately cultivate wisdom and undermine suffering (20). The oldest and most pervasive Buddhist meditative practice, Vipassana (or mindfulness) meditation, concerns focusing attention on the present moment while detecting and disengaging sporadic thoughts in order to experience the flow of consciousness with a clear and neutral mind (21). Vipassana meditation is comprised by three interconnected active practices which represent the inverse of the passive perceiving practices that result in change blindness, inattention blindness, and perceptual biases:

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