Meditation Alters Perceptual Rivalry in Tibetan Buddhist Monks

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1) To explore claims that training in meditation can lead to increased control and stability of mental processes.

2) To investigate whether this increased control and stability can be seen in the visual domain.
Binocular Rivalry
Binocular Rivalry
Motion Induced Blindness (MIB)
Low level/high level debate

- Some say rivalry involves multiple levels of competition and may share mechanisms involved in very general processes like attention and decision making.

- Other studies suggest that rivalry is resolved very early in the visual processes and is unlikely to be strongly influenced by attention.
One-point

“Sustained focus on a single object or thought, leading to the stability and clarity of mind required for development of introspective understanding and insight.”

Compassion

“Non-referential (no single point of attentional focus) contemplation on the suffering of others while radiating good will and compassion.”
Different types of meditation linked to distinct patterns of neural activity (Lehmann et al, 2001)

- “Focused” styles of meditation leads to increased activation of frontal regions of the cortex (Newberg et al, 2001)

- Compassion meditation linked to increased gamma-band synchronization across distributed neural regions (Lutz et al 2004)

Greater changes in neural activity is seen in meditators with the most experience (Lutz et al 2004)
Buddhist monks were tested at 4 monasteries in Northern India.

Meditation - introduction

Meditation -- introduction

Buddhist monks were tested at 4 monasteries in Northern India.

Jammu & Kashmir

Samstanling Monastery

Thiksey Monastery

Kotsang Monastery

Namgyal Monastery, Dharamsala

Thiksey Monastery, Ladakh
Binocular Rivalry

Virtual Reality
Head Mounted Display (HMD) Goggles

LEFT EYE

RIGHT EYE
**Methods**

76 monks (5-54 years training)

including 3 “retreates” meditators

- 23 monks tested on binocular rivalry

1\textsuperscript{st}) Familiarization

2\textsuperscript{nd}) Experimental conditions

- 1 non-meditation condition & 3 different viewing conditions

Rivalry during meditation (button-press & verbal report)

Rivalry after meditation (button-press & verbal report)

Rivalry during meditation (verbal report only)
Results – Switch Rate

Carter et al. (2005) Current Biology 15: R412-R413

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<th>Faster</th>
<th>Slower</th>
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<td>Compassion</td>
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<td>Rivalry during meditation</td>
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<td>*Button response = 0/16</td>
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Results – Switch Rate

Button response data from 1 subject

No meditation (‘pretest’)

After 5mins of one-point meditation

Carter et al. (2005) Current Biology 15: R412-R413
Results – Qualitative changes

Mixed / Transitional state

Proportion of monks (%)

More mixed
Less mixed
No change from non-meditation pretest

Compassion
Rivalry during meditation (n = 13*)
*Button response = 6/13

One point
Rivalry after meditation (n = 14*)
*Button response = 11/14

One point
Rivalry during meditation (n = 16*)
*Button response = 0/16

Qualitative changes

Proportion of monks (%)

No Meditation
Compassion during
One point after
One point during
Results - MIB

MIB mean disappearance time

Number of Individuals

Seconds

Non-meditators

Meditators

Carter et al. (2005) Current Biology 15: R412-R413
Summary

1) Meditation appears to slow/stop perceptual rivalry switching.

2) Effect is specific to focused style of one-point meditation.

3) Suggests a link between attention and binocular rivalry.

3) Supports introspective reports of monks that they are able to control and stabilize the contents of their minds.

4) Future studies are needed to confirm and explore these findings in more detail.
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