A Controlled Study of the Effects of *mahāprāṇa* and green Meditation Components of *Prekshā Dhyān* in College Students

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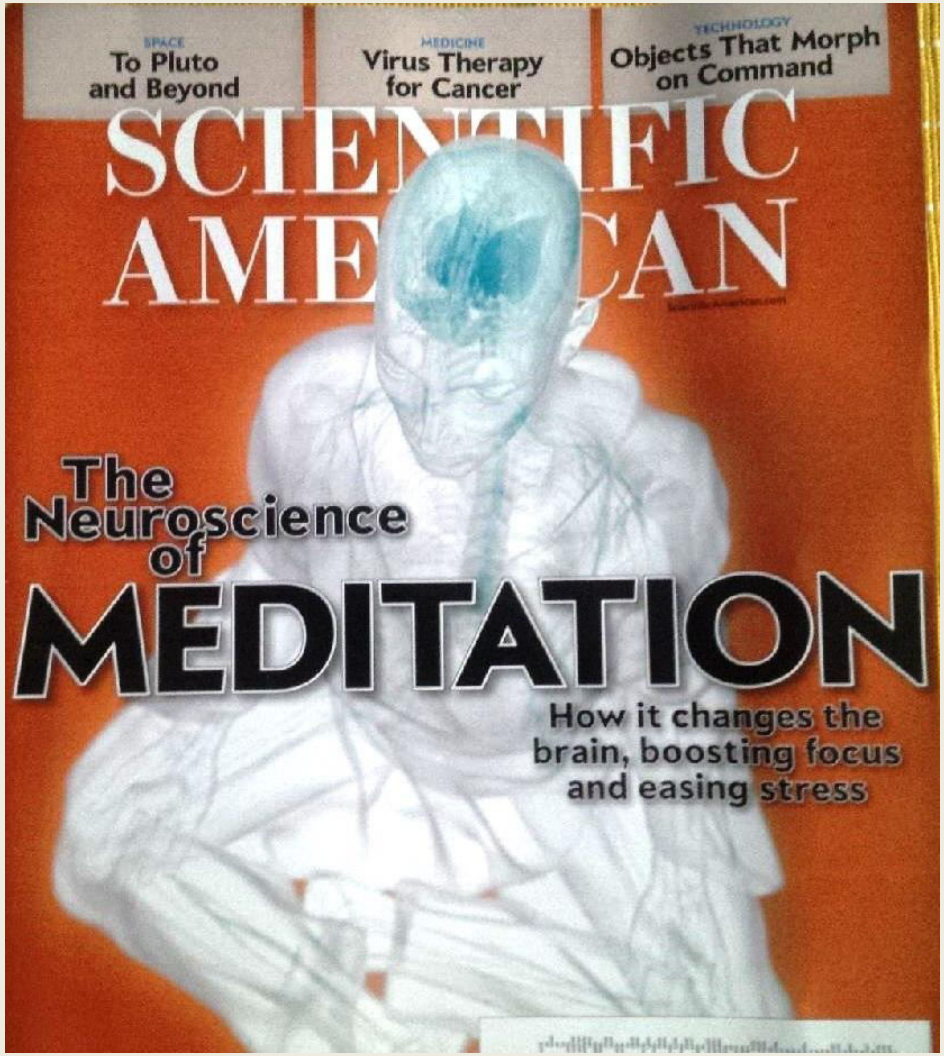
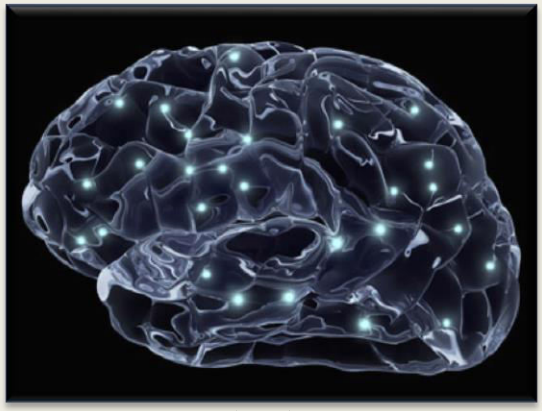

SPACE
To Pluto and Beyond
MEDICINE
Virus Therapy for Cancer
TECHNOLOGY
Objects That Morph on Command
SCIENTIFIC AMERICAN
The Neuroscience of
MEDITATION
How it changes the brain, boosting focus and easing stress

Influence:
Immediate modification of activity patterns
Neuroprostheses

Patterns of neural activity



Access:
Tap into endogenous activity patterns

Neurosignatures

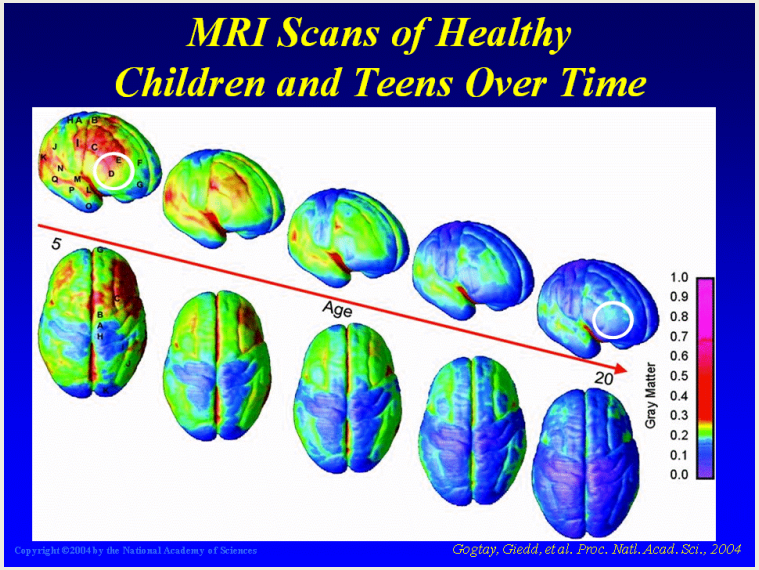
Plasticity:
Alter pattern formation mechanisms

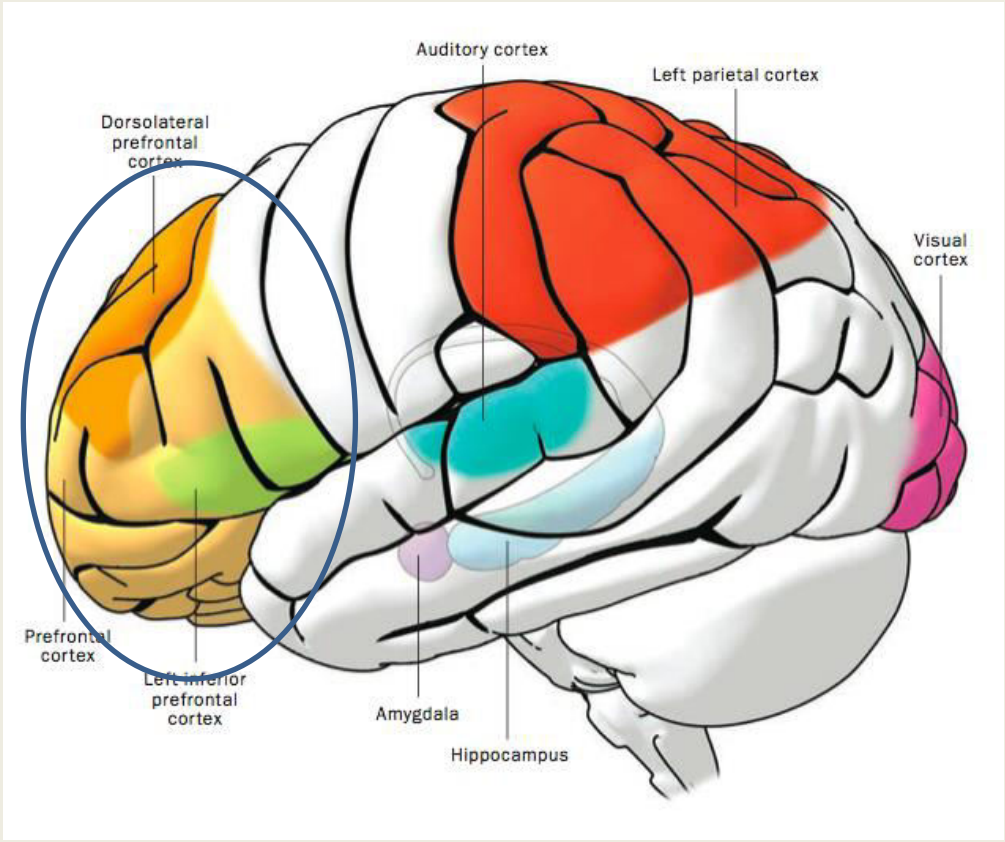
Neurotherapies

Focused Attention

Mindfulness

Compassion





Enhanced BOLD activity

Altered electrical activity patterns
In different frequency bands

Increased volume/fibers

Study Leaders

- Dr Devendra Mehta
- Dr. Naina Mehta
- Samani Unnata Pragya
- Ranu Jung
- Prof Ramprasaud Evadnie
- Arpit Mehta

Collaborative Team

Religious Studies

Psychology

Biomedical Engineering

Public Health

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- Noah DeLone, MD, BME
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Student Team

Semester	Students team		
2012 fall	Anoop Budhram	Desmond Johnie	
2013 Spring	Occeanna Marr	Gabriella Roman	Laura Anderson
2013 Fall	Kitiya Harris	John-Paul Watson	Nidia Rivera
2014 Spring	Stephanie	Jennifer Villatro	Parita Alwani & Neelam Mehta
2014 Fall	Stephanie Martinez	Parvin Uddin	Maria Venegas

Acknowledgements

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  - Jain Education and Research Foundation; Rajiv and Latika Jain
- Facility
  - FIU campus facility
  - Prof. Bennett Squartz for providing Lab

Intervention

Experimental group

- Mahapran Dhvani/ buzzing sound/ humming sound
- Leshya Dhyan (green Color)
- Hybrid

Control group

What is *mahāprāṇa dhvani?*

- Haribhadra suri has enumerated five kinds of yoga in Yogavinshika (Mahapragya, 1969, p. 4):
- *Sthāna-* proper posture
- *Ūrṇa-varṇa*: correct utterance of sound, hymns and japas etc.
- *Artha*: proper understanding of the meanings of the words like “eye”
- *Ālamabaa*: concentration on the image of a Tirthankar
- *Rahita*: concentration on his abstract attributes
  - Of these the first two are karmayoga and the rest three are gyanayoga.
    - *mahāprāṇa* is a karma yoga
    - It’s result orientation is Gyan yoga

Praṇav dhvani

- *Om*
- *Aum*
- *Arham*
- *Mahāprāṇa*
  - *(Muni Dharmesh, 35)*

- During 1985, *Jīvana Vijñāna* training started at Govt. high school at Jodhpur. Meditation session was started with 'Arham' sound. After few days some Muslims and Christians opposed that what are you teaching our children? Is this a kind of religious mantra? A meeting was called by *Mahā*prajña and discussed about this issue. Finally he told Alphabet M effects Hypothalamus which is good for students memory and consecration power. Since then *māhāprāṇa* sound become a part of *prekṣā* meditation. (Interview Munni Kiśanalāla :24-12-2013 by Samani Pratibha Pragya at Ladnun)

What is pranav?

- Based on *nu root word meaning – Eulogy of the soul*
  - Muni Dharmesh, 35

- Hemachandracharya:
  - For physical world practice mantra with praṇav
  - For spiritual without it
    - (Jain Tap, 35
      - Mahaprbhavi navasmaran granth

Dharma Dhyān?

- Dharma Dhyān is switching concentration on
  - Word, meaning, object

Is it Bhrāmari?

- Bhrāmari sound is similar
- Not Bhrāmari
  - Method differs
  - Bhrāmari is mudra in Gerand sanhitā
  - Bhrāmari is known as pranayam
    - *mahāprāṇa* is a blend of dhvani, mudra & breathing/ pranayama

Linguistic presentation of *mahāprāna*

- *mahāprāna* sound being non-alphabetical is *anakṡar shrut* (Nandi, 1997).
  - *Anakṡar* means which is a sound lacking any alphabets which confers that it is lacking any language or is beyond language.
  - The literature explicitly mentions that animal sounds can be both sounds *anakṡar* (linguistic) and *anakṡar* (non-linguistic). The *mahāprāna* sound is humming of a bee, could linguistic and a non-linguistic sound.

- Further it falls under the category of *uddāt, sanunasik* and *pluta.*
  - It is *uddāt*, as it is pronounced high
  - It is *sānunāsika* as it is nasal
  - It is extended sound hence *pluta*.
  - As per the Sanskrit grammarians, the nasal sound consists of the following traits: *samvāro, nādo and ghosha* (Chothamallah, 1982, pp. 6, verse 18).
    - Samvaro is a sound pronounced with closed mouth which is the case in *mahāprāna*.
    - Ghosha means vibrant sound also found in *mahāprāna*.

- Nāda
  - sound
- Not Nāda
  - Silence

- *Sunna-kala-joi-bindū, nādo, tārā-lao-lavo-matta*
- *Paya-siddhī paramajuyā jhāṇaī hunti cauvīsam* (dhyan Vicar, p.4)
- There are twenty four kinds of dhyāna as well mentioned (Namaskar Swadhyaya (Prakrit), p.225)
- Of those twelve are: meditation, shunya, kala, jyoti, bindu, naad, tara, laya, maatra, pada, and siddhi. Adding the word param to it makes it twenty four.

- As per Dhyān Vicar, By the recitation of prāna, an unheard sound resonates constantly. This is *nāda*. In every heart, this *nāda* resonates naturally which no one can obstruct (Maharaj, 1997, p. 68).
- *Nāda* is a natural sound, hence this can categorize as *nāda*

- Vaikhari, madhyama, pashyanti, para: these are the four types of speech.
  - All varna (letters) undividedly are present in the naad. Hence naad is key cause of the production of all letters. Hence looking into the cause and effect relationship, the naad are also called letters/ sound.
  - This journey is a journey of returning back. Sound is a power of retrieval where it returns from vaikhari to para state. The seat of naad is spine end. The naad from the spine end travels through the spine enters into the bramharandra (lotus center) penetrating through different chakras. This is invisible-very subtle sound called “akshar”.
  - As the sound travels, one escalates from one state to the state of para.
    - In the vaikahri sound, mantra and its meaning are significantly distant. In the state of madhyama, the two exist differently and unified. In the state of pashyanti, the duality of word and meaning is lost. In the state of para everything dissolves, one experiences full divinity. (p. 70).
  - Here we analyze that *māhāprāna* sound is a sound which does not have any word meaning tied to it. It is a natural sound. Hence we can assume, the process of escalation from vaikhari to para gets more feasible for the practitioner.
  - Though as long as sound persists, the state of para is not accomplished but the state of trance and thoughtless can surely be accomplishable goals through this.

Purpose

- Samatvamavalambyātha dhyānam yogī samāshrayet, Binā Samatvamārabdhe dhyāne svātmā vidambyate. (Hemachandracharya, 1989, p. 4.112).
  - *The yogis who would aspire after meditation, should first achieve equanimity and then meditate. If one tries to enter meditation without achieving equanimity the soul is unnecessarily tortured.*

- To meditate, mind needs to be quite.
- The control of mind (manogupti) has three stages (Mahapragya, 1969, p. 29):
  - free from fantasy
  - fixed in the state of equanimity
  - absorbed in the soul.

  - When one is guided through the buzzing sound, the effort is to retrieve the mind from the worldly roller-coaster and in tuned into the sound waves. This perpetrates equanimity, a state of poise.
  - In any mantra or word meditation, the escalation and control of *Nāda* is most crucial. As this control of *Nāda* renders ease in accomplishing a state of thoughtlessness (Maharaj, 1997, p. 68).

Purpose

1. Pranav activates the vital energy, Lightsomeness in Mind, Concentration, Engrossment, Metal peace, Increased memory
2. Mental stress, migraine, insomnia, headache release
3. Melodious voice, clarity of voice, speech empowerment
4. Blood purifies, breath gets longer and appropriate
5. renders message to stomach muscles
6. Mahapran with mulbandh escalates the energy
   - Muni Dharmesh

Leshya Dhyan

- Leshyā dhyān
  - Color meditation
  - Green color for detox & bliss

Methodology

- Recruited students from FIU
- Emails
- Criteria:
  - Not regularly practicing meditation
  - No other meditation practices was allowed nor same meditation could be done more than designed
  - In person guided sessions were required

Subject enrollment

- Study recruited 108 students for 8 weeks

Preksha Meditation Research

- Five semesters
  - STUDENT RECORD
- 196 students enrolled
- 108 survived (continues)

Changes in Attention, Cognition, Memory, Affect, Pulmonary function and Brain activity after Mahapraan and color meditation in a controlled study of college students

Preksha Meditation (Preksha Dhyan- 1975)

Preksha Package

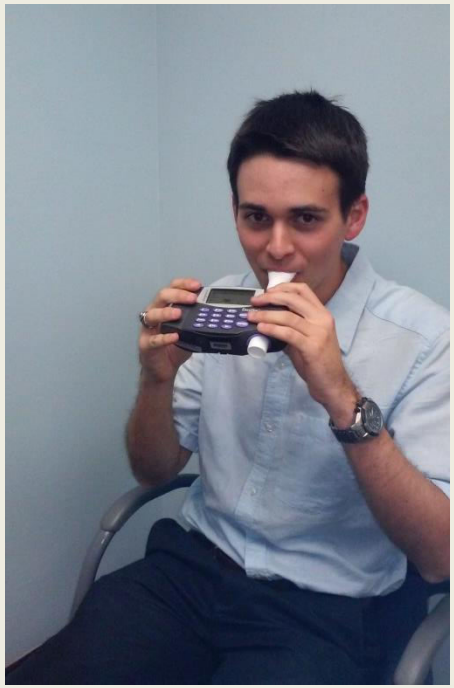
Kāyotsarg 6 mins

Focus

- Sound meditation-12 mins Buzzing
- Leshyā- 12 mins Green Color

Assessment

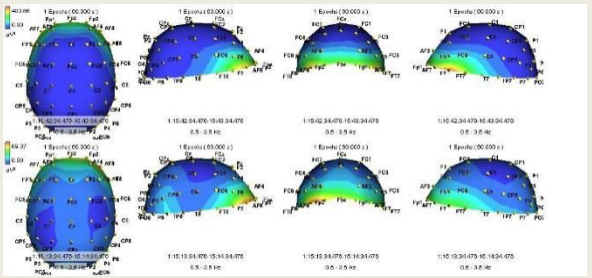
Pulmonary



Spirometry

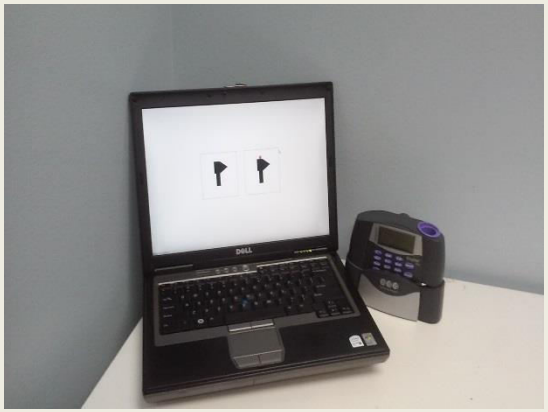
Buzzing test

Neural Assessment



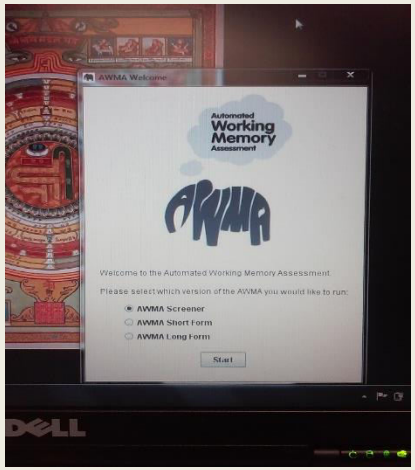
EEG

Cognitive



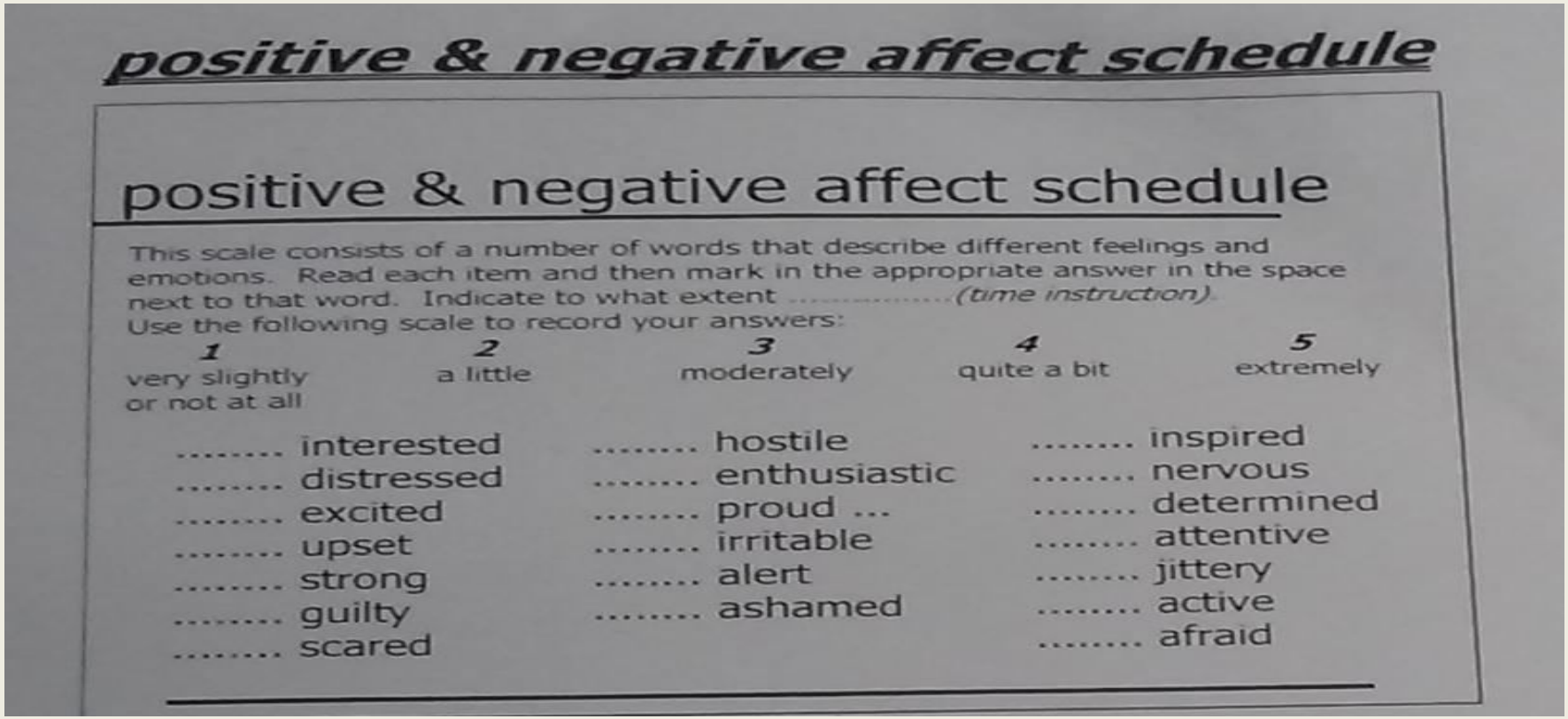
CPT-Cornor,

Working Memory



Happiness test

Happiness test



positive & negative affect schedule

positive & negative affect schedule

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark in the appropriate answer in the space next to that word. Indicate to what extent .....*(time instruction)*.
Use the following scale to record your answers:

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

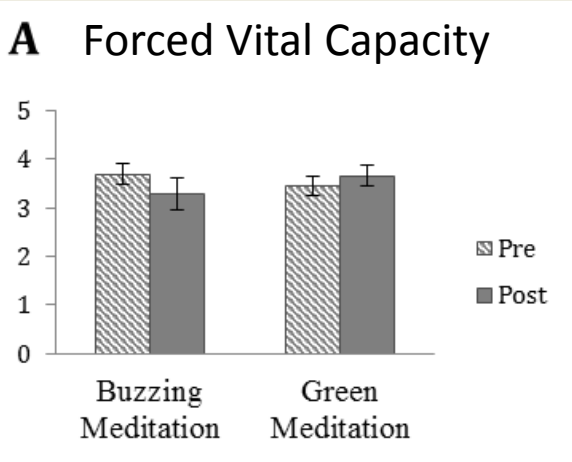
..... interested	..... hostile	..... inspired
..... distressed	..... enthusiastic	..... nervous
..... excited	..... proud ...	..... determined
..... upset	..... irritable	..... attentive
..... strong	..... alert	..... jittery
..... guilty	..... ashamed	..... active
..... scared		..... afraid

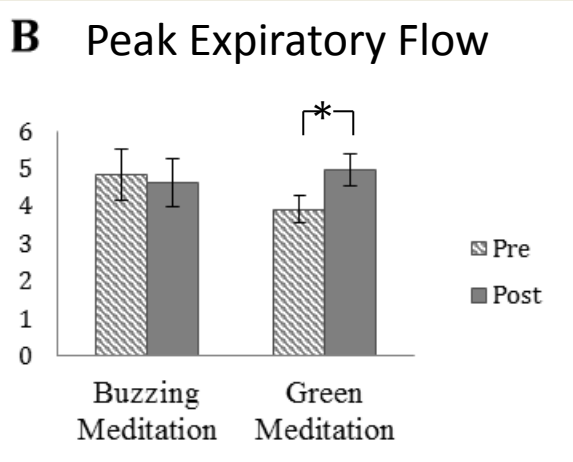
Study Design

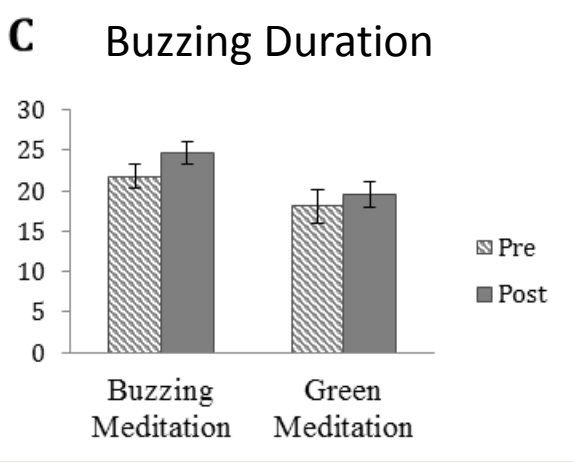
	Buzzing (13 subjects)	Green color (14 subjects)
Pre-Initiation	Pulmonary assessment	Pulmonary assessment
	Cognitive assessment	Cognitive assessment
1-29 Session	Buzzing training	Green color training
Session 29	EEG (4 of 13 subjects)	EEG (5 of 13 subjects)
Post-Study	Pulmonary assessment	Pulmonary assessment
	Cognitive assessment	Cognitive assessment

- 27 participants, 9 weeks, 29 sessions (conducted each week)
- 1-3 sessions 15 minutes of meditation
- 4-27 sessions – 20 minutes of meditation
- 28-29 session – 25 minutes of meditation

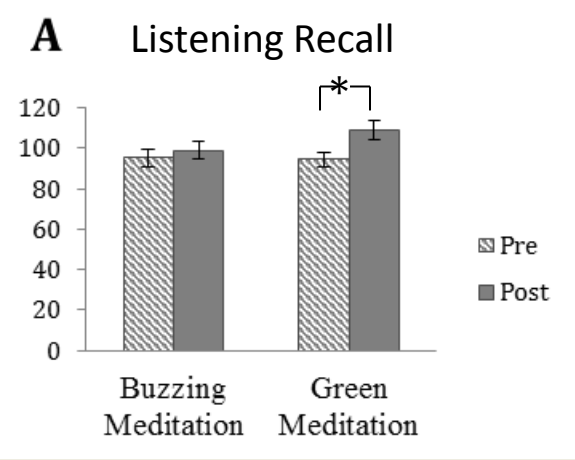
Pulmonary Assessment

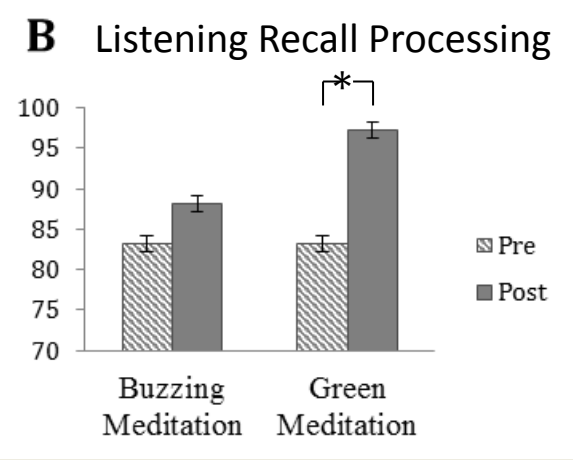


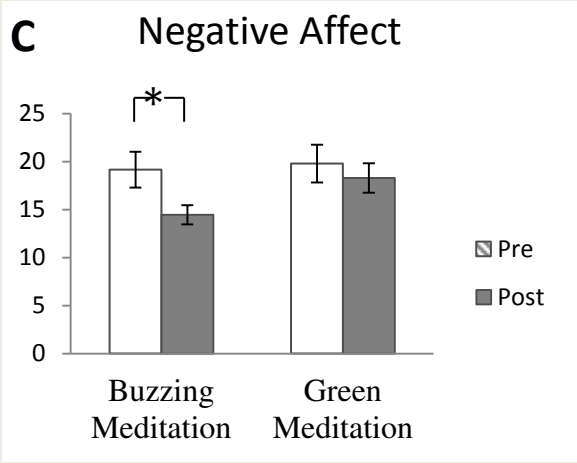


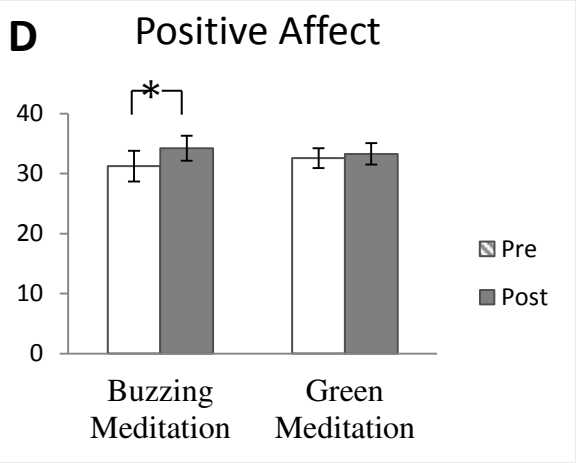


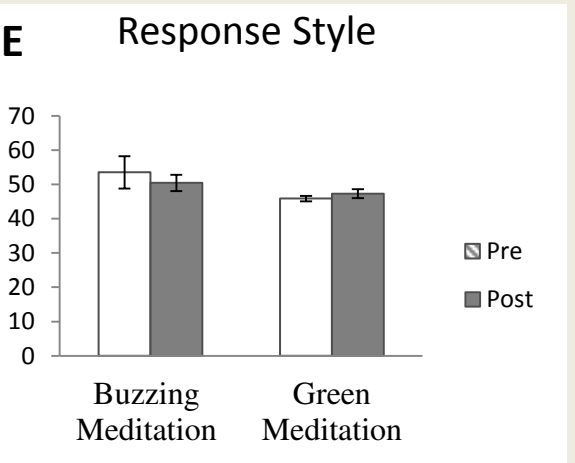
Cognitive Assessment







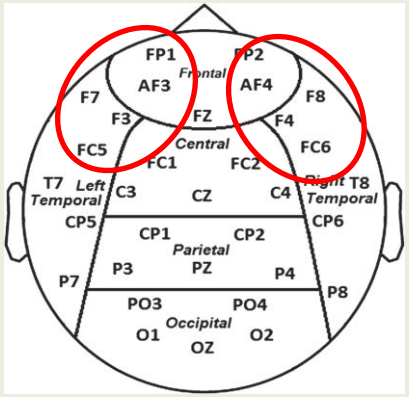




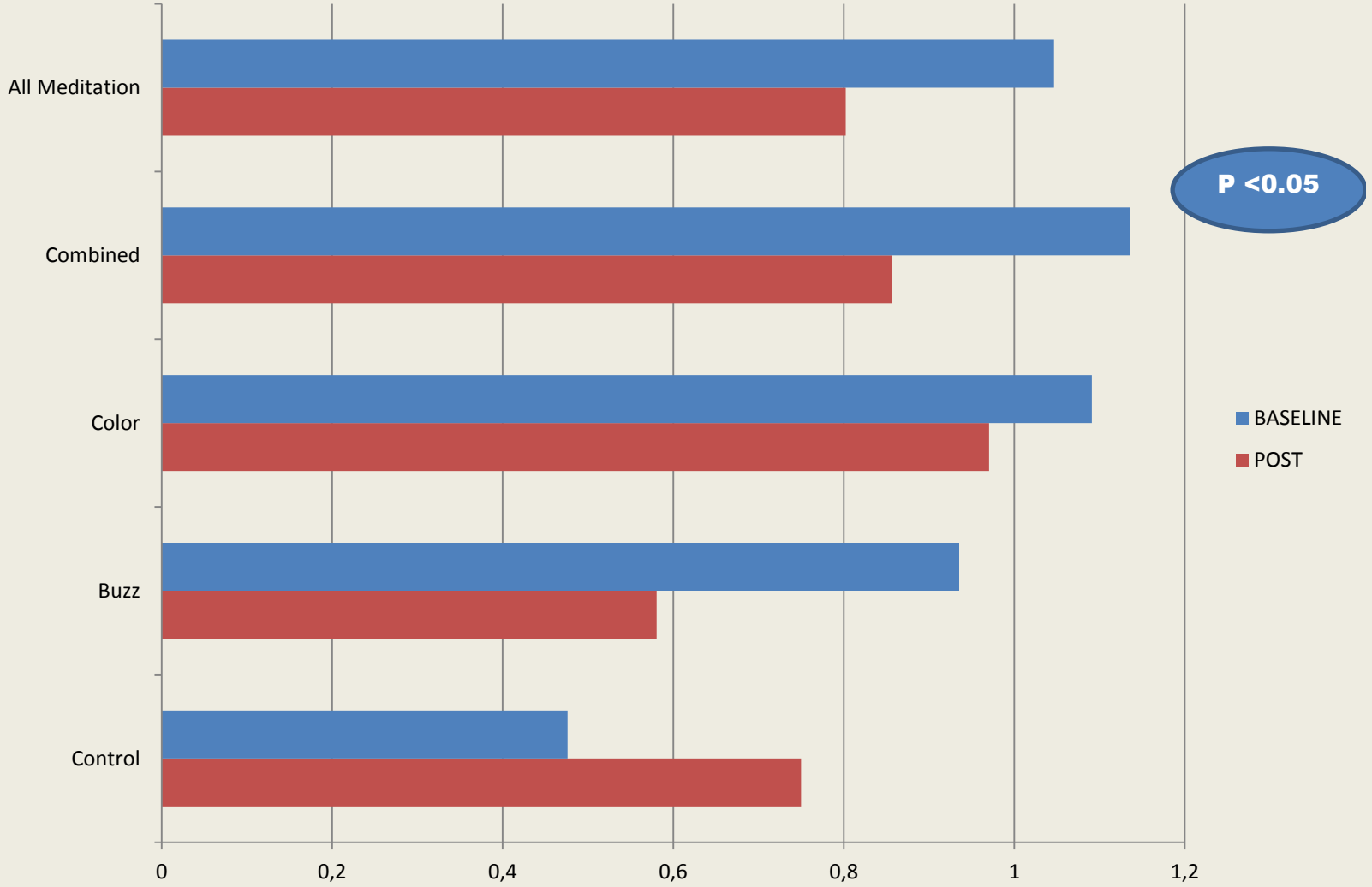
EEG

P-values		
Bands	Buzzing	Green
Delta (Deep sleep/relaxation)	0.114	0.508
Theta (Transition from wake to sleep)	0.878	0.646
Alpha (Internal attention)	0.022	0.508
Beta (Active concentration)	0.721	0.386
Gamma (Cortical plasticity)	0.721	0.959

- 1 minute , baseline, eyes-closed, no meditation
- 1 minute, end of study, eyes closed, last minute of meditation
- Spectral analysis for EEG from frontal and parts of temporal cortex areas; Calculation of power in different frequency bands

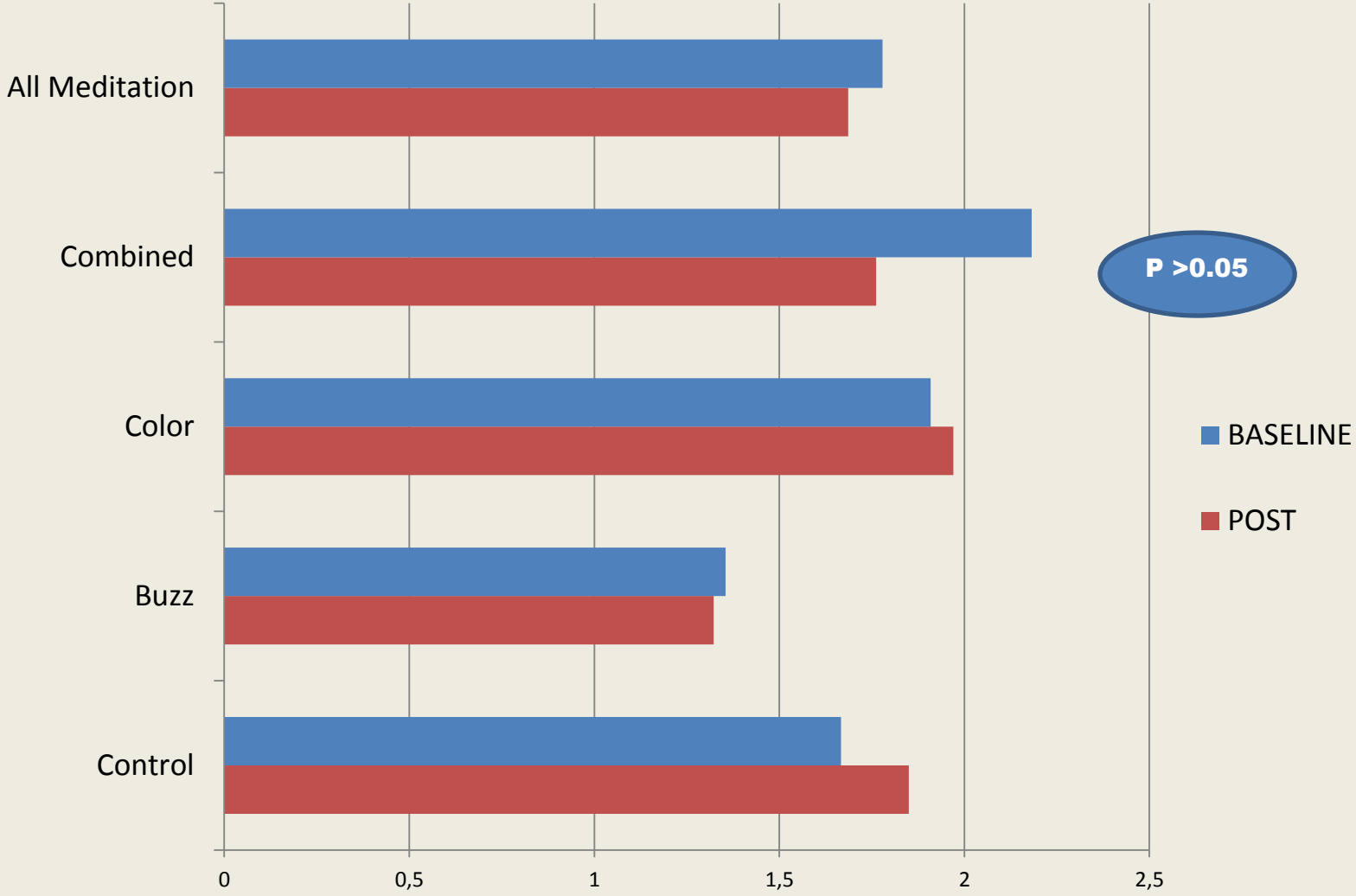


Impulsivity Score 108 subjects



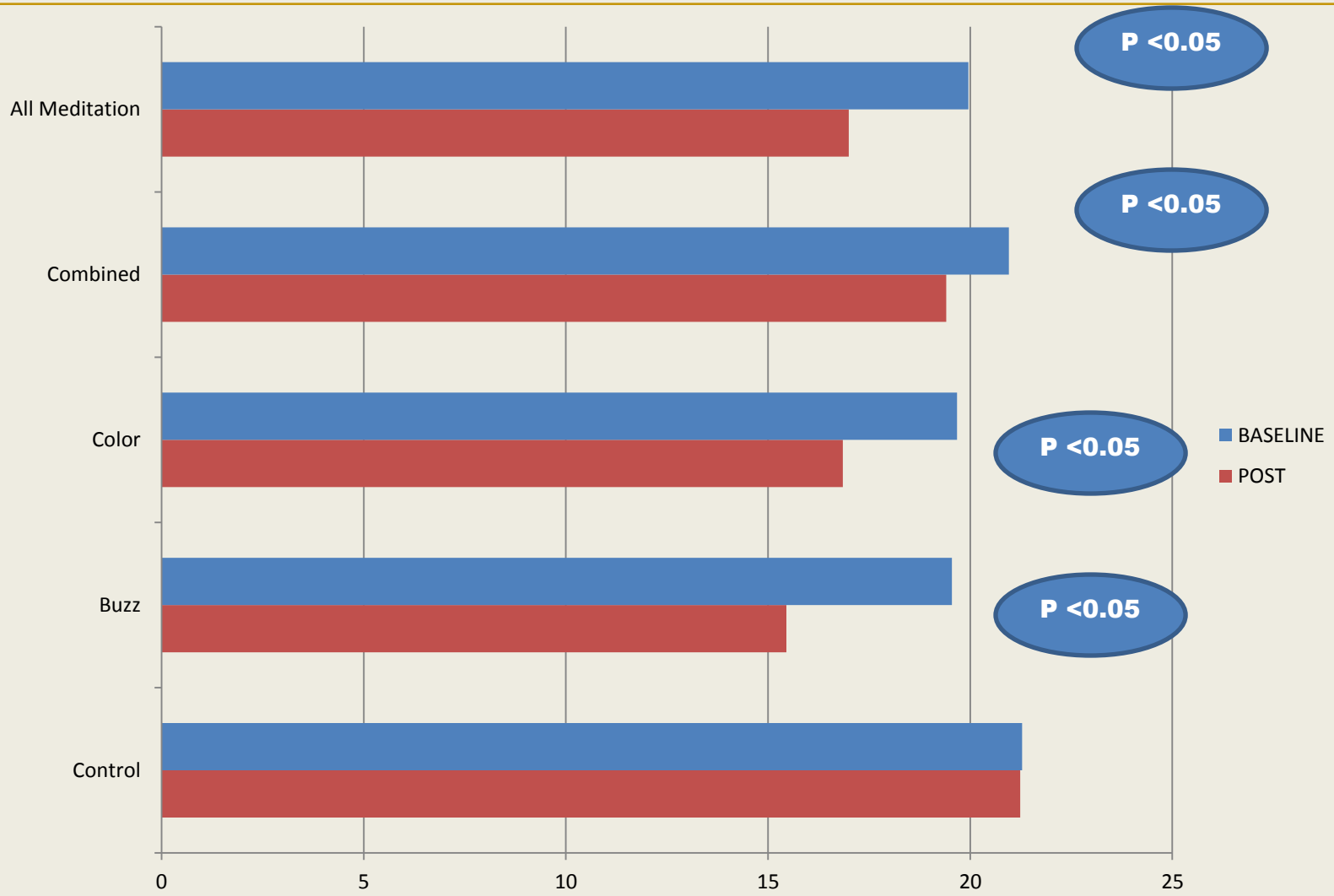
Inattention Score

108 subjects



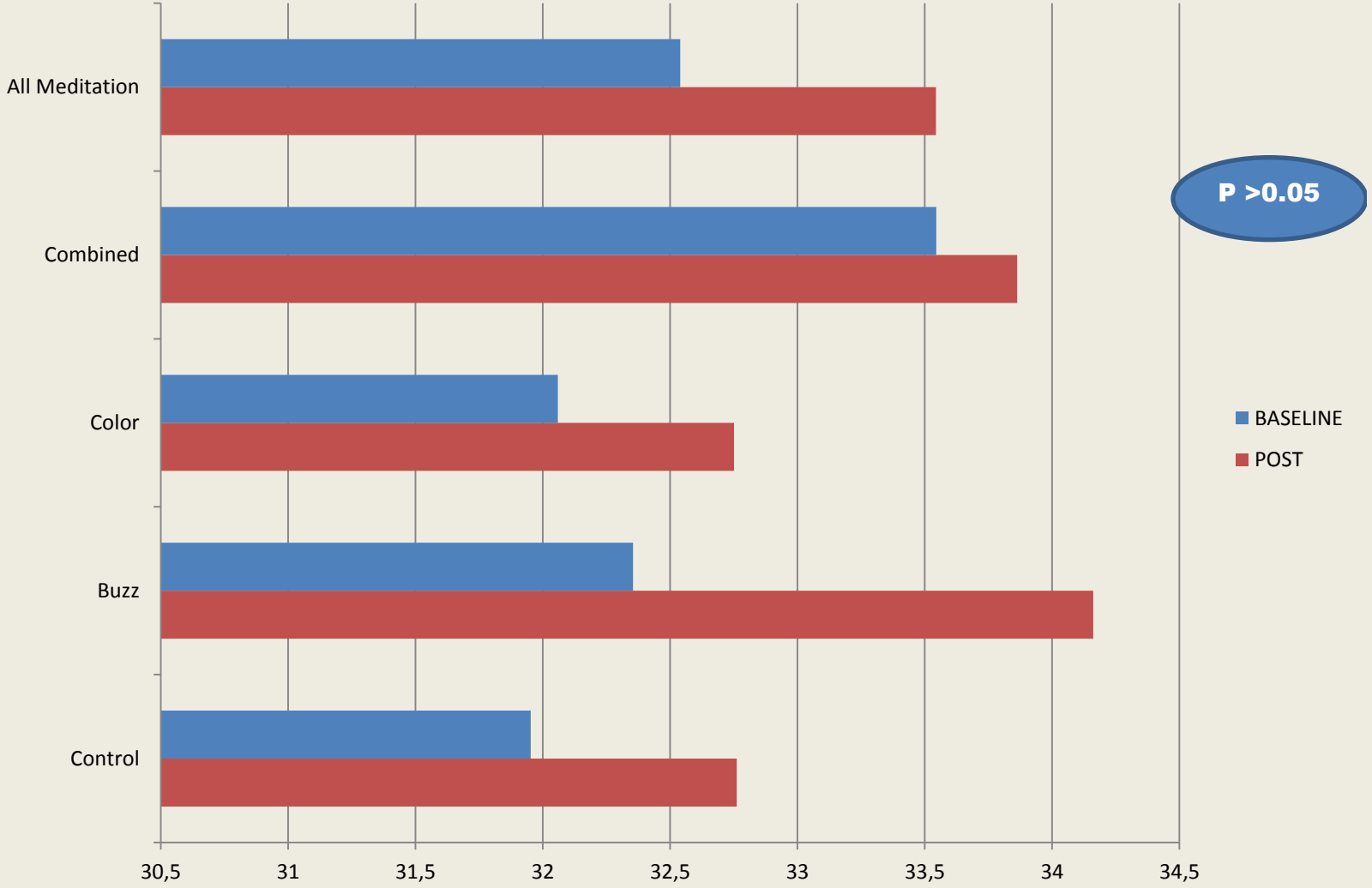
Negative Affect

108 subjects



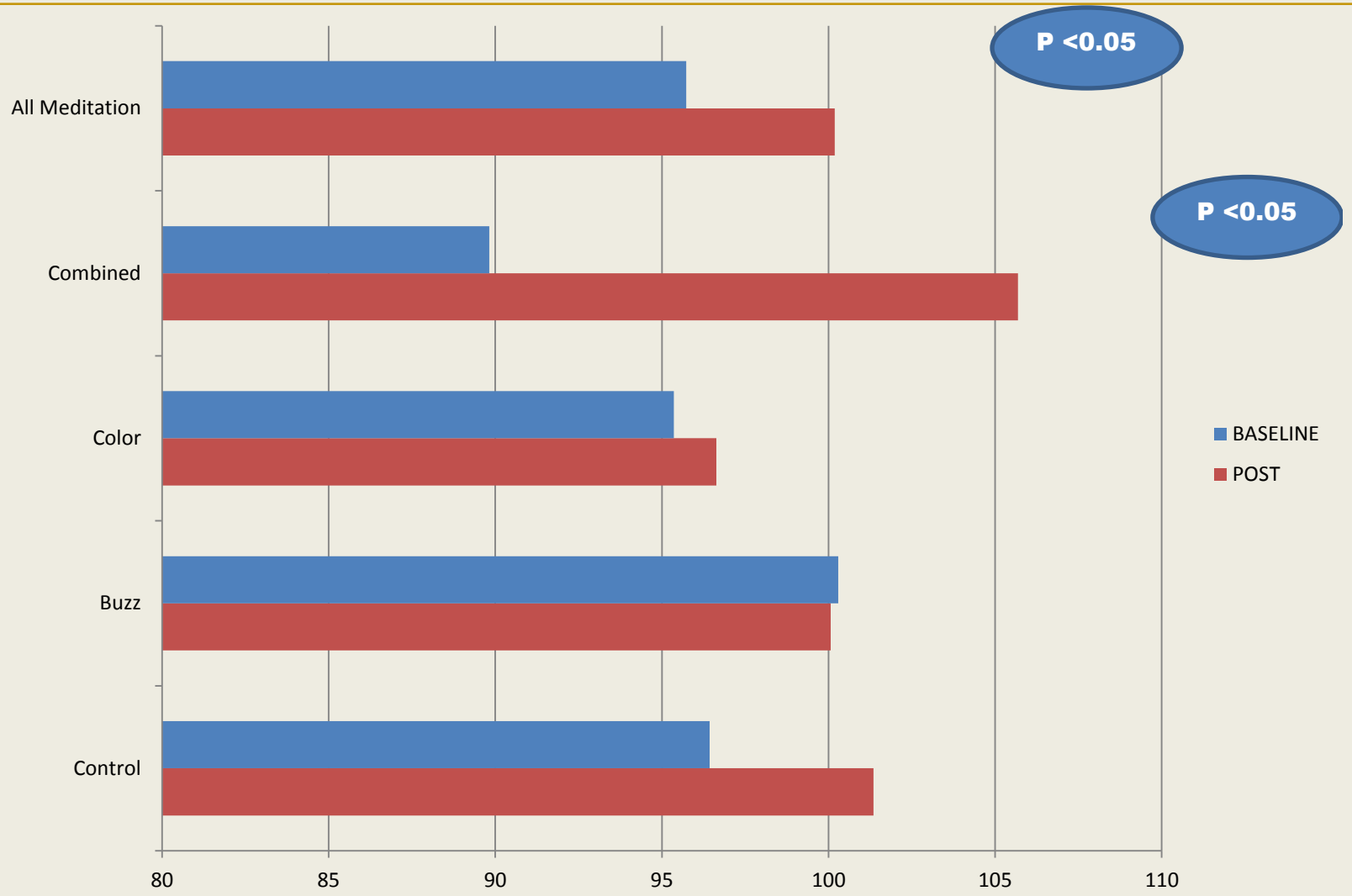
Positive Affect

108 subjects



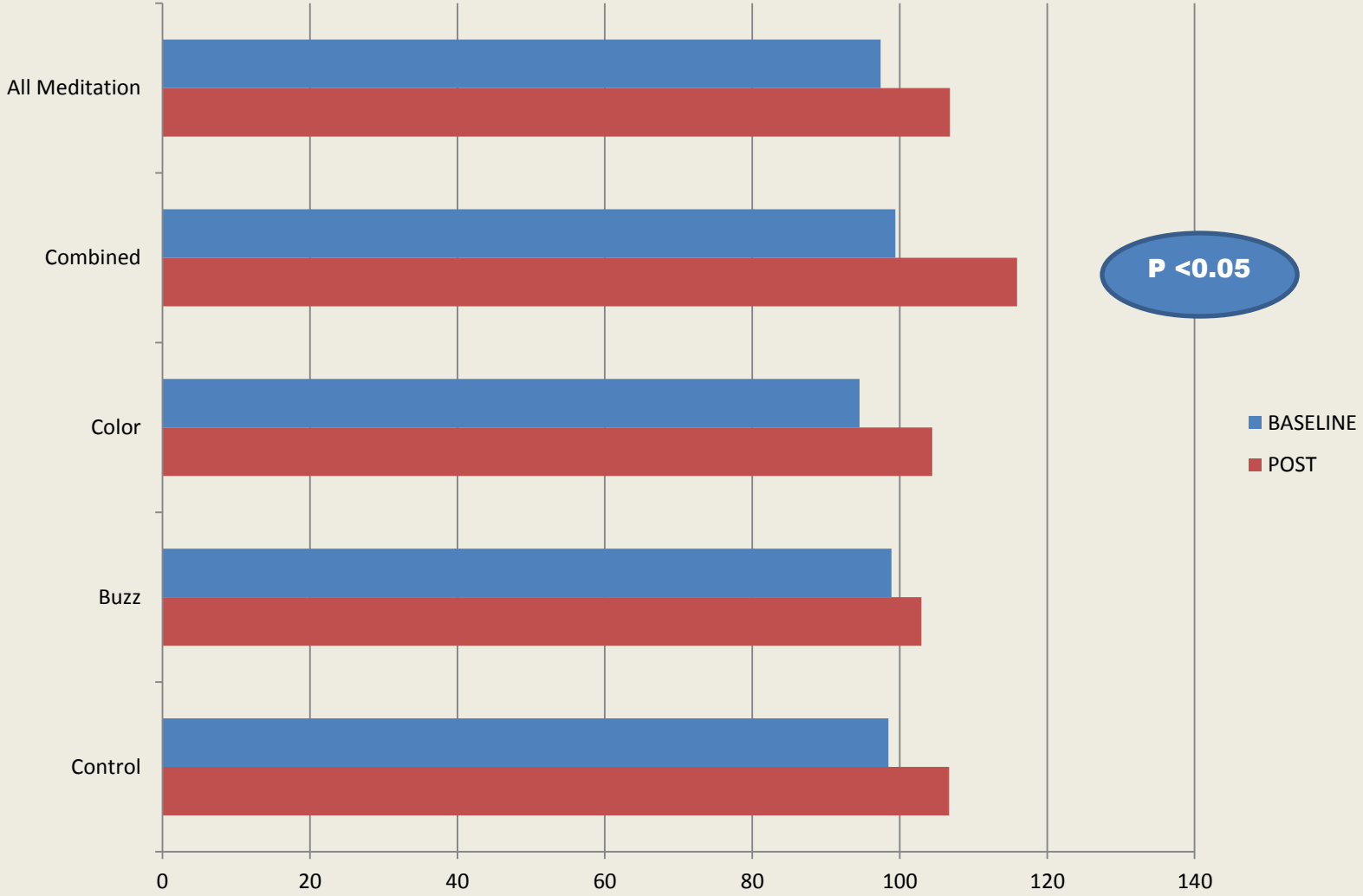
Digital Recall

108 subjects



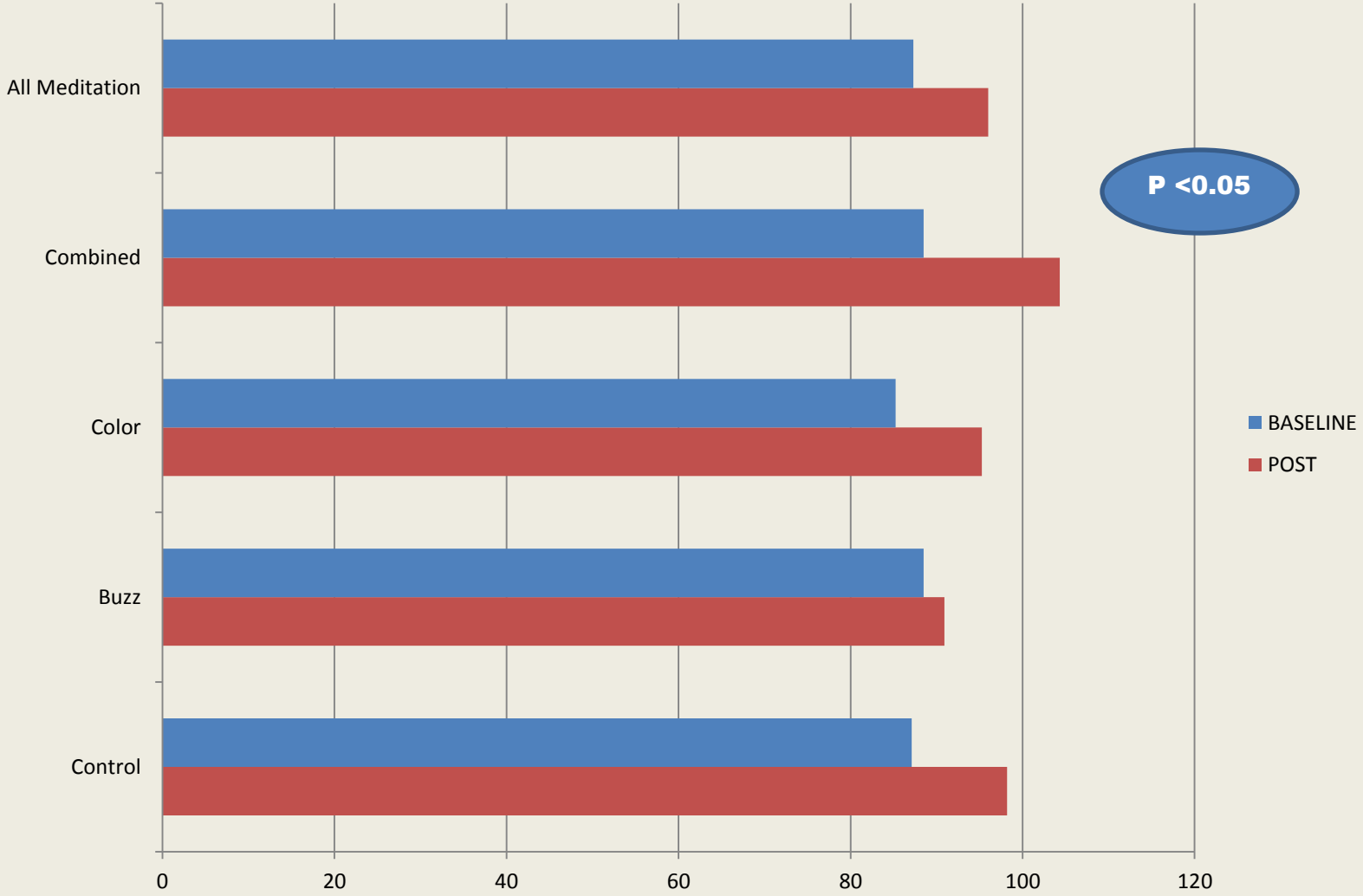
Listening Recall

108 subjects



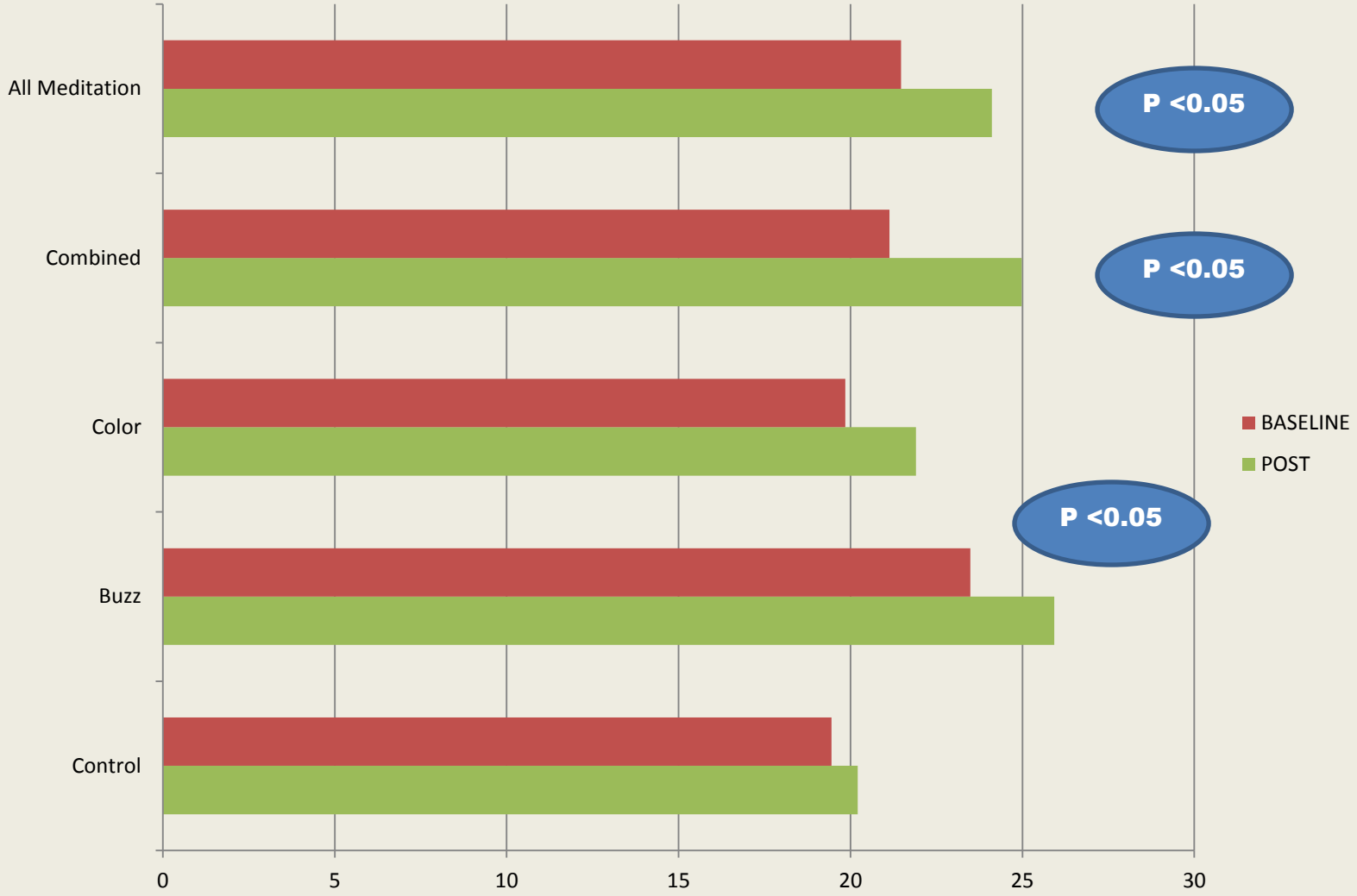
Listening Processing

108 subjects



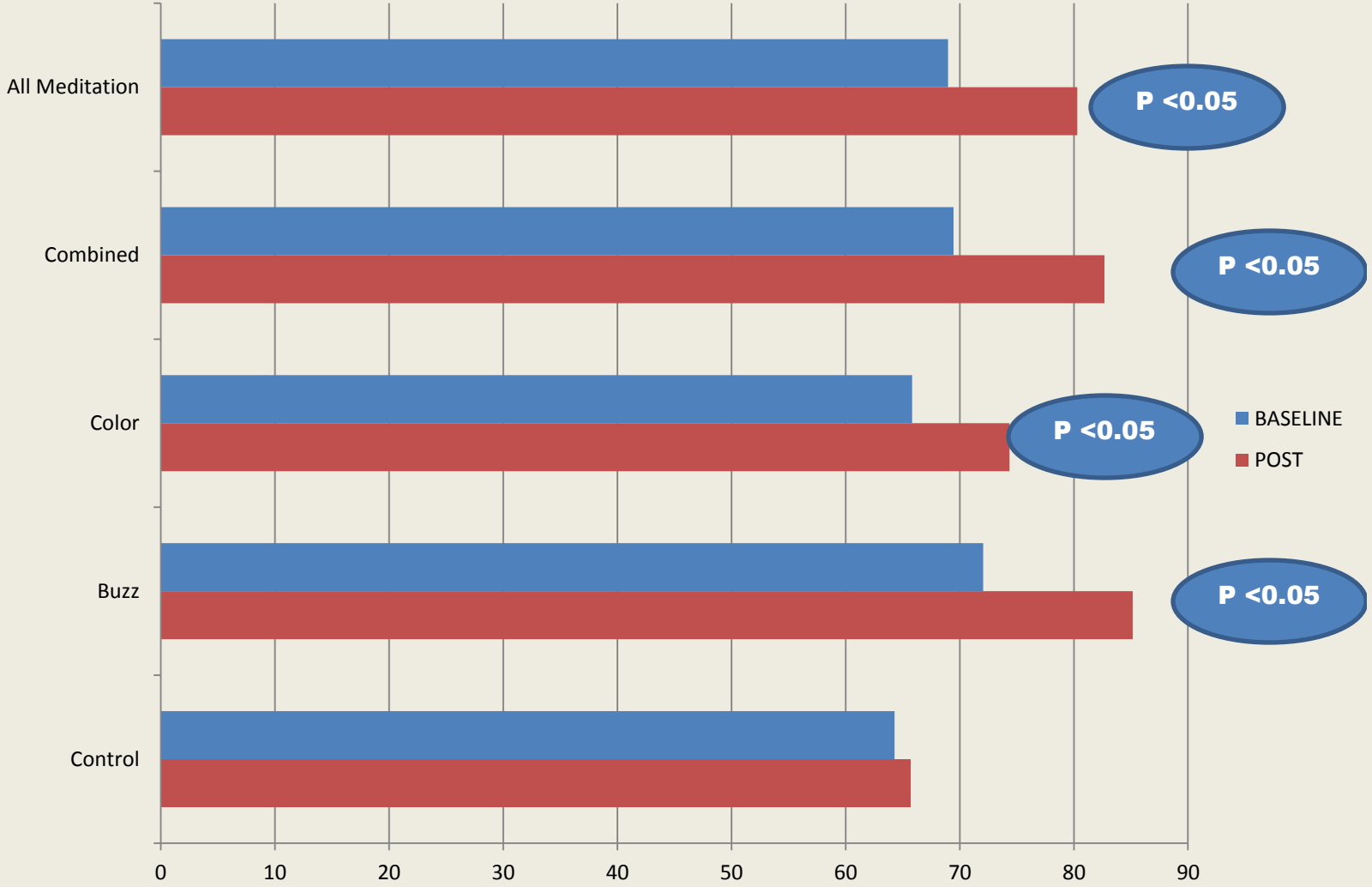
Maximum Duration of Buzzing in Seconds

108 subjects



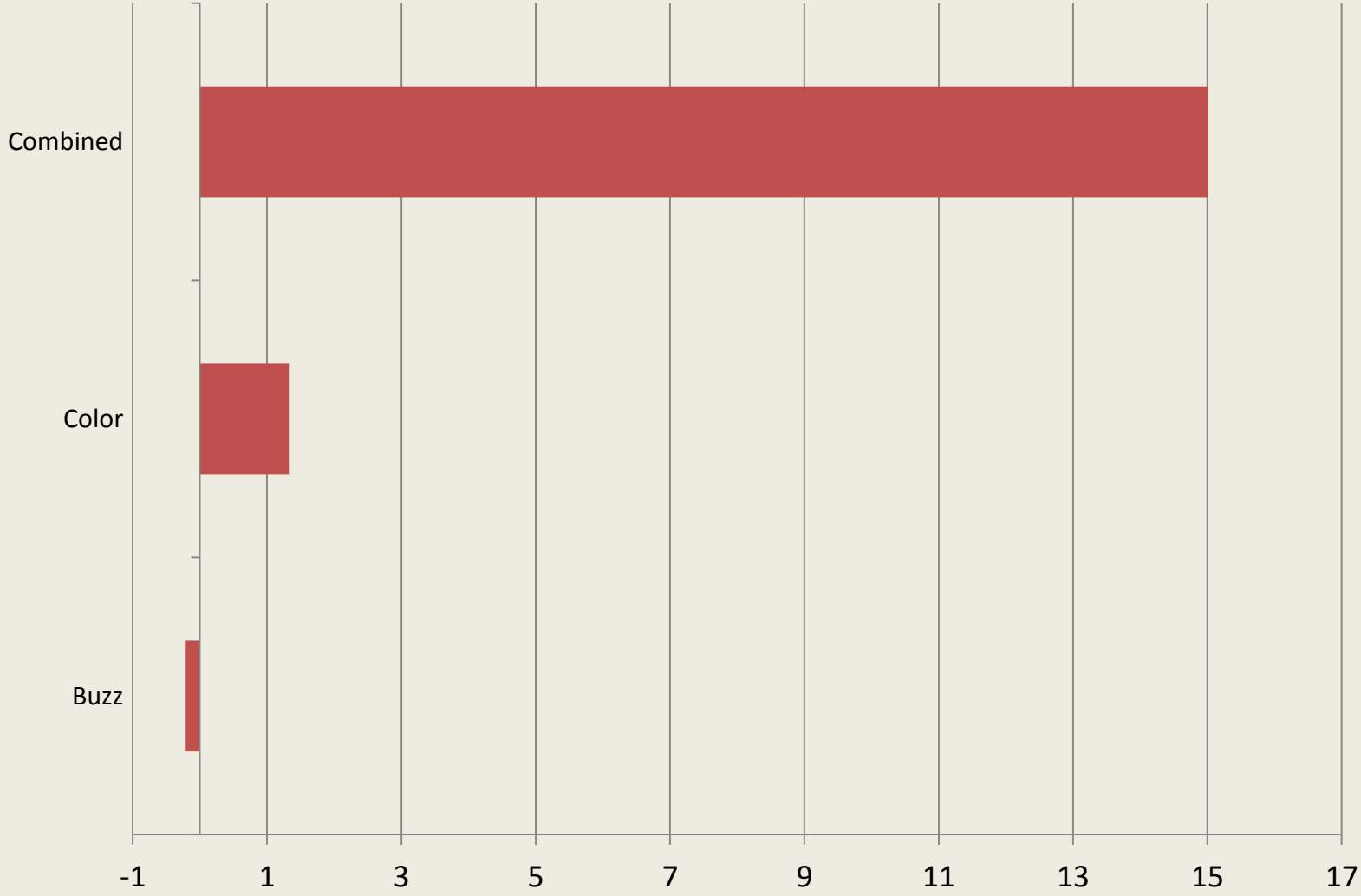
Peak Expiratory Flow Rate

108 subjects



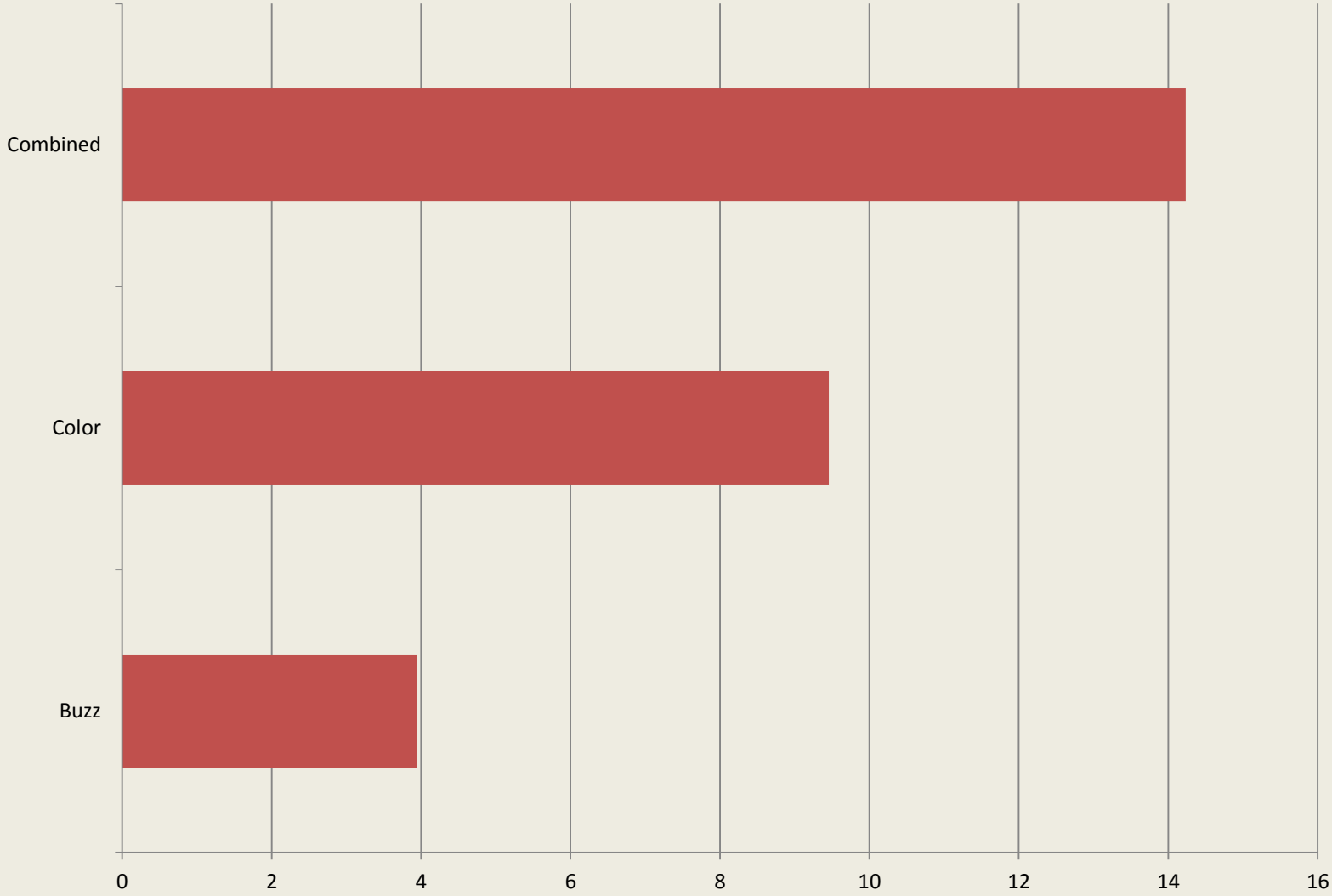
Increase in Digital Recall over Baseline in %

108 subjects



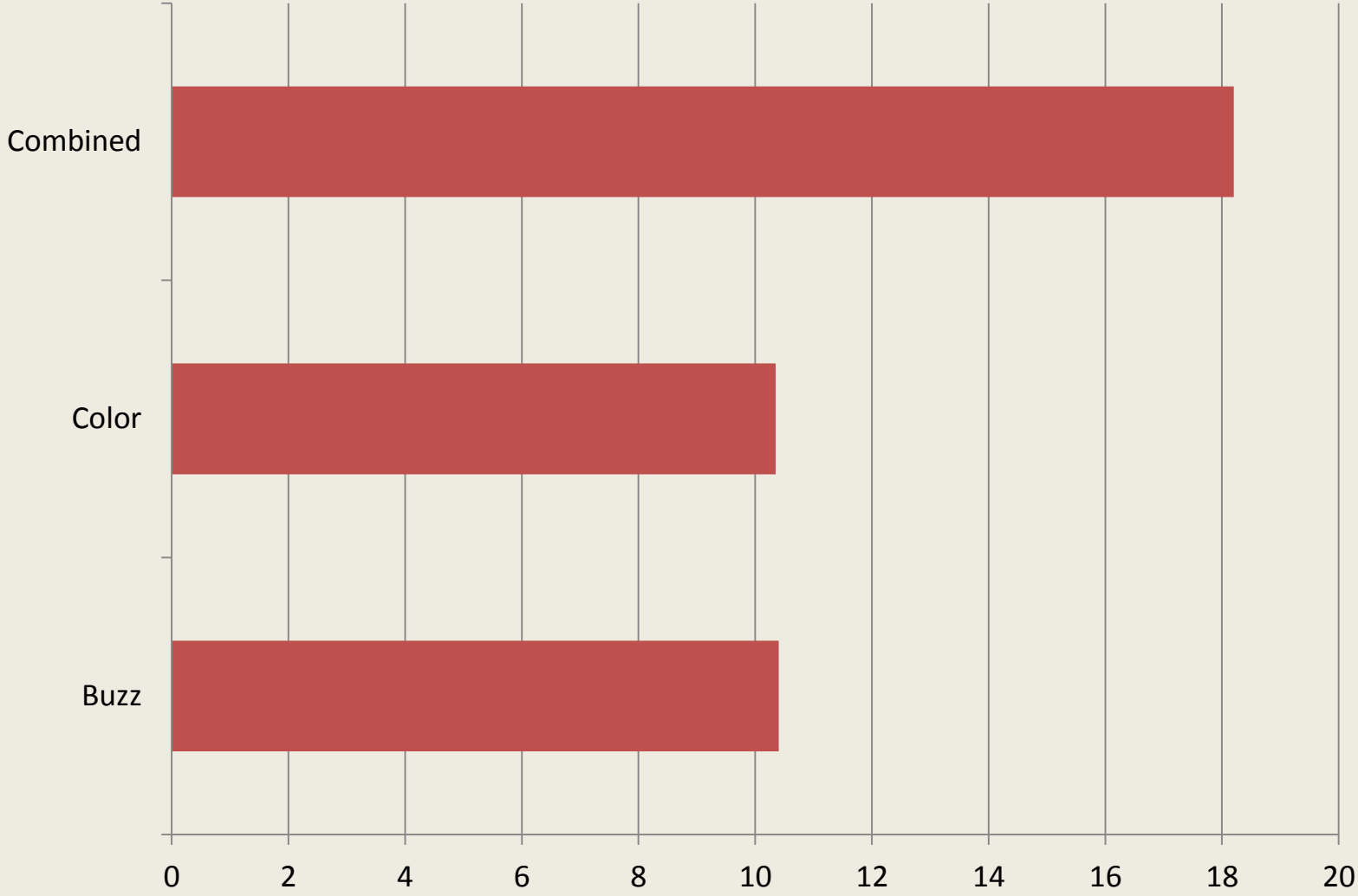
Improvement in Listening Recall from Baseline in %

108 subjects

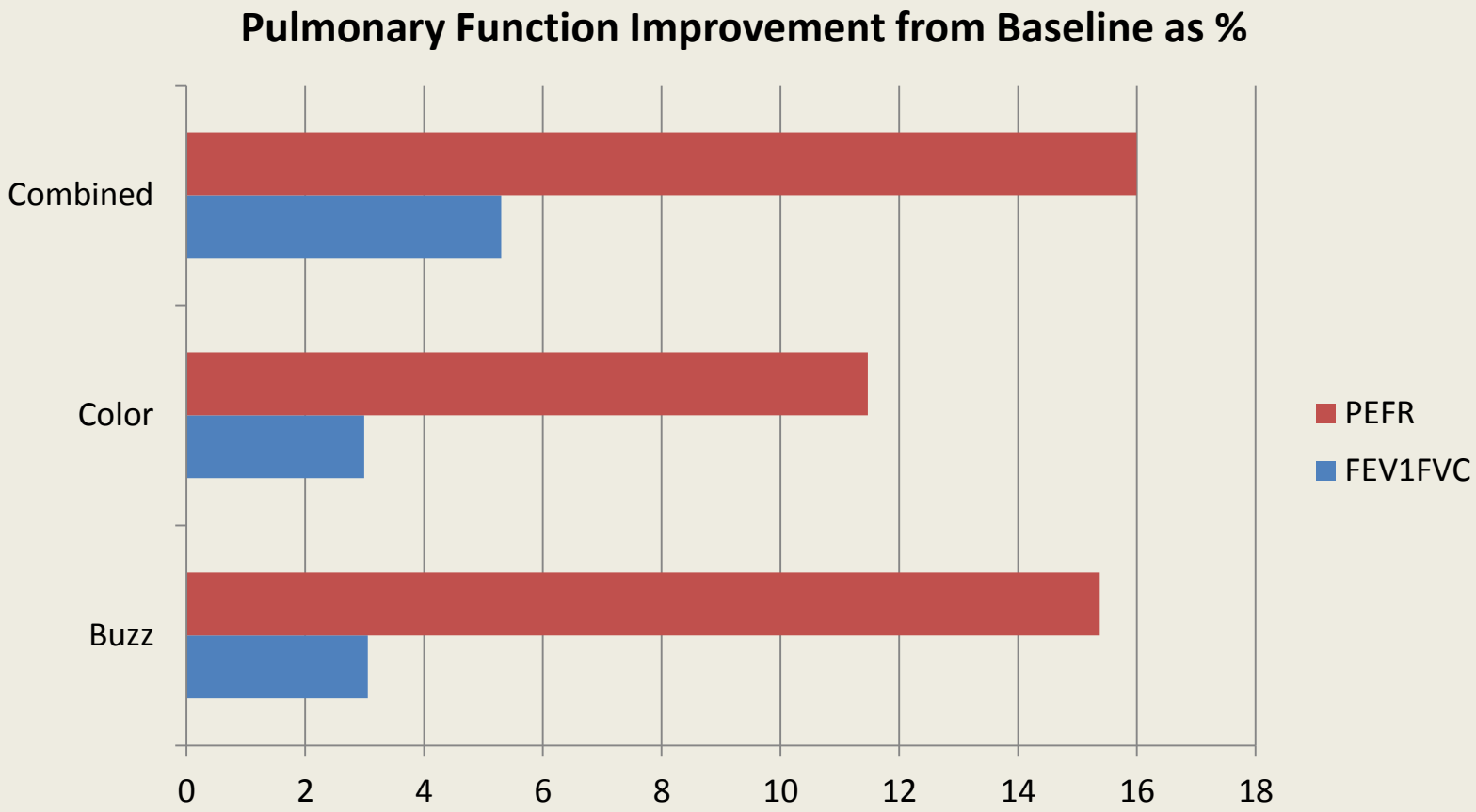


Increase in Length of Buzz from Baseline in %

108 subjects



108 subjects



Conclusion

- In a case –controlled study on 108 FIU students over 2 years, benefits of 30 minute sessions of Prekshya Dhyan at least twice a week showed significant benefits.
- We assessed impact of Mahapraan and Color Meditation alone and also when combined to assess additive effects

Inattention and Impulsivity

- Connor's Computerized Performance Test II:
  - Impulsivity improved significantly in those who practiced combined Mahapraan as well as Color meditation, compared with their baseline as well as controls. This was not seen in either Mahapraan or Color meditation groups alone.
  - Inattention improved in the Mahapraan only group though did not reach statistical significance

Digital and Listening Recall

- Digital recall (Verbal Short-Term memory) improved by 15% from baseline in the combined meditation group the most, though all meditation groups also improved statistically

- Listening recall (Verbal Working Memory) improved in the combined Meditation group by 15.5% over baseline, again more than other groups

Conclusion

- This suggests combining techniques of Mahapraan and Color Meditation has at least an additive effect on short term and working memory.
- Impulsivity also improved most when both techniques are combined.
- This is the first study assessing components of meditation in isolation and combined, and may offer further insight into mechanisms of effect

Conclusion

- All forms of meditation were associated with clinically important improvement in pulmonary function. However pulmonary function changes were not associated with cognitive, memory or affect improvements.
- This suggests benefits observed are independent of changes in pulmonary function.

Improvement based on Gender

- The results did not how significant difference between the male and female
- Yet the enrollment number itself did differ

Awaiting

- Epigenetic analysis

Summary

Remarkable improvement was seen in –

- Impulsivity
- commission of errors
- Digital and Language Recall, improved pulmonary function
- Less negativity was also seen.
- Combined meditation with Buzz and Color is better than either ones alone, suggesting an additive effect.
- Benefits were not related to improvement in Pulmonary function, suggesting an independent effect.