

Coaching with compassion alters neural mechanisms of stress processing

Jack AI, Boyatzis RE, Abou Zeki D, Passarelli A, Dawson AJ.

Dept. of Cognitive Sci., Brain, Mind, and Consciousness Lab. Weatherhead School of Management, Case Western Reserve University, Cleveland, OH



INTRODUCTION

An individual's perceived sense of social connectedness is now recognized as a key factor for both physical and mental health, and relates to an increased capacity for the individual to tolerate stress. The subgenual cingulate (sgACC) activity seems to mediate this coping response.

Sub-genual Anterior Cingulate Cortex (Brodmann area 25)

- Altruistic Decisions driven by Affiliative Feeling (Moll, 2006)
- Differentiating Valence of social feedback (Somerville, 2006)
- Empathetic Concern and Feeling of Attachment (Zahn, 2009)
- Processing basic and simple Reinforcers (Rolls, 2004)

Greater activation for both positive & negative emotional stimuli (Gotlib, 2005)

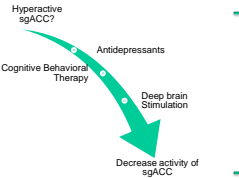
Attentional Processes regulating Cognition & Emotion (Bush, 2000)

Emotional Impact of Self-referential Judgment (+ve > -ve) (Moran, 2006)

Modulating Parasympathetic Responses (Eisenberger, 2011)

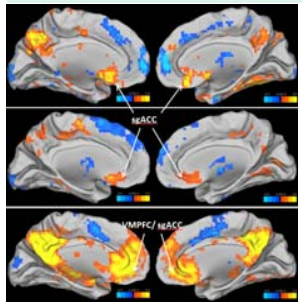
Central Role in Depression And Affective Disorders (Davidson, 2002)

"Junction Box" relaying input from limbic system, memory areas, & cortex **"HYPERACTIVITY"** implicated in **DEPRESSION** (Mayberg, 1999, 2003) and targeted by Deep Brain Stimulation (Mayberg, 2005)



- ✓ Down-regulating NEGATIVE Affect
- ✗ Persistent Blunted POSITIVE Affect (Treadway, 2007)
- ✗ Persistence of Anhedonia and psychomotor retardation in one third of patients (Pelliza, 2009)
- ✗ Relapse And Recurrence Rates Remain High (Vittengyl 2007)

Our prior studies clearly show that sgACC activity is associated with positive emotion in the context of our fMRI tasks.

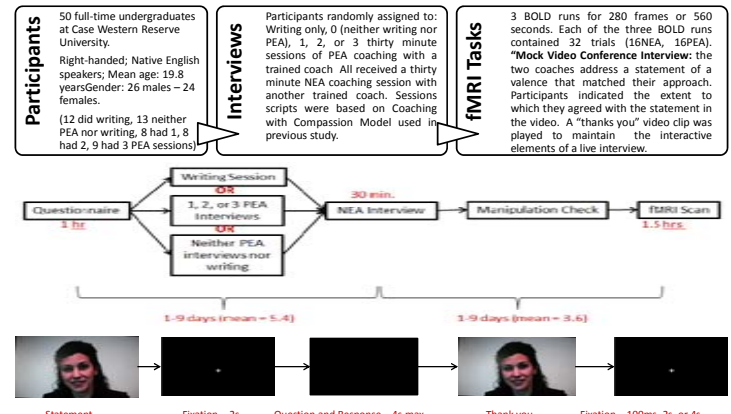


Increased activity in sgACC extending to Nucleus Accumbens associated with Positive Emotional Attractor (PEA) vs. Negative Emotional Attractor (NEA) conditions

Increased activity in sgACC in participants who underwent coaching toward a Positive Emotional Attractor (PEA)

Increased activity in this VMPFC for faces of families or friends compared to unfamiliar faces (fixed effects Familiar-Unfamiliar)

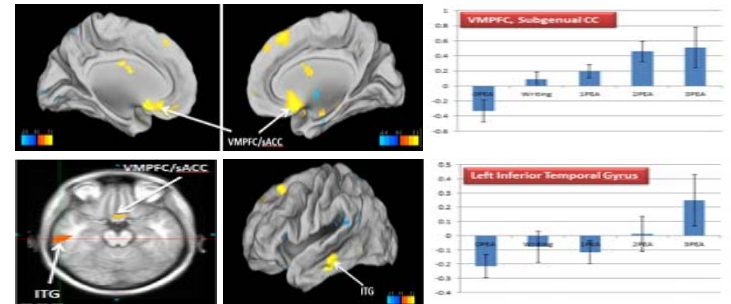
MATERIALS & METHODS



IMAGING RESULTS

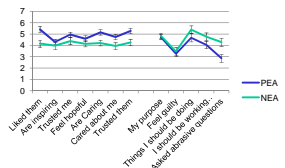
Whole brain analysis revealed 4 brain regions whose activities were significantly modulated by prior coaching sessions: sgACC, Inferior temporal gyrus & middle & superior frontal gyri.

We found a clear **DOSE-DEPENDENT EFFECT** of prior PEA coaching on sgACC response while participants were thinking about their life purpose.



Graphs for regions were created using estimates from the random effects analysis. The graphs depict average percent signal change over all participants according to number of PEA sessions received.

BEHAVIORAL RESULTS



The mean responses of all 13 questions asked on the post-interview questionnaire. Participants felt significantly more cared for by the likable and caring PEA coach and significantly considered the NEA coach's questions abusive. This confirms that the right corresponding valence of each coach's approach was transmitted to the participants, proving the interview scripts' efficacy.

1. I/he inspired me about my future.
2. I liked her/him.
3. I/he is an inspiring person.
4. I/he trusted me.
5. I/he made me feel hopeful about my experience at Case.
6. I/he is a caring person.
7. She cared about me.
8. I/he made me think about my purpose for being at Case.
9. I/he made me feel guilty about how much effort I am putting into my studies.
10. I/he is a caring person.
11. I/he made me think I should be working harder at Case.
12. I/he asked me questions about things I should be doing at Case regarding my studies.
13. I/he asked abusive questions.

Participants were asked to rate the degree of oneness they felt with each coach. Ratings were significantly higher for the PEA coach, suggesting a direct relation between the valence of the approach and the feeling of closeness.

DISCUSSION

These findings demonstrate that brief exposure to this social intervention directly affects the function of brain mechanisms responsible for positive emotion and healthy coping with stress.

This sgACC has been related to the individual's thinking of the far rather than the near future (D'Argembeau, 2008). This goes along with our findings since the elicited response was secondary to thoughts of career and future plans.

Extrapolating our results from healthy populations to clinical patients suffering from mood and anxiety disorders, we suggest that implementing coaching with compassion models in psychotherapeutic interventions can help alleviate symptoms by enhancing cognitive openness and dampening the sympathetic response and improving positive affect.



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This study examines whether sgACC activity (while thinking about life purpose) is modulated by our coaching with compassion intervention