

Self-Deception as Protective Emotion Regulation Strategy

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A dark blue diagonal gradient bar that starts from the bottom left and extends towards the top right, covering the lower half of the slide.

Defining Deception

Self-Deception: intentionally forming a belief that conflicts with another belief within an individual; denial

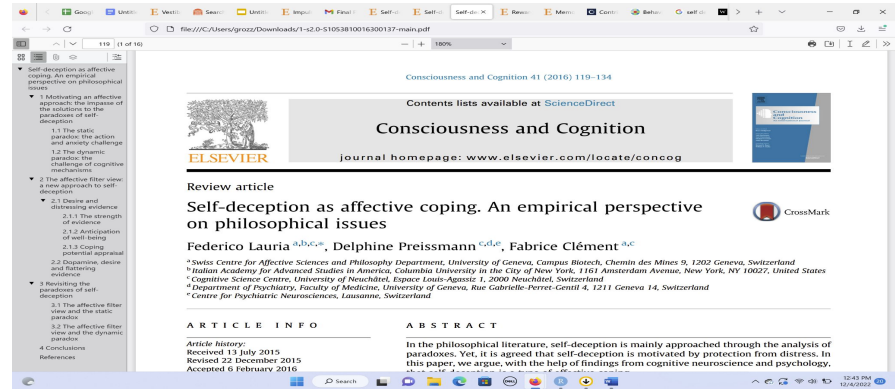
- The Sam and Mary Scenario

Interpersonal Deception: intentionally inducing in others a belief that the deceiver does not hold

- Sam in the Sam and May Scenario

Self-Deception in Psychology

- Protection from the negative somatic marker associated with the true belief
- Favoring the dopamine producing event
- Decreased activity in higher order processing compared to interpersonal deception



Central Study: “Self Deception as Affective Coping” (Meta-Analysis) (Lauria, Preissmann, Clément, 2015)

(a) appraisal of the strength of evidence as uncertain, (b) low coping potential and (c) negative anticipation along the lines of Damasio’s somatic marker hypothesis

Study 1

“Vestibular stimulation attenuates unrealistic optimism”

(Mckay, Tamagni, Palla, Krummenacher, Hegemann, Straumann, Brugger, 2013)

Mimicking Anosognosia Symptoms in Healthy Patients

Anosognosia: lack of insight; impaired ability to understand and perceive one's illness (assoc. With IFG lesions)

Unrealistic Optimism: predicting a personal future outcome will be more favorable than that suggested by a relevant, objective standard (assoc. with “deficient coding of unwelcomed information in right IFG”)

left caloric stimulation would attenuate unrealistic optimism in healthy participants.

Methods

Thirty-one healthy right-handed adults underwent cold-water caloric vestibular stimulation of both ears in succession. During each stimulation episode, and at baseline, participants estimated their own relative risk of contracting a series of illnesses in the future.

Results

Compared to baseline, average risk estimates were significantly higher during left-ear stimulation, whereas they remained unchanged during right-ear stimulation. Unrealistic optimism was thus reduced selectively during cold caloric stimulation of the left ear.

Study 2 : “Behavioral and Functional Anatomical Correlates of Deception in Humans”

(Spence, Farrow, Hereford, Wilkinson, Zheng, Woodruff, 2001)

Task: Phase 1 - take 36 questionnaire truthfully Phase 2 - take the questionnaire again through a) visual protocol, followed by b) auditory protocol, except on this phase your answers are provided (aka, the participants are lying in the second phase)

Table 1

[Behavioural and functional anatomical correlates of deception in humans](#)

Spence, Sean A.; Farrow, Tom F. D.; Herford, Amy E.; Wilkinson, Iain D.; Zheng, Ying; Woodruff, Peter W. R. *NeuroReport*12(13):2849-2853, September 17, 2001. doi:

Table 1. Demographic and response data from subjects performing lying tasks outside and inside scanner.

	Outside scanner	Inside scanner
Number of subjects	30	10
Males	11/30	10/10
Right-handed (EHI)	26/30	10/10
Mean age (range) years	24 (19–29)	24 (23–25)
Mean predicted verbal IQ (NART) (range)	118 (110–123)	120 (111–127)
Response times—visual protocol		
Truth: mean (s.d.) ms	1607 (710)	1600 (592)
Lie: mean (s.d.) ms	1820 (795)*	1793 (636)*
Response times—auditory protocol		
Truth: mean (s.d.) ms	2485 (579)	2438 (448)
Lie: mean (s.d.) ms	2689 (611)*	2632 (498)*

*In each case, lie vs truth, two-tailed, paired t-test, $p < 0.001$.

NEUROREPORT

Demographic and response data from subjects performing lying tasks outside and inside scanner.

Study 2

Neural Correlates

Table 2

[Behavioural and functional anatomical correlates of deception in humans](#)

Spence, Sean A.; Farrow, Tom F. D.; Herford, Amy E.; Wilkinson, Iain D.; Zheng, Ying; Woodruff, Peter W. R. *NeuroReport*12(13):2849-2853, September 17, 2001. doi:

Table 2. Brain regions showing increased activation during lying responses (relative to truthful responses), $p < 0.05$, corrected at voxel and cluster levels.

Protocol	Cortical region (Brodmann area)	Coordinates	Z value
Visual task	Right ventrolateral prefrontal (BA 47)	56,16,-8	5.29
	Left ventrolateral prefrontal (BA 47)	-52,18,-8	5.30
	Medial premotor (BA 6)	0,18,54	5.52
		4,26,44	4.68
Auditory task	Right ventrolateral prefrontal (BA 47)	-2,38,36	4.51
	Right ventrolateral prefrontal (BA 47)	56,18,-6	5.66
	Left ventrolateral prefrontal (BA 47)	-52,18,-6	5.00
	Both tasks	56,18,-6	7.70
Both tasks	Left ventrolateral prefrontal (BA 47)	-52,18,-6	7.23
	Medial prefrontal (BA 32/8)	4,26,42	6.34
	Medial premotor (BA 6)	0,18,54	6.18
	Left lateral premotor (BA 6)	-38,8,56	5.00
	Left inferior parietal (BA 40)	-48,-52,54	5.05

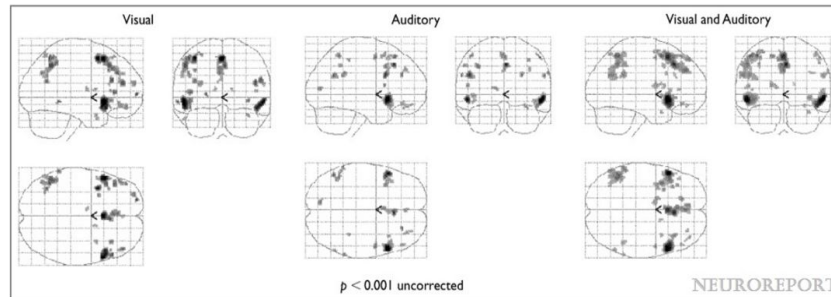
Brain regions showing increased activation during lying responses (relative to truthful responses), $p < 0.05$, corrected at voxel and cluster levels.

Fig. 1.

[Behavioural and functional anatomical correlates of deception in humans](#)

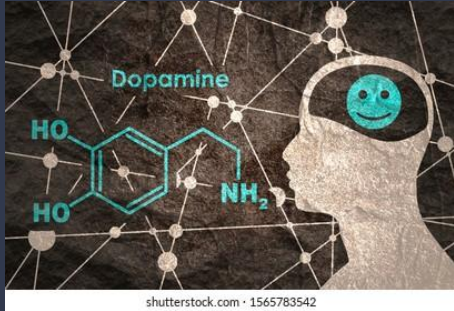
Spence, Sean A.; Farrow, Tom F. D.; Herford, Amy E.; Wilkinson, Iain D.; Zheng, Ying; Woodruff, Peter W. R. NeuroReport12(13):2849-2853, September 17, 2001. doi:

Ventrolateral Prefrontal Cortex and Pre-Motor Cortices most significantly involved in the studied form of deception



Brain regions showing significantly greater neuronal response to lying on the visual protocol (left), auditory protocol (middle) and combined analyses of both protocols (right). These figures show statistical parametric maps thresholded for display purposes at $p < 0.001$ (uncorrected). In each group, the upper left figure is a sagittal view (from the right side), the upper right figure is a coronal view (from behind) and the lower left is a transverse view (from above the brain). These are group data obtained from 10 healthy subjects.

Dopamine & the Somatic Marker Hypothesis as Predictive



“The joint [neurobiological mechanisms](#) of [somatic markers](#) and dopamine elicited by some appraisals lead to self-deception.”

“[Schultz, 1997](#), [Schultz et al., 1998](#) showed that [dopaminergic activity](#) increases when a monkey sees the cue predicting a reward and decreases if the reward does not follow the anticipating cue.”

“This dopaminergic reward system is modulated by prefrontal cortex top-down control. In fact, self-control (regulation between reason and desire) seems to strongly rely on the balance between prefrontal cortex and dopaminergic neurotransmission ([Heatherton & Wagner, 2011](#)).”

“This increase in the dopaminergic system is accompanied with a decrease in frontal activation, in particular in the ability of the frontal cortex to inhibit compulsory behavior in the presence of reminder cues ([Crews & Boettiger, 2009](#)).”

Discussion

Implications

The notion that the dopaminergic system-PFC balance correlates with self-control and inhibition...and our findings from Study 1 & Study 2 implies...

The Somatic Marker Hypothesis may predispose individuals to choose the positive/dopamine enriched belief as the most salient, as opposed to the truth, which is associated with distress. The decreased activity in frontal regions (PFC, IFG) tips the scales in favor of dopaminergic structures (nucleus accumbens/basal ganglia) thus favoring the belief that allows for short-term relief, while ignoring the long-term consequences