



Neural correlates of self-deception and impression-management



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ABSTRACT

Self-deception and impression-management comprise two types of deceptive, but generally socially acceptable behaviours, which are common in everyday life as well as being present in a number of psychiatric disorders. We sought to establish and dissociate the ‘normal’ brain substrates of self-deception and impression-management. Twenty healthy participants underwent fMRI scanning at 3T whilst completing the ‘Balanced Inventory of Desirable Responding’ test under two conditions: ‘fake good’, giving the most desirable impression possible and ‘fake bad’ giving an undesirable impression. Impression-management scores were more malleable to manipulation via ‘faking’ than self-deception scores. Response times to self-deception questions and ‘fake bad’ instructions were significantly longer than to impression-management questions and ‘fake good’ instructions respectively. Self-deception and impression-management manipulation and ‘faking bad’ were associated with activation of medial prefrontal cortex (mPFC) and left ventrolateral prefrontal cortex (vlPFC). Impression-management manipulation was additionally associated with activation of left dorsolateral prefrontal cortex and left posterior middle temporal gyrus. ‘Faking bad’ was additionally associated with activation of right vlPFC, left temporo-parietal junction and right cerebellum. There were no supra-threshold activations associated with ‘faking good’. Our neuroimaging data suggest that manipulating self-deception and impression-management and more specifically ‘faking bad’ engages a common network comprising mPFC and left vlPFC. Shorter response times and lack of dissociable neural activations suggests that ‘faking good’, particularly when it comes to impression-management, may be our most practiced ‘default’ mode.

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1. Introduction

Social desirability refers to ‘the tendency to endorse items in response to social or normative pressures instead of providing veridical self-reports’ (Ellingson et al., 2001) and reflects an individual’s ‘need for approval’ (Leite and Beretvas, 2005). However more than simply a mode of responding, this response bias can be conceptualised as a personality style (Stober et al., 2002). Though some research has treated social desirability as a unitary concept, Paulhus (1984) suggested that social desirability can be broken down into two concepts: (i) ‘self-deception’ – “an unintentional propensity to portray oneself in a favourable light,

manifested in positively biased but honestly believed self-descriptions”; and (ii) ‘impression-management’ – “a conscious, purposeful manipulation of one’s image in public in order to be perceived favourably by others” (Li and Bagger, 2006). We interpret Paulhus’s description of self-deception as being ‘unintentional’ as implying ‘so habitual as to be automatic and sub-conscious’ (i.e. without forethought), as opposed to being ‘beyond intentional control’. We also note, in relation to Paulhus’s definition of self-deception, that it is typically ‘positively biased’ but does not have to be. Such ego-enhancing biases may be absent in maladjusted (e.g. depressive, neurotic) individuals (Judge et al., 2000). While self-deception is very much a self-orientated measure of defensiveness towards personal threats, impression-management is much more focussed on the desire to create a favourable impression on others and is also argued as being easier to change in different situations (Kroner and Weekes, 1996).

1.1. Self-deception

Examples of self-deception include playing the lottery (and believing you have a realistic chance of winning), an alcoholic

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convincing themselves that their drinking is not problematic, a mother convincing herself that her criminal son is 'a good boy really' and downplaying health advice which contradicts one's behaviour (e.g. smoking, obesity, not wearing sunscreen etc.). Self-deception is also common in people's belief of the diagnostic value (i.e. causal reasoning) of their own actions (Sloman et al., 2010). There is evidence that the short-term psychological benefit of self-deception can cumulatively impact to result in longer-term costs (Chance et al., 2011). As to the 'purpose' or utility of self-deception, the evolutionary biologist, Robert Trivers has recently published a book on self-deception (Trivers, 2011), the central hypothesis of which is that our ability to deceive ourselves evolved in order to deceive others.

1.2. Impression-management

Impression-management, also known as socially desirable responding, describes the process by which people manage the impressions others form of them and plays a key role in interpersonal behaviour. Individuals attempt to create impressions of their personal qualities, including their attitudes, moods, roles, status, interests and beliefs and thereby aim to portray themselves in a socially desirable manner as appearing competent, attractive, friendly and honest (Singh et al., 2002). Creating such impressions requires emotion-regulation (Reyers and Matusitz, 2012), behavioural modification (Ellis et al., 2002), self-monitoring (Turnley and Bolino, 2001) and even outright deception (Carlson et al., 2011). Impression-management is context dependent (i.e. the 'correct' impression to portray may vary from situation to situation) and is also closely associated with social conformity. We have previously reported a role for the ventrolateral prefrontal cortex (vlPFC) in judging social hierarchies (Farrow et al., 2011), and these judgments may be an important component in selecting the appropriate impression to project. The role of vlPFC in modulating and judging socially appropriate behaviour (i.e. giving the right impression) has been previously ascertained from lesional studies including the well-known case of Phineas Gage. Gage famously suffered severe damage to either left vlPFC (Ratiu et al., 2004) or bilateral vlPFC (Damasio et al., 1994) in an accident sustained whilst working on a railway (a 'tamping iron' passed through his skull). Despite retaining "full possession of his reason", Gage was subsequently described by his foreman as, "... manifesting but little deference for his fellows..." (i.e. failing to give a good impression; Harlow, 1868). More recent studies of patients with discrete prefrontal cortical lesions have also shown impaired behavioural responses to certain hierarchies (Karafin and Tranel, 2004), defective social decision-making (Eslinger and Damasio, 1985; Barrash et al., 2000) and impaired social reasoning in response to authority and punishment (Anderson et al., 1999) – all deficits likely to impact on successful impression-management.

1.3. Clinical relevance of self-deception and impression-management

Both self-deception and impression-management are of relevance to clinical psychiatry and social psychology: impression-management may comprise an element of psychopathic/antisocial conduct, while self-deception is more relevant to notions of self-esteem, ego psychology and personal adjustment. Disorders involving such deceptive behaviours include Munchausen's syndrome and anorexia nervosa. Furthermore, and particularly pertinent to discussions of an individual's insight into self-deception, there was debate as to whether Munchausen's syndrome should be reclassified as a somatoform disorder in DSM-5 (APA, 2013) as it is unclear whether or not people are conscious of drawing attention to themselves (Krahn et al., 2008). By investigating the brain activation of healthy individuals during self-deception and

Table 1

Impression-management vs. counting baseline. Flexible factorial design. See Fig. 1.

Anatomical region	BA	x	y	z	Z-value	Extent
Left medial prefrontal cortex	6/8	-4	14	47	6.14	272
		-6	29	45	5.58	
Left inferior frontal gyrus/ <i>Ventrolateral prefrontal cortex/orbitofrontal cortex</i>	45/47	-51	18	1	5.64	77
		-48	31	-3	5.52	
		-48	18	10	5.32	
		-46	23	-10	5.40	19
Left middle frontal gyrus	8/9	-40	8	38	5.35	24
Left middle temporal gyrus	21	-50	-31	-5	6.04	71
		-46	-41	-1	5.33	
Right cerebellum		22	-67	-24	5.07	13

Co-ordinates are shown in standardised neuroanatomical space (Talairach and Tournoux, 1988). BA=Brodmann's area. Co-ordinates without a corresponding extent threshold and shown in *italics* refer to sub-clusters of the preceding activation. $p < 0.05$ corrected for family-wise error (FWE). Extent threshold = 10.

impression-management, we may gain a greater knowledge of the underlying neural mechanisms and further our understanding of abnormal conditions.

1.4. Balanced Inventory of Desirable Responding (BIDR) scale

The Balanced Inventory of Desirable Responding (BIDR) scale, a forty item self-report questionnaire developed by Paulhus (1994) includes two subscales tapping the self-deception and impression-management dimensions of socially desirable responding (Lanyon and Carle, 2007; Li and Bagger, 2007). Subjects mark their response on a seven point, counterbalanced Likert-type scale ranging from 'strong disagreement' to 'strong agreement'. When designing and interpreting the results of fMRI studies, it is important to consider the orthogonality between the cognitive concepts studied. True orthogonality between impression-management and self-deception would indicate that the two fMRI time courses were completely independent of each other (otherwise a unique solution could not be attained and it would be impossible to unambiguously evaluate how to partition the data variance as being explained by one variable versus the other). Defining a single behaviour as either self-deception or impression-management can be virtually impossible (e.g. If a colleague tells me that female students think he is 'hot', is this self-deception, or impression-management-to convince me that he is irresistible to women; or a combination of both?) However, whilst it may be difficult to parcelate individual behaviours, more general self-report measures of self-deception and impression-management, such as the BIDR, show discriminant validity in forming separate factors in factor analysis (Paulhus, 1984; Reference Manual for BIDR version 6, 1994). BIDR v.6 has been reported to exhibit correlations between self-deception and impression-management ranging from very low ($r^2 = .05$) to low-medium ($r^2 = .40$) depending on the situational demand for self-presentation. Slightly complicating the issue, Pauls and Crost (2004) report higher correlations between faked compared with standard BIDR scores. However, these inflated correlations between theoretically unrelated scales are reported as likely explainable by individual differences in a subject's trait ability to fake on questionnaires – rather than evidence that impression-management and self-deception are actually non-dissociable constructs.

1.5. Faking

As well as filling out questionnaires such as the BIDR 'honestly' (i.e. how subjects initially choose to present themselves), subjects can also be instructed to manipulate their responses to either 'fake

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