

# Reduced facial expression and social context in major depression: discrepancies between facial muscle activity and self-reported emotion

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## Abstract

The expression of emotion is determined by emotion and the presence and absence of others, i.e. social context. The present study examined social context differences in facial muscle activity and self-reported emotion of 11 major depressed and 11 non-depressed patients. Subjects were asked to imagine happy and sad situations with and without visualizing other people. Facial muscle activity over the brow and cheek region was reduced in depressed compared to non-depressed patients during happy and sad imagery whereas self-reported emotion showed no group differences. In both subject groups, happy imagery induced increased smiling and self-reported happiness whereas sad imagery induced increased frowning and self-reported sadness. Smiling and self-reported happiness were increased during happy-social compared to happy-solitary imagery in both groups. In contrast, frowning showed a lack of social context differences, although self-reported sadness was increased during sad-social vs. sad-solitary imagery in both groups. Reduced facial muscle activity in depression may indicate psychomotor retardation whereas the lack of social context differences in frowning may suggest social disengagement and an inhibition of sad facial expression in the presence of others. © 2000 Elsevier Science Ireland Ltd. All rights reserved.

*Keywords:* Facial EMG; Emotion; Motivation; Social disengagement; Psychopathology

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## 1. Introduction

Previous research in healthy subjects indicates that happy stimuli induce smiling whereas sad stimuli induce frowning (e.g. Schwartz et al., 1976; Cacioppo et al., 1986). However, facial expression is affected by the social context of the emotional situation, such as being alone (solitary situation) vs. being with others (social situation), and the role of the interaction partner in a social situation, i.e. strangers vs. friends. Smiling is increased during happy situations and frowning is increased during sad situations when being with others compared to being alone (e.g. Fridlund et al., 1992; Hess et al., 1995). These social context differences in facial expression are more pronounced when the interaction partner is a friend rather than a stranger (Buck et al., 1992; Hess et al., 1995). Therefore, facial expression may reflect both emotional and social functioning. This emotional and social functioning seems to be altered in depression.

Some studies indicate that the expression of emotion is reduced in depressed compared to non-depressed patients (e.g. Schwartz et al., 1976; Pogue-Geile and Harrow, 1984; Katsikitis and Pilowsky, 1991; Berenbaum and Oltmanns, 1992). Other studies show increased facial expression in depression (e.g. Greden et al., 1986). However, these studies used emotional stimuli without taking the social context into account. Facial expression and self-reported emotion were examined previously in depressed patients during social situations by Brown and colleagues. Depressed patients showed reduced smiling, although self-reported happiness was increased compared to that in non-depressed subjects (Brown et al., 1978) and subjects with schizophrenia (Brown et al., 1979). Discrepancies between facial expression and self-reported emotion in depressed subjects during social situations may indicate social disengagement (Ekman and Fridlund, 1987), i.e. the diminished motivation to express one's emotion in the presence of others. Socially disengaged facial expression is not affected by social context and, therefore, should not differ between social (i.e. being with others) and solitary situations (being alone).

Social context differences, or the lack thereof (i.e. social disengagement), in facial expression may be associated with underlying changes in self-reported emotion. For instance, social context differences in facial expression may reflect social context differences in self-reported emotion. Social situations may be more emotional than solitary situations and, thus, may induce both more facial expression and more self-reported emotion (Buck, 1991). Similarly, a lack of social context differences (social disengagement) in facial expression of depressed patients may reflect a lack of social context differences in self-reported emotion. Adjusting social context differences in facial expression, or the lack thereof, for social context differences in self-reported emotion may clarify if smiling during happy situations and frowning during sad situations change as a function of self-reported emotion intensity or social context (Fridlund et al., 1992).

The purpose of this study was to investigate facial muscle activity and self-reported emotion of major depressed and non-depressed patients in response to the social context of happy and sad stimuli. On the basis of previous research, we hypothesize that depressed patients will show reduced and socially disengaged facial expression compared to non-depressed patients. Depressed patients should show reduced facial muscle activity during happy and sad stimuli compared to non-depressed patients. In addition, depressed patients should show a lack of social context differences compared to non-depressed patients in smiling during happy stimuli and frowning during sad stimuli.

## 2. Methods

### 2.1. Subjects

Eleven depressed subjects, age 21–37 (mean age  $\pm$  S.D.:  $23.45 \pm 4.99$ ), and 11 non-depressed control subjects, age 20–38 (mean =  $28.45 \pm 6.68$ ), assessed by the Structured Clinical Interview for DSM-IV (SCID; First et al., 1994), participated in the study. Although age was different between

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