CHAPTER 4

NONVERBAL ATTUNEMENT BETWEEN DEPRESSED PATIENTS AND AN INTERVIEWER PREDICTS SUBSEQUENT IMPROVEMENT

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ABSTRACT

Depressed patients' support seeking behaviour and the responses to this behaviour by others (support-giving) are presumed to play a causal role in depression. In interactions between normals, attuning nonverbal behaviour (i.e. equalizing levels of specific behavioural activities) is important for satisfaction of the participants with the interaction. We investigated the attunement between nonverbal support seeking and support-giving of 31 depressed patients and 1 interviewer during a 20 minutes admission interview. We defined attunement as the absolute difference between patients' and interviewers' nonverbal behaviour. It was found that the more attunement increased over the interview, the more favourable the subsequent course of depression was. The findings emphasize the potential role of interpersonal processes in depression.
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INTRODUCTION

Social interactions between depression-prone subjects and their social environment are considered to be causally involved in the etiology and maintenance of a depression (e.g. Libet and Lewinsohn, 1973; Coyne et al., 1990; Coyne and Downey, 1991; Hickie et al., 1991; Brown et al., 1994). A great deal of interest has been given to depression-prone subjects' interpersonal sensitivity (dependency) and support seeking attitude on the one hand and social support from the environment on the other. It has been found that high levels of dependency are related to poor prognosis (Boyce et al., 1991), while lack of social support is also related to an unfavourable course of the depression (George et al., 1989). High dependency levels induce negative and rejective feelings in others (Coyne, 1976b; Coyne et al., 1990; Bornstein, 1992). Moreover, it has been found that normal controls report more negative and rejective feelings towards depressed than to non-depressed persons (Coyne, 1976b; Sacco et al., 1985; Stephens and Hokanson, 1987; Marcus and Nardone, 1992).

About 60% of human communication is nonverbal (Burgoon, 1985; Cahn and Frey, 1992). Ethological observations have shown that high pre-treatment levels of patients' nonverbal manifestations of support seeking during an interaction are related to poor clinical outcome in depression (Troisi et al., 1989; Bouhuys and van den Hoofdakker, 1993; Geerts et al., 1995). Bouhuys and van den Hoofdakker (1993) and Geerts et al. (1995) showed that, apart from the patients' behaviour, also high levels of nonverbal support giving by an interviewer predict poor clinical outcome. In addition, Geerts et al. (1997) found that experimentally manipulated levels of nonverbal support giving behaviour of an interviewer affect the support seeking behaviour of depressed patients. This causal relationship between patients' support seeking behaviour and interviewers' support giving behaviour suggests that depressed patients attune their support seeking behaviour to the support giving behaviour of the social environment. In non-depressed subjects, such attunement has been described for instance for voice pitch (Gregory, 1990; Gregory et al., 1993), body movement synchrony (Bernieri, 1988), and for the durations of an interviewer's speaking behaviour, yes nodding, and verbal backchannel ("hmm hmm, yes yes" emitted to show one is listening) on the one hand, and an interviewee's speaking on the other (Matarazzo et al., 1965). Moreover, attunement of interpersonal behaviour plays a role in interpersonal satisfaction and rapport (Cappella and Palmer, 1990; Hall et al., 1995).
In the present experiment we investigated the attunement of depressed patients' nonverbal support seeking and an interviewer's nonverbal support giving during an interaction and its relationship with the subsequent course of the depression. Patients' nonverbal support seeking behaviour is reflected by Speaking Effort (looking at the interviewer and gesturing during the patients' own speaking) and the interviewer's nonverbal support giving behaviour by Encouragement (verbal backchannel and yes nodding during the patients' speaking; Bouhuys and van den Hoofdakker, 1993; Geerts et al., 1995). These "behavioural factors" are based on the statistical clustering of different behavioural elements of the patients and of the interviewers (Bouhuys et al., 1991; Bouhuys and van den Hoofdakker, 1991; Geerts et al. 1995). Two aspects of baseline attunement are investigated in relation to the subsequent course of the depression: the mean level and the time-course over an interview.

**METHODS**

**Subjects**

Thirty-one severely depressed patients (8 males, 23 females, mean age= 47.5 years, SD= 14.5, range 22 - 72) participated in the study. The patient group has been described earlier by Bouhuys and van den Hoofdakker (1993). Patients suffered from unipolar major depression (n= 28) or bipolar depression, depressed phase (n= 3)(DSM-III-R, American Psychiatric Association, 1987). They were included if the severity of the depression was \( \geq 16 \) on the Hamilton Rating Scale for Depression (HRSD, 21-item version; Hamilton, 1967). The mean HRSD at admission (T1) was 26.4, SD= 5.1 (baseline severity of the depression). Severity of the depression was assessed by an experienced psychiatrist (age= 47 years) who was not the patients' therapist. The mean interval between admission and the Hamilton-interview was 8.7 days (range 2 - 23 days). All interviews were conducted between 9:00-11:00 am. They were videotaped for the registration of behaviour. Patients were drug free for at least 3 days before the interview. After T1 the patients received various treatments, according to their individual clinical needs: tricyclics (if necessary combined with neuroleptics), non-pharmacological therapies (cognitive and behavioural therapy, patient group sessions, family therapy, and/or occupational therapy), and combinations of pharmacological and non-pharmacological therapies. Seven patients received no medication during the study. All therapeutic programs started within 2-3 weeks after the baseline interview.
to assess the course of the depression, a second interview (T2) was conducted 10 weeks later (mean interval between the interviews = 67.3 days, SD = 14.7, range 38 - 87 days). The course of the depression is defined as baseline severity of the depression minus the severity of the depression at 10 weeks later (\( \Delta \text{HRSD} = \text{HRSD}(T1-T2) \)). Patients were judged to be improved if they showed a decrease of at least 8 points on the HRSD.

Assessment of behaviour and data analysis
Appendix 1 presents the behavioural elements constituting the patients' Speaking Effort and the interviewer's Encouragement. Durations and frequencies of these behavioural elements and of patients' and interviewer's speaking were registered for the first 20 min of the Hamilton interview at T1. The mean inter-rater reliability (kappa; Cohen, 1968) was 0.91 (range 0.71 - 0.99). We assessed the time-course of the attunement per 4-minutes epoch, resulting into 5 epochs. For each epoch, the durations and frequencies of the different behavioural elements (see appendix 1) were normalised for each behavioural category over the 31 interviews and over the 5 epochs (hence over 5 x 31 scores). Then, the different behavioural elements were clustered into the behavioural factors. The construction of these factors is based on statistical criteria and has been developed in earlier studies (Bouhuys et al., 1991; Bouhuys and van den Hoofdakker, 1991; Geerts et al., 1995). In addition, Speaking Effort and Encouragement were assessed on the basis of 20 minutes of observation.

Attunement is operationalized as the absolute differences between the interlocutors' behaviour (Cappella and Palmer, 1990). Small absolute differences reflect high levels of attunement. We assessed attunement as the absolute difference between patients' Speaking Effort and interviewer's Encouragement.

Statistical analyses
The relation between attunement and subsequent improvement was analysed in 2 ways: 1) Analyses of Variance (ANOVA, between groups, repeated measures on time) were applied to investigate the predictive value of the mean level of the attunement and of the time course of the attunement with respect to the outcome. 2) Pearson's correlations (Pearson's r) were calculated between the change in the attunement (attunement during the first 4 minutes minus attunement during the last 4 minutes,
therefore, a positive change reflects an increase of the attunement) and the course of the depression (ΔHRSD). Possible confounding factors (e.g. baseline severity of the depression) were controlled for by using Analyses of Covariance (ANCOVA) and partial correlations (partial r).

RESULTS

Course of the depression

Eighteen patients met the criteria for improvement (mean baseline severity of depression: HRSD(T1)= 27.5, SD= 3.9, 10 weeks later: HRSD(T2)= 6.1, SD= 4.4), 13 patients did not improve (mean baseline severity of depression: HRSD(T1)= 24.8, SD= 6.2), 10 weeks later: HRSD(T2)= 20.8, SD= 6.8). Improvers did not differ from non-improvers with respect to gender ($P = 0.09$, not significant (ns)) or age (ANOVA: $F(1,29)= 1.62$, ns). Medication was related to improvement: the 7 patients who received no medication did not improve during the study ($P = 12.52$, $p<0.0004$). In addition, baseline severity of the depression was positively correlated with subsequent improvement (Pearson's $r= 0.42$, $p= 0.02$).

Prediction of subsequent improvement

Figure 1 shows the time-course of the attunement for the interviews with improvers and with non-improvers. We applied a 2-way ANOVA (between groups, repeated measures on time) to investigate whether (the time-course of) the attunement has predictive value with respect to the subsequent course of the depression. There was no main effect of groups. This indicates that the mean level of the attunement between Speaking Effort and Encouragement does not differ between the interviews with improvers and those with non-improvers. A significant interaction effect was found (ANOVA [groups x time]: $F(4,116)= 3.15$, $p= 0.02$): the attunement significantly decreased during the interviews with patients who would not improve (ANOVA [first versus last epoch]: $F(1,29)= 5.01$, $p= 0.03$). During the interviews with patients who would improve, the attunement tended to increase (ANOVA [first versus last epoch]: $F(1,29)= 3.08$, $p= 0.09$).

The correlational approach revealed comparable results: a positive correlation was found between improvement and the change in the attunement over the interview (Pearson's $r= 0.46$, $p= 0.009$; see figure 2). In other words, the more the attunement increased (i.e. the more the absolute difference between Speaking Effort and
Encouragement decreased over the interview), the more favourable the subsequent course of the depression was. The change in the attunement explained 22% of the variance in the course of the depression (univariate regression: $F(1,29)= 7.97$, $R^2= 0.22$, $p= 0.009$). The relationship between the change in the attunement over the interview and improvement was still significant after correction for baseline severity of the depression (partial $r= 0.41$, $p= 0.02$) or for the level of the attunement during the first 4 minutes of the interview (partial $r= 0.45$, $p= 0.01$). This indicates that the relation between the change in the attunement and the subsequent improvement is independent of the baseline severity of the depression and of the initial level of the attunement. One may argue that absolute differences between Speaking Effort and Encouragement depend on the overall levels of these behavioural factors (i.e. high overall levels may result into high absolute differences, compared to
Figure 1: Time course of the attunement between depressed patients' Speaking Effort and an interviewer's Encouragement during a clinical interview at admission for patients who will improve (n=18) and patients who will not improve (n=13) in the subsequent 10 weeks. Attunement = 'Speaking Effort - Encouragement' (high absolute difference reflect poor attunement). The y-axis presents the inversed absolute differences. Bars represent S.E.M. Interaction effect: ANOVA [group x time]: F(4, 116) = 3.15, p = 0.02

low overall levels). However, the relationship between the change in the attunement and the subsequent course of the depression was independent of the overall levels of Speaking Effort and Encouragement, as assessed on the basis of 20 min of observation (ANCOVA [covariates= Speaking Effort and Encouragement]: F(1, 27) = 9.02, p = 0.006).

Additional analyses
Nonverbal interpersonal processes may influence prescription of medication by a medical attendant. Therefore, one may argue that our results should be ascribed to the 7 patients who received no medication during the study. In order to investigate this, we excluded these patients from the original analyses. This did not affect the significant interaction effect between the time course of the attunement during the interview and subsequent improvement (ANOVA: F(4, 88) = 2.05, p = 0.048; Pearson's r between the change in the attunement and ΔHRSD: r = 0.43, p = 0.04). Hence, this drug-free subgroup does not explain our results.
Figure 2: Correlation between the change in the attunement between depressed patients' Speaking Effort and an interviewer's Encouragement over a 20 min clinical interview at admission and subsequent course of the depression over a 10 weeks period (n=31). The change in attunement over the interview was assessed as 'Speaking Effort - Encouragement' during the first 4 min minus 'Speaking Effort - Encouragement' during the last 4 min (a positive change reflects an increase of the attunement over the interview). The subsequent course of the depression is assessed as HRSD (at admission) - HRSD (10 weeks later). Univariate regression: F(1, 29) = 7.97, β = 0.46, p = 0.009.

Earlier it has been demonstrated that the levels of Speaking Effort and of Encouragement per se have a predictive value with respect to subsequent improvement. We investigated whether the patients' Speaking Effort or the interviewer's Encouragement contribute to the prediction of the subsequent improvement, apart from the change in the attunement. We applied a Forward Regression, in which the change in the attunement was entered as the first step. It was found that both Speaking Effort and Encouragement explained an additional 11% of the variance in the subsequent improvement (Speaking Effort: β = -0.33, ΔR² = 0.11, p = 0.04; Encouragement: β = -0.35, ΔR² = 0.11, p = 0.04). This indicates that high levels of Speaking Effort and of
Encouragement predict persistence of the depression, even when the decrease of the attunement between these factors was partialled out.

DISCUSSION
Earlier it has been found that pre-treatment levels of patients' Speaking Effort and of interviewers' Encouragement are related to the subsequent course of the depression or to treatment-response (Bouhuys and van den Hoofdakker, 1993; Geerts et al., 1995). The time course of the attunement between Speaking Effort and Encouragement also predicts the subsequent course of the depression (this experiment): the more the attunement decreases over the interview, the more persistent the depression tends to be. This relationship cannot be explained by baseline severity of the depression, nor by the initial level of attunement or the overall levels of Speaking Effort and Encouragement. Moreover, Speaking Effort and Encouragement have additive predictive value with respect to subsequent improvement, in addition to the change in attunement. Both in normal interactions (Cappella and Palmer, 1990) and in interactions between patients and clinicians (Hall et al., 1995) attunement of interpersonal behaviour is related to interpersonal satisfaction and positive rapport. We feel that the decrease in attunement may be an important underlying mechanism for generating the uncomfortable and unsatisfactory relationships as observed in depression (Youngren and Lewinsohn, 1980; Hoehn-Hyde and Rush, 1982; Coyne and Downey, 1991).

From an interpersonal perspective, it is predicted that these unsatisfactory social interactions play a causal role in the development and course of a depression. This is supported by the findings that interpersonal difficulties are related to persistence of depression (Hickie et al., 1991; Hickie and Parker, 1992; Brown et al., 1994). Depression-prone subjects' support seeking and dependency and their social environment's support giving are considered to be of critical importance (e.g. Libet and Lewinsohn, 1973; Coyne et al., 1990, Boyce, 1991). According to Coyne (Coyne et al., 1991; Coyne and Downey 1991), people from the social environment initially respond in a supportive way to the depression-prone subjects. Due to continuing support seeking these supportive reactions become intermingled with negative and rejective signals.
Patient characteristics, e.g. interpersonal sensitivity (dependency) may play a role in these interactions. High levels of dependency induce negative and rejective feelings in others (Boyce et al., 1991; Bornstein, 1992; Blatt and Zuroff, 1992) and are related to poor prognosis (Boyce et al., 1991; Hickie et al., 1991). Speaking Effort has been interpreted as a nonverbal manifestation of support seeking (Bouhuys and van den Hoofdakker, 1991) while the behavioural elements that constitute Encouragement (verbal backchannel and yes nodding) have been found to be related to perceived involvement, empathy, and warmth by the patients (Dooley, 1978; see also Hall et al., 1995 for a review). In line with the findings on dependency (Boyce et al., 1991; Hickie et al., 1991; Brown et al., 1994) high overall levels of Speaking Effort are related to persistence of the depression. Moreover, the causal relation with Encouragement (Geerts et al., 1997) suggests that depressed patients attune their Speaking Effort to an interviewer’s Encouragement. In the present experiment we show that the time-course of the attunement between Speaking Effort and Encouragement is also related to the subsequent improvement: the more the attunement decreased over the interview, the more persistent the depression was. Hence, the results underscore the suggestion that unsatisfactory interpersonal relations play a role in the persistence of a depression. In addition, the behavioural findings indicate that psychological constructs, e.g. dependency and support seeking, can be objectively demonstrated to play a role in naturalistic depressive interactions.

Attunement may be vested in a biological mechanism to facilitate stable relationships. This mechanism may facilitate satisfaction with interpersonal relationships in humans, in animals it may serve mate choice and strengthening of pair bonds. Illustrative examples can be found in ethological studies on the biological function of bird song. In some species of birds individuals modify their vocalizations to match or complete those of their mates (Halliday, 1983). Also, in courtship postural displays are synchronized within pair-bonds.

Cappella and Palmer (1990) investigated similarity between durations and frequencies of the same observable behaviour of participants of a dyadic interaction. In this experiment we assessed attunement between behavioural factors, each constituted by different behavioural elements. Therefore, we used normalized scores. One may argue that attunement occurs only on the level of single behavioural elements. However, Geerts et al. (1996) demonstrated that attunement also occurs on the level of
clusters of various behavioural elements.

A prerequisite for normal interactions is the ability to accurately decode social cues. Experimental evidence suggests that depression and stress negatively affect the ability to accurately decode nonverbal social stimuli (e.g. Colussy and Zuroff, 1985; Gur et al., 1992; Rubinow and Post, 1992; Wexler et al., 1994). An impairment in the ability to decode social cues may hamper attunement. Interpretation of our results in terms of a deficit in decoding abilities is in line with the finding that persistence of a depression is related to a decreased sensitivity to facial expressions (Bouhuys et al., 1995b).

Interpersonal therapies on depression focus on the current social interactions between patients and their social environment (e.g. Weissman and Markowitz, 1994). It would be of interest to investigate depressed patients' behavioural response to manipulated levels of behaviour of an interviewer, in relation to the subsequent course of a depression. Such an approach can provide objective data on interpersonal (in-) capabilities that might retard patients' improvement. This may enable optimization of therapeutic interventions.