Nonverbal interaction involvement as an indicator of prognosis in remitted depressed subjects

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ABSTRACT

Fifty-one remitted depressed inpatients and their interviewers were observed during a conversation. We investigated whether nonverbal behavioral elements indicative of involvement displayed by the remitted patients and/or their interviewers were predictive of depressive symptoms 6 months later. Involvement behavior of the patients appeared to be related to future complaints; the lower the level of involvement displayed, the more unfavorable the outcome. We interpret these results with reference to concepts of social support.
INTRODUCTION

Depression is frequently associated with interpersonal dysfunctioning. Several theories have been formulated linking interpersonal factors to depressive disorder (Lewinsohn, 1974; Coyne, 1976; Coyne et al., 1991; Gotlib and Hammen, 1992). Social support and well-developed social networks are supposed to protect against depression, to facilitate recovery, and to prevent recurrence. Problems in interpersonal functioning and lack of social competence are thought to lead to interpersonal stress and withdrawal of the social environment and, via these, to increase risk of depression.

This credible idea of a link between depression and the interpersonal is supported by a considerable amount of empirical research. Several studies show that depressives have problems in social functioning, and that these problems are associated with poor recovery and chronicity of the depression (see Lara and Klein, 1999; Joiner, 2000). Most of these studies, however, merely tell us something about interpersonal problems of individuals while they are depressed and about how these problems relate to episode duration. Little is known about social functioning of nondepressed or recovered individuals and its implications for depression onset and recurrence. Evidence at all that interpersonal factors are predictive of the development of depressive disorders and of relapse or recurrence is scarce (Paykel, 1994; Joiner, 2000).

It is not unreasonable to hypothesize that the factors responsible for interpersonal problems in depressed patients are also the ones that make individuals vulnerable for development and recurrence of depression. Such would be consistent with the diathesis-stress model of depression, which presumes that certain underlying traits (that interact with stressful events) predispose people to depression (e.g., Bebbington, 1987; Perris, 1987; Robins and Block, 1989). Reasoning within the lines of this model, one would expect interpersonal problems not to be confined to the depressive state, but to endure in remission, reflecting an underlying vulnerability. Some longitudinal studies with measurements both in depression and in remission support this idea. Marital discord and lack of close relationships have been shown to continue when the depression is over, and to predict relapse and recurrence (e.g., Rounsaville et al., 1980; Billings and Moos, 1985a; Billings and Moos, 1985b). Other studies, however, could not establish that the social factors that impede recovery in depressed patients are also the ones that increase risk of
recurrence in recovered patients (see Barnett and Gotlib, 1988). Anyhow, too few longitudinal studies focusing on interpersonal functioning of remitted or recovered patients have been done so far to be decisive upon this.

In the present study, we examine interpersonal interactions of inpatients while the depression is in remission. We want to investigate whether there is anything observable in the behavior of remitted patients and/or their conversation partners that differentiates individuals at high risk for relapse from others. Nonverbal, observable, behavior is an important, but often neglected aspect of interpersonal communication (cf. Burgoon, 1985; Cahn and Frey, 1992). Several nonverbal aspects of the behavior of depressives have been related to problems in social functioning (see Segrin, 1998). This appears to hold especially for nonverbal correlates of interaction involvement. Adequate levels of involvement behavior seem to be indispensable for the establishment and maintenance of satisfactory interpersonal relationships (cf. Cegala et al., 1982; Bell, 1987; Coker and Burgoon, 1987; Segrin and Abramson, 1994). Individuals showing very low levels of involvement behavior, for example, are easily experienced as unresponsive, unconcerned, and lacking initiative (e.g., Davis and Holtgraves, 1984; Burgoon et al., 1989). On the other hand, very high levels of involvement are likely experienced as a sign of dependency and excessive reassurance seeking (e.g., Harlow and Cantor, 1994). In either case, the reaction of the social environment may be aversion and rejection. Displaying adequate involvement in interactions thus seems to be a matter of a good balance.

In line with this, both extremes in involvement behavior of depressives have been related to unfavorable depression outcome. High levels of involvement (Troisi et al., 1989; Bouhuys and Albersnagel, 1992; Geerts et al., 1995), as well as low levels (Zeiss and Lewinsohn, 1988) have been found to be associated with poor recovery. These findings do not settle the question of how involvement behavior relates to depression. The way involvement was operationalized varied in these studies. Moreover, the association between involvement behavior and outcome was not consistently found. For instance, Hale et al. (1997b) could not find such an association. Geerts et al. (2000) did find a relationship between involvement and outcome, but only with regard to the behavior of the conversation partners of the depressives. Most importantly, the above studies again concern the behavior of depressed patients and its consequences for episode duration. Evidence that the same applies to the behavior of remitted patients having implications for depression relapse is
lacking. Hale et al. (1997a) did study involvement behavior in remitted patients, but in too small a sample to draw any firm conclusions (n = 34).

The present study is an extension of the above-mentioned study by Hale et al. (1997a). In a larger sample, we investigate nonverbal involvement behavior of remitted patients in a dyadic interaction. The behavior of the participants’ interviewers and the interplay between participants and interviewers will be studied as well, since these may also contain prognostic information. Possibly, the interaction partners influence each others’ displayed level of involvement, and the degree to which this happens may relate to depression outcome. Such “interviewer” and “interaction effects” were found in previous studies of our research group (Bouhuys and Van den Hoofdakker, 1993; Geerts et al., 1995; Geerts et al., 1996; Geerts et al., 1997; Geerts and Bouhuys, 1998; Geerts et al., 2000).

The behavioral elements we focus on in this study are gesticulations, head movements, gaze, verbal backchannel (i.e. small supportive sounds like “hm, hm” and “yes, yes” emitted during listening), and speech. These behaviors are considered to be indicative of involvement (see Cappella, 1983; Patterson, 1983; Coker and Burgoon, 1987; Bouhuys et al., 1991; Bouhuys and Van den Hoofdakker, 1991). We hypothesize that involvement as reflected in these behaviors is related to severity of depressive symptoms at 6 months after remission. As we do not know whether this relationship is a negative or a positive one, we will test our hypothesis bilaterally.

**METHODS**

**Participants and design**

We studied 51 inpatients recovered from a depressive episode (major depressive disorder, n = 41; dysthymic disorder, n = 1; and bipolar disorder (depressed phase), n = 9; with psychotic features, n = 25 (DSM-IV; American Psychiatric Association, 1994). The diagnosis was made at hospital admission by experienced psychiatrists. We assessed severity of depression by means of the Hamilton Rating Scale for Depression (HRSD, 21-item version; mean of two independent raters; Hamilton, 1967). This HRSD interview was done thrice: at hospital admission (T0), at remission (T1), and 6 months after remission (T2). The interviews were conducted between 9:00 AM and 12:00 AM. Interviewers were six researchers, three male and three female, with a mean age of 36.8
years (SD = 10.8; range 25–50). Patients were included in the present study if their HRSD score was at least 16 at admission and at most 8 at remission. All subjects gave their written informed consent to participate. The group consisted of 35 women and 16 men. Mean age at hospital admission was 46.6 (SD = 13.1, range 18–71). Average length of hospital stay was 141.7 days (SD = 70.6, range 48–323). At T0, mean group HRSD score was 24.1 (SD = 5.8, range 16–38). At T1, mean HRSD score was 4.3 (SD = 2.3, range 0.5–8.0). All participants received treatment according to their clinical needs. Most participants used psychotropic medication at remission: antidepressants, benzodiazepines, neuroleptics, antiparkinson treatment, lithium, or combinations of these.

**Analysis of behavior**

HRSD remission interviews were videotaped for later analysis of nonverbal behavior. The first 15 minutes of the videotaped interview were analyzed. Seven trained scorers registered various behavioral elements of the participant and the interviewer by means of an event-recording system. The mean inter-rater reliability (kappa; Cohen, 1968) was 0.89 (range 0.68–0.98). Different categories of behavioral elements were recorded in different runs of the videotape. Durations as well as frequencies of behaviors were registered. The behaviors were analyzed relative to a subject's speaking or listening, as the occurrence of these behaviors depends on whether one is doing one of the two.

We recorded different sets of behavioral elements for participants versus interviewers. With respect to the participant, we registered gesticulations (all sorts), general head movements, gaze, and speech. With respect to the interviewer, we measured yes-nodding, verbal backchannel, and speech. The choice of these specific sets of behavioral elements was based on a factor analytic study of participant and interviewer behavior done earlier by Bouhuys et al. (Bouhuys et al., 1991; Bouhuys and Van den Hoofdakker, 1991; Geerts et al., 1995). The difference in the collections of behaviors for participant vs. interviewer is a result of the outcome of this factor analysis. This outcome can be seen as a reflection of the different roles interviewers and interviewees have in a conversation, interviewers mainly listening and inquiring, interviewees mainly answering and telling. These two sets of behavioral elements proved to have predictive qualities in several studies of our group (Bouhuys and Albersnagel, 1992; Bouhuys and Van den Hoofdakker, 1993; Geerts et al., 1995; Geerts et al., 1996; Geerts and Bouhuys, 1998; Geerts et al., 2000).
Moreover, the two sets appeared to be (causally) related to one another (Bouhuys and Van den Hoofdakker, 1991; Geerts et al., 1997). In addition, in other studies these behavioral elements are also considered as indicative of involvement (e.g., Cappella, 1983; Patterson, 1983; Coker and Burgoon, 1987). For these reasons, we chose to hold on to them in the present study.

The behavior scores were normalized over the interviews, to enable pooling of the behavioral elements into two behavioral factors: “participant involvement” and “interviewer involvement”. The factor “participant involvement” consisted of duration and frequency of gesticulations, duration and frequency of head movements, duration and frequency of gaze (all during speech), and duration of gaze during listening. This factor can be seen as a reflection of the amount of effort one puts in speaking (the factor has also been called “speaking effort”). The factor “interviewer involvement” consisted of duration and frequency of verbal backchannel and duration and frequency of yes-nodding (all during listening). This factor is considered to reflect the degree one is stimulating the other in speaking by showing one is attending and understanding (the factor has also been called “encouragement”) (for a detailed description of the composition of the factors, see Geerts et al., 1995).

Statistical analysis
We employed partial correlation and linear multiple regression techniques to detect relationships between behavioral predictor variables measured in remission and depressive symptom scores 6 months later. In all equations with higher-order terms we used centered versions of first-order terms (Aiken and West, 1991). The upper level of significance to reject $H_0$ was set at 0.05.

RESULTS

Sample characteristics
At T2, 6 months after remission, mean HRSD score of the sample was 6.9 (SD = 6.6, range 0.5–30.5). The depression score of 37 of the 51 remitted patients had remained below the initial remission criterion of 8. The HRSD score of 10 participants had considerably increased at T2. These 10 participants could be labeled “relapsed” according to common criteria (HRSD score ≥ 12 and 100% increased relative to score at remission). Four participants had an intermediate
HRSD score (between 8 and 12). The thus distinguished subgroups are presented here only to describe the sample, and will not be used in further analyses.

HRSD remission scores (T1) appeared to be positively related to HRSD scores at T2 (Pearson’s r = 0.30, p = .035). The amount of change in depression score from T1 to T2 was not related to age, length of antecedent hospitalization, or severity of depression at admission (partial correlations, correction for HRSD score at T1). Neither was change in depression score related to subtype of depression (unipolar or bipolar, with or without psychotic features; ANCOVA, correction for HRSD score at T1). Women, however, showed a higher increase in depression score than men (ANCOVA, correction for HRSD score at T1; F(1,48) = 4.35, p = .042). This gender difference is in line with the general higher risk of depression in women relative to men (Weissman and Klerman, 1977; Paykel, 1991). Baseline HRSD score (T1) was not different for the two sexes.

Male and female interviewers were evenly distributed over interviews with male and female participants (Chi-square test). No difference in change in depression score was found between participants with an interviewer of the same sex and participants with an interviewer of the opposite sex (ANCOVA, correction for HRSD score at T1).

HRSD score at T1 was not significantly correlated with either participant involvement scores (Pearson’s r = 0.087, n.s.) or interviewer involvement scores (Pearson’s r = 0.204, n.s.).

**Involvement behavior**

We applied a linear multiple regression design to determine whether the involvement behavior of the participants as measured at T1 contributed to the prediction of severity of depressive symptoms at T2. As we knew that depression score at T1 and participant’s gender accounted for some variance in depression score at T2, we controlled for these factors by forcing them into the equation in the first blocks. The factor participant involvement indeed appeared to be a significant predictor of later depression score. Lower levels of participant involvement were associated with worse prognosis (Figure 1, Table 1a).

Since in our hypothesis we took account of the possibility that both low and high involvement may be related to a negative outcome, we also tested for a curvilinear effect of participant involvement. This curvilinear model,
however, yielded a slightly worse fit than the linear model ($F(4,46) = 3.55, p = .013$), and the higher-order term (participant involvement squared) did not explain any variance at all ($\Delta R^2 = 0.000, \Delta F(1,47) = 0.97, \text{n.s.}$).

To check whether the found effect of participant involvement was different for the two sexes, we added an interaction term “gender x participant involvement” to the regression equation. No significant interaction effect was found, however ($\Delta R^2 = 0.023, \Delta F(1,47) = 1.41, \text{n.s.}$).

Given the relative high proportion of participants in our sample diagnosed as having a disorder with psychotic features, we were able to investigate whether this subgroup behaved differently from the subgroup without psychotic features. We found that the “psychotic features” group tended to be lower in participant involvement than the “no psychotic features” group (ANOVA; $F(1,49) = 3.22, p = .079$). When we controlled for the presence of psychotic features in the equation of Table 1a, however, the factor participant involvement was still predictive of outcome ($\Delta R^2 = 0.083, \Delta F(1,46) = 5.11, p = .029$). The psychotic features factor did not contribute significantly to the equation.

**Figure 1** Regression of residual HRSD scores at T2 (corrected for HRSD scores at T1 and gender) on participant involvement scores at T1.
In a similar linear regression design (controlling for HRSD score at T1 and gender) we investigated whether the behavior of the interviewer was related to outcome as well. It appeared that the factor interviewer involvement was not predictive of later depression score at all ($\Delta R^2 = 0.001$, $\Delta F(1,47) = 0.03$, n.s.). The six interviewers, however, appeared to differ in their individual levels of involvement behavior (ANOVA, $F(5,45) = 3.73$, $p = .007$). Aware of the fact that this could have had repercussions on the levels of their partners’ involvement behavior (like participant levels of involvement could have influenced interviewer levels), we checked whether these differences in interviewer style confounded our results. Entering interviewer dummy variables into the equation of Table 1a revealed that this was not the case. The factor participant involvement was still significantly related to outcome ($\Delta R^2 = 0.087$, $\Delta F(1,42) = 4.95$, $p = .031$). Interviewer dummy variables did not contribute significantly to the equation ($\Delta R^2 = 0.008$, $\Delta F(5,43) = 0.084$, n.s.).

**Interaction**

Besides investigating whether the behaviors of participant and interviewer separately had predictive qualities, we also examined the interaction between the behaviors of the conversation partners. For that purpose, we regressed the HRSD score at T2 on interviewer involvement, participant involvement, and the interaction term build of these two factors (controlling for HRSD score at T1 and gender).
As can be seen from the table, this analysis did not yield any new insights. No significant interaction effect was found.

DISCUSSION

In this study, we investigated nonverbal behavioral elements indicative of involvement in remitted depressed patients and their conversation partners. We examined whether this nonverbal involvement behavior was predictive of return of depressive symptoms after 6 months. We found that involvement behavior of the remitted patients was related to outcome. The lower the level of involvement displayed, the more unfavorable the prognosis. Involvement behavior of the interviewers was not predictive of later depressive complaints, and no more was the interaction between the conversation partners’ behavior.

The finding that low levels of involvement behavior were related to return of depressive symptoms can be seen as an indication of the importance of gratifying social interactions and the role the former patient self plays in these. Fruitful social interactions may need some mutual investment. Social support, considered so important in the protection against depression, is something that one may receive but also largely has to acquire. The literature on social support predominantly focuses on the support given by the social environment, disregarding the active stand the needing party itself can take. Displaying some involvement in social interactions may be indispensable for the establishment and maintenance of social supportive relationships. Individuals displaying too little involvement may thus run an increased risk of depression as a result of a decreased social buffer capacity. This idea is in line with more general perspectives that interpersonal strategies involving approach -as opposed to avoidance- can buffer against the depressogenic effects of negative life events by enhancing social resources (cf. Dill and Anderson, 1999; Holahan et al., 1999).

It is instructive to compare the present results with those of previous studies of our research group (Bouhuys and Albersnagel, 1992; Bouhuys and Van den Hoofdakker, 1993; Geerts et al., 1995; Geerts et al., 1996; Geerts and Bouhuys, 1998; Geerts et al., 2000). In these studies involvement was operationalized in exactly the same way as in the present study, but measured when patients were in a depressed state, and used to predict subsequent improvement. When patients’ involvement behavior was found to be related...
to outcome in these studies, it were the patients displaying the lowest levels of involvement that would improve most (Bouhuys and Albersnagel, 1992; Geerts et al., 1995). Low involvement from the part of the interviewers was related to patients’ improvement as well (Bouhuys and Van den Hoofdakker 1993; Geerts et al., 1995). Also measures of the interaction between patients’ and interviewers’ involvement behavior were related to outcome; the degree to which patients and interviewers adjusted their levels of involvement to each other predicted subsequent improvement (Geerts et al., 1996; Geerts and Bouhuys, 1998; Geerts et al., 2000).

The present results clearly deviate from these earlier findings. A favorable outcome was related to the higher levels of involvement here, and no interviewer or interaction effects were found. This may indicate that involvement behavior differentially relates to depression maintenance vs. depression relapse, which would be in line with Barnett and Gotlib’s observation (1988) that factors predictive of episode duration are not necessarily also predictive of relapse and recurrence. The differences in results may be understood if one recognizes the importance of the difference in the condition of the patients (depressed vs. remitted). Presumably, the way interaction partners perceive and react to each other’s behavior varies depending on the patients’ condition. Signs of involvement displayed by patients in a depressed state, for example, may easily be perceived as signs of support seeking and dependency, contributing to these patients being experienced as demanding or claiming (see also Bornstein, 1992). When the depression is over, and the social environment does not face the other in a context of helplessness anymore, these signs of involvement may be perceived as appropriate. Showing higher levels of involvement would be positively received and reacted to in the latter situations, while they would not be so in the first.

The difference in condition may also account for the fact that in this study no significant interviewer or interaction effects were found. Possibly, in a remitted state interaction partners behave more independently than in a depressed state. Indeed, there is evidence that the behaviors of patients and interaction partners are more strongly influenced by each other the more patients are depressed (Bouhuys and Van den Hoofdakker, 1991). The behaviors of the interaction partners in this study may thus have been too weakly associated to find an interviewer or interaction effect on participant’s prognosis. This may also be partly a consequence of the fact that the interviewers in the present study probably were not very significant to the
participants compared to people they interact with in daily life (at least now they were not depressed anymore). There is evidence that behavior displayed in patient-stranger interactions is less related to depression outcome than behavior displayed when patients interact with significant others (Hale et al., 1997b; see also Schmaling and Becker, 1991).

The latter fact points to a possible disadvantage of the present design, making the generalizability of the results to everyday life limited. Another factor limiting generalizability may have been the severity of illness of our sample. Our sample consists of inpatients who suffered from severe depression, in many cases accompanied by psychotic features. Clearly, our group cannot straight away be put on a par with, for example, an outpatient group. Other disadvantages of this study are that group size may still not have been large enough, and that medication was not controlled for. Notwithstanding these limitations, this study shows that nonverbal involvement behavior is relevant as a predictor of depressive symptoms, even when measured in remitted patients interacting with relatively insignificant others. This result underpins the importance of behavioral observation in the search for interpersonal risk factors for depression. This method provides a more direct and concrete measure of social functioning than asking participants to reflect on this issue and to fill out a questionnaire. Such behavioral assessments may open new possibilities to unravel processes that underlie inadequate social functioning, and in doing so, bear relevance to prevention of relapse in depression.

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