Interpersonal mechanisms in recurrence of depression
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Lack of association between conversation partners’ nonverbal behavior predicts recurrence of depression, independently of personality

E.H. Bos, A.L. Bouhuys, E. Geerts, T.W.D.P. van Os, J. Ormel

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ABSTRACT

High neuroticism and low extraversion are related to (recurrence of) depression. We investigated whether nonverbal involvement behavior during social interaction is one of the factors via which these relations are effectuated. We measured nonverbal expressions of involvement from videotaped behavior of remitted depressed outpatients (n = 101) and their conversation partners, and assessed self-reported neuroticism and extraversion scores. During a 2-year follow-up we assessed recurrence of depression. Twenty-eight participants (27.7%) experienced a recurrent episode. Time to recurrence was predicted by neuroticism and extraversion, and also by the degree of association between levels of nonverbal involvement behavior of conversation partners. The behavioral effect did not explain the personality effect. Neuroticism moderated the behavioral effect. The results point to the independent relevance of personality and nonverbal behavior in the long-term course of depressive disorder.
INTRODUCTION

Depressive disorder is a highly recurrent disease, with rates of relapse and recurrence as high as 20-50% within 2 years (Belsher and Costello, 1988). Identification of factors that predict recurrence is therefore of great importance. The personality factor neuroticism is one of the more reliable psychosocial predictors of recurrence thus far (Angst, 1999; Mulder, 2002). Neuroticism is a major higher order personality dimension, the core of which is a sensitivity to negative stimuli (Clark et al., 1994). Neuroticism is not only consistently related to depression (Klein et al., 2002), but in fact to all kinds of psychopathology (Clark et al., 1994), which is not surprising given its broad conceptualization. The factor therefore is only a global vulnerability marker that does not tell us anything specific about why it confers risk of depression.

Another higher-order personality dimension frequently studied in the context of depression is extraversion. Like neuroticism, extraversion is a broad personality construct, including positive emotionality, energy, affiliation, and dominance (Clark et al., 1994). It is also related to depression, but inversely. Depressives have lower levels of extraversion than controls, and low extraversion predicts a poorer course of the depression, although less consistently than high neuroticism does (Klein et al., 2002). Extraversion is more explicitly linked to overt behavior than neuroticism, theoretically as well as empirically (La France et al., 2004). Studies that relate extraversion to observations of actual behavior in the context of recurrence of depression are virtually absent. The same is true for neuroticism (see also Funder, 2001).

As we are interested in why high neuroticism and low extraversion increase risk of recurrence of depression, and as we presume that interpersonal behavior may play a role, in this study we relate neuroticism and extraversion to the way individuals behave in interpersonal interactions. The interpersonal realm is very important in the etiology of depression, not only because it serves as a major source of stressful experiences which may trigger depression, also because social supportive relationships can protect against depression (Joiner and Coyne, 1999). An important factor in interpersonal interaction is nonverbal communication. This factor receives strikingly little attention from clinical researchers and practitioners (Philippot et al., 2003). Nonverbal signals give significance to verbal messages and also have great communicative impact independently of speech (Depaulo and Friedman, 1998). Central to the accomplishment of satisfactory interactions are for example nonverbal...
expressions of involvement (Coker and Burgoon, 1987). A number of studies found that nonverbal involvement behavior is also related to the course of depression (Zeiss and Lewinsohn, 1988; Bos et al., 2002).

Whereas the nonverbal behavior of individuals is of great importance in social interactions, the interplay between individuals’ behavior may be so even more. Especially the extent to which interaction partners adjust their behavior to each other is interesting. Mutual adjustment of nonverbal behavior is very common in everyday interaction. It can be seen in for example posture similarity, mimicry of facial expressions, movement synchrony, and congruence of levels of behavior (Bernieri and Rosenthal, 1991; Cappella, 1996). Such mutual adjustment usually occurs unintentionally and can be observed already at a very young age. It is believed to be a fundamental aspect of human communication, serving to facilitate social intercourse and interpersonal bonding (Isabella et al., 1989; Lakin et al., 2003). This idea is corroborated by evidence that interactions characterized by a high degree of behavioral congruence and synchrony are related to feelings of rapport, affiliation, and satisfaction (Tickle-Degnen and Rosenthal, 1987; Bernieri and Rosenthal, 1991).

We expect that the degree to which interaction partners adjust their nonverbal behavior to each other is also related to the course of depression. We expect this, because satisfactory social interactions are important also in the maintenance and recurrence of depression (e.g., Joiner, 2000). Two earlier studies of our group further feed our expectation (Geerts et al., 1996; Geerts et al., 2000). These studies investigated nonverbal involvement behavior of depressed patients and their interviewers. The degree to which patients and interviewers adjusted their levels of involvement behavior to each other was predictive of improvement of the depression.

In the present study we investigate remitted outpatients and relate their personality and their nonverbal involvement behavior to recurrence of depression within 2 years. We hypothesize that the less levels of involvement behavior of participants and their conversation partners are associated, the higher the risk of recurrence is. We also expect high neuroticism and low extraversion to increase risk of recurrence. We investigate whether (any of) the risk of recurrence connected to personality can be explained by involvement behavior (mediation), or whether personality and involvement behavior influence each other in the prediction of recurrence (moderation).
METHODS

Subjects
The original sample consisted of 208 outpatients, recruited from 2 mental care centers in the northern part of the Netherlands. They were considered remitted from a depressive episode according to their practitioners. After their written informed consent the participants were screened with the Composite International Diagnostic Interview (CIDI, lifetime version; World Health Organization, 1997). Subjects were included in the study if they met DSM-IV criteria for major depressive disorder or dysthymic disorder (American Psychiatric Association, 1994). Subjects were excluded if they had a disorder with psychotic symptoms, a dysfunction of the CNS, an organic cause of the disorder, substance dependence, severe communication problems, or if the end of their last depressive episode was more than 6 months ago according to CIDI data. Subjects were also excluded if their age was lower than 18 or higher than 65 years at the day they were screened.

Remission was established with the Beck Depression Inventory (BDI; Beck et al., 1961). In accordance with the proposal by Frank et al. (1991), our remission criterion was a BDI score of 8 or less for 2 consecutive times, with a 4-week interval in between. Possibly, some participants should be classified as recovered according to Frank’s criteria (BDI ≤ 8 for more than 4 months), since the end of the last depressive episode of some participants was more than 4 months ago according to CIDI data. Because BDI scores were not systematically assessed during the full length of this period, we cannot formally distinguish between remission and recovery. For that reason, we use the term remission for participants’ state at baseline in all cases. Similarly, with regard to new depressive episodes that develop in the course of the follow-up we do not distinguish between relapse and recurrence but use the term recurrence throughout.

Of the original 208 participants, 35 (16.8%) were excluded from the study, 26 because they did not have the proper diagnosis, 9 because the end of their last depressive episode was more than 6 months ago. Nine participants (4.3%) preliminarily withdrew from the study. We also excluded 60 participants (28.8%) who failed to reach our remission criterion within 2 years after the screening session. The final sample consisted of 104 participants (50%).
Baseline assessments (T0)
T0 sessions consisted of a series of measurements, including interviews, self-report questionnaires, and computer tasks. The interviews took place in the beginning of the session and were videotaped for later analysis of nonverbal behavior. The first interview was the Hamilton Rating Scale for Depression (HRSD, 21-item version; Hamilton, 1967), which was assessed to get an external judgment of depressive symptom severity. This interview was also used for the behavioral analyses of the present study. The HRSD is a semi-structured interview, which means that the content of the interview is similar over all interviews, without the interaction being too much constrained. Interviewers were 3 trained research workers, 1 male and 2 female, with a mean age of 31 years (range 29–34). These were also the ones that led the participants through the other assessments. The interviewers were given no special instructions with regard to their own nonverbal displays during the interview.

After the T0 session, participants were given a booklet with self-report questionnaires to fill out at home. One of the questionnaires was the Dutch version of the Eysenck Personality Questionnaire (Revised Short Scale, EPQ-RSS; Eysenck et al., 1985), which contains 12-item subscales for neuroticism and extraversion (scores can range from 0 to 12).

Analysis of nonverbal behavior
The participant and the interviewer were seated in chairs placed approximately 1.2 m apart, half-facing each other. Two cameras were used to get a frontal view of both individuals. By means of a split-screen technique the two recordings were combined to get a synchronized view. The first 15 minutes of the videotaped HRSD interviews were used for the analysis of nonverbal behavior. Two trained scorers registered behavior of participants and interviewers by means of an event-recording system.

Different sets of behavioral elements were recorded for participants and interviewers. The choice of these specific sets of behaviors was based on a previous factor-analytic study by Bouhuys and colleagues (Bouhuys et al., 1991; Bouhuys and Van den Hoofdakker, 1991; Geerts et al., 1995). This factor analysis grouped different behavioral elements in participant vs. interviewer factors. The factor participant involvement consisted of gesticulations, general head movements, and gaze. The factor interviewer involvement consisted of yes-nodding and verbal backchannel (standardized and weighted scores, relative to speaking or listening).1 The differences in the behavioral elements

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1 The differences in the behavioral elements
that make up the participant and interviewer factors can be seen as a reflection of the different roles interviewers and interviewees have in a conversation.

The thus composed involvement factors proved to be predictive of the course of depression in several studies of our group (see introduction). Moreover, the factors appeared to be positively associated (Bouhuys and Van den Hoofdakker, 1991; Geerts et al., 1995) and causally related to each other (Geerts et al., 1997). The behavioral elements from which the factors are constituted are regarded as indicative of involvement in the literature as well (e.g., Cappella, 1983; Coker and Burgoon, 1987).

The two scorers each registered a different set of behavioral elements. They registered one or more of the elements in separate viewings of the videotape, depending on the difficulty to record them reliably. Frequencies and durations of the behaviors were registered, relative to a subject’s speaking and listening. The mean interrater reliability (kappa) was 0.88 (range 0.68–0.96) (Cohen, 1968). The mean intrarater reliability was 0.90 (range 0.76–0.99).

**Follow-up**

BDI scores were assessed 4-weekly by mail, for up to 24 months. At 6, 12, 18, and 24 months after T0, medication use in the preceding 6 months was assessed, also by mail. If BDI scores rose above 14 for 2 consecutive times (see Frank et al., 1991), the CIDI (12-months version) was conducted to further establish recurrence of depression. In case the CIDI indicated a recurrence, further follow-up assessments were cancelled. In case the CIDI result was negative, the follow-up was continued.

1 **Participant involvement** = 1/3 look/sp + 1/3 dhead/sp + 1/3 dgest/sp + 1/2 flook/sp + 1/2 fhead/sp + fgest/sp + dlook/li. **Interviewer involvement** = dbch/li + dyes/li + fbch/li + fyes/li (look = looking in the direction of the others face, head = general head movements, yes = yes-nodding, no = no-shaking, gest = gesticulations of all sorts, bch = verbal backchannel: “yes yes”, “hmm hmm”, emitted to show one is listening, d = duration, f = frequency, /sp = during speaking, /li = during listening). All behavior scores are proportional to total duration of speaking and listening, respectively. Scores are normalized over subjects. (Note: in previous studies by Bouhuys and Geerts et al. the factors were called “speaking effort” and “encouragement”).
Statistical analyses
For analyses of associations between participant and interviewer involvement behavior, we used a standard correlational approach (interclass correlations). Cox proportional hazards regression analyses were used to examine the relation between predictor variables and onset of recurrent depressive episodes. Time to recurrence was defined as the interval in weeks after T0 until onset of the new depressive episode according to follow-up BDI scores. Observations of participants who did not experience a recurrence within the 2-year follow-up were considered censored. In all analyses on relations between determinants of interest and (time to) recurrence we corrected for gender, age, and education. We also corrected for the interviewer, as each of the 3 interviewers presumably had an idiosyncratic nonverbal style that may have influenced the outcome of the interaction. We investigated possible gender interactions as well, in view of the evidence in the literature of gender differences in the etiology of depression (Weissman and Klerman, 1977; Bebbingtong, 1998). As no significant gender interactions were found, gender interaction terms were not included in our final models.

RESULTS
Sample characteristics and rate of recurrence
The video registrations of 3 participants failed due to technical problems, leaving data of 101 participants. Of these 101 participants, 61 were female and 40 were male. Lifetime diagnosis of most subjects was major depressive disorder (n = 99). Two subjects suffered from dysthymic disorder. Seventeen subjects had “double depression”. Of those having major depressive disorder, 59 had a history of recurrent depression, 40 had had a single episode. The mean age of the sample at T0 was 44.5 years (SD = 10.7, range 24–66). The mean BDI score at T0 was 3.8 (SD = 2.4, range 0–8). The mean HRSD score was 4.6 (SD = 3.2, range 0–15). The median length of the remission period preceding T0 was 11 weeks (range 4–32). Seventy-three participants (72.3%) used psychoactive medication at T0 (modern antidepressants, n = 57; tricyclic antidepressants, n = 14; sedatives, n = 16; mood stabilizers, n = 6). Of the 71 subjects using antidepressants, 20 stopped using them in the course of the follow-up. Three subjects started antidepressant medication in the course of the follow-up. Three subjects started antidepressant medication in the course of the follow-up.
Twenty-eight of the 101 participants (27.7%) experienced a new depressive episode within 2 years after T0. Of these, 15 (53.6%) were female and 13 (46.4%) were male. The majority (75.0%) of the recurrent episodes occurred within 1 year after T0. We checked whether time to recurrence was related to the above demographic or clinical variables (Cox regression analyses). None of these variables was significantly related to time to recurrence. Neither was medication use related to time to recurrence. We tested this for each type of psychoactive medication as used at T0 (Cox regression analyses). We also investigated whether discontinuation of antidepressant medication in the course of the follow-up made a difference. We tested this by comparing subjects who used antidepressants continuously (n = 51) with subjects who stopped antidepressant medication (n = 20) and subjects who remained free of antidepressants at all (n = 27). Time to recurrence was not significantly different for these 3 groups (Cox regression analysis).

**Nonverbal involvement behavior**

We hypothesized that the less levels of involvement behavior of participants and interviewers are associated, the higher the risk of recurrence is. We first examined overall levels of involvement behavior, i.e. mean levels of behavior as measured over the entire interview (15 minutes). The correlation between levels of participant and interviewer involvement behavior was 0.13 in the total study group (partial correlation, n.s.). In the group that did not experience a recurrent episode in the 2-year follow-up the correlation was significantly positive (partial r = 0.26, p = .032). In the group that did experience a recurrence the correlation was negative (though not significantly so: partial r = –0.27, n.s.; see Figure 1). Fisher’s z scores were computed to test whether the correlation coefficients in the two groups were significantly different from each other. This appeared to be the case (Fisher’s z = 2.33, p = .020). Thus, the involvement behavior of participants and interviewers was indeed more congruent in dyads with nonrecurrent participants than in dyads with recurrent participants.

We subsequently investigated whether the association between the conversation partners’ involvement behavior was also related to time to recurrence. To this end, we entered the involvement factors and their interaction term in a Cox regression model. The involvement factors themselves were not related to time to recurrence, but the interaction between the two factors was (HR = 0.20, CI = 0.05–0.79, p = .022). To visualize this interaction effect, we divided
the participant and the interviewer involvement factors into lower and higher halves (median splits) and plotted the estimated survival curves for the 4 different possible combinations of levels of involvement behavior (low-low, low-high, high-low, high-high; see Figure 2). The figure shows that recurrence rates were relatively low when the participant and the interviewer showed congruent levels of involvement behavior (i.e. both low or both high). In a different way, we see here again that when levels of behavior of participants and interviewers were more associated, the risk of recurrence was lower.

**Personality and involvement behavior**

Personality data were missing for 1 recurrent participant, so the number of participants for analyses with personality variables is 100 (27 recurrent). The mean neuroticism score of the sample was 6.5 (SD = 3.3, range = 0–12). The mean extraversion score was 6.9 (SD = 3.8, range 0–12). We investigated the relation between personality and time to recurrence and the possible mediating effects of nonverbal involvement behavior in a hierarchical multivariate Cox regression model. Table 1 presents the results. After adjustment for our confounders, we introduced extraversion into the model as the first determinant. As can be seen from the table, extraversion was significantly predictive of time to recurrence. The hazard ratio was 0.90, indicating that a 1-point increase in extraversion decreases the hazard of recurrence with 10%. In the
second step, we added neuroticism to the model. Neuroticism also significantly predicted time to recurrence. The hazard ratio was 1.17, indicating that a 1-point increase in neuroticism increases the hazard of recurrence with 17%. Due to the neuroticism effect, the extraversion effect was not significant anymore. When extraversion was not controlled for, the neuroticism effect was somewhat stronger (univariate test, not shown in the table, HR = 0.20, CI = 1.05–1.37, p = .009). Thus, our expectation that high neuroticism and low extraversion increase risk of recurrence was confirmed, and high neuroticism appeared the strongest risk factor.

To test whether the personality effect could be (partly) explained by the involvement behavior of the conversation partners, we subsequently entered the involvement factors and their interaction term into the model (third step). The interaction between the involvement factors was significantly predictive of time to recurrence also in this multivariate model. The effect of neuroticism was not reduced by the effect of the involvement factors. Both neuroticism

Figure 2  Survival functions for 4 different groups representing 4 different combinations of levels of nonverbal involvement behavior within dyads: low-low = participant and interviewer involvement low (n = 24); high-high = participant and interviewer involvement high (n = 25); high-low = participant involvement high, interviewer involvement low (n = 26); low-high = participant involvement low, interviewer involvement high (n = 26).
and the interaction between the involvement factors remained significantly predictive of time to recurrence. Neither had the introduction of the involvement factors a substantial effect on the parameters for extraversion. We thus have no indication that the relationship between personality and recurrence is effectuated via nonverbal involvement behavior.

Table 1  *Three-step multivariate Cox regression model predicting onset of recurrence from personality and from nonverbal involvement behavior of participants and interviewers*

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>HR</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>-0.11</td>
<td>0.90</td>
<td>0.81-0.99</td>
<td>.040</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
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<td>0.93</td>
<td>0.84-1.03</td>
<td>.164</td>
</tr>
<tr>
<td>Neuroticism</td>
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<td>1.17</td>
<td>1.02-1.34</td>
<td>.027</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
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<td>0.92</td>
<td>0.83-1.03</td>
<td>.135</td>
</tr>
<tr>
<td>Neuroticism</td>
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<td>1.20</td>
<td>1.04-1.39</td>
<td>.014</td>
</tr>
<tr>
<td>Participant involvement</td>
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<td>0.61</td>
<td>0.27-1.40</td>
<td>.244</td>
</tr>
<tr>
<td>Interviewer involvement</td>
<td>0.45</td>
<td>1.57</td>
<td>0.79-3.12</td>
<td>.198</td>
</tr>
<tr>
<td>Participant inv. x Interviewer inv.</td>
<td>-1.58</td>
<td>0.21</td>
<td>0.05-0.92</td>
<td>.038</td>
</tr>
</tbody>
</table>

All models adjusted for gender, age, education, and interviewer; inv. = involvement.

We also tested whether personality modified the involvement interaction effect. We did this by adding a 3\textsuperscript{rd}-order interaction term to the final model of Table 1, together with all 2\textsuperscript{nd}-order interaction terms. We did this separately for interactions with neuroticism and extraversion. The 3\textsuperscript{rd}-order interaction term with neuroticism (N x participant involvement x interviewer involvement) appeared significant (HR = 2.21, CI = 1.29–3.80, p = .004). This means that the predictive value of the involvement interaction effect was different for different levels of neuroticism. To get more insight in the nature of this interaction, we reanalyzed the above-described model, now with a categorical neuroticism variable (tertile split: low = 0–5, n = 36; medium = 6–8, n = 34; high = 9–12, n
Hazard ratios of the involvement interaction effect for different categories of neuroticism were derived by alternatively coding each of the categories 0. It appeared that the involvement interaction effect was only significant for the low and medium categories of neuroticism (HR = 0.00, p = .005, and HR = 0.04, p = .002, respectively). In participants with the highest neuroticism scores, involvement behavior was not predictive of time to recurrence (HR = 0.43, n.s.).

Temporal aspects of adjustment
Thus far, we concentrated on overall levels of involvement behavior, as measured over the entire interview. We disregarded the possibility that conversation partners need some time to adjust to each other. To investigate in which stage of the interview dyadic involvement behavior was predictive of recurrence, we analyzed involvement behavior over 5 consecutive fragments of 3 minutes of the interview. We tested the effect of the interaction between the involvement factors for each of these fragments separately. We found that only in the 5th fragment the interaction between the involvement factors was significantly related to time to recurrence (HR = 0.30, CI = 0.11–0.83, p = .021). Thus, with respect to the prediction of recurrence from the dyads’ involvement behavior, the end stage of the interaction was the most important.

Confounding by residual symptom severity?
In the above analyses, we did not adjust for baseline depression score. We did not, since participants were included in the study only when their BDI scores fell in the asymptomatic range (BDI ≤ 8; see Frank et al., 1991). It still may be argued that variation in residual depression score at T0 may account for some of the found effects. The HRSD scores of the subjects show greater variability than the BDI scores, and may also give a different impression of symptom severity compared to the BDI scores because the HRSD is not a self-report measure. To be sure, we performed all analyses again, now including HRSD depression score as an extra covariate. The univariate extraversion effect (Table 1, panel 1) and the multivariate neuroticism effects (Table 1, panels 2 and 3) lost their significance as a result. These effects were reduced to trends (p < .10). The univariate neuroticism effect remained significantly predictive of time to recurrence (p = .039). All behavioral effects remained significant as well. We conclude that our results are not confounded by residual symptom severity.
DISCUSSION

Our results on personality showed that remitted outpatients low on extraversion or high on neuroticism are at increased risk of recurrence of depression. Although this was expected given the general evidence that these factors are related to depression (Klein et al., 2002) and some earlier studies that explicitly link personality in remitted subjects to recurrence (e.g., Duggan et al., 1990; Surtees and Wainwright, 1996; Oldehinkel et al., 2003), the findings are important, as prospective studies with measurements in remission are not numerous. The finding that the prognostic effect of extraversion was outclassed by the effect of neuroticism is in line with the fact that extraversion is inversely related to neuroticism (Sanderman et al., 1995), and with the fact that neuroticism is a more consistent predictor of (recurrence of) depression than extraversion is (Klein et al., 2002).

Our behavioral results did not provide an explanation for why neuroticism and extraversion are related to recurrence. Lack of association between the conversation partners’ involvement behavior predicted recurrence of depression, but did not mediate between personality and recurrence. In one other study that explicitly linked personality to adjustment of involvement behavior (Geerts et al., 2000), no significant correlations between personality and adjustment of behavior were found either. Possibly, neuroticism and extraversion are reflected in other nonverbal behaviors than the ones we assessed. It may also be that the risk of recurrence attached to these personality traits is not conferred by nonverbal behavior at all, and that other mechanisms are involved. Research in which personality is related to other aspects of behavior or to variables from other domains like the physiological or the cognitive is therefore needed.

Our finding that incongruence of involvement behavior during an interaction was not the result of deviant personality but predicted recurrence of depression independently, is important in its own respect. It is in line with research that stresses the significance of involvement in social interactions. Nonverbal involvement behavior is considered central to human communication (Coker and Burgoon, 1987) and has appeared especially problematic in depressives. Depressed persons often show behavioral patterns of too low or too high involvement, and both lead to interpersonal difficulties (Segrin and Abramson, 1994). Which levels of behavior are appropriate also depends on how one’s interaction partners behave. Here we come to the interaction
aspect of social interaction. The bulk of interpersonal research of depression does not address this aspect and focuses exclusively on how the patient behaves (cf. Coyne, 1999). It neglects what happens in the interplay between patients and others, while the quality of interactions highly depends on the outcome of this interplay (Tickle-Degnen and Rosenthal, 1987; Bernieri and Rosenthal, 1991). This is substantiated by our finding that congruence of levels of involvement behavior was more important with respect to future recurrence than levels of involvement as such. Sharing levels of involvement presumably contributes to feelings of compatibility and interrelatedness in interactions, and the ability to realize this can be seen as a social skill. This ability will improve the quality of social interactions, with reduction of interpersonal stress and enhancement of social supportive resources as the likely results. This in turn decreases the risk of becoming depressed again (Joiner, 2000).

Our results corroborate and extend earlier studies of our group in which adjustment of involvement behavior in interviews with depressed patients was related to improvement of the depression (Geerts et al., 1996; Geerts et al., 2000). The present study is the first to show that adjustment of involvement behavior is also related to recurrence of depression in remitted outpatients. In the earlier studies, it was especially the time course of behavioral adjustment that was related to improvement of the depression. In line with this result, the present study showed that particularly the end stage of the interview was decisive in predicting recurrence from the dyads’ involvement behavior. This suggests that conversation partners need some time to reach a balanced interaction.

In an earlier study of remitted patients (Bos et al., 2002) we did not find that adjustment of involvement behavior was related to future course. In that study, we found that low levels of involvement from the part of the patients were predictive of an unfavorable course, a finding that was not replicated in the present study. The study differed from the present one in that the sample consisted of former inpatients, the sample size was considerably smaller, and remission and relapse were less well defined and assessed (i.e. by point measurements). Moreover, the follow-up period was only 6 months. The latter is relevant as the mechanisms behind depression relapse vs. recurrence may be different (Prien et al., 1991).

An unexpected finding was that lack of adjustment of involvement behavior between interaction partners was predictive of recurrence only in
low- and medium-neurotic persons, not in high-neurotic ones. We would have expected the most neurotic persons to be the ones that would suffer most from the detrimental effects of poor nonverbal communication (or would benefit most from skillful nonverbal communication), since these persons can be considered the most sensitive to the depressogenic effects of interpersonal stress (cf. Oldehinkel et al., 2000, Kendler et al., 2004). It should be noticed that our sample as a whole had rather high neuroticism scores compared to controls (mean = 6.5, SD = 3.3; Dutch controls: mean = 4.1, SD = 3.3; Sanderman et al., 1995). Maybe, all too high levels of neuroticism overrule behavioral effects or impede the possibility to sufficiently develop compensatory behavioral skills.

A remark should be made with regard to the method we used to assess the degree of association between the conversation partners’ behavior. Interclass correlations only give an impression of “relative similarity”. For example, if both members of a dyad show high levels of involvement behavior, “high” means “high relative to the levels displayed by the members of other dyads”. We do not know whether these levels are similar also in an absolute sense. Another issue concerns the experimental setting in which the interview took place. Clearly, this makes the interaction not an everyday one. This may have consequences for the generalizability of the results.

Although our results have to be replicated, the study points to the relevance of nonverbal aspects of interpersonal interaction in the long-term course of depressive disorder. A further step would be to investigate involvement behavior in more naturalistic interactions, especially those with significant others. These interactions in particular can be decisive in whether a remitted patient remains out of episode. Our results may also have implications for preventive treatment strategies. An important insight is that the interplay between patient and others is sometimes more crucial than just the patient’s behavior. Behavior of people is often irreducibly intertwined, which underlines the importance of an integrative treatment approach (Coyne, 1999).

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