CHAPTER 1

GENERAL INTRODUCTION

DEPRESSION: FEATURES AND PREVALENCE

Depressed feelings, either because of personal loss or disappointment, or as the result of, for instance, failure or frustration are common to most of us. These experiences of negative mood can eventually be combined with other features such as pessimism, reduced energy, and/or reduced feelings of pleasure and/or motivation. Although these feelings may be unpleasant they will usually pass within a restricted period. In contrast to the transitory aspects of "normal" depressed mood, the syndrome of depression is characterized by the persistence of the depressed feelings and the associated features over time (Gelder et al., 1990; American Psychiatric Association, DSM-IV, 1994). The concept of clinical depression is heterogeneous, both in its features and in its course. Within the context of clinical depression, distinguishing features are the severity of depression (mild, moderate, or severe), associated special features (e.g. neurotic symptoms, psychotic symptoms, agitation, and retardation or stupor), the course of depression (bipolar or unipolar) and the etiology (reactive (to environmental stress factors) or endogenous). Moreover, clinical depression can co-occur with other forms of psychopathology such as Anxiety Disorder.

The prevalence ratings of depression vary with the application of different diagnostic criteria. When the DSM criteria for depression are applied (American Psychiatric Association, 1994), the (year-) prevalence of depression is estimated at 5% of the population (van den Hoofdakker et al., 1989; Koopmans et al., 1997). This figure increases when subjects are also considered who experience serious disruptions of mood but do not meet the criteria for clinical depression (Gotlib and Hammen, 1992).

The syndrome depression causes serious disruption and impairment of functioning. Despite the development of pharmacotherapy, psychotherapy, combinations of pharmaco- and psychotherapy, light therapy for seasonal affective disorder, and of electroconvulsive therapy, a considerable number of patients ($\pm$ 30%) do not respond to treatment. Furthermore, the long-term prognosis of depression is unfavourable. Roughly estimated, about 50% of the subjects who experience a first episode of depression will develop a new depressive episode (recurrence) within a period of about two years (e.g. Piccinelli and Wilkinson, 1994). Of those patients who have experienced a recurrence about 80% will develop more future depressive episodes or chronic depression (e.g. Surtees and Barkley, 1994; Angst, 1996). Women are more likely to experience clinical depression than men (Weissman and Klerman, 1977; Nolen-Hoeksema, 1987; Paykel,

1991), although the presence of sex-differences may depend on demographic features (see Gotlib and Hammen, 1992). Finally, some authors mention a tendency that the prevalence of depression increases, in particular among younger people (see Gotlib and Hammen, 1992, for
references).

The figures on the prevalence of depression and on treatment efficacy underscore the relevance of insight in mechanisms that underlie depression-onset, -persistence, and -recurrence. The studies in the thesis to be presented here address the role of nonverbal interpersonal processes in depression-persistence.

INTERPERSONAL THEORIES OF DEPRESSION

Interpersonal functioning in depression

Depression severely affects the contact between the patient and her or his social environment. In general, depressed patients are less satisfied with, and feel less comfortable in their social interactions when compared to normal controls (e.g. Youngren and Lewinsohn, 1980; Gotlib and Whiffen, 1989; Gotlib and Hammen, 1992; Segrin and Abramson, 1994). Hautzinger et al. (1982) and Linden et al. (1983) investigated the verbal interactions between depressed subjects and their partners in comparison to the verbal interactions between control couples. They found that the depressed subjects and their partners displayed more negative evaluations during the interactions than the control couples. The patients and their partners also displayed more disagreement than the control couples. Also, depression is related to higher divorce and separation ratios (Leader and Klein, 1996). McNaughton et al. (1992) found that depressed subjects tend to receive less support compared to others.

Lewinsohn (1974) suggested that depressed subjects lack the social skills necessary to elicit support. Some studies favour this suggestion by the finding that depression is associated with deficits in social skills (e.g. Libet and Lewinsohn, 1973; Segrin, 1992). However, other studies have failed to prove deficits in nonverbal social skills in depression (e.g. Youngren and Lewinsohn, 1980; Shean and Heefner, 1985). Based on a meta-analytic review Segrin (1990) found that depression is most strongly related to social skill deficits when they are measured via self-reports. However, based on observed ratings and on behavioural analyses a relationship between social skill deficits and depression was found less obvious. Gotlib (1982) did find lower levels of

social skills in depression, however, he also showed that the lowered social skills could not explain the low amounts of positive self-reinforcement in depression.

Interpersonal theories of depression

Within the framework of interpersonal theories of depression it is hypothesized that the disturbed interactions may not be only a consequence of depression, but may also play a causal role in its onset and course (e.g. Lewinsohn, 1974; Coyne, 1976a; Feldman, 1976; Hinchliffe et al., 1977; Horowitz and Vitkus, 1986; Coyne et al., 1990; Brown et al., 1994). From the perspective of interpersonal theories of depression it is assumed that depression-prone subjects can be characterized by a specific behavioural repertoire, mostly defined as submissive (e.g. Horowitz and Vitkus, 1986) or support seeking behaviour (e.g. Coyne, 1976a; Coyne et al., 1990). This specific depressive behaviour evokes specific responses in the environment (e.g. dominant or support giving behaviour) which in their turn reinforce the depressive behaviour. Thus, a vicious circular pattern results that is assumed to account for the (further) development and persistence of depression.

Support for a causal role of interpersonal processes in the course of depression may come from studies that show that the interpersonal processes can predict the course of depression. And indeed, several studies have found that interpersonal difficulties and lack of social support can predict the onset of depression (Paykel, 1994) and the duration of a depressive episode (George et al., 1989; Brugha et al., 1990; Vallejo et al., 1991; Hickie and Parker, 1992; McLeod et al., 1992; Brown et al., 1994; Lam et al., 1994), although some authors fail to demonstrate a relationship between social support and the duration of a depressive episode (e.g. Paykel et al., 1996). In addition, it has been shown that criticism by spouses of remitted patients predicts depression-relapse (Hooley et al., 1986; Hooley and Teasdale, 1989). Furthermore, evidence for a causal role of interpersonal processes in the course of depression may be derived from the beneficial effects of interpersonal therapy (Weissman and Markowitz, 1994), supportive psychotherapy (Holmes, 1995) and of marital and spouse aided therapy (Emanuels-Zuurveen, 1996) in the treatment of depression.

According to the social skill hypothesis (Lewinsohn, 1974, see above), the lack of social skills to elicit support from the social environment is considered as an important antecedent condition for depression-onset. This assumption has not received

unequivocal support. Zeiss and Lewinsohn (1988) found that depressed subjects who exhibit low social skills are less likely to improve compared to patients who exhibit higher levels of social skills. However, Cole and Milstead (1989) found that social skills may be affected by depression, rather than causing it.

Lewinsohn's social skill hypothesis especially addresses the features of depression-prone subjects. Later theorists also payed attention to the role of significant others in the onset and course of depression. In this context the interactional model for depression as proposed by Coyne (1976a; 1990) has received most attention by researchers. Central assumptions in Coyne's model are that 1) Depressed subjects seek support in their social environment, however, they do so in a way that induces negative mood in others; 2) The induction of negative mood results in rejecting attitudes towards the depressed subjects; 3) The response from the social environment not fulfilling the patients' needs for support and (growing) awareness of the rejecting attitudes by others induce more support seeking behaviour in the depressed subjects; and 4) The negative mood and rejecting attitude may eventually stimulate people from the social environment to withdraw from further interactions with the depressed subjects.

Several authors have confirmed the assumption that depressed subjects induce rejecting attitudes in others (e.g. Coyne, 1976b; Sacco et al., 1985; Joiner et al., 1992; Marcus and Nardone, 1992; see also Segrin and Dillard, 1992, for a review). In contrast, there is only limited support for the induction of negative mood in others (see Segrin and Dillard, 1992). Segrin and Dillard (1992) argued that induction of negative mood in others (alone) cannot account for the rejecting attitude by the social environment. Therefore, the mechanisms that underlie the interaction between the depressed patients' support seeking behaviour and support giving behaviour by the social environment, are as yet insufficiently and incompletely understood (see also Segrin and Abramson, 1994).

Interfields between interpersonal theories of depression and other psychological theories

Coyne's interpersonal model of depression implies that the patients' depressive behaviour is maintained by lack of efficacy of the support that the patients receive from people in their social environment (Coyne, 1976a; Coyne et al., 1990). Several authors have focused their attention on the role of cognitive processes and of personality traits

in depressives' interactional styles (e.g. Ormel and Sanderman, 1989; Ormel and Wohlfart, 1991; Boyce et al., 1992; Gotlib and Hammen, 1992; Poulton and Andrews, 1992; McCann and Lalonde, 1993; Clark et al., 1994).

On the possible role of cognitions in interpersonal processes

It seems reasonable to assume that one's cognitions about others' behaviour (i.e. the interpretations of others' behaviour) play a role in interpersonal interactions. Indeed, cognitions about others' behaviour determine to a large extent the behavioural responses to others' behaviour (Halford and Sanders, 1990; see also Patterson, 1991; McCann and Lalonde, 1993; Patterson, 1994). Moreover, cognitions about others' behaviour play a role in interpersonal satisfaction: high levels of accurate processing of others' nonverbal behaviour are related to more meaningful and supportive relationships (Hodgins and Zuckerman, 1990; Hall et al., 1995). Also, persons who are highly accurate in the processing of others' behaviour are perceived as more warm and sympathetic by others than persons who are less accurate (Funder and Harris, 1986).

With respect to the processing of social stimuli in depression the cognitive theory of depression as proposed by Beck et al. (1979) is of relevance. According to Beck's theory, depression is to be understood by a negative view of the self, of others, and of the future (the "negative triad"). These negative cognitions become overt in particular with respect to neutral or ambiguous stimuli. Several authors have found that depressed mood is associated with a tendency to interpret emotional stimuli negatively (Hokanson et al., 1991; Mogg et al., 1991; Mathews and MacLeod, 1994; Bouhuys et al., 1995a). The negative interpretation of stimuli is expected to play a causal role in the development and persistence of a depressive episode (Beck et al., 1979; Teasdale and Dent, 1987; Hokanson et al., 1991). Dykman et al. (1991) showed in depressed college students that, apart from actual interpersonal performance, negative cognitions determine the evaluation of feedback on their interpersonal performance. Therefore, one may argue that the negative cognitions affect the evaluation of others' support giving behaviour and, thus, may contribute to the lack of efficacy of the support given by others as proposed by Coyne and co-workers (Coyne, 1976a; Coyne et al., 1990; see also Coyne and Downey, 1991). In addition, negative interpretations of others' behaviour may contribute to the generation of stressful interpersonal events.

On the possible role of personality in interpersonal processes

Nowadays, much attention is given to factors that make people vulnerable to depression onset and to persistence of depression. In this context high Neuroticism and low Extraversion are considered as personality traits that are associated with depression-onset and -persistence (e.g. Hirschfeld et al., 1983; Ormel and Wohlfart, 1991; Boyce et al., 1991; Scott et al., 1992; Clark et al., 1994; Bagby et al., 1995). Several authors have hypothesized that personality traits may also play a role in the depressives' interpersonal styles.

With respect to Neuroticism it is assumed that subjects with high levels of Neuroticism not only experience more negative interpersonal life events than those with low Neuroticism but also that subjects with high Neuroticism respond with more symptoms of distress to these negative events (Ormel et al., 1989). Moreover, empirical evidence suggests that subjects with high levels of Neuroticism may even evoke these negative interpersonal life events (Horwood and Fergusson, 1986; Ormel and Wohlfarth, 1991; Poulton and Andrews, 1992; Clark et al., 1994; Leenstra et al., 1995).

High levels of Neuroticism have been found related to negative interpretations of social and emotional stimuli (Martin, 1985; Teasdale and Dent, 1987). It is assumed that these negative cognitions may mediate the relationship between high Neuroticism and risk for depression. In addition, the negative cognitions may explain the relationship between high levels of Neuroticism and negative interpersonal events.

For low Extraversion it has been argued that the relationship with depression may be explained by the less satisfactory interactions associated with low Extraversion when compared to high Extraversion (Clark et al., 1994). The lesser satisfactory interactions on their turn may be explained by subjects with low Extraversion being less sensitive to rewarding signals by the social environment. Also, subjects with low Extraversion engage less in cooperative interactions than those with high Extraversion (Lu and Argyle, 1991). Important experimental evidence for the role of Neuroticism and Extraversion in interpersonal behaviour has been provided by the finding that subjects' levels of both Neuroticism and Extraversion are related to the nonverbal responses of the subjects to experimental manipulations of an interviewer's speech behaviour (Wiens et al., 1980).

In summary, there is substantial empirical evidence that supports the involvement of

interpersonal processes in the course of depression. However, knowledge of the mechanisms that may underlie the relationship between these interpersonal processes and depression is insufficient and incomplete. Possibly, cognitive processes and personality traits may be involved. Aspects of cognitions and of personality are related to the course of depression. Moreover, experimental evidence shows that subjects' cognitions about others' behaviour and personality traits determine to a large extent the interpersonal behaviour of the subjects.

Nonverbal behaviour plays an important role in human communication. Experimental evidence suggests that in humans nonverbal communication accounts for about 60% of what is communicated (Cahn and Frey, 1992; see also Burgoon, 1985). Thus, incorporation of the analysis of nonverbal interpersonal behaviour in the approach of interpersonal theories may contribute to a better understanding of the role of interpersonal processes in the development and subsequent course of a depression.

ETHOLOGY AND COMMUNICATION

In biology, the analysis of behavioural interactions between individuals and their (social) environment has been elaborated by ethology. A difficult task for researchers, including ethologists, has been the providing of a uniform entirely satisfactory definition of communication (see Slater, 1983, and Hauser, 1996, for an overview of the problems that have risen in defining communication and for some examples of different definitions).

By large, communication can be described as any morphological feature or action of one individual that affects another individual in such a way that it either alters or maintains the behaviour of the other individual (Slater, 1983). Communication thus requires at least two participants: a sender and a receiver. Senders encode a message into signal units (aspects of morphology or behaviour that carry the message) that are received by other individuals (receivers). The receivers sensor the signals and attribute a specific meaning to the signals that are perceived (decoding). One may note that the message encoded by the sender may differ from the meaning attributed to the signal by the receiver. Ethology has provided analytical and experimental tools that can be used in the analysis of communication structures, and in identifying the (biological relevant) information encoded in communication signals. Furthermore, ethology has contributed to the insight in the fundamental processes that underlie effective communication

between individuals (Wiley, 1983; Hauser, 1996). In contemporary ethology, behaviour is studied from four perspectives (Tinbergen, 1952):

1 **Mechanistic:** What external stimuli cause the behaviour under study? The stimuli that cause the behaviour are called proximate factors.
2 **Ontogenetic:** What processes and factors are involved in the ontogeny (i.e. the development (of the organisation)) of the behaviour ?
3 **Functional:** What biological relevant function does the behaviour serve, i.e. what are the consequences of the signal with respect to expectancies on survival of the individual and of its offspring? The biological relevance of behaviour is related to "fitness". The fitness measure includes all aspects related to the survival of the individual and of its offspring. The (beneficial) effects of behaviour with respect to fitness are called ultimate factors.
4 **Phylogenetic**: How can the development of the behaviour be understood from the perspective of evolutionary processes?

Research and theory in the field of ethology is inspired by (neo-) Darwinism. From the (neo-) Darwinistic point of view all behaviour (including communication) is subject to evolutionary processes. The basic assumptions in neo-Darwinism are: 1) There is variation in phenotypes between individuals of a population; 2) (Mutation of) genes underlie the phenotypical variation; 3) The production of offspring is maximized. Therefore, the number of individuals within a population tends to exceed the carrying-capacity of the ecological niche that the individuals occupy. As a result there is a "shortage" of natural resources (referred to as selective pressure); 4) The combination of limited natural resources and variation in phenotypical traits results into a favourable bias towards those phenotypes that are best equipped to capitalize the available resources (often called "selection of the fittest"). The individuals with favourable phenotypes and their offspring have higher chances of survival. In this way, the frequencies of the genes that underlie the favourable phenotypes increase in the population.

Evolutionary processes and communication

With respect to communication, evolutionary processes seize upon both sender specific

features (organs that are responsible for the signal-production, for instance vocal cords, odour glands, and visual display features) and upon receiver specific features (the sensory organs)(Slater, 1983). Factors that furthermore determine the direction of evolving communication processes are the inter- and intra- species specific messages that are communicated (Halliday, 1983), and environmental circumstances (Gerhardt, 1983; Hauser, 1996).

The evolution of communication has been directed towards higher efficacy of message transmission. The more capable an individual is in transmitting its internal state to another individual, the smaller the chance that errors occur in the decoding of the signals. High efficacy of message transmission results in more predictable interactions. The strive towards transmission efficacy results in schematized stereotypical species-specific signals (Wiley, 1983; Fridlund, 1991; Hauser, 1996). The process that underlies the schematization of signals is called ritualization.

Reliable signals may open perspectives for deceit. Deceit may occur when senders can take advantage of the responses of receivers (Wiley, 1983; Fridlund, 1991). Receivers can counteract an increase of deceit by devaluating the signal value and by using supplementary signals. In addition, it has been postulated that signals may be defended against deceit by the costs associated with the signal production (the handicap principle, Zahavi, 1975; see also Hauser, 1996). According to the handicap principle, signals are honest if they are costly to produce and to maintain and if the costs are relatively higher for individuals in a poor condition. Costs associated with the signal production may lie in the increased risk of being detected by predators. Also, signals may hamper individuals in escaping from predators. In addition, the energetic costs associated with the signal production and maintenance may have a negative effect on the individual's metabolism.

Apart from ritualization and deceit, learning capabilities and learning processes play a role in the evolution of communication, and may modify the processes of ritualization and deceit.

Under the influence of Wilson's book "Sociobiology: a new synthesis" (1975) in particular the functional analysis of behaviour via the ultimate approach has become a somewhat separated discipline (also called sociobiology). Over the recent years it has become clear that the separation between research on ultimate and proximate factors has major disadvantages (Curio, 1994). There is a growing awareness that an efficient

approach of ultimate factors requires insight into proximate or causal relationships.

A true meaningful ultimate approach of depression requires insight into causal and ontogenetic processes that may underlie depression-prone subjects' (interpersonal) functioning which might lead to depression. An ultimate approach completes knowledge derived from the study of causal and ontogenetic factors in depression and may provide a theoretical framework for the interpretation of the results of these studies.

Ultimate approaches of interpersonal processes in depression

McGuire et al. (1992) presents a short review of evolutionary approaches in psychiatry. A more detailed review on evolutionary approaches of depression is presented by Gilbert (1992). In the present paragraph two models that may be of relevance from the perspective of an interpersonal approach of depression will be discussed in more detail: 1) The social competition hypothesis and its related involuntary insubordinate strategy theory as formulated by Sloman et al. (1989; 1994) and Price et al., (1994) and 2) The reduced altruistic behaviour as an evolved strategy or as a consequence of dysfunctional recognition systems as proposed by McGuire et al. (1994).

According to the social competition hypothesis, depression can be viewed as a (pathological) exaggeration of social communication processes that in normals serve the ending of agonistic interactions by the loser signalling submission/surrendering. These signals are assumed to prevent 1) the winner from further attack, and 2) relatives of the loser from insisting on continuation of the interaction (Sloman, 1994; Price et al., 1994). The hypothesis is derived from knowledge of the use of submissive signals in animal societies (e.g. primates). In normals, it is assumed that, in case of loss of an agonistic interaction, the submissive behaviour has beneficial effects by avoiding unnecessary harm. Furthermore, it is assumed that the submissive behaviour serves smooth and quick fitting into the (new) social structures. In normals, the submissive behaviour returns to the normal behaviour by feedback mechanisms. Insufficient or blocked feedback mechanisms result in depression (i.e. depression is seen as an (involuntary) prolonged state of ritual losing behaviour). Based on several critiques, Price and Gardner (1995) have reformulated the theory, in particular with respect to how depressives will behave towards persons of different social ranks.

McGuire et al. (1994) have interpreted mental disorders in terms of unbalanced altruistic behavioural interactions between the disorder-prone subject and her or his

social environment. The unbalance can be explained by a dysfunction of signalling and of recognition during relationships and/or by dysfunctional appreciation of cooperative behaviour. It is assumed that these dysfunctions have negative effects on the interaction effort by others. The model as proposed by McGuire et al. is in line with the findings on possible deficits in social skill and on negative cognitions in depression, as presented above. Furthermore, the model by McGuire et al. may explain the rejecting attitudes that depressed subjects induce in others (see also above).

Several authors have claimed that an evolutionary approach may contribute to a better understanding of psychiatric pathology (e.g. Nesse, 1984; Troisi and McGuire, 1992; Smith, 1993; Schelde, 1994). Moreover, based on anecdotal evidence, Sloman et al. (1994) even claim that therapeutic interventions based on the social competition hypothesis are effective in the treatment of psychiatric illness. However, sociobiology, in particular the postulated genetic basis for supposedly universal patterns in (human) behaviour, has also received much critique. The arguments against a sociobiological approach are diverse and are based on political reasoning as well as on scientific reasoning (and are often intermingled) (Rose et al., 1984; van Rhijn and Westerterp-Plantenga, 1989; Gould, 1991). For instance, from a scientific perspective it has been argued that the differences in behaviour between chimpanzees and humans can hardly be fully explained by the genetic differences between these species (about 1%, Gilbert, 1992). Instead of a direct link between genes and behaviour it has been argued that (most) genes may have a modifying function in the development of behaviour. Another argument has been that the sociobiological approach of human behaviour cannot be falsified. Additionally, it may be impossible to adequately test the sociobiological assumptions against explanations from other human behavioural sciences such as psychology and sociology (Rose et al., 1984). Further arguments against and in favour of an evolutionary approach to psychiatry can be found in Lane and Luchins (1988), McGuire et al. (1992) and Gilbert (1992).

Proximate approaches of depression

A proximate approach of interpersonal theories of depression may seem more fruitful in the light of empirical validation compared to the more or less necessarily theoretical ultimate approach. From the perspective of an interpersonal approach two types of studies are of relevance: 1) cross-sectional studies that have investigated nonverbal

interpersonal behaviour of depressed subjects in relation to that of normal controls and 2) longitudinal studies that have investigated whether nonverbal interpersonal behaviour can predict the subsequent course of depression and/or that have investigated depressed patients' nonverbal interpersonal behaviour in relation to different stages of depression (e.g. subjects in their depressed period versus their remitted state).

Both types of studies have been consistent with an interpersonal approach: it has been confirmed that depression is reflected on the level of nonverbal behaviour (see for instance Ekman and Friesen, 1974, and Siegman, 1985). In addition, it has been found that clinical features of depression such as symptoms of retardation or agitation can be reliably measured on the level of the patients' nonverbal interpersonal behaviour (Bouhuys et al., 1991, see also Schelde, 1994). Furthermore, it has been found that the level of nonverbal interpersonal behaviour increases when depression improves (Rosen et al., 1981; Fossi et al., 1984; Lyons et al., 1985). Gotlib and Robinson (1982) found that healthy subjects' nonverbal responses towards depressed subjects reflect less involvement than those towards other healthy subjects. Moreover, these differences on the level of nonverbal interpersonal behaviour could not be detected by using psychological questionnaires.

From the perspective of the present thesis, the studies of particular relevance are those that investigated the relationship between depressed patients' nonverbal interpersonal behaviour and the subsequent course of depression. Five out of seven longitudinal studies have shown that observable interpersonal behaviour of depressed patients has predictive quality with respect to subsequent treatment-effects or course of depression (Ranelli and Miller, 1981; Lyons et al., 1985; Zeiss and Lewinsohn, 1988; Troisi et al., 1989; Bouhuys and Albersnagel, 1992). Only Fossi et al. (1984) and Hale et al. (1997a) failed to show a relationship between observed nonverbal behaviour and the subsequent course of depression. Troisi et al. (1989) and Bouhuys and Albersnagel (1992) found that high levels of depressed patients' nonverbal behaviour that can be interpreted as nonverbal "involvement" and "support seeking behaviour" are related to an unfavourable course of depression. Apart from the patients' "support seeking behaviour" high levels of an interviewer's nonverbal behaviour that may depict "support giving behaviour" and empathy is also predictive of persistence of depression (Bouhuys and van den Hoofdakker, 1993). Moreover, Bouhuys and van den Hoofdakker (1993) found that the patients' nonverbal "support seeking behaviour" and the interviewer's

"support giving behaviour" are interrelated.

Parallel to the studies from the present thesis Hale and co-workers conducted a series of studies concerning, amongst others, the nonverbal interactions between depressed patients and their partners (Hale et al., 1997a; 1997b; 1997c). The findings from those studies that are of relevance from the perspective of the thesis presented here will be discussed in chapter 7.

Within the framework of interpersonal theories of depression a general conclusion from the results of a proximate approach so far may be that the results on nonverbal observable behaviour of depressive interactions are consistent with the hypothesis that interpersonal processes may play a role in the development and course of a depression. However, the different studies lack uniformity in the types of encounters and the observed elements of behaviour. Therefore, the results from the different studies allow no general conclusion as to what behaviour is specific to depression and what behaviour is predictive of the subsequent course of depression.

OUTLINE OF THE PRESENT THESIS

Aims of the studies

In the current thesis a proximate approach of depressive interactions is applied in order to identify 1) what specific behavioural aspects of depressed patients and of an interviewer are predictive of the subsequent course of depression, 2) what behavioural mechanisms may be involved, 3) whether and, if so, how these mechanisms are related to the patients' personality aspects, and 4) whether and, if so, how these mechanisms are related to the patients' cognitions about nonverbal social stimuli (i.e. how patients interpret nonverbal interpersonal behavioural displays by others).

Methods

In the studies to be presented here those methods are applied that have been described by Bouhuys et al. (1991) and Bouhuys and van den Hoofdakker (1991). Compared to the other longitudinal ethological studies on depression (e.g. Ranelli and Miller, 1981; Fossi et al., 1984; Troisi et al., 1989) these methods have two major advantages. For one, in the methods described by Bouhuys et al. (1991) and Bouhuys and van den Hoofdakker (1991) the interpersonal behaviour of the interviewer is incorporated in the analyses. Thus, the depressed patients' behaviour can be described in regard of

another's behaviour. This is of particular relevance with respect to the analyses and interpretations of the data within the framework of an interpersonal approach of depression. Secondly, in these methods different nonverbal elements are aggregated on the basis of statistical analyses. In contrast, in other studies elements of behaviour have been pooled on the basis of different theoretical arguments (e.g. Ranelli and Miller, 1981; Fossi et al., 1984; Troisi et al., 1989).

The methods consist of the registration of the duration and frequencies of different elements of nonverbal behaviour of depressed patients and of interviewers for the first 15 minutes of a clinical interview. Speaking and listening are accompanied by different behaviour. Therefore, the various elements of the patients' and of the interviewers' behaviour are analysed with respect to their occurrence during speaking of the patients and during speaking of the interviewers. By using factor analysis Bouhuys et al. (1991) showed that the different elements of the patients' behaviour can be pooled into a limited set of meaningful behavioural factors. Similarly, the interviewers' behaviour can be described by a limited set of meaningful behavioural factors (Bouhuys and van den Hoofdakker, 1991). Factors that describe both the patients' and the interviewers' behaviour are: Restlessness-1 (leg movements and light body touching); Restlessness-2 (object touching); Speech (duration and frequency of speaking); and Active Listening (intensive body touching during speaking of the other). Specific patient factors are Eagerness (yes-nodding and no-shaking) and Speaking Effort (gesticulating and looking at the interviewer, both during the patients' own speaking). Specific interviewer factors are Turn Taking (leg movements and gesticulating during the patients' speaking); Encouragement (yes nodding and verbal backchannel ["hmm hmm, yes yes", emitted to show one is listening] both during listening to the patients); and Change Looking (changes between looking at and away from the patient). Appendix 1 provides a specific description of the registered behavioural elements of the patients and the interviewers. In addition, in appendix 1 it is described how the different behavioural elements constitute the behavioural factors.

Displays of observable interpersonal behaviour depend on both inner mood states and activation states such as depressive feelings, alertness, tiredness, and tension (e.g. Bouhuys et al., 1991). In addition, observable behaviour depends on contextual features, such as the (status of the) conversation partner, the type of conversation (for instance clinical interviews versus daily social encounters), the topic of the

conversation, and the environment in which the conversation takes place (e.g. Burgoon, 1985; Hall et al., 1995).

Depressed patients frequently experience mood fluctuations over the day (see for instance Gordijn et al., 1994). These fluctuations result mostly in an improvement of mood over the day, although worsening of mood also occurs.

To limit influences of diurnal variation in mood on possible differences in observable interpersonal behaviour all behavioural interactions are assessed between 9:00 h and 12:00 h am. (Semi) structured clinical interviews are applied to avoid effects that can be ascribed to differences in the topics of the conversations (i.e. all interviews concern the (severity of the) patients' depression) or to differences in the role of the patients or of the conversation partners. In interviews the role of the participants is decided by the interviewer role (gaining information via asking questions to the interviewee) and by the interviewee role (providing information via answering the questions). All interviews are conducted in the same room. The interviews are conducted by various interviewers, differing in gender and clinical status (i.e. from a psychiatrist and a psychologist to research assistants). This may allow generalization of the findings in this respect. Furthermore, it is investigated whether the results can be generalized over different subgroups of depression: an outpatient population of patients with seasonal affective disorder (SAD), and hospitalized, severely depressed patients (predominantly non-seasonal Major Depression). Appendix 2 presents the diagnostic criteria for Major Depression and SAD as formulated the American Psychiatric Association (APA, 1994: DSM-IV) and, for SAD, by Rosenthal et al. (1994).

Research questions

1 Generalization of the findings by Bouhuys and van den Hoofdakker

As argued above, so far, longitudinal studies on observable behaviour in depression lack information on whether the findings can be generalized to other patient populations. This issue is dealt with in chapter 2. The question is raised whether the findings by Bouhuys and Albersnagel (1992) and Bouhuys and van den Hoofdakker (1993) on the predictive quality of the behavioural factors of depressed patients and of an interviewer with respect to the subsequent course of depression can be generalized to a population of 24 patients with SAD. The results show that both the patients' behavioural factors and the interviewers' behavioural factors are predictive of the patients' response to

subsequent light treatment. When compared to the findings by Bouhuys and Albersnagel (1992) and by Bouhuys and van den Hoofdakker (1993), the results are in line especially with respect to the so called factors Speaking Effort of the patients (looking at the interviewer and gesticulating, both during the patients' speaking bouts) and Encouragement of the interviewers (verbal backchannel and yes nodding during the patients' speaking bouts). Furthermore in line with the findings by Bouhuys and van den Hoofdakker (1993), the patients' Speaking Effort and the interviewers' Encouragement are interrelated. The nonverbal behaviour that constitutes Speaking Effort is indicative of involvement and of support seeking (Giles and Street, 1985; Coker and Burgoon, 1987; Bouhuys and van den Hoofdakker, 1993; Segrin and Abramson, 1994). In addition, the elements that constitute the interviewers' Encouragement may manifest supportive behaviour (Duncan et al., 1979; Giles and Street, 1985; Bouhuys and van den Hoofdakker, 1991; Bouhuys and van den Hoofdakker, 1993; Segrin and Abramson, 1994; Hall et al., 1995). Therefore, Speaking Effort and Encouragement can be interpreted as the nonverbal manifestation of involvement and of respectively the patients' nonverbal support seeking behaviour and nonverbal support giving behaviour by an interviewer. In the further studies we focus on these factors.

2 Specification of the interrelatedness between Speaking Effort and Encouragement

In view of the fact that nonverbal behaviour referring to support seeking and support giving can predict the outcome of treatment, one may raise the question as to how these behavioural factors are causally interrelated. Much attention has been paid to the effects of depressed subjects' behaviour on others (e.g. Coyne, 1976b; Gotlib and Robinson, 1982; Sacco et al., 1985). An important assumption in interpersonal theories of depression is that depression-prone subjects are sensitive to the responses that they evoke in their social environment. However, no study has addressed the question how depressed patients respond to others' behavioural responses that actually predict the subsequent course of depression. This issue is dealt with in chapter 3. More specifically, the question is raised whether the observed interrelationship between the patients' Speaking Effort and the interviewers' Encouragement can be attributed to a causal relationship. In other words: can the patients' Speaking Effort be influenced by experimentally controlled levels of an interviewer's Encouragement?

3 The importance of nonverbal attunement in natural interactions for the course of depression

A causal relationship between Speaking Effort and Encouragement might suggest that depressed patients attune their nonverbal support seeking behaviour to the nonverbal support given by the interviewers. In normals such nonverbal interpersonal attunement has been shown to occur for various kinds of behaviour. For instance, Matarazzo and co-workers have shown that the durations and frequencies of speaking bouts of conversation partners are causally related to each other (see Matarazzo et al., 1965). Also body postures and body movements become attuned during interactions (e.g. Cappella, 1981; Bernieri and Rosenthal, 1991). Gregory et al., (1993) found evidence for attunement of paralinguistic parameters between participants of an interaction. Burgoon et al. (1993) and Gregory et al. (1997) present a further overview of attunement of interpersonal behaviour in human interactions.

Some authors have investigated the temporal aspects of attunement during an interaction (Bernieri and Rosenthal ,1991; Burgoon et al., 1995). The results from their studies show that attunement of behaviour develops over time. Figure 1 presents a theoretical concept of attunement: two persons (A and B) start an interaction. Initially, person A and B will differ in the levels of their behaviour. However, due to reciprocal influences on each other's behaviour the levels of their behaviour will converge. This results in smaller differences between the levels of the behaviour displayed by A and B.

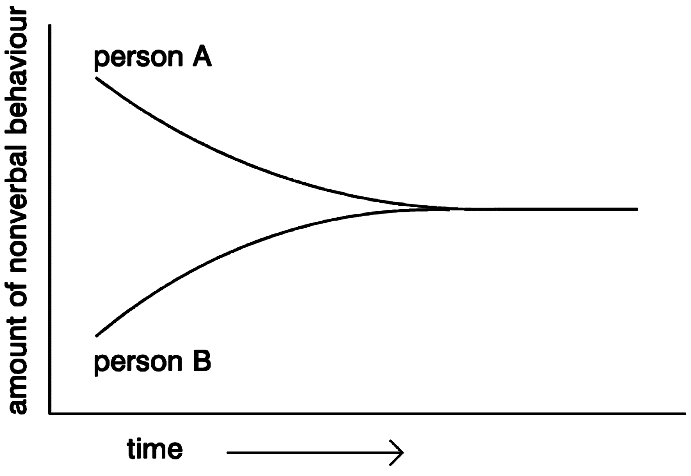

Figure 1: Theoretical concept of nonverbal attunement between two persons (A and

B). During the interaction the amounts of behaviour of persons A and B become more similar.

In normals it has been found that the more equal the levels of nonverbal interpersonal behaviour between conversation partners become, the higher the conversations partners' satisfaction with that encounter will be (Cappella and Palmer, 1990; Cappella, 1997). Furthermore, high levels of nonverbal attunement are related to mutual agreement (rapport) (Bernieri, 1988; see also Hall et al., 1995). In other words, attunement of nonverbal behaviour may be a mechanism that underlies interpersonal satisfaction. If so, lack of nonverbal attunement between Speaking Effort and Encouragement may be a mechanism that underlies the unsatisfactory interactions observed in depression.

From figure 1 two parameters of attunement can be derived that may be of be interest: the time it takes to become attuned (i.e. the development) and the (mean) level of attunement reached during the entire interactions. As can bee seen in figure 1, the more the patients and the interviewers become attuned the smaller the difference between the levels of their behaviour will become. So far, there is no theoretical basis that may justify the attribution of any specific value to the direction of the differences between the levels of the patients' behaviour and the behaviour of others. Therefore, the absolute difference between the patients' Speaking Effort and the interviewers' Encouragement are calculated to estimate the levels of the attunement. To assess the time-course of the nonverbal attunement the absolute differences between the patients' and the interviewers' behavioural factors are calculated for five subsequent 3-minutes epochs of the interviews.

In chapter 4 it is hypothesized that if nonverbal attunement underlies the unsatisfactory interactions, lack of nonverbal attunement between depressed subjects and interviewer will also predict an unfavourable course of depression. In a population of 31 hospitalized, severely depressed patients, the mean levels of the nonverbal attunement between Speaking Effort and Encouragement during the interviews and its time-course are investigated in relation to the subsequent course of depression. In chapter 5 the same questions are raised on the nonverbal attunement between Speaking Effort and Encouragement with respect to the response to light treatment in patients with SAD (n = 56). In chapter 6 the time-course of the attunement is investigated in

relation to the course of depression in another population of hospitalized, severely depressed patients (n = 26).

4 The relationship between nonverbal attunement and the cognitive and personality domains

Attunement of nonverbal interpersonal behaviour requires the ability to recognize others' nonverbal signals. Furthermore, the response to another's behaviour depends on the cognitions of the other's behaviour and on personality aspects (see above for arguments). Therefore, patient characteristics such as personality and cognitions of behaviour may (partially) explain the level and/or the time-course of the nonverbal attunement that occurs during interactions. In chapter 5 and 6 an attempt is made to empirically integrate findings on interpersonal behavioural attunement on the one hand and cognitive features and personality traits that play a role in depression on the other.

Chapter 5 addresses the question as to whether the levels and/or the time-course of the nonverbal attunement is related to the patients' personality traits Neuroticism and Extraversion in patients with SAD.

In chapter 6 it is investigated if and how the nonverbal attunement is related to the patients' cognitions about nonverbal behaviour (perception of emotions from schematic faces) and to the patients' levels of Neuroticism and Extraversion. More specifically, it is investigated 1) how the personality traits Neuroticism and Extraversion and the patients' cognitions about others' behaviour are related to the subsequent course of depression over a period of 6 weeks, and 2) how these personality traits and cognitions of nonverbal behaviour are related to the nonverbal attunement between the patients' Speaking Effort and the interviewers' Encouragement.

In chapter 7 the results are briefly reviewed and summarized. The outcome of the studies is discussed in terms of their implications for an interpersonal approach of depression. In addition, our results will be discussed from the perspective of an integration of interpersonal theories of depression, cognitive concepts of depression, and theories concerning the relationship between personality traits and depression. Furthermore, the findings from the underlying studies are discussed with respect to their relevance for human ethological theory and research. Finally, possible prospects of the findings from the studies presented for clinical practice and for innovative programs on

therapies for depression will be briefly addressed.