Eur Arch Psychiatr Neurol Sci (1985) 235:179–186

European Archives of Psychiatry and Neurological Sciences

The Zurich Study

VI. A Continuum from Depression to Anxiety Disorders?

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Summary. A representative sample of 456 persons from the normal population aged 22 and 23 years was used to study the overlap of depression with anxiety disorders. The 1-year prevalence rate for major depression (DSM-III), minor depression, and anxiety disorder together was 16.4%. The observed cases of major depression cooccurred in 36% with anxiety disorder, the cases with minor depression in 60%. On the level of symptoms assessed by a semistructured clinical interview and on the level of self-assessed items of the symptom check list SCL-90, the overlap was even greater. The main finding was that subjects with both diagnoses, depression and anxiety disorder, were more severely affected in general. Discriminant analyses of the SCL-90 scales together with the qualitative distribution of SCL items characterizing depression, anxiety, or phobia, did not disprove the hypothesis of a continuum.

Key words: Minor depression – Major depression – Anxiety disorder – Overlap

1. Introduction

"Anxiety is a common and probably integral part of the depressive reaction" (Lewis 1934). "The relationship between depressive states and anxiety states constitutes a problem of central importance in the classification of disorders of affect" (Roth 1981). Mountjoy and Roth (1982a, b) have provided good evidence for a clear distinction between depressive and anxiety states, findings in line with those of other authors, e.g., Derogatis et al. (1972), Gurney et al. (1972), Prusoff and Klerman (1974). But they all admit that there is considerable overlap in the symptomatology. When comparing neurotic depressive and anxiety/phobic states, Mountjoy and Roth found no difference in the following symptoms: suicidal ideas, anorexia, weight loss, poor memory, dizzy attacks, loss of interest, energy, libido, and emotional response, compulsions, agitation, fear of being alone, initial insomnia, restless sleep, early waking, poor concentration. Many of these symptoms are criterion symptoms for the diagnosis of a major depressive episode as defined by DSM-III.

Findings based on treated patients with depressive and anxiety disorders have to be accepted with some reservation. Only a fraction of the cases found in population studies reported seeking treatment, and treated patients may therefore not be representative of the range of persons with the disorder (Weissman 1983). So, the distinction between depressive and anxiety states may be clearer in treated cases. A continuum may only be evidenced if untreated milder depressive and anxiety states are included. Epidemiological studies of the general population may clarify this issue. Another difficulty is the simultaneous presence of two or more syndromes which is often by-passed by a questionable hierarchical subsumption. This principle goes back to Jaspers (1913).

In this paper, we examine the overlap of depressive, phobic, and anxiety states on different levels: diagnoses, symptoms, SCL-90 items, and other clinical characteristics.

2. Methodology

A longitudinal field study of a representative cohort of initially 19-year-old men and 20-year-old women investigated, among other things, the simultaneous or subsequent occurrence (overlap) of depression and anxiety disorders over the last 4 weeks, 3 months, and 12 months preceding the assessment. The data presented here resulted from an interview administered in 1981 at age 22 and 23 which had been preceded by three other assessments. The methodological details have been described elsewhere (Angst et al. 1984).

An internationally accepted definition of depressions and anxiety disorders does not exist as yet. For depression we used different diagnostic concepts, among them DSM-III (American Psychiatric Association 1980), RDC (Spitzer et al. 1978), Feighner et al. (1972), and a new one (Angst and Dobler-Mikola 1984).

We dichotomized the depressive states into major and minor depression. The latter was a group of individuals with the same number of symptoms as major depression, but with mood swings that lasted less than 2 weeks but recurred at least

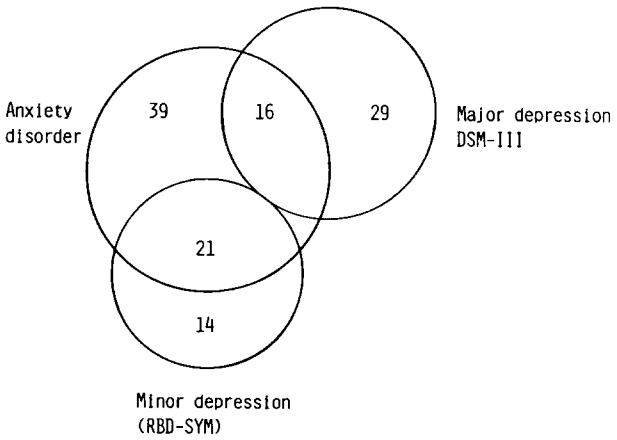

Fig. 1. Overlap of anxiety disorder with major and minor depression

Project supported by grants 3.804.76 and 3.956.80 from the Swiss National Science Foundation

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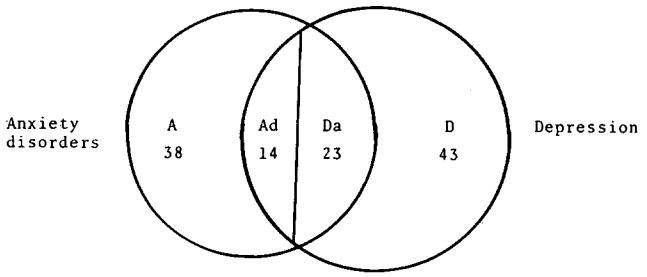

Fig. 2. Overlapping subgroups. *A* = subjects with a diagnosis of anxiety disorder alone (1 of the original 39 cases was excluded for diagnostic reasons). *D* = subjects with a diagnosis of depression (DSM-III, RBD (SYM)). *Ad* = subjects with both diagnoses and a subjective analog rating of anxiety > depression. *Da* = subjects with both diagnoses and a subjective analog rating of anxiety < depression

monthly for 1 year. We termed this group 'Recurrent Brief Depression' (RBD) (Angst and Dobler-Mikola 1985a). The classification of anxiety disorders is even more difficult. As described previously we divided them into three anxiety states and three phobic states (Angst and Dobler-Mikola 1985b). All our case definitions required social impairment in addition to characteristic symptoms.

3. Diagnostic Overlap of Depression and Anxiety Disorders

For the population we found a 1-year prevalence rate of 7.0% for major depression DSM-III, of 4.4% for minor depression RBD (SYM), and of 8.9% for anxiety disorders. The overlap group had a prevalence of 1.8% for major depression and 2.1% for minor depression. In our sample, we identified 45 cases of major depression DSM-III, 35 cases of minor depression RBD (SYM), and 76 cases of anxiety disorders. The diagnostic overlap is illustrated by the Venn diagram in Fig. 1. In the anxiety disorders, 21% overlapped with major depression and 28% with minor depression. Major depression showed an overlap in 36% with anxiety disorder, and 60% of minor depression overlapped with anxiety disorder.

Table 1. Frequency of SCL-90 items (intensity: moderate or more)

Item number	SCL-90 Items	Controls (86) (%)	A (38)[a] (%)	Ad (14) (%)		Da (23) (%)		D (43) (%)
SCL Scale depression								
05	Loss of sexual interest or pleasure	2	21	14		39	≫	12
14	Feeling low in energy or slowed down	3	31	43		52		35
15	Thoughts of ending your life	—	8	7		30	>	7
20	Crying easily	1	24	14	<	48	≫	16
22	Feelings of being trapped or caught	2	34	28		65	⋙	19
26	Blaming yourself for things	10	50	50		61	>	35
29	Feeling lonely	3	37	21	<	61	≫	28
30	Feeling blue	7	47	36	≪	78	>	49
31	Worrying too much about things	21	63	64		83		67
32	Feeling no interest in things	2	10	14	<	52	>	23
54	Feeling hopeless about the future	4	35	57		69	≫	35
71	Feeling everything is an effort	1	21	36		48	>	23
79	Feeling of worthlessness	2	45	50		59	≫	23
SCL Scale anxiety								
02	Nervousness or shakiness inside	13	47	64		69		53
17	Trembling	—	13	21		39	≫	9
23	Suddenly scared for no reason	—	24	50		52	⋙	9
33	Feeling fearful	—	31	36		39	>	14
39	Heart pounding or racing	1	13	21		35	≫	7
57	Feeling tense or keyed up	11	68	57	<	87	≫	53
72	Spells of terror or panic	—	13	28		30	>	7
78	Feeling so restless you could not sit still	5	34	36		48		25
80	The feeling that something bad is going to happen to you	1	21	43		26		19
86	Thoughts and images of a frightening nature	3	34	36		43		28
SCL Scale phobia								
13	Feeling afraid in open spaces or on the streets	—	3	14		17	>	2
25	Feeling afraid to go out of your house alone	—	3	21		4		5
47	Feeling afraid to travel on buses, subways, or trains	—	5	7		4		—
50	Having to avoid certain things, places, or activities because they frighten you	—	24	36		43	>	19
70	Feeling uneasy in crowds, such as shopping or at a movie	—	39	43		52		28
75	Feeling nervous when you are left alone	—	39	28		30		23
82	Feeling afraid you will faint in public	—	8	7		9		7

[a] 6 cases with phobia only

$> = P < 0.05$; $\gg = P < 0.01$; $\ggg = P < 0.001$

Table 2. Characteristics of the four groups

	Controls (90) (%)	A (38) (%)	Ad (14) (%)	Da (23) (%)	D (43) (%)
Sex: male	54	50	7	39	37
female	46	50	93	61	63
Family history:					
anxiety/phobia	9	39	71	57	37
depression	14	29	43	39	33
anxiety or depression	18	50	79	65	51
Treatment:					
anxiety	—	16	36	17	12
depression	—	3 <	57	30	23
anxiety or depression	—	16 <	57	30	28
Hypomania	—	—	7	13	7
Suicidal ideas/attempts	—	8	36	39	19
SCL-90					
anxiety $\bar{x}$ (s)	1.2 (0.21)	2.0 (0.73)	2.2 (0.55)	2.5 (0.82) ⋙	1.8 (0.52)
phobia $\bar{x}$ (s)	1.0 (0.04)	1.6 (0.42)	1.9 (0.66)	1.8 (0.66) ≫	1.4 (0.47)
depression $\bar{x}$ (s)	1.2 (0.27)	2.2 (0.69)	2.2 (0.51) ≪	2.9 (0.88) ⋙	2.0 (0.67)
total $\bar{x}$ (s)	1.2 (0.18)	1.9 (0.55)	2.0 (0.46)	2.4 (0.63) ⋙	1.7 (0.44)
Subjective severity					
anxiety $\bar{x}$ (s)	—	67.1 (28.8) <	86.0 (19.3) >	68.6 (27.6)	—
depression $\bar{x}$ (s)	—	—	61.8 (32.8) <	83.7 (20.4) ≪	65.5 (26.9)

> = $P < 0.05$; ≫ = $P < 0.01$; ⋙ = $P < 0.001$

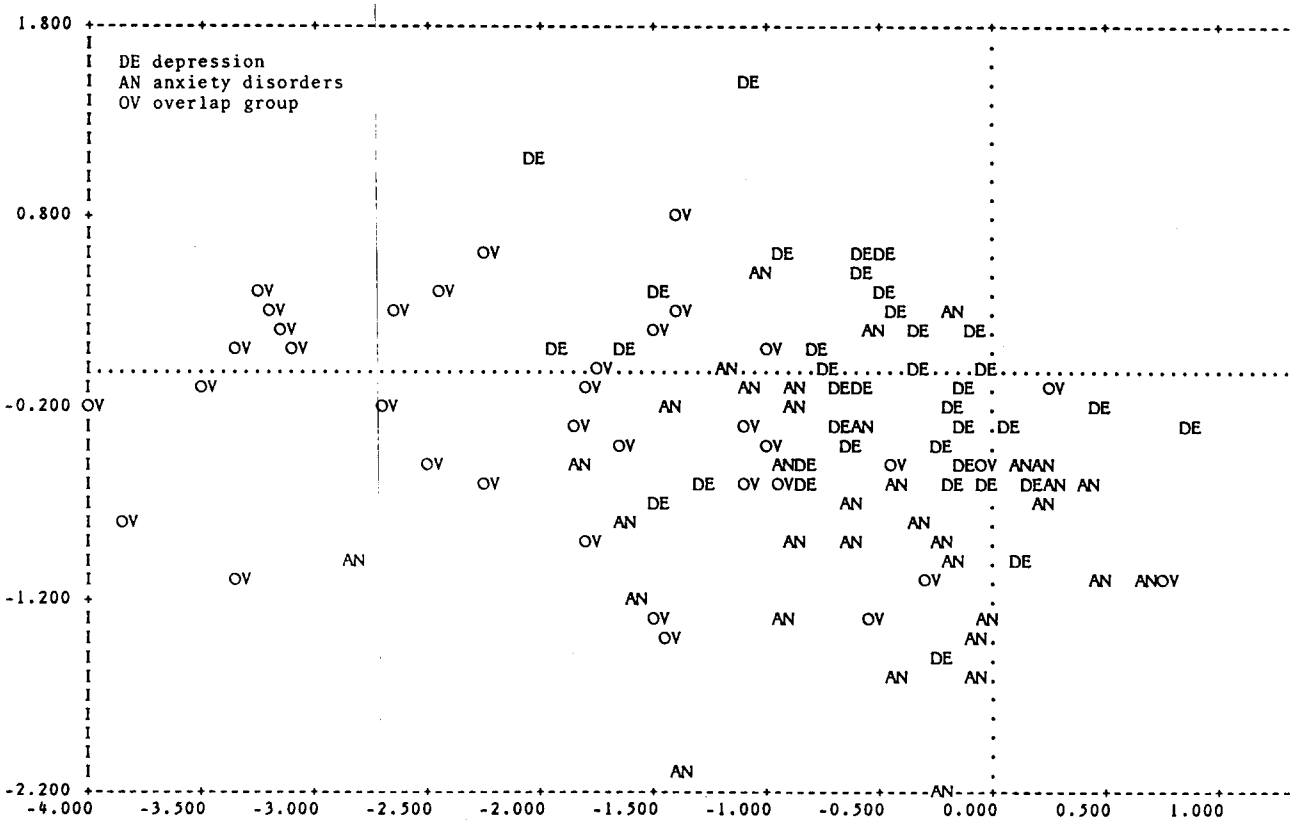

Fig. 3. Perpendicular projections of measurements onto the plane defined by the 2 eigenvectors. It is important to note that these eigenvectors are not necessarily orthogonal although the variables are uncorrelated. In the above case the angle between the 2 eigenvectors is 111.2 degrees and the mapping has been corrected with respect to this angle

Table 3. Loading matrix of SCL items

Item number	Item	Discriminating power of original variables, relative magnitude of	
		1st eigenvector	2nd eigenvector
SCL Scale depression			
05	Loss of sexual interest or pleasure	−0.26	−0.21
14	Feeling low in energy or slowed down	−0.10	0.36
15	Thoughts of ending your life	−0.14	0.22
20	Crying easily	−0.02	0.08
22	Feelings of being trapped or caught	−0.16	−0.11
26	Blaming yourself for things	0.12	−0.31
29	Feeling lonely	0.06	−0.27
30	Feeling blue	0.04	0.07
31	Worrying too much about things	−0.04	0.04
32	Feeling no interest in things	−0.08	0.43
54	Feeling hopeless about the future	0.18	0.18
71	Feeling everything is an effort	0.13	−0.10
79	Feeling of worthlessness	−0.40	−0.00
SCL Scale anxiety			
02	Nervousness or skakiness inside	0.03	−0.05
17	Trembling	−0.10	−0.10
23	Suddenly scared for no reason	−0.43	−0.12
33	Feeling fearful	0.08	−0.41
39	Heart pounding or racing	−0.07	−0.07
57	Feeling tense or keyed up	−0.21	0.05
72	Spells of terror or panic	−0.41	0.13
78	Feeling so restless you could not sit still	0.21	−0.10
80	The feeling that something bad is going to happen to you	−0.02	0.12
86	Thoughts and images of a frightening nature	0.17	−0.14
SCL Scale phobia			
13	Feeling afraid in open spaces or on the streets	−0.08	0.31
25	Feeling afraid to go out of your house alone	−0.24	0.12
47	Feeling afraid to travel on buses, subways, or trains	0.18	−0.20
50	Having to avoid certain things, places, or activities because they frighten you	0.14	0.13
70	Feeling uneasy in crowds, such as shopping or at a movie	−0.35	−0.04
75	Feeling nervous when you are left alone	0.18	−0.11
82	Feeling afraid you will faint in public	0.33	−0.07

Table 4. Correct classification by discriminant analysis

		n	Classification by discriminant analysis		
			Anxiety (%)	Overlap (%)	Depression (%)
Anxiety	group 1	38	61	13	26
Overlap	group 2	37	24	57	19
Depression	group 3	43	21	9	70

We also divided our material into those with phobic symptoms (simple/social phobia, agoraphobia with/without panic attacks) and those without phobic symptoms (anxiety states, panic attacks, or both combined) but found no significant difference in their overlap with major or minor depression. However, such a distinction is very artificial because anxiety states coexist rather frequently with phobia (Angst and Dobler-Mikola 1985b).

Next, we examined the overlap of these disorders at the symptom level, using the DSM-III criteria for major depression and RBD (SYM) for minor depression, and handling the anxiety disorders as one group. The individual composition of each group is given in Fig. 2. The overlap group consisted of 37 subjects and was broken down into a more anxious (Ad) and a more depressed (Da) subgroup. This distinction resulted from subjective assessment of the preponderance of anxiety/phobia versus depression on an analog scale (0–100). In cases of equal self-rating ($n = 9$), the respective subject was allocated to group Da.

4. Overlap in SCL-90 Items

The four groups A, Ad, Da, D, were compared in item frequency of depression, anxiety, and phobia on the three respective SCL-90 scales (Table 1).

SCL Items for Depression. To our surprise, group D was clearly less depressed than group Da. This was not explained by a preponderance of major depression in Da, group D had 67% major depression, group Da 30%, and group Ad 64%. Group-Da had the highest frequency in all 13 depressive

symptoms as compared to the other three groups. Even suicidal ideas were more prominent (30%) than in the other three groups (7%–8%).

SCL Items for Anxiety. In the same way we found no differences between the two mixed groups Ad and Da and the pure anxiety group A, all having prominent anxiety symptoms.

SCL Items for Phobia. These items were found in low frequencies in all four groups, and the differences cannot therefore be interpreted. But again, there was no visible trend in the direction that patients with anxiety disorder scored higher than those with depression.

5. Other Characteristics of the Four Subgroups (A, Ad, Da, D)

Table 2 presents some further characteristics of the four groups. The sex ratio varied substantially. It would appear that male and female probands had an equal risk for anxiety or phobia alone (without concurrent depression), whereas all subgroups with depression (Ad, Da, D) showed a preponderance of females. The four groups did not differ in family history of anxiety and/or depression, but as in treatment, there was a trend for higher rates in the two overlap groups (Ad, Da). The same was true for suicidal ideas and attempts. The mean values of the SCL subscales and total scale were highest in the two overlap groups. The same was true for the self-assessment of severity on the analog scale THERMO.

6. Discriminant Analysis

For several discriminant analyses, a division into four groups (defined in section 3) was used, taking into account the items of the three respective scales, and in a second step also the scale values. The following five discriminant analyses were computed: A vs (Ad+Da) vs D, A vs (Ad+Da), (Ad+Da) vs D, A vs D, (A+Ad) vs (D+Da).

A description of all the results would be too cumbersome. We present only the first analysis and concentrate on the question whether the overlapping cases (Ad+Da, $n = 37$) belonged to group A (anxiety disorders, $n = 43$) or to group D (depression, $n = 38$). Three discriminant analytic statistics are presented: discriminant loading matrix, distribution of the subjects on the discriminant function, classification rate.

Figure 3 provides the easiest insight into the results. The groups are projected on a two-dimensional draft defined by the two discriminant functions. The respective loading matrix is given in Table 3.

Figure 3 shows two results. On discriminant function 1 on the abscissa, the overlap group is mainly found on the left-hand side and fairly well separated from the other two. The items with the best discrimination are presented in Table 3. Items with negative loadings distinguished the overlap group best from the others. Essential is the fact that these items came from all three scales measuring depression, anxiety, and phobia (Table 3). The overlap group was more severely affected.

The two "clean" groups of depression and anxiety disorders are hardly distinguishable in Fig. 3. On both discriminant functions, they showed a considerable overlap. The correct classification rates are given in Table 4. Only 62% of the cases were classified correctly, the error rate being equal in all three groups (one-third).

Our conclusion is (1) that based on SCL-90 items, depression and anxiety disorders are hardly distinguishable, and (2) that the overlap group with both diagnoses must be just more severely affected. This conclusion is also supported by the four other discriminant analyses carried out. Even the exclusion of the overlap group for a comparison of the two "clean" groups of depression and anxiety disorder did not reveal results that would disprove our conclusion. As expected, the correct classification rate was better with 75%. But also in this case, the items discriminating best came from all three SCL scales in both groups, meaning that there is no real qualitative difference. The other analyses comparing overlapping groups with clean groups (either depression or anxiety disorder) gave similar results and are again compatible with the conclusion that this group is mainly characterized by a higher severity. Our basic hypothesis of a continuum between depression and anxiety disorder is therefore not refuted.

7. Discussion

In a random sample of normal young adults we identified 118 'cases': 38 anxiety disorder (32%), 43 major and minor depression (36%), and in 37 cases the presence of both diagnoses (31%).

The anxiety disorder group was certainly heterogeneous, consisting of subjects with a variety of syndromes mostly co-occurring (anxiety states, simple phobia, social phobia, agoraphobia, panic attacks). Details have been described elsewhere (Angst and Dobler-Mikola 1985b). We found, for instance, only 6 subjects (5%) with only phobia (simple phobia or agoraphobia or social phobia). Because of their rare occurrence we could not analyze those "clean" groups separately. Of the 76 cases 60 showed a coexistence of two or more diagnoses of anxiety disorder and did not fit into simple diagnostic schemes. This finding is similar to that of the New Haven population survey (Weissman et al. 1982) reporting that 30% of the phobics had panic disorder at some time in their life.

Most depressed patients are also anxious, and anxious patients depressed (Roth and Mountjoy 1982; Fawcett and Kravitz 1983). A vast literature is devoted to the question whether and how well depressive disorders and anxiety disorders can be separated. Reviews have been published by Derogatis et al. (1972), Marks and Lader (1973), Hamilton (1975), Klerman (1977), McNair and Fisher (1978), and Gersh and Fowles (1979). The main studies with positive results and a fairly good distinction stem from the Newcastle school and were based on two studies of inpatients. The final results have been summarized by Roth (1981), Roth and Mountjoy (1982), Mountjoy and Roth (1982a, b), confirming their earlier work (Gurney et al. 1972; Roth et al. 1972; Schapira et al. 1972). Other confirming studies have been based on psychiatric inpatients (Fleiss et al. 1971; Klerman 1977; Coryell et al. 1983; Vanvalkenburg et al. 1983) or outpatients (Claghorn 1970; Downing and Rickels 1974; Prusoff and Klerman 1974; Fawcett and Kravitz 1983; Kolvin et al. 1984). Together they support to a great extent the separation of depression and anxiety disorders (Klerman 1977).

A possible explanation for cooccurrence is secondary depression, which is considered to be a frequent complication of anxiety disorders in psychiatric patients (Schapira et al. 1972; Woodruff et al. 1972; Dealy et al. 1981; Davidson et al. 1980)

and in patients from medical clinics (Clancy et al. 1978; Noyes et al. 1980). The frequency of secondary depression in anxious patients varies between 33% (Dealy et al. 1981), 44% (Clancy et al. 1978; Noyes et al. 1980) and 50% (Woodruff et al. 1972). An important finding is that patients with or without secondary depression do not differ considerably in clinical characteristics or family history suggesting homogeneity (Dealy et al. 1981).

Unfortunately, the concept of secondary depression does not explain all facts. The temporary relationship between the occurrence of anxiety disorders and depression is not always plain and easy to assess. Breier et al. (1984) studied the occurrence of RDC major depression in 60 outpatients with agoraphobia and panic disorder retrospectively. A major depression was present in two-thirds of anxiety patients. There was evidence for all possible temporal relationships suggesting the existence of secondary anxiety disorders, secondary depression and also simultaneous and subsequent independent episodes of depression and anxiety disorder. Another fact to be considered is that in some cases, anxiety of depressed patients may be due to personality traits (Vanvalkenburg et al. 1983).

Another important study of inpatients and outpatients from psychiatric and nonpsychiatric facilities was published by Vanvalkenburg et al. in 1984. The authors compared four groups of patients, panic disorders (P), panic disorders and secondary depression (PD), depression (D), and depression with secondary panic attacks (DP) diagnosed by Feighner criteria. They were impressed by the similarities of the PD and DP groups in clinical symptoms, treatment response, chronicity, and family history of depression and anxiety states. The authors concluded that the findings would support a unitarian hypothesis; at least, they certainly did not disprove it. They seemed to be at variance with some other studies, e.g., Coryell et al. (1983) found an autonomy of the two diseases in course and family data. Also the genetic data published by Crowe et al. (1983) and Harris et al. (1983) supported the assumption of two separate diseases. However, another genetic study (Leckman et al. 1983b) found evidence of some genetic interrelation between panic disorders and depression, suggesting a common underlying diathesis and the existence of a distinct "anxious-depressive" syndrome (Leckman et al. 1983a). The "contradictory" findings were discussed in detail by Leckman et al. (1984) and explained by methodological differences. They consisted of difficulties in the selection of probands and controls, in diagnoses of anxiety disorders and depression in separating primary from secondary disorders, and in treatment settings.

The question whether depression and anxiety disorders can be separated has frequently been tackled on the basis of symptoms. Recently, Mullaney (1984) published a metaanalysis of 40 studies applying principle component analysis of symptoms presented by anxious and depressed patients. He found an amazing consistency over the 40 studies resulting in two factors, "anxiety" and "depression". This result points to the existence of a replicable factor structure of symptoms in both disorders, anxiety and depression, but does not exclude a continuum between them. Self-rating scales for anxiety and depression intercorrelate highly in hospitalized patients (Mendels et al. 1972). This is in agreement with Goldberg (1983) who found a substantial overlap trend in the general health questionnaire of patients from general practice.

Three American studies of outpatients provided evidence for the existence of a subgroup of anxious-depressives (Derogatis et al. 1972; Prusoff and Klerman 1974; Downing and Rickels 1974), a conclusion made by Gersh and Fowles (1979) in an extensive review of the literature. A cluster of anxious-depressed patients has also been described by Overall et al. (1966), Claghorn (1970), Paykel (1971), Paykel and Henderson (1977), and the concept was supported by the results of different drug treatments (Raskin et al. 1974; Johnstone et al. 1980; Crook 1982; Russell and de Silva 1983). Paykel (1983) therefore still maintained this label for a subgroup of depressive patients.

Reviewing the literature on separating anxiety from depression McNair and Fisher (1978) concluded that further knowledge is badly needed on the natural history of these disorders in untreated groups and future samples should be more representative. "Epidemiological and natural course of illness studies are required to separate the living from the dead hypotheses".

Unfortunately, there is a paucity of studies of community samples focusing particularly on the distinction between depression and anxiety disorders. Roth and Mountjoy (1982) summarized "the impression gained from community surveys is that states of anxiety and depression are inseparable from one another. But the available evidence is imprecise." In the 1979 National Survey of psychotherapeutic drug use, Mellinger and Balter (1981) gave some data for the age group 65–79 years. Balter (personal communication) indicated a 9% prevalence of anxiety, 4% depression and 10% mixed anxiety-depression. This means that 50% of the subjects suffered from mixed states. In the 1975 New Haven Community Survey of Weissman et al. (1978) an overlap in 12% of RDC anxiety disorders with major or minor depression at some time in their life was found (Weissman et al. 1982).

In the New Haven epidemiological catchment area survey (ECA) more than one-third of subjects with agoraphobia but no symptoms of panic had another psychiatric disorder, usually major depression (Weissman et al. 1982). The main results of the ECA Study (Regier et al. 1984; Eaton et al. 1984; Robins et al. 1984) are not available as yet.

A large epidemiological questionnaire study with a response rate of 64% of all living Australian twins aged 18 and over analyzed 3810 pairs (Jardine et al. 1984). The results of the Eysenck Personality Questionnaire (Eysenck and Eysenck 1975) and the anxiety and depression scales of Delusions-Symptoms-States Inventory (Bedford et al. 1976) are available. The authors found a high genetic covariation of symptoms of anxiety and depression, as well as a significant correlation of both with neuroticism, suggesting a genetic dependence on a single factor. However, there was also evidence for some genetic variation specific to depression.

Our study of a young homogeneous cohort from the normal population supports the unitarian hypothesis in several respects. On the diagnostic level, we found not only a great overlap of the subgroups of anxiety disorders but also an overlap in 37 of 118 cases (31%) with both subgroups of depression (major and minor depression) together. The remaining so-called pure groups still showed a great overlap, on the level of symptoms assessed by an interview and of self-assessed symptoms (SCL-90), considering symptom frequency and quality. Several discriminant analyses confirmed the overlap.

The overlap group is of particular interest. The hypothesis of a continuum is supported by the following characteristics of this group: typical SCL symptoms of all three factors (depres-

sion, anxiety, phobia) were simultaneously present. In addition, this is the most severely affected group which fact is illustrated by higher SCL-90 scale values, higher symptom frequency, a higher level of subjective suffering, and a higher treatment rate.

Including all epidemiological studies, Mapother's (1926) and Sir Aubrey Lewis' (1934) unitary hypothesis of a continuum between depression and anxiety disorders cannot be refuted. Another explanation since this is a young nonpatient sample would be that in the future these two disorders may clarify themselves.

The unsolved question whether the 'amalgamators' or 'subdividers' are right (Hamilton 1975) is not a personal one but a prerequisite for a dimensional or hierarchical classification of psychiatric disorders.

Acknowledgement. The authors thank P.J. Clayton, M.D., University of Minnesota, Minneapolis, for reviewing and advising in the preparation of this paper.

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Received September 3, 1985