Rolf Manz, Juliane Junge, Simon Neumer, Jürgen Margraf

Primary Prevention of Anxious and Depressive Symptoms in Adolescents

First Results from a Quasi-Experimental Study
Primäre Prävention von Angst- und depressiven Symptomen bei Adoleszenten. Erste Ergebnisse einer quasi-experimentellen Studie

This paper describes the design of a large scaled intervention study to prove the effectiveness of a prevention programme for anxiety and depression. In addition the development and application of a programme for the primary prevention of anxiety and depression in adolescents is presented. The treatment targets anxious and depressive symptoms, cognitive distortions and attributional styles as well as social skills in 14 to 18 year old high-school students. First results on the efficacy of the prevention treatment are reported. We found small but positive effects on cognitive and social risk factors over a 6 months period. The effects of the prevention programme depend on the fidelity of the treatment implementation.

Keywords: prevention, anxiety, depression, adolescents, treatment fidelity

Die Arbeit beschreibt das Design einer umfangreichen Interventionsstudie zur Überprüfung der Effektivität eines Programms zur primären Prävention von Angst und Depression.

Stichworte: Prävention, Angst, Depression, Jugendliche, Güte der Programmumsetzung

Introduction

Recent investigations of the WHO have shown the high prevalence of mental disorders in European countries (Üstün/Sartorius 1995). In spite of the high prevalence rates of mental disorders and the increasing knowledge about them, only rare attempts for primary prevention exist. While in the US the Clarke-group (Clarke et al. 1995) and the Seligman-group (Seligman et al. 1999) have developed prevention programmes for depression and have shown them to be effective. In Europe up to now there are no such attempts.

With support from the German Ministry for Research and Technology, the Dresden University of Technology launched a large research project to develop and
test a programme for primary prevention of anxiety and depressive disorders in adolescents and young adults. It is the first project on primary prevention of mental disorders in Germany. This article will give an overview of the study's aims, design, methods and first results.

Epidemiology of mental disorders in adolescents

There are only few recent epidemiological studies on mental disorders that cover adolescents and young adults (Wittchen 1995; Wittchen et al. 1999). Nevertheless there is limited knowledge about the onset of some of these disorders. In most disorders it can be located in late childhood and early adolescence (Burke et al. 1990; Kovacs et al. 1997). Especially simple phobias and social phobias have an onset at the age of 13 (Kessler et al. 1994). For major depressive disorders (MDD) the age of onset is about 14 years (Lewinsohn et al. 1994). Panic disorders and agoraphobia have an age of onset at 20 but in contrast to panic attacks they are highly indicative for more severe psychopathology (Reed/Wittchen 1998).

The course of anxiety and depressive disorders is of additional importance. Both anxiety and depressive disorders in adolescents show relatively low proportions of complete remission. The complete remission rates for MDD and dysthymia are about 43% and 33%, respectively (Oldehinkel et al. 1999). Comorbidity with other mental disorders are common, increasing the risk for poor outcome. Moreover other unfortunate impacts of these disorders are social isolation, alcohol, drug and tobacco abuse. Behavioural and cognitive impairment is likely to lead the young person to learning deficits and school problems. The prevention of anxiety disorders and depression therefore is of high Public Health relevance.

Primary prevention of mental disorders

Although there is no doubt about the importance of primary prevention within the scope of Public Health, at least in Germany this branch of research is deficient. This is unfortunate, considering that the proof of successful interventions is an evidence for causal risk models (Häfner 1996).

Whereas programmes for the primary prevention of tobacco and drug use are well known and proved to work effectively only partially (Bruvold et al. 1988; Ennet et al. 1994; Lynam et al. 1999), primary prevention of mental disorders is a relatively young research interest. Durlak and Wells (1997) recently reported results of a meta-analysis on primary prevention mental health programmes for children and adolescents. Programmes modifying the school environment and individually focussed programmes yielded significant effects ranging from .24 to .93. Especially in young children these programmes seemed to work effectively where affective and competence promoting programmes showed effects between .69 and .85. Behavioural and cognitive-behavioural forms of interventions were twice as effective than non-behavioural techniques.

Objectives

The study's main objective is the development, evaluation and implementation of a programme for the prevention of depressive and anxiety disorders in adolescents.
In addition to the general psychopathology knowledge base, programme development was based on the work of Beck (1976) and others on depressive disorders as well as the work of Margraf and Schneider (1990) on anxiety disorders. Although the role of cognitive distortions and deficiencies in the aetiology of depressive and anxiety disorders is not yet completely understood (Sweeney et al. 1986), their potential as risk factors are at least probable. The programme contains both disorder-specific and general health promoting components. Cognitive-behavioural techniques, information about stress and mental disorders as well as training of social skills are used to enhance coping, mastery and competence of the students to face negative life events and other situations that might enhance their risk for developing mental disorders. Practice transfer will be achieved by implementing the programme in mental health care and educational settings in Saxony. The development of extensive training materials and the training of moderators such as teachers will serve this purpose.

Methods

Design

With the use of a quasi-experimental intervention study design, adolescents who are at an increased risk for developing depressive or anxiety disorders are investigated. To test the effectiveness of our prevention programme after pre-intervention measurement high-school classes are randomly admitted to either treatment or control groups. Programme evaluation will involve a prospective 18 months follow-up.

Screening measures and definition of implicit risk-groups


The Youth Self-Report (YSR; Achenbach & Edelbrock 1987) is a standardised, empirically-based dimensional inventory for the assessment of adolescent problem behaviours and competencies. The self-report instrument has been used extensively in previous research on psychopathology in childhood and adolescence. As a general indicator for psychopathological impairment a total score is computed.

Psychiatric diagnoses: To assess clinical diagnoses in our sample the original Diagnostic Interview for Mental Disorders (DIPS; Margraf et al. 1991) was adopted for the use with adolescents and to obtain current and lifetime diagnoses, including childhood diagnoses (Mini-DIPS-J; Margraf/Junge 1998). The structured clinical interview is based on the Diagnostic and Statistical Manual of Mental Disorders, 4th ed. (DSM-IV; APA 1994). The structured interviews were conducted individually in a private location after regular classroom periods.

Interviewers were recruited from the clinical psychology programme at the Dresden University of Technology. They were already extensively pre-trained in the use of structured clinical interviews, especially the DIPS, through the
university psychology programme. Nevertheless interviewers took part in a comprehensive additional training seminar consisting of two 8-hour training sessions during which the criteria for the relevant disorders were reviewed. Coding and interviewing skills for the modified DIPS-version were taught with the use of role-playing techniques under supervision. Interviewers were continually supervised by the authors during the study. Interview forms were reviewed on-site to assure quality and address difficulties immediately.

Subjects
Letter of consent forms describing the prevention programme were sent to all parents of 9th and 10th grade students of 4 randomly selected high schools in Dresden, Germany. After this a total of 627 male and female adolescent students aged 15-17 took part. These are 90.2% of the initial pool of all 9th and 10th graders of these schools. The prevention programme was administered to 325 students in the classroom setting. Further 302 students served as a control group. All school classes were randomly assigned to either treatment or control conditions. High risk criteria for the development of anxiety or depressive disorders have been expected to be met by 30% of the students in both, the treatment and the control group. This procedure was employed so that the investigation could be carried out within the classroom setting and to reduce selection bias (for details see Manz et al. 2000).

Measures of risk factors
In addition to the impairment and symptom measurements mentioned above we administered instruments that cover cognitive, social and behavioural risk factors. An extensive examination before treatment included the registration of the mental state of health as well as typical risk factors for the development of depressive and anxiety disorders. Cognitive styles, attributive patterns and self-efficacy expectations, self security and self esteem, social support and social behaviour and avoidance behaviour were assessed. These factors serve as predictors of changes in the dependent constructs (anxiety and depression) during the course of the training.

The cognitive factors considered were dysfunctional attitudes and anxiety sensitivity as risk and self-efficacy as protective factors.

Explanatory styles were measured by the Dysfunctional Attitude Scale (DAS: Weissmann/Beck 1978 [German: Hautzinger et al. 1985]) a self-report measure that contains 40 items that represent different aspects of cognitive distortions.

Anxiety sensitivity (Peterson/Reiss 1987; Reiss et al. 1986) describes a person's tendency to interpret his or her physical reactions as dangerous and health threatening. The construct was measured by a 16 items self-rating questionnaire.

Self-efficacy (Bandura 1982) enhances a person's ability to cope with threatening situations. Individuals feel that they have the ability to master stressful situations. The self-report measure applied (German: SWIE; Schwarzner 1994) includes 10 items.

The social factors considered were social support and self-security as protective factors:
Social support was measured by a comprehensive questionnaire for social support (German: SOZU-K; Fydrich et al. 1987).

Self-security was measured by three sub-scales of a social security and social behaviour questionnaire (German: U-Fragebogen; Ulrich de Mynck/Ulrich 1976).

The behavioural factors considered were avoidance behaviour and social behaviour.

Avoidance behaviour was measured by three scales of the fear questionnaire (FQ; Marks/Mathews 1979).

Social behaviour was measured by three sub-scales of the „U-Fragebogen“ (see above).

Measure of psychological knowledge

To assess the gain in psychological knowledge during the programme we administered a 30 items multiple choice test regarding the programme specific psychological knowledge. The test was administered pre and post intervention in the treatment and the control group.

Data analyses

We used analyses of variance for repeated measurement to analyse our data. To reduce the number of variables to be compared between treatment and control group factor analyses were carried out for each set of variables representing cognitive, social and behavioural factors and for the variables measuring symptoms. For each set of variables main component analyses were carried out for each time point. On the basis of these main components factor scores were calculated and z-transformed. The following analyses are based on these factor scores. As the factor scores are standardised for each time point with its mean set to zero the pure time effects which are not of interest here were diminished from the data. The first components showed variance explanation between 38,9 and 46,9% for the cognitive, 57,8 and 62,0% for the social, 46,2 and 55,2% for the behavioural and 65,5 and 68,1% for the impairment variables. Therefore each construct is well represented by these first factors. The cognitive construct was defined by risk factors as well as by a protective factor (self efficacy). Self efficacy was represented by a negative factor loading on the first components of the cognitive variables.

Sample characteristics

The age cohort to be studied is particularly relevant to the early manifestation of anxiety and depressive disorders and their prevention. Table 1 gives an overview of demographic characteristics of the students. There are no differences between the treatment and control groups with regard to age, marital status of the parents and family social status.

According to the central question of our work, the primary prevention of mental disorders, we defined three subgroups. Where „cases“ are students that suffer from impairment of clinical relevance, „at risk“ are students that reach impairment not actually at clinical relevance but subclinical and therefore at risk.
Table 1: Demographic Variables by group (percentages)

<table>
<thead>
<tr>
<th>Variables</th>
<th>High-School (treatment) n=325</th>
<th>High-School (control) n=302</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean/SD)</td>
<td>15,5/0,8</td>
<td>15,4/0,8</td>
</tr>
<tr>
<td>(range)</td>
<td>14 – 18</td>
<td>14 – 17</td>
</tr>
<tr>
<td>Sex (male/female; %)</td>
<td>41/59</td>
<td>42/58</td>
</tr>
<tr>
<td>Parents married (%)</td>
<td>79</td>
<td>78</td>
</tr>
<tr>
<td>Family Social Status (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>academic</td>
<td>8,3</td>
<td>7,2</td>
</tr>
<tr>
<td>self-employed</td>
<td>14,1</td>
<td>16,6</td>
</tr>
<tr>
<td>civil servant</td>
<td>10,2</td>
<td>7,2</td>
</tr>
<tr>
<td>white collar worker</td>
<td>55,6</td>
<td>58,6</td>
</tr>
<tr>
<td>blue collar worker</td>
<td>10,9</td>
<td>8,2</td>
</tr>
<tr>
<td>other</td>
<td>0,9</td>
<td>2,4</td>
</tr>
</tbody>
</table>

to develop a disorder, "normal" are students without any clinically relevant impairment.

Case definition: by using self rating instruments there must be an operational case definition. "Cases" of self rated clinical anxiety or depression are students that score 18 and above on the BDI or 24 and above on the BAI (cases: BDI > 17 or BAI > 23). For both instruments these are the cut-offs for the 90th percentile. "At risk" is defined as 11 to 17 points on the BDI or 16 to 23 points on BAI and neither on BAI nor on BDI scores that would define a "case" (at risk: BDI 11 – 17 and BAI < 24; or BAI 16 – 23 and BDI < 18). For both instruments this defines the 75th to 89th percentile. "Normal" is defined by scores on BDI lower than 11 and scores lower than 16 on BAI (normals: BDI < 11 and ADI < 16). Prevalence of "at risk" status indeed is about 28,2% ranging from 21,8% in males to 32.6% in females (see Fig. 1). Additional 13,1% already reached the "case" criteria.

Figure 1: Anxiety and depressive impairment of 627 Dresden students aged 14 to 18 (prevalence rates according to operational criteria, BDI and BAI)
The prevention programme „GO!“ (Health and Optimism)

The development of the programme began within a pre-test target group of 75 students 15 to 17 years old. These first experiences led to a number of modifications of the programme. An overview of the topics of the final „GO!“ programme gives table 2.

The programme is based on a method by Gillham and co-workers successfully applied to prevent depressive symptoms in younger children (10 to 13 years old) (Gillham et al. 1995; Jaycox et al. 1994). For the application in German-speaking areas this programme was considerably modified and supplemented by a specific part for the prevention of anxiety disorders.

Table 2: Topics of the prevention program „GO!“ by session

<table>
<thead>
<tr>
<th>Session</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction: what is stress, analysis of risk factors for adolescents, development of a four component stress model</td>
</tr>
<tr>
<td>2</td>
<td>Cognition and Emotions: personal aims, stress experiment, cognition – emotion-behaviour circle, automatic thoughts</td>
</tr>
<tr>
<td>3</td>
<td>Anxiety: three components of anxiety, maladaptive anxiety, self confrontation</td>
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<tr>
<td>4</td>
<td>Depression: depressive thinking, cognitive distortions, logical mistakes, dysfunctional attitudes</td>
</tr>
<tr>
<td>5</td>
<td>Social Competence and Assertiveness: insecure – aggressive – self secure behaviour, assertive behaviour</td>
</tr>
<tr>
<td>6</td>
<td>Stress and Coping: habits – attitudes – behaviour, time management techniques, relaxation techniques</td>
</tr>
<tr>
<td>7</td>
<td>Problem-solving: general structure of rational problem solving, techniques for solving social problems</td>
</tr>
<tr>
<td>8</td>
<td>Repetition, feedback, outlook, discussion</td>
</tr>
</tbody>
</table>

One part of the curriculum (see Table 2) involves general information about anxious and depressive moods as well as on anxiety and depressive disorders. The treatment components specifically relating to depression are based on the work of Beck (1976), Ellis (1962), and Seligman (1991) (i.e., correcting negative convictions, elaborating explanatory styles as well as replacing negative and inappropriate causal attributions by realistic ones). Components specifically relating to anxiety disorders are based on the studies of Margraf & Schneider (1990) (i.e., information about anxiety such as three-component-model, temporal course of anxiety reactions and implications for ways of coping with them, meaning of misinterpretation and auto-suggestive processes, vicious-circle-model, training of self-exposure techniques, and techniques for modifying cognitive distortions). In addition, the programme contains unspecific components like the training of personal skills because health and social competence promotion is an effective way to prevent mental health problems (Elia 1995; Leon et al. 1980). These are social skills and problem solving techniques, clarification of personal goals and intentions prior to engaging in action, anticipation of the consequences of one's actions, self-confidence training, and relaxation techniques.
Programme application

Carrying it out in the unit of a class is an easy access to a group homogenous in the age of the first manifestation of the discussed disorders. The prevention programme „GO!“ was conducted within groups of 15-18 participants in a classroom setting. The net time to be spent on the programme was 12 hours, the programme's overall duration 8 weeks. The newly developed prevention programme (Junge et al. in press) was carried out by two supervised trainers in school classes in eight double lessons. 23 trainers carried out the programme at 4 high-schools. 12 of them only carried out only 1, 11 trainers 2 and 1 trainer 3 groups. 21 of them were females and 2 were males.

Results

Since our programme is educative and knowledge is one precondition for behavioural and cognitive change we assessed the effects of the treatment on the psychological knowledge of the students. Boys and girls showed considerably good improvement of their knowledge in comparison to the control group \((F = 111.1, p = .000)\) (Fig. 2).

Figure 2: Psychological knowledge before and after the prevention programme GO! (treatment n= 106; control n=155)

To examine the efficacy of preventive strategies it is useful to distinguish between proximal and distal effects. Proximal effects are effects on the risk factors themselves i.e. cognitive, behavioural and social factors that lead to psychological impairment and mental disorders. Distal effects are effects on psychopathological state. In general we found considerably small effects of the treatment.

Proximal effects

As we assessed a lot of variables representing the different proximal areas we carried out principal component analyses to reduce data. The cognitive area was represented by dysfunctional attitudes (DAS), anxiety sensitivity (ASI) and self-efficacy (SWE). For the first component of these variables we found significant pre-post differences that remain stable until 6 month follow-up for boys \((F = 2.925, \text{df} = 2/252, p = .050, (\text{eta}^2 = .023)\). The mean scores are shown in figure 3. For the girls this effect did not reach statistical significance \((F = 0.492, \text{df} = 2/528, p = .611)\).
Figure 3: Mean z-scores for the first social factor; boys: treatment (n=72) vs. control (n=65)

The first component of the behavioural risk factors did not show significant pre-post differences and no effect during the follow-up period.

Social factors were assessed by sub-scales of a questionnaire on self-security (UFB) and a questionnaire on social support (SOZU-K). For the first main factor of these variables we found treatment effects neither for boys nor for girls.

Distal effects

Although our prevention programme includes some therapeutic techniques the main elements are educational and only small effects on psychopathology are to be expected. We found no significant treatment effects on psychopathology measured by the YSR, BAI and BDI. Fig. 4 shows the mean scores for the first component of these instruments. Neither the boys nor the girls gained from the treatment. The girls showed increasing scores from pre to post that may indicate a „sensibilisation“ by the treatment.

Figure 4: Mean z-scores of the first component of the impairment measures for boys and girls, each treatment by control group.

Other effects

Comparing the effects of the treatment for the different schools lead to the following results: There are significant three way effects (time x treatment x school)

for the cognitive \( F = 2.154, \text{df} = 6/802, p = .045, (\text{eta}^2 = .016) \) and the social \( F = 2.828, \text{df} = 6/794, p = .010, (\text{eta}^2 = .021) \) factors indicating different efficacy of the programme. The students of school #4 in treatment gained significantly in two proximal areas (see fig. 5). The time x treatment effects for school #4 are as follows: social \( F = 5.282, \text{df} = 2/122, p = .006, (\text{eta}^2 = .080) \) and behavioural \( F = 3.389, \text{df} = 2/108, p = .037, (\text{eta}^2 = .060) \).

Figure 5: Mean z-scores of the first components of the social \((n=20/43)\) and behavioural \((n=19/37)\) measures for students of school #4, each treatment by control group

Discussion

Our prevention programme „GO!“ (Junge et al., in press) has been developed based on the work of Seligman, J.M. and others on depressive and anxiety disorders. The programme includes the modification of dysfunctional thinking and attributional styles. Thus, we expect it to work effectively in the prevention of anxiety and depression for people „at risk“ and „cases“. Beside these specific components, the programme also contains general health promoting components like the training of social skills. These health promoting components are necessary at least for two reasons. First they enhance protective resources of the person like social support and reduce risk for developing mental disorders. A further reason to introduce health promoting components to our programme comes from the application in an unselected sample. Unlike Gillham and colleagues we did not explicitly select people at risk for intervention, so we might expect to have a mixed sample of „normals“ people „at risk“ and „cases“ together when administering the programme. Muños (1993) pointed out that an overlap of primary prevention and therapy always is to be expected because „normals“ and people „at risk“ can not be distinguished perfectly by operational criteria. Therefore the claims to the programme are high. It should work effectively for „cases“, people „at risk“ and at the same time it should be interesting enough for „normals“ to take part.

This concept offers some advantages to the study of primary preventive programmes. First of all, to avoid selection bias to programme participation. This strategy worked well because 90.7% of the high-school students who have been selected for treatment took part and selection bias is reduced to a minimum. Of additional advantage is the possibility to prove the programm’s preventive as well as its health promoting effects.

The health promoting as well as the preventive effects of the programme are considerably small. We found effects only for the cognitive, the social and the
behavioural proximal factors and for treatment specific knowledge. This is in line with the experiences of Clarke et al. (1993). The authors reported that they found no effects of two educational oriented prevention programmes administered to unselected pupils. In a later study (Clarke et al. 1995) found good preventive effects of a modified prevention programme. Gillham et al. (1995) reported positive effects of their prevention programme, and Seligman et al. (1999) also found positive effects in a highly selected sample of high-school students. These authors used different strategies for pre-selection of the participants by the psychopathological or the cognitive risk status. Therefore it can be speculated that using a pre-selection strategy would lead to considerably better effects of our prevention programme (Manz 2000). In an unselected population the programme yet does not work sufficiently.

A comparison of the schools involved in the study showed different treatment effects. Particularly the students in school # 4 gained from the treatment. A comparison of socio-economic factors between the schools indicated no difference between them (chi² = 25,508, df = 21, p = 0.371). But school # 4 was the last school where the treatment started. All the trainers that have been working in school # 4 had good experience with the programme while in the other 3 schools most of the programmes had been administered by un-experienced trainers. It is well-known that the effect of preventive programmes for instance in drug prevention depend on the fidelity of the programme application (Botvin et al. 1990). Trainer competence and adherence to the manual significantly enhance the effects of preventive strategies. At school # 4 these criteria have been fulfilled sufficiently and these results underline the preventive as well as the health promoting potential of our prevention programme GO! They also point out the importance of a quality assurance strategy when implementing the programme into routine.

References


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Kontakt:
Dr. Rolf Manz, Dresden University of Technology, Research Association Public Health Saxony
Fiedlerstraße 33
01307 Dresden, Germany
Tel. 0049 -351 – 4333016, Fax 0049 -351 – 433300
eMail: manz@rcs.urz.tu-dresden.de