Manual for the Benzodiazepine Dependence Questionnaire (BDEPQ)

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Description

The Benzodiazepine Dependence Questionnaire (BDEPQ) is a 30 item self report questionnaire designed to measure dependence on benzodiazepine tranquillisers, sedatives, and hypnotics. Items cover all aspects of the dependence syndrome with the exception of withdrawal symptoms. Each item is rated on a four point likert scale referring to experiences in the last month.

Rationale and Background

The BDEPQ was developed because no measure existed to assess dependence on BZDs on a continuum.

Existing measures of benzodiazepine dependence either focus on withdrawal symptoms (Ashton, 1984, 1991; Busto, Sykora, & Sellers, 1989; Merz & Ballmer, 1983; Pecknold, McClure, Fleuri, & Chang, 1982; Petursson & Lader, 1984; Rickels, Schweizer, Case, & Greenblatt, 1990b; Tyrer, Murphy, & Riley, 1990) or categorical diagnosis (Cottler et al. 1991, Wittche et al.,1991). For other drugs of dependence self-report scales yielding continuous measures have been used clinically and in research (Davidson, 1987; Stockwell, Murphy, & Hodgson, 1983; Sutherland, Edwards, Taylor, Phillips, Gossop, & Brady, 1986).

Many authors have developed rating scales to quantify BZD withdrawal symptoms (Ashton, 1984, 1991; Busto et al., 1989; Merz & Ballmer, 1983; Pecknold et al., 1982; Petursson & Lader, 1984; Rickels et al., 1990b; Tyrer et al., 1990). Others have used general anxiety rating scales such as the Hamilton Anxiety Rating Scale (Hamilton, 1959) to assess BZD withdrawal (Lader, 1983; Noyes, Garvey, Cook, & Suelzer, 1991; Petursson & Lader, 1981; Power, Jerrom, Simpson, & Mitchell, 1985; Rickels et al., 1990b; Schweizer, Rickles, Case, & Greenblatt, 1991). While some of these scales may be of use in research and in the management of BZD withdrawal syndromes, none assess the wider concept of dependence.

Structured diagnostic interviews (Cottler et al., 1991; Wittchen et al., 1991, for example) provide categorical assessment of ICD and DSM criteria for BZD dependence. Counts of the BZD dependence symptoms present can be used as a more sensitive indication of the severity of dependence.

Non-categorical assessment of BZD dependence from a broader view is desirable for more than conceptual purity. Golombok et al. (1987) have reported that the severity of withdrawal symptoms reported do not predict longer term abstinence from BZDs. A fuller assessment of BZD dependence may be able to make predictions of BZD withdrawal as measures of alcohol dependence can predict severity of withdrawal during alcohol detoxification(Stockwell et al., 1983). The relationship between BZD dependence and related constructs such as state-anxiety or neuroticism needs further work. Rickels, Case, Schweizer, Garcia-Espana, and Fridman (1990a) have reported that higher scores on Eysenck's neuroticism scale (Eysenck & Eysenck, 1975) predict severity of withdrawal symptoms.

Careful assessment must be part of any intervention to assist people to withdraw from BZDs. As recommendations for the use of BZDs have changed in the last decade (Priest & Montgomery, 1988; NH&MRC, 1991) a substantial number of people may be using BZDs more frequently and for longer than is currently appropriate. Mant (1991) has estimated that about 330,000 Australians (2.7% of the adult population) used a BZD every day for six months or more in 1989/90. This is outside current guidelines. Appropriate assistance for these people when they choose to withdraw should be guided by careful assessment.

There are three reasons for developing a broader measure of BZD dependence. Firstly such a measure may be able to predict the success of attempts to cease BZD use. Secondly a broader concept may assist in the understanding of the processes underlie BZD dependence. Finally there is a pressing need for assessment devices to assist clinicians to withdraw those patients whose long term BZD use is harmful.

The WHO dependence syndrome (Edwards & Gross, 1976; Edwards, Arif, & Hodgson, 1981) had a significant influence over the conception of dependence from which the BDEPQ was developed. In addition ideas about craving (Kozlowski & Wilkinson, 1987) and beliefs and attitudes (Wright, Beck, Newman, & Liese, 1993) to BZD use were considered. The notion of psychological dependence has been prevalent for some time. Eddy, Halbach, Isbell, and Seevers (1965) claim that any agent that produces a reduction in tension or anxiety will lead initially to 'psychic' dependence. They list chlordiazepoxide, the first BZD to be marketed, among other sedating and tranquillising agents as confirming their claim. DSM-IV (American Psychiatric Association, 1994) describes a diagnosis of *substance dependence without physiological dependence* were neither tolerance or withdrawal is evident. One aim of this paper was to explore the psychological aspects of dependence on BZDs from a cognitive perspective. From such a perspective a person's beliefs and attitudes about their use of BZDs may have some role in their continued use (Wright et al., 1993). When applied to other substances cognitive theories have yielded useful interventions such as relapse prevention(Marlatt & Gordon, 1985). Our understanding of concepts is advanced by our ability to measure them, thus items reflecting beliefs about BZDs were included in the scale.

Benzodiazepine dependence

History of benzodiazepine dependence

The BZDs were initially thought to be free of the addictive properties of the barbiturate drugs they largely replaced. However, Hollister, Motzenbecker, and Degan (1961) reported a withdrawal syndrome in people who had been given quantities of chlordiazepoxide much larger than recommended therapeutic doses. Since the publication of that paper there has been considerable controversy over the putative harm and/or dependence producing properties of BZDs. Over the next 20 years many other reports were published describing a withdrawal syn-

drome in people who had used BZDs within therapeutic doses (Ashton, 1984; Covi, Lipman, Pattison, Derogatis, & Uhlenhuth, 1973).

Evidence mounted that BZDs could produce withdrawal symptoms and the conclusion that they could produced dependence first appeared in the early 1970s. A search of the *Medline* database by the author revealed that the first use of the words 'benzodiazepine' and 'dependence' in the title or subject keywords of a publication[1] was in late 1974 (Greenblatt & Shader, 1974; Kellett, 1974). Earlier Eddy et al. (1965, p. 726), reporting on the WHO Expert Committee on Addiction-Producing Drugs, claimed that

> '...all agents which produce barbiturate-like sedation, because of the relief of anxiety, mental stress, etc., should produce some psychic dependence and, for the reasons enumerated for dosage increase, physical dependence when a sufficient concentration in the organism has been attained. This possibility has been confirmed for many sedative agents of different types, including barbiturates and the so-called non-barbiturate sedatives such as glutethimide, methyprylon, meprobamate, *chlordiazepoxide*, bromisoval, chloral hydrate and paraldehyde, but there may be exceptions.' (*emphasis added*)

Aside from the assumption that exposure to a drug leads to dependence upon it, it is surprising to note the inclusion of chlordiazepoxide (*Librium*) in the discussions of this eminent committee only four years after Hollister et al. (1961) first reported BZD withdrawal symptoms. Their emphasis on 'psychic dependence' is notable as most commentators (Ashton, 1991; Lader, 1983; Marks, 1985) focus on the production of withdrawal symptoms and tolerance as indicating dependence, the signs of so-called 'physiological' dependence.

It is now widely accepted that humans can become dependent on BZDs (World Health Organization Review Group, 1983; NH&MRC, 1991; Woods, Katz, & Winger, 1987, for example) and evidence for this will not be presented. A full review of the evidence for or against this proposition is available elsewhere (Cappell, Sellers, & Busto, 1986; Woods et al., 1987). However, it should be noted that the addiction potential of BZDs is much lower than similar medications like the barbiturates.

Conceptualization and features of benzodiazepine dependence

Many authors describe dependence on BZDs in terms one or more of the signs of so-called 'physiological' dependence: a withdrawal syndrome and tolerance to the drugs effects. The distinction between 'psychological' and 'physiological' dependence is implicit in these descriptions. As is the reductionist assumption that 'physiological' dependence is of greater importance. This customary definition of

[1]Excluding those publications describing the use of BZDs as an aid to alcohol detoxification

BZD dependence remains popular despite the WHO recommendation that it be ceased (Expert Committe on Addiction-Producing Drugs, 1964).

The recent recommendations made by the NH&MRC (1991) are an example of the above distinction in the way BZD dependence is commonly presented. On page two of their recommendations NH&MRC (1991) suggest that people dependent on BZDs fall into two categories of 'physiological dependence' and 'benzodiazepine dependence syndrome'. The first they define by the presence of withdrawal symptoms on cessation of BZD use while the second is defined by the DSM3R criteria for dependence. This taxonomy of BZD problems is presented without any empirical evidence. The notion of a continuum, from a non-dependent state to a highly dependent state, which was part of the *WHO dependence syndrome*, is missing in the NH&MRC taxonomy. There is no apparent reason why the NH&MRC could not have cited the DSM3R diagnoses of sedative, hypnotic, or anxiolytic withdrawal in place of the 'physiological dependence', making their taxonomy consistently reflect DSM3R. There seems to be a persistence in using the 'physiological dependence' concept which is not restricted to the NH&MRC, but appears in many other publications (Lader, 1983; Marks, 1985; Miller & Gold, 1990).

As an alternative to the 'physiological dependence' conceptualization of BZD dependence, the following paragraphs discuss how the features of the *WHO dependence syndrome* might apply to BZDs. Each of these features are likely to vary in severity and the more highly dependent BZD user is likely to show more of the features at higher levels of severity. The relationship between the severity of each feature and the overall severity of BZD dependence is of importance but is not yet known.

- *Subjective compulsion to use BZDs.* Many therapeutic dose users of BZDs will take them not because they have a desire or compulsion to do so, but because they were prescribed or because they have always taken them. Some BZD users who have tried to stop using BZDs abruptly without assistance and experienced withdrawal symptoms, especially insomnia, may feel that they have no alternative other than to continue to take BZDs. This hopeless feeling may be considered a compulsion, however, it appears to have more 'rational weighing up of alternatives' than is meant by compulsion.

- *Desire to stop BZD use.* While few therapeutic dose users will report a compulsion to use BZDs, many are concerned about continuing to use BZDs and, in this sense, have a desire to stop BZD use. However, this type of desire may be driven by personal and societal views about the use of drugs rather than by the harmful consequences of BZD use. At higher levels of BZD dependence a desire to stop drug use similar to that observed in problem drinkers and those dependent on opiates may occur.

- *Stereotyped pattern of BZD use.* Many therapeutic dose users of BZDs will

always take their BZDs in the same way at the same time. For example they may take a BZD at the same time each night as they get into bed to read. However, while this behaviour may be habitual, it is unlike the progressive narrowing of drug use behaviour as described by Edwards et al. (1981).

- *Evidence of neuroadaptation to BZDs.* There is abundant evidence that BZDs produce withdrawal symptoms. These can range in severity from mild malaise to grand mal seizures (albeit rare). Symptoms of BZD withdrawal are listed in Table 11. Some BZD withdrawal symptoms are very similar to symptoms of anxiety, however, other BZD withdrawal symptoms, such as perceptual distortions, are more rarely reported as anxiety symptoms. Thus some differentiation between symptoms of anxiety and of BZD withdrawal can be made (Busto, Sellers, Naranjo, Cappell, Sanchez-Craig, & Sykora, 1986). Rickels et al. (1990b) suggest that approximately 40% of people who have used BZDs for longer than one year will experience withdrawal symptoms if they stop abruptly. For some the length of the withdrawal syndrome has been reported to be as long as six months (Ashton, 1991).

  Tolerance to BZDs is mostly evidenced by the same dose of BZDs having a reduced effect. Rarely will therapeutic dose users show the dose escalation demonstrated in other drugs in order to maintain the same drug effect. There is some evidence that tolerance to the sedative, anticonvulsant, muscle relaxant and anxiolytic effects occurs at different rates with anxiolytic effects the most resistant to tolerance (Busto & Sellers, 1991).

- *Withdrawal avoidance and relief.* Anecdotally the avoidance of withdrawal is thought to be one of the main reasons why people continue to consume BZDs. Because the symptoms of BZD withdrawal may be similar to the problems for which the person originally took BZDs it difficult to know whether a person is taking a BZD to avoid or relieve their problem or to avoid or relieve BZD withdrawal.

- *Salience of BZD use over other priorities.* Because BZDs have long half-lives relative to other drugs, can be legally used, and are easily obtained, their effects seldom prevent involvement in other activities. This phenomena is more likely in polydrug users, for whom BZDs may not be the preferred drug. In many cases BZD use will allow people to become more active members of society.

- *Rapid reinstatement after abstinence.* This feature of the *WHO dependence syndrome* has proved difficult to assess and has not been included in either DSM3R or ICD10. It would seem unlikely for this characteristic to occur in therapeutic dose BZD users.

Many of the features of the *WHO dependence syndrome* described above are considered to be rare in therapeutic doses users of BZDs.

Aims for scale development

Baillie (1992) and Baillie and Mattick (1994) aimed to develop a scale which

- was internally consistent,
- had a simple factor structure,
- was relatively stable over time,
- was related to other measures of BZD dependence,
- was unrelated to the pattern of BZD use,
- did not include measures of BZD withdrawal symptoms as these were assessed by many other measures,
- was unrelated to measure of other constructs such as anxiety, depression, sleep quality, and neuroticism, and
- was able to predict future BZD use and withdrawal symptoms.

Administration

The BDEPQ is intended to be used as a self administered questionnaire. Some supervision of subjects may be necessary to answer questions.

Checking that there are responses to all appropriate items is important. Older subjects were more likely to return incomplete questionnaires in the mail surveys described by Baillie (1992).

The BDEPQ should not be used while a subject is experiencing strong withdrawal symptoms such as during detoxification or during periods of high anxiety. Testing should be postponed under these or similar circumstances.

Where subjects are not able to read the questionnaire it may be advisable to read the items and responses to them as they are written.

Administration and scoring of the BDEPQ require no training beyond basic clerical skills. However, because the BDEPQ is under development it should only be interpreted by psychologists trained in psychometric theory.

Scoring Instructions

Scoring the BDEPQ requires no more than basic clerical skills. The following steps describe how to calculate a total score and scores on the three subscales.

1. Score the items as follows (anchor labels are ommited below)

a. Score most items as

b. except items 2, 5, 6, 9, 12, 16, 17 and 23 which are reversed. Score these as

c. Score the second part (b) of two part items (items 10a & b, 18a & b, 20a & b, 21a & b) as 0 if the first part (a) is scored 0.

d. Ignore item 14a.

e. Score item 11 as

3 ☐ No, it would be impossible
2 ☐ Perhaps, with a lot of difficulty
1 ☐ Yes, with some difficulty
0 ☐ Yes, without difficulty

2. Sum the items to give a total score.

3. Optionally calculate subscale scores as follows

a. sum items 1, 6, 7, 10a, 10b, 14b, 15, 16, 17, 19, 20a, 20b, 21a, and 22 to give a score on the *General Dependence* subscale.

b. sum items 2, 13a, 13b, 18a, 18b, and 21b to give a score on the *Pleasant Effects* subscale.

c. sum items 3, 4, 5, 8, 9, 11, 12, 23, 24, and 25 to give a score on the *Perceived Need* subscale.

Interpretation

As the BDEPQ is under development, interpretation of scores should be undertaken with care. Only the most general interpretations can be made with any certainty.

Interpretation of scores relative to the development sample can be achieved by comparison of an individuals score with the scores shown in Table 8 for restricted percentiles.

In general higher scores are associated with greater risk of future withdrawal symptoms, of continued BZD use, and are more likely to be associated with positive CIDI diagnoses of BZD dependence. The following section on validity describes the evidence for these interpretations.

Development

Baillie (1992) developed the BDEPQ following a mail survey of BZD users recruited through media announcements. The methods used by Baillie (1992) to develop the BDEPQ are summarized in Baillie and Mattick (1994) and are described below.

Description of the development sample

369 people were recruited through advertisements in newspapers and on the radio seeking long term users of BZDs to participate in research. Of these people 263 returned completed questionnaires from wave one. In addition four people were interviewed by phone but failed to return their questionnaires. Thus demographic information was available for 267 people. The following section describes these 267 participants and compares them with estimates of the population of BZD users from the National Health Survey (NHS) conducted by the Australian Bureau of Statistics (Australian Bureau of Statistics, 1991) between 1989 and 1990. Some of the questions used in the NHS interview (Australian Bureau of Statistics, 1991) were asked of the sample recruited for Baillie (1992). This was done to enable comparison of the present sample to estimates of the population from which it was drawn. For scale development purposes a representative sample is important to ensure that all levels of BZD dependence are covered. The generalizability of psychometric information about the scale calculated from the present sample to other groups of BZD users is reduced if the sample is unrepresentative.

Demographic characteristics

The gender of the 267 people who were interviewed by phone or responded to the first mailed questionnaire is shown in Table 1. The estimated proportion of BZD users in Australia who are women is also shown for comparison. A chi square goodness-of-fit test was used to examine the hypothesis that the gender of the sample was consistent with the sample being randomly drawn for the population of Australian BZD users. Significantly fewer women participated in the survey than would be expected if the sample was randomly drawn from the population of BZD users ($\chi^2_1 = 11.92, p < .05$).

The average age of the sample was 61.0 ($sd = 13.2, median = 63, n = 268$). Table 1 also shows a comparison of the age of sample with estimates of the age of BZD users in the Australian population from the National Health Survey. A greater percentage of the sample fall between the ages of 40 and 70 compared with

BZD users in the Australian population. The difference between the sample and the population was larger than due to chance indicating that the sample was not randomly drawn from the population ($\chi^2_{15} = 64.20, p < .05$).

The majority of participants were married or living as if they were married. Compared with estimates of the population of BZD users, the sample had fewer widowed or never married people and more who were separated or divorced. This difference may be related to the differences between the age of the population and the sample discussed above. A goodness-of-fit chi square test indicated that these differences were due to sampling alone ($\chi^2_4 = 8.20, p = ns$).

Table 2 compares participants in development sample with estimates of the population of BZD users on occupation, ethnicity, and the age at which participants left school. The majority of the sample was not working and of those who were employed most were managers, professionals, or para-professionals. A greater percentage of the population were not working at the time of interview and hence their current occupation was 'Not Applicable'. The sample has a smaller percentage of younger people, who do not yet have occupations, and of people over 80, who have retired compared with the population estimates. There are differences between the sample and the population estimates where a current occupation is known. The sample has more managers, professional people, and para-professionals while there is a greater proportion of tradespersons, salespersons and personal service workers, plant and machine operators and drivers, or labourers and related workers in the estimated population of BZD users. This difference probably reflects the audiences of the radio stations and newspapers which advertised the request for participants. As above, the goodness-of-fit test indicated that it was unlikely that the sample was randomly drawn for the population ($\chi^2_8 = 47.31, p < .05$).

The ethnicity of the sample was evaluated by asking participants if they spoke a language other than English at home, and whether they were born overseas. A comparison of the responses of the sample and of the population estimates is shown in Table 2. Only 1.8% of the sample spoke another language at home compared with the population estimate of 9.4%. There was a poor fit between the sample and the population estimate indicating a non-random sample ($\chi^2_1 = 17.58, p < .05$). While 26.7% of the population of BZD users were estimated to have been born overseas, 21.7% of the sample had migrated to Australia, a difference within the limits of sampling variation ($\chi^2_1 = 2.87, p = ns$).

The age at which the sample and the estimated population of BZD users had left school is also shown in Table 2. Participants in the development sample were older when they left school compared with estimates for the Australian population of BZD users. A goodness-of-fit test showed that the sample was not randomly drawn from the population ($\chi^2_3 = 86.20, p < .05$). This finding is consistent with the greater proportion of professional people in the sample.

In summary, the comparisons between the sample and estimates from the

Table 1: Comparison of sample and population estimates of age, gender and marital status

	Population estimates n = 688984	Sample n = 267
Gender (percent female)	66.4%	56.2%
Age		
00-04	0.1%	0
05-09	0	0
10-14	0.1%	0
15-19	1.4%	0
20-24	1.6%	0
25-29	2.8%	1.5%
30-34	3.6%	0.4%
35-39	4.0%	4.5%
40-44	5.6%	8.2%
45-49	5.8%	10.9%
50-54	7.1%	8.6%
55-59	8.1%	10.9%
60-64	11.9%	14.6%
65-69	12.5%	15.0%
70-74	14.4%	14.2%
75-79	10.3%	10.5%
80+	10.8%	0.7%
Marital status		
Married including de facto	58.4%	60.7%
Separated	2.7%	4.5%
Divorced	6.8%	8.2%
Widowed	22.5%	17.6%
Never married or single	9.52%	7.5%

Table 2: Comparison of sample and population estimates of occupation, ethnicity and age when left school

	Population estimates n = 688984	Sample n = 267
Current occupation		
Not applicable	79.75%	70.0%
Managers and administrators	2.5%	4.1%
Professionals	2.8%	7.1%
Para-professionals	1.3%	2.2%
Tradespersons	2.0%	0.4%
Clerks	4.0%	4.1%
Salespersons and personal service workers	3.0%	0.4%
Plant and machine operators and drivers	1.8%	0
Labourers and related workers	2.8%	0.4%
Ethnicity		
Speak a language other than English at home	9.4%	1.8%
Born overseas	26.7%	21.7%
Age when left school		
Never went to school	0.7%	0%
Under 15 years	45.8%	22.0%
15 to 17 years	47.4%	62.5%
18 or more	6.1%	15.5%

NHS of the Australian population of BZD users indicate that the sample is highly unlikely to have been randomly drawn from the population. The sample is more likely to be male, middle aged, professional or para-professional, and speak English at home. This is consistent with the audiences of the media outlets in which advertisements for volunteers were placed. Thus the sample under represents BZD users who are older, female, employed in blue collar occupations or in sales and other service jobs.

Use of benzodiazepines

The National Heath Survey included several questions about the ways in which the Australian population used BZDs in the last two weeks. A comparison of estimated patterns of BZD use in the population with the sample is shown in Table 4. Most of the sample ($71.2\%, n = 178$) had used BZDs for night sedation or as hypnotics with a smaller percentage (19.2%) reporting both night and day use, and the remaining 9.6% reporting only day time use. There was a significant lack of fit between population estimates and the sample ($\chi^2_2 = 41.47, p < .05$). A greater percentage of the sample used BZDs both for night and day time sedation suggesting that they use more BZDs than average Australian BZD user.

The majority of the sample (73.4%) used a BZD daily in the two weeks prior to phone interview or filling out the first questionnaire. In contrast, results from the NHS give an estimate of 52.1% of BZD users taking BZDs daily. There was a significant lack of fit between the sample and the population estimates ($\chi^2_3 = 66.23, p < .05$), indicating that the sample used BZDs more frequently than the Australian population of BZD users.

Table 4 also shows the length of time that the sample and the estimated population have been using BZDs. The majority (83.9%) of the sample have used BZDs for six months or longer while 64% of the estimated population of BZD users had taken them for that long. There was a significant lack of fit between the sample and the population estimates ($\chi^2_4 = 58.18, p < .05$) in the direction of longer BZD use in the sample. The average number of months that the sample had been using BZDs was 96.9 ($sd = 103, n = 259$) or just over eight years. This is clearly outside the current recommendations that BZDs be used for no longer than one month (NH&MRC, 1991) and suggests that respondents are on average chronic BZD users.

The dose and type of BZDs taken over the two weeks prior to phone interview or completing the questionnaire was recorded. Doses were translated into diazepam-equivalents using the methods described above. Because there is no agreement about the precise diazepam-equivalence of other BZDs a lower and upper bound of diazepam-equivalent dose was calculated. The average upper estimate of daily diazepam dose was $56.7mg$ ($sd = 98.3, median = 28, n = 269$) while the lower estimate was $28.34mg$ per day ($sd = 49.2, median = 15, n = 269$). As a rough guide, the recommended therapeutic range of diazepam is 5 to $40mg$

per day with a recommended dose for 'ambulatory patients' of 6 to 9mg per day (Badewitz-Dodd, 1992). Thus participants are on average above the recommended therapeutic range. As there is no widely accepted criteria for a high does of BZDs, 100mg per day was chosen. Taking the upper estimate of diazepam-equivalent dose, 14.4% of the sample were taking the equivalent of over 100mg of diazepam each day in the two weeks prior to the survey. When the lower estimates were used 4.5% were taking the equivalent of more than 100mg of diazepam a day. No data were collected in the NHS interviews about the actual dosages of BZDs taken so no comparison point is available for this variable. However it appears that doses of BZDs taken by the sample are more than is recommended by drug companies. The sample also contains some people who may be considered to be high dose BZD users.

The dose weighted average half-lives of the BZDs taken by each respondent were calculated using the methods described above. The mean dose weighted average half-life was 17.5 hours ($sd = 10.9, n = 260$). Comparison with Table 3 indicates that the sample is not restricted to either long or short half-life BZDs but is made up of people using a representative selection of BZDs.

The generic names of the BZDs taken are shown at the bottom of Table 4. The most frequently reported BZD was temazepam (*Normison, Euhypnos or Temaze*), with 40.1% of the sample using this medication in the last two weeks. Temazepam is primarily indicated for night sedation and its dominant use by the sample is consistent with the predominant use of BZDs for sleep problems reported above. Estimates of the BZDs used in the Australian population are also shown in Table 4. In the population, it is estimated that oxazepam (*Serepax, Murelax, or Antenex*) is the most frequently used BZD. A goodness-of-fit test showed that there was a significant lack of fit between the sample and the population estimates ($\chi^2_{12} = 107.32, p < .05$).

In summary, the sample recruited in the development sample is not restricted to low or high dose users of BZDs, nor does it focus on people using BZDs for day time sedation alone. The BZDs taken by respondents represent the full range of BZDs taken by the Australian population in both type and half-life. The use of BZDs in the sample was also different from the population estimates with the sample more likely to use BZDs more frequently, for longer and for night sedation. Thus it is likely that the sample is drawn from the longer term chronic user of high therapeutic doses of BZDs.

Dependence on benzodiazepines

The level of dependence on BZDs in the sample was assessed in three ways: CIDI diagnoses for those interviewed by phone, retrospective rating of the BWSQ, and a global rating of dependence or addiction made by respondents.

Table 3: Doses of BZDs equivalent to 5mg of diazepam and their half lives

BZD type	lowest equivalent (mg)	highest equivalent (mg)	half-life
alprazolam	0.25	1	12±2
bromazepam	3	6	20.1±0
chlordiazepoxide	10	25	10.0±3.4
clonazepam	0.5	2.5	23±5
flunitrazepam	1	15	15±5
lorazepam	0.5	1	14±5
nitrazepam	2.5	10	26±3
oxazepam	15	30	6.8±1.3
temazepam	10	20	13±3
triazolam	0.1	0.5	2.8±1

Notes: Only BZDs used by respondents are included in the table. Information on diazepam-equivalence is taken from (Murphy & Tyrer, 1991; Harrison, Busto, Naranjo, Kaplan, & Selllers, 1984; Busto et al., 1986; NH&MRC, 1991). Half-lives are taken from Goodman and Gilman (Gilman, Rall, Nies, & Taylor, 1990, pp. 1655-1715) with the exception of bromazepam which is taken from MIMS (Badewitz-Dodd, 1992).

Table 4: Comparison of sample and poulation estimates of benzodiazepine use

	Population estimates n = 688984	Sample n = 267
Reason for using benzodiazepines		
Day time sedation only	18.0%	9.6%
Night time sedation only	73.3%	71.2%
Both Day and night sedation	8.7%	19.2%
Frequency of use		
Every day or night (6 to 7 days/nights per week)	52.1%	73.4%
Most days or nights (4 to 5 days/nights per week)	6.0%	7.1%
One to three days or nights per week	17.8%	11.2%
Less than once a week	24.1%	6.4%
Duration of use		
Less than one month	4.2%	0.7%
One month to less than three months	4.3%	3.0%
Three months to less than six months	3.0%	4.9%
Six months or more	64.4%	83.9%
Not known	24.1%	7.5%
Benzodiazepines used		
temazepam	27.7%	40.1%
oxazepam	28.4%	24.0%
diazepam	21.9%	19.1%
nitrazepam	20.9%	16.9%
flunitrazepam	2.8%	8.2%
alprazolam	1.7%	3.7%
lorazepam	1.3%	3.4%
other BZDs	0.2%	2.2%
chlordiazepoxide	0.9%	1.5%
bromazepam	1.3%	1.1%
clorazepate	0.5%	0
flurazepam	0.3%	0
clobazam	0.2%	0

CIDI diagnoses of BZD dependence. The substance use section of the CIDI was administered to 92 (34.5%) of the respondents by telephone. Table 5 shows the number of people interviewed who met DSM3R or ICD10 criteria for BZD dependence. The majority of those interviewed ($71.7\%, n = 66$) had never met either criteria for BZD dependence while the remaining 26 had met either or both criteria in their lifetime. Five participants met criteria for a diagnosis of BZD dependence on ICD10 and DSM3R in the month prior to interview.

Version 1.0 of the CIDI was used in the interviews. This version was designed to give diagnoses according to the final draft of ICD10. There were significant changes from the final draft to the published edition of the ICD10. Scoring of the CIDI was therefore altered to reflect the published edition of ICD10 (World Health Organization, 1992). It should be noted that the changes from the final draft to the published edition made the criteria much more conservative. If the ICD criteria as stated in the final draft were applied, 25 respondents would have met criteria for a diagnosis of BZD dependence. The published ICD10 functions as a conservative subset of DSM3R as all eight people meeting ICD criteria also meet DSM3R criteria.

Self-rated BZD dependence. All respondents were asked to give a global rating of their addiction or dependence on BZDs. Of the 267 people who responded to the first wave, 257 (96.3%) answered this question. Seventy-five (27.9%) thought that they were not dependent on BZDs, 34 (12.6%) thought that they 'maybe' dependent, 60 (22.3%) thought they were 'a little' dependent and 88 (32.7%) described their dependence on BZDs as 'a lot' or a great deal. The average rating was 2.63 ($sd = 1.23$), which lies approximately midway between 'maybe' and 'a little'.

The correlation between the self-rating made during the telephone interview and the self-rating made in the first wave questionnaire was 0.71 (n=86). This coefficient can be considered as a two to three week test-retest correlation. The same correlation between ratings made in the the first and second wave questionnaires, a three month test-retest correlation, was 0.68 ($n = 236$). These coefficients are remarkably high for a single rating.

The correlation between self rated dependence and a DSM3R or ICD10 diagnosis of dependence made with the CIDI was 0.33 for DSM3R and 0.28 for ICD10 (n=86). These correlations suggest that respondents are making a rating of something other than BZD dependence as assessed by the CIDI.

Respondents were also asked whether they wanted to stop using BZDs. Most respondents wanted to stop 'a little' ($13.0\%, n = 35$) or 'a lot' ($48.0\%, n = 129$), while 54 (20.1%) wanted to continue using BZDs and 40 (14.9%) were unsure. Given that the average length of time that respondents had been taking BZDS was over eight years this reported desire to stop may have been frustrated in the past.

Table 5: Number of participants with CIDI diagnoses of BZD dependence

		ICD10			
		Never	Lifetime but not current	Current	Total
DSM3R	Never	66	0	0	66
	Lifetime but not current	8	2	1	11
	Current	10	0	5	15
Total		84	2	6	92

Notes: CIDI = Composite International Diagnostic Interview; ICD10 = International Classification of Diseases, 10th edition; DSM3R = Diagnostic and Statistical Manual of the American Psychiatric Association, third edition revised; A current diagnosis was given if three or more symptoms occurred in the last month, while a lifetime but not current diagnosis was given if three symptoms occurred simultaneously at any other time.

BZD withdrawal symptoms. Respondents were asked to describe their experience of BZD withdrawal symptoms on the BWSQ. Of the 267 participants in the development sample, 241 completed the BWSQ at the first wave. Many respondents returned questionnaires which had confusing responses to the section of the BWSQ which asked whether the symptom had occurred while dose of BZDs was stable or while the dose was being reduced or stopped. Responses to this part of the scale were ignored in wave one because their meaning was unclear. Thus scores on the BWSQ for wave one indicate the experience of symptoms, which have been associated with withdrawal in other samples, at any time in the past rather than only when BZDs were stopped or reduced.

The average score on the BWSQ was 5.27 ($sd = 6.06$) indicating the most common experience was of five symptoms of moderate severity. The distribution of scores on the BWSQ was highly positively skewed with 36 being the highest score. Many ($n = 58, 24.1\%$) respondents reported that they had never experienced any of the 20 symptoms listed in the BWSQ.

Most of the sample were using BZDs outside the current National Health and Medical Research Council recommendations and guidelines (NH&MRC, 1991), and most thought that they were addicted or dependent. However, the majority of those interviewed did not meet criteria for a diagnosis of dependence nor had many experienced more than moderate withdrawal. Thus the majority of the sample thought that they were dependent on BZDs while there was little evidence to support this belief in the information collected.

Other properties of the sample

The scores of the sample on self-report measures of neuroticism (EPQ-N), depression (BDI), and Anxiety (BAI) are shown in Table 6.

Neuroticism. Two hundred and fifty-one of the sample (94.0%) returned complete EPQ-N questionnaires. From these responses the mean score was 11.6 ($sd = 6.0$) for females and 9.9 ($sd = 5.2$) for males. The mean N scores for the normative sample described in the EPQ manual (Eysenck & Eysenck, 1975) are 12.74 ($sd = 5.2$) for women and 9.83 ($sd = 5.18$) for men indicating that N scores in the sample were not different to the normative sample. Using the cut-off scores of 12 and over for women and 10 and over for men, 49.4% ($n = 132$) of the sample scored on the 'neurotic' side of the cut-off. Male respondents scored lower on EPQ-N compared with females in the sample consistent with the normative sample ($t_{250} = 2.35, p < .05$).

Ashton and Golding (1989) compared BZD users with other people in a random population sample of over nine thousand adults in the United Kingdom. They report that BZD users have higher EPQ-N scores ($mean = 13.7, sd = 5.3, n = 296$) than people who did not use these medications ($mean = 9.5, sd = 5.2, n = 8707$). The average EPQ-N scores for the present sample were lower than those described

in (Ashton & Golding, 1989). Surprisingly the average EPQ-N scores for the non BZD users in (Ashton & Golding, 1989) are much lower than the 'normal' group described in (Eysenck & Eysenck, 1975). (Rickels et al., 1990a) report that higher EPQ-N scores predict more severe withdrawal symptoms during tapered reduction of BZD use, but give no scores in their paper.

Depression. Complete Beck Depression Inventories (BDI) were returned by 262 of the sample (98.1%). The mean score for the respondents was 10.33 with 23.0% ($n = 62$) falling above 15, the cut-off point suggested in the manual (Beck & Steer, 1987) when the BDI is used as a screening instrument for depression in a normal population. The gender breakdown of BDI scores is shown in Table 6. There was no difference in the BDI scores of male and female respondents ($t_{261} = 1.59, p = ns$).

Anxiety. The strength of anxiety symptoms experienced by the sample in the month prior to responding is indicated by scores on the Beck Anxiety Inventory (BAI). Of the sample, 249 (93.3%) returned completed BAI forms. The average total BAI score is shown in Table 6 as 10.04 ($sd = 8.73$), indicating that the sample falls between groups of non-anxious people and groups of clinically anxious people (Beck & Steer, 1990). The majority of the sample (62.5%, $n = 168$) fell in the normal range (0-9), while 22.3% ($n = 60$) scored in the mild to moderately anxious range (10-18), 12.6% ($n = 34$) responded in the moderate to severe anxiety range (19-29), and 2.6% ($n = 7$) fell in the severe range (30-63). The BAI manual reports that females completing the BAI will score four points higher on average than males (Beck & Steer, 1990, p. 10). No such difference was found in the development sample ($t_{248} = 0.29, p = ns$). Romach, Busto, Sobell, Sobell, Somer, and Sellers (1991) used the BAI in their study of withdrawal from alprazolam. They report a mean score of 11.67 ($sd = 6.35, n = 25$) which is slightly higher than in the present sample. As all of the subjects in (Romach et al., 1991) were seeking specialist assistance for BZD withdrawal it is reasonable to expect that they would be more anxious than the present sample.

Sleep quality. The quality of sleep experienced by participants in the development sample was assessed only at the second wave by the PSQI. Many of those who returned questionnaires had not given the times that they would go to bed and get up. Without this information their scores on the 'habitual sleep efficiency' subscale and total PSQI scores could not be calculated. Largely because of this, only 189 (76.2%) of the 248 responses were complete. The average total score was 8.91 ($sd = 4.2, median = 8$). Buysse, Reynolds, Monk, Berman, and Kupfer (1989) report the mean score for a group of normal sleepers as 2.67 ($sd = 1.7, n = 52$), with depressed people scoring 11.09 ($sd = 4.3, n = 34$) on average and people diagnosed as suffering Disorders of Initiating and Maintaining Sleep (DIMS) scored a mean of 10.38 ($sd = 4.6, n = 45$). The sample drawn in

Table 6: Neuroticism, depression and anxiety questionnaire scores for the sample by gender

	EPQ-N			BDI			BAI		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
n	144	108	251	148	115	262	139	111	249
mean	11.6	9.9	10.87	10.9	9.4	10.33	10.1	9.8	10.04
sd	6.0	5.2	5.72	8.0	6.8	7.54	8.7	8.8	8.73
min	0	0	0	0	0	0	0	0	0
max	23	23	23	35	30	35	46	53	53

Notes: EPQ-N = Neuroticism scale of the Eysenck Personality Questionnaire, BDI = Beck Depression Inventory, BAI = Beck Anxiety Inventory

Baillie (1992) falls, on average, within one standard deviation of the depressed or DIMS groups suggesting that the majority of the present sample have clinically significant sleep problems.

Buysse et al. (1989) suggest that total PSQI scores of greater than five indicates a sleep problem. Of the 189 complete responses, 151 or 80% of responders had scores greater than five indicating a clinically significant sleep problem. Given that the majority of the sample are being prescribed BZDs for sleep problems such a high percentage would be expected.

As the PSQI was only collected at the second wave the results described above reflect a nonrandom selection of the original sample because of drop-outs. Some degree of regression towards the mean might be expected. Thus had the PSQI been included in the first wave responses may have been more widely distributed.

Questionnaire construction

1. The theoretical and conceptual nature of dependence was reviewed. Items were developed based on the conception of dependence developed in the introduction.

2. Items resulting from step 1 were reviewed by clinicians working with people dependent on BZDs and their suggestions were implemented. At this point the new scale contained 68 items.

3. Items were randomly ordered and responses to 15 were reversed to reduce and assess for response bias.

4. The 68-item scale was piloted on people dependent on BZDs who were in treatment for anxiety disorders, and suggested changes were made.

5. A sample of people who had used BZDs more than seven times in the last three weeks was drawn and sampled on two occasions (waves one and two), as described in survey methods below. The 68 items included at this step are shown in Table 7.

6. Items 18 and 30 were excluded because the former was included to simplify the following 4 items and did not reflect dependence, and the later because it asked about withdrawal symptoms which were outside the focus of the scale.

7. The remaining 66 items were then reviewed to ensure that each reflected some aspect of the dependence concept outlined in the introduction. Items reflecting problems caused by use of BZDs were excluded in this step.

8. Correlation coefficients between each of the remaining items and the total score on the scale were calculated. Items with item-total correlations less

than 0.4 were discarded following Nunnally's (1967) suggestions. Cronbach's (Cronbach, 1951) coefficient alpha was also calculated as an index of the internal consistency of the scale.

9. Confirmatory factor analysis and exploratory principal components analysis were used to test the dimensionality of the resulting scale.

The steps used to construct the BDEPQ are described above in the methods section. The results of steps 7, 8 and 9 are described below and shown in Table 7.

Step 7: Excluding non-dependence items. The 66 items were reviewed to ensure that they assessed dependence on BZDs. Items that asked about the frequency and strength of problems that the respondents thought were caused by BZDs were discarded. Other items unrelated to BZD dependence were also excluded leaving 51 items. The items excluded in this step are marked in Table 7 with a cross. The coefficient alpha of the 51 item scale was 0.916.

Step 8: Excluding items with low item-total correlation. The correlation between each of the remaining 51 items and their sum was calculated and is shown in Table 7. Nunnally (1967) recommends that items with Item-Total Correlations (ITC) below 0.4 be excluded. This was done in three stages as excluding items has some effect on the total score and hence the ITCs of other items. The first stage was to exclude items with an ITC below 0.3. In this way nine items were dropped (18a, 18b, 18c, 18d, 32, 34, 39, 49 & 51) leaving 42 items.

Items with an ITC below 0.4 were excluded in the next two stages resulting initially in 36 and then in 34 remaining items. Stage 2 involved dropping six items (1, 9, 11a, 14, 36 & 43). A further two items (11b & 16) were dropped in the third stage as their ITCs had fallen below 0.4. The resulting 34 item scale had a coefficient alpha of 0.928.

Step 9: Dimensionality of items. To assess the dimensionality of the 34-item scale a confirmatory factor analysis was conducted using SIMPLIS (Jöreskog & Sörbom, 1989b). This program employs a two stage least squares method to examine the extent to which the obtained data fits the proposed factor structure. There were significant differences between the obtained data and a single factor model ($\chi^2_{527} = 8264.53, p < 0.05$) indicating that a single factor fitted poorly. The goodness of fit (GOF = 0.072) and adjusted goodness of fit (AGOF = -0.048) were not close to 1.0 also indicating a poor fit.

Principal components analysis was used to identify the factorial structure of the 34-item BDEPQ. Because different aspects of dependence are likely to be correlated oblique rotation was used. All of the 34 items loaded more than 0.4 on the first unrotated principal component. Nine components had eigenvalues above 1.0, so Catell's scree test (Cattell, 1966) was used to select meaningful components. The scree test was inconclusive with either three or five principal

Table 7: The results of steps taken to reduce the number of items in the BDEPQ

Item	Step 7	Step 8	Step 9
1. In the last month, have you felt that you would not sleep at all if you did not have a sleeping pill?	-	0.303	
2. In the last month, have you taken another sedative or tranquilliser as soon as the effects of the previous one began to wear off?	-	0.590	-
3. Have you taken sedatives, tranquillisers or sleeping pills in the last month because you like the way they make you feel?	-	0.521	-
4a. Have tranquillisers, sedatives or sleeping pills caused you to feel sad, low, or depressed?	x		
4b. How strong have these feelings been?	x		
5. In the last month, have you felt that you cannot face anything out of the ordinary without a sedative or tranquilliser?	-	0.627	-
6. Have you been involved in accidents of any type (for example cutting yourself or falling over) because you were affected by sedatives, tranquillisers or sleeping pills?	x		
7a. Have you had trouble with your memory because you took tranquillisers, sedatives or sleeping pills?	x		
7b. How severe have your memory problems been?	x		

(*Continued*)

Notes: 'x' indicates that the item was excluded in steps 7 or 9, and '-' indicates that the item was included. Numbers in the table represent item-total correlations.

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	8	9
8. How much have you thought about sedatives, tranquillisers or sleeping pills in the last month?	-	0.602	x
9. Do you keep spare sedatives, tranquillisers or sleeping pills in different places (for example in your car or with your spouse) just in case you might need them?	-	0.388	
10. Do you feel that you cannot get through the day without the help of your sedatives or tranquillisers?	-	0.640	-
11a. In the last month, have you tried to cut down the number of sedatives, tranquillisers or sleeping pills you have taken?	-	0.399	
11b. Have you been successful when you tried?	-	0.392	
12. Do you need to carry your sedatives or tranquillisers with you?	-	0.486	-
13a. Have tranquillisers, sedatives or sleeping pills caused you to feel anxious, tense or keyed up?	x		
13b. How strong have these feelings been?	x		
14. Have tranquillisers, sedatives or sleeping pills had less of an effect on you in the last month compared with when you first took them?	-	0.392	

(*Continued*)

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	8	9
15. Have the pleasant effects of taking sedatives, tranquillisers or sleeping pills changed since you first took them?	-	0.421	x
16. Have you gone to different doctors to get extra tranquillisers, sedatives or sleeping pills or to increase your supply?	-	0.393	
17a. Have tranquillisers, sedatives or sleeping pills caused you to feel paranoid, have strange ideas or see things that were not there?	x		
17b. How strong have these feelings been?	x		
18a. When you started again how many sedatives, tranquillisers or sleeping pills did you need to get the same effect as before?	-	0.207	
18b. When you started again did the same number of sedatives or tranquillisers have the same effect?	-	0.120	
18c. When you started again did you feel the same urge or desire to take a sedative or tranquilliser?	-	0.161	
18d. When you started again did you have the same difficulty controlling the number of sedatives, tranquillisers or sleeping pills you took?	-	0.152	

(*Continued*)

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	8	9
19. Have sedatives, tranquillisers or sleeping pills interfered with your life (for example stopped you doing things you enjoy like sport or meeting people)?	x		
20. Have you tried to reduce the number of sedatives, tranquillisers or sleeping pills you take because they interfered with your life?	-	0.584	-
21. Have you found that you needed to take more tranquillisers, sedatives or sleeping pills to get the same effect in the last month compared to when you first took them?	-	0.428	-
22. Do you need to take sedatives, tranquillisers or sleeping pills to deal with the problems in your life?	-	0.456	-
23. How much time did you spend getting over the effects of sedatives tranquillisers or sleeping pills in the last month?	x		
24. Do you feel terrible if you do not take a sedative, tranquilliser or sleeping pill?	-	0.579	-
25. Do you plan your day around when and where you can take sedatives or tranquillisers?	-	0.581	x

(*Continued*)

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	8	9
26a. In the last month, have you been worried that your doctor might not continue to prescribe the sedatives, tranquillisers or sleeping pills you are taking?	-	0.510	-
26b. How strong has this worry been?	-	0.520	-
27. Could you stop taking sedatives, tranquillisers or sleeping pills tomorrow without any difficulties?	-	0.537	-
28. Do you count down the time until you can take your next sedative, tranquilliser or sleeping pill?	-	0.539	-
29a. Have you experienced relief when you have taken sedatives, tranquillisers or sleeping pills in the last month?	-	0.504	-
29b. How strong is that relief?	-	0.536	-
30a. Have you taken another sedative, tranquilliser or sleeping pill to reduce these unpleasant after-effects?	-	0.439	-
31. Have you drunk alcohol within a few hours of taking sedatives, tranquillisers or sleeping pills?	x		

(*Continued*)

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	8	9
32. Do you feel in control of the number of sedatives, tranquillisers or sleeping pills you have taken in the last month?	-	0.273	
33. Have you driven a car or worked heavy machinery within a few hours of taking sedatives, tranquillisers or sleeping pills?	x		
34. Have you taken another person's sedatives, tranquillisers or sleeping pills because you felt like you did not have enough?	-	0.280	
35. Have sedatives, sleeping pills or tranquillisers caused you problems such as memory loss, drowsiness, problems at work or with your family?	x		
36. Have you reduced the number of sedatives, tranquillisers or sleeping pills you take because of the problems they caused you?	-	0.352	
37. In the last month, have you taken sedatives, tranquillisers or sleeping pills against your doctor's advice or more frequently than recommended?	-	0.483	-
38. Are you concerned about the number of sedatives, tranquillisers or sleeping pills you have taken in the last month?	-	0.519	-

(*Continued*)

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	8	9
39. Do you prefer one brand or type of sedative, tranquilliser or sleeping pill?	-	0.175	
40. When you have been upset in the last month have you needed to take sedatives or tranquillisers to calm you down or to sleep?	-	0.436	x
41. Have you taken more sedatives, tranquillisers or sleeping pills in one day or night than you planned to?	-	0.584	-
42a. Have you found the effects of sedatives, tranquillisers or sleeping pills pleasant?	-	0.422	-
42b. How strong is the pleasant feeling?	-	0.496	-
43. Has your doctor asked you to reduce the number of tranquillisers, sedatives or sleeping pills you take?	-	0.377	
44. Have you taken sedatives, tranquillisers or sleeping pills for a longer period than you intended to when you started?	-	0.552	-
45a. Have you felt tense or anxious as your prescription for sedatives, tranquillisers or sleeping pills began to run out?	-	0.661	-
45b. How strong have these feelings been?	-	0.674	-

(*Continued*)

Table 7: The results of steps taken to reduce the number of items in the BDEPQ *Continued*

Item	Step 7	Step 8	Step 9
46a. Have you felt an urge or a desire to take sedatives, tranquillisers or sleeping pills in the last month?	-	0.625	-
46b. How strong is that urge or desire?	-	0.652	-
47. Have you taken sedatives, tranquillisers or sleeping pills in the last month when you did not really need them?	-	0.475	-
48. I feel powerless to prevent myself taking a sedative or tranquilliser when I am anxious, uptight or unhappy.	-	0.666	-
49. Successfully getting off sedatives, tranquillisers or sleeping pills is a matter of good luck.	-	0.024	
50. Most of us are victims of forces and pressures that we cannot control.	x		
51. People who cannot control their use of tranquillisers or sedatives are just weak.	-	0.033	
52. I would not be able to handle my problems unless I take a sedative or tranquilliser.	-	0.456	-
53. I get so upset over small arguments, that I need to take a sedative or tranquilliser.	-	0.438	-

Notes: 'x' indicates that the item was excluded in steps 7 or 9, and '-' indicates that the item was included. Numbers in the table represent item-total correlations.

components identified. Both a three and a five component analysis were conducted with the three component solution preferred for parsimony. The three component solution explained 44.7% of variation in scores on the 34 items while the five component solution explained 54.0%.

The principal component loadings for the 34-item scale on three oblique components are contained in Appendix 6. Nunnally's recommendation to select only items with factor loadings over 0.4 was employed. Four items (8, 15, 25, & 40) did not load more than 0.4 on any of the three rotated components. The same items also loaded less than 0.4 in the five component solution along with items 12 and 28. There was evidence that items 8,15,25 and 40 did not fit into the factor structure of the other 30 items and they were dropped from the scale.

The resulting 30 items possessed a coefficient alpha of 0.922, however the correlation between item 21 and the total score had fallen below the criteria of 0.4. Because this item was the only remaining item to ask about tolerance on BZDs it was retained.

Some idea of the meaning of the three components can be gleaned from the questions that load on each. The first component is the most difficult to interpret as there is little semantic similarity between the items that contribute to it. It may reflect a 'common' factor of dependence as many of the items ask about symptoms of the 'dependence syndrome'. The questions that load on the second component all seek information about experiencing pleasant feelings after taking BZD. Item 46b, which asks about the strength of urges or desires to take BZDs, loads on this component. In contrast, item 46a, which seeks information about the frequency of these feelings, loads on the first component. The third component appears to assess the respondents belief that they cannot function without BZDs. Most questions that load on this component were written to assess this dimension of perceived need for BZDs. These items ask about beliefs rather than the occurrence of particular events or experiences that are sought in other items.

The first, apparently general component, was correlated 0.49 ($n = 219$) with the second pleasant effects factor, and 0.64 ($n = 211$) with the third component. The correlation between the second and third components was 0.55 ($n = 198$). A similar pattern of relationships between the three subscales was observed in the second wave of responses. The general component was correlated 0.48 ($n = 182$) with the pleasant effects subscale and 0.66 ($n = 188$) with the perceived need component. The pleasant effect and perceived need components were correlated 0.56 ($n = 176$).

Properties of BDEPQ total scores

Table 8 shows some of the psychometric properties of the total and sub-scale scores of the 30 item BDEPQ.

Normality

A Lilliefors test (Lilliefors, 1967) was performed to examine the normality of BDEPQ total scores. Scores from both the first and second waves were not normally distributed (Wave 1: Maximum difference $= 0.136, p < .05$, Wave 2: Maximum difference $= 0.111, p < .05$). The skewness of BDEPQ scores was 0.906 at wave one and 0.889 at wave two. Wilkinson (1990) recommends $2\sqrt{\frac{6}{n}}$ as a critical value for skewness, which is 0.356 for wave one and 0.376 for wave two. Comparison with these values indicates significant positive skewness in BDEPQ scores. The kurtosis of total scores was 0.376 at wave one and 0.264 at wave two. The significance of these values can be gauged by comparison using the same formula (Wilkinson, 1990). This indicates that BDEPQ scores from wave one are leptokurtic while those from wave two have a 'peakedness' similar to the normal distribution. The distribution of total BDEPQ scores from wave one is shown graphically in Figure 1.

Internal consistency

Coefficient alphas for the total and sub-scale scores collected in the second wave confirm the reliability of the scales. Because the information was collected from the same respondents it is likely that regression toward the mean reduced the variability of scores and influenced the size of these coefficients from the second wave.

The standard error of measurement of total and sub-scale BDEPQ scores is shown in Table 8. These values were calculated with the formula described by Ghiselli, Campbell, and Zedeck (1981, p. 206) and indicate the confidence that can be placed in an individuals score on the scale. The table shows 4.47 as the error of measurement for the first wave. A 95% confidence interval around any score on the BDEPQ would thus be 1.96 times this error of measurement (8.76). For example if a person scored 60 on the BDEPQ prior to detoxification, completed the scale six months later and scored 50, one could be 95% sure that this change of 10 scale points was not due to chance or error in the scale. The estimates of standard error of measurement from wave one should be used for any practical purposes as regression to the mean may have reduced the variance in wave two scores and consequently reduced the error of measurement.

Temporal stability of BDEPQ items

The three to four month test-retest correlation between scores on the 30-item BDEPQ in wave one and wave two was 0.88 ($n = 128$). The 3 subscales show similar test-retest coefficients of 0.83 for the general dependence subscale ($n = 175$), 0.73 for the pleasant effects subscale ($n = 160$), and 0.87 for the perceived need subscale. This indicates that the scale is measuring a relatively stable aspect of the respondents attitudes. As discussed in the introduction dependence is best

Table 8: Properties of BDEPQ total and sub scale scores on both waves

	n	mean	sd	sem	alpha	min	25%ile	50%ile	75%ile	max
Wave one										
Total	189	22.1	16.0	4.47	0.922	0	11	19	33	72
General dependence	225	8.1	7.0	2.74	0.847	0	3	7	11	38
Pleasant effects	214	5.9	4.8	1.90	0.844	0	2	5	10	18
Perceived need	241	7.7	6.7	2.44	0.867	0	3	6	11.25	30
Wave two										
Total	170	18.5	14.3	4.17	0.915	0	6	15	27	65
General dependence	202	6.7	5.8	2.61	0.798	0	2	6	9	32
Pleasant effects	189	4.6	4.4	1.76	0.840	0	0	4	8	17
Perceived need	201	7.4	6.6	2.38	0.870	0	2	5	11	28

Notes: n = number of subjects, sd = standard deviation, sem = standard error of measurement, alpha = Cronbach's coefficient alpha, min = minimum score, max = maximum score.

Figure 1: Frequency histogram of BDEPQ total scores

Notes: the histogram is plotted with a normal curve fit to illustrate the possible distribution of scores in a larger sample

considered as a state rather than a trait. The high test-retest correlation reported above suggests that the BDEPQ is measuring a trait instead. However, the average length of time that respondents had been using their current dose was over eight years. If patterns of consumption remain stable it may be that dependence also remains stable. While dependence is best considered a state rather than a trait, the present sample shows great stability in their use of and dependence on BZDs.

Validity of the BDEPQ

The validity of the 30-item BDEPQ was examined by analysis of Multitrait-Multimethod (MTMM) matrices, by assessing the ability of BDEPQ scores to predict future withdrawal symptoms and changes in BZD dose with multiple regression analysis and by Receiver Operating Characteristic (ROC) analysis of the BDEPQ as a screening test for CIDI diagnoses of BZD dependence.

Construct Validity

Multitrait-multimethod (MTMM) matrices are presented separately for waves one and two in Tables 9 and 10. The conceptual basis of the BDEPQ has assumed that dependence is a state rather than a trait, however, for simplicity the matrix is termed multitrait not multistate. The matrices presented do not conform to the strict definition of a MTMM matrix in that each trait has not been assessed with each method. Four traits (dependence, anxiety, depression, and neuroticism) were measured using a single method (self-report questionnaire). In addition the dependence 'trait' was also measured using two other methods (CIDI interview and global self-rating).

Inspecting the coefficients in Table 9 shows that scores on the BDEPQ have a moderate to strong relationship with most other variables in the table. The correlations between BDEPQ scores and other measures of dependence indicate that the new scale has some convergent validity. However, BDEPQ scores are also correlated with BAI, BDI, and EPQ-N scores suggesting a lack of divergent validity. BDEPQ scores are more highly correlated with measures of anxiety, depression, and neuroticism than they are with CIDI diagnoses of dependence. Importantly BDEPQ scores are correlated with diazepam-equivalent dose and how frequently BZDs were used[2].

The information presented in Table 9 allows the BDEPQ to be compared with two other self-report measures of BZD dependence: the BWSQ and global self-rated dependence. Self-rated dependence is significantly shorter and simpler to administer than the BDEPQ however it is less reliable and it's relationship to

[2]Frequency of BZD use was coded using the same method as the National Health Survey so more frequent use is given a lower score and infrequent use a higher score. This explains the negative correlation between BDEPQ and frequency shown in the table.

CIDI diagnoses is not as strong. The divergent validity of self-rated dependence was shown to be greater by its correlations with BAI, BDI, and EPQ-N scores.

The BWSQ shows a pattern of relationships with other variables that is similar to the BDEPQ. BWSQ scores are related to other measures of dependence supporting convergent validity but are also correlated with BAI, BDI, and EPQ-N scores. Contrary to the predictions of simple physiological models of dependence, scores on the BWSQ are not highly related to measures of BZD dose, half-life, frequency or duration of BZD use. CIDI diagnoses of BZD dependence are not as highly related to BAI, BDI and EPQ-N scores suggesting that the correlations between these measures and BDEPQ scores is due to method variance.

Confirmatory factor analysis of MTMM matrices. Campbell and Fiske (1959) proposed that the convergent and divergent validity of a test could be examined by use of a multitrait-multimethod (MTMM) matrix of correlation coefficients. They proposed a set of rules for examining the correlations in such a matrix. Since that time, other authors have attempted to formalize the evaluation of a MTMM matrix (Cole, 1987; Kenny & Kashy, 1992). Maximum Likelihood Confirmatory Factor Analysis (CFA) is the most recent statistical procedure to be recommended for this task (Cole, 1987). As has been reiterated by Fiske and Campbell (1992) in their recent review of MTMM methods, there is no one formal statistical method that is widely accepted.

A subset of the MTMM matrix shown in Table 9 made up of of BDEPQ, BWSQ, BDI, BAI, and EPQ-N scores and respondent self-rated dependence (SRD) was subjected to CFA using SIMPLIS. CIDI diagnoses were not included because doing so would have significantly reduced the number of complete cases. This matrix contains four 'traits' (dependence, anxiety, depression, and neuroticism) and two methods (questionnaire and self-rating) although both methods and traits are likely to be related. Following Cole's (1987) example of the analysis of a multitrait-monomethod matrix a single factor solution was initially tested. A single factor solution accounted for much of the variance within the matrix as shown by the goodness- of-fit indices ($GOF = 0.880, AGOF = 0.719, RMSR = 0.071, \chi^2_9 = 59.89, p < .05$) and root mean square residual (RMSR). However these goodness-of-fit indices were lower than those recommended by (Cole, 1987) of $GOF > 0.9$ and $AGOF > 0.8$. The chi square test also indicated a significant amount of variance in the matrix not accounted for by the single factor. The standardized residuals showed a significant amount of variance between BDEPQ and self-rated dependence and between BAI, BDI and EPQ-N scores that was not accounted for by a single factor.

A second model involving a trait factor (dependence) and a method factor (questionnaire) was then tested. No other method was used to gather information so the 'questionnaire' method factor obviously taps into trait variance common to depression, anxiety, neuroticism and perhaps dependence. This two factor model

Table 9: Multitrait-multimethod matrix: Wave one and phone interview

		Dependence					Anxiety	Depression	Neuroticism		Pattern of BZD use		
		BDEPQ	BWSQ	SRD	DSM3R	ICD10	BAI	BDI	EPQ-N	Dose	$\frac{1}{2}$life	Frequency	Duration
	BDEPQ	0.92 (187)											
	BWSQ	0.61 (171)	0.90 (239)										
Dependence	SRD	0.51 (184)	0.27 (233)	0.71 (86)									
	DSM3R	0.39 (68)	0.27 (82)	0.33 (86)	-								
	ICD10	0.37 (68)	0.40 (82)	0.28 (86)	0.50 (88)	-							
Anxiety	BAI	0.56 (179)	0.54 (230)	0.23 (241)	0.34 (88)	0.11 (88)	0.88 (249)						
Depression	BDI	0.50 (187)	0.55 (238)	0.16 (254)	0.20 (87)	0.13 (87)	0.52 (248)	0.84 (247)					
Neuroticism	EPQ-N	0.48 (181)	0.44 (232)	0.20 (244)	0.14 (82)	-0.00 (82)	0.53 (240)	0.59 (250)	0.88 (253)				
	BZD dose	0.31 (189)	0.23 (241)	0.24 (257)	0.29 (88)	0.29 (88)	0.18 (251)	0.12 (264)	0.06 (253)	-			
Pattern of BZD use	Half-life	0.04 (182)	-0.02 (233)	-0.16 (248)	0.01 (88)	-0.06 (88)	0.06 (243)	-0.00 (255)	0.04 (244)	-0.38 (260)	-		
	Frequency	-0.25 (188)	-0.15 (238)	-0.50 (256)	-0.13 (87)	-0.05 (87)	-0.08 (246)	-0.07 (259)	-0.03 (248)	-0.22 (264)	0.15 (255)	-	
	Duration	0.06 (188)	0.03 (234)	0.24 (252)	-0.11 (88)	-0.02 (88)	-0.07 (242)	-0.09 (259)	-0.06 (244)	-0.04 (259)	0.03 (253)	-0.26 (258)	-

Notes: The diagonal contains reliability coefficients which are coefficient alphas except for self-rated dependence which is a two to three week test-retest correlation. BDEPQ = Benzodiazepine Dependence Questionnaire, BWSQ = Benzodiazepine Withdrawal Symptom Questionnaire, SRD = Self-Rated Dependence, DSM3R = a current DSM3R diagnosis of Benzodiazepine Dependence made using the CIDI, ICD10 = a current ICD10 diagnosis of Benzodiazepine Dependence made using the CIDI, BAI = Beck Anxiety Inventory, BDI = Beck Depression Inventory, EPQ-N = Neuroticism scale of the Eysenck Personality Questionnaire, Dose = high estimate of diazepam-equivalent dose of BZDs, Half-life = dose weighted average half-life of BZDs taken, Frequency = how often were BZD taken, and Duration = for how long were BZDs taken.

Table 10: Multitrait-multimethod matrix: Wave two

		Dependence				Anxiety	Depression	Sleep Quality	Pattern of BZD use		
		BDEPQ	BWSQA	BWSQB	SRD	BAI	BDI	PSQI	Dose	$\frac{1}{2}$-life	Frequency
Dependence	BDEPQ	0.92 (170)									
	BWSQA	0.55 (72)	0.88 (112)								
	BWSQB	0.50 (168)	0.72 (109)	0.83 (240)							
	SRD	0.47 (168)	0.21 (110)	0.22 (236)	-						
Anxiety	BAI	0.57 (165)	0.55 (106)	0.60 (234)	0.19 (233)	0.87 (240)					
Depression	BDI	0.40 (163)	0.55 (101)	0.45 (227)	0.14 (225)	0.61 (225)	0.88 (229)				
Sleep Quality	PSQI	0.28 (135)	0.27 (86)	0.29 (186)	0.09 (186)	0.36 (187)	0.39 (179)	0.83 (189)			
Pattern of BZD use	BZD dose	0.10 (170)	0.17 (110)	0.07 (240)	0.26 (246)	0.14 (237)	0.09 (229)	-0.01 (189)	-		
	Half-life	0.05 (160)	-0.01 (78)	-0.01 (202)	-0.13 (207)	-0.07 (200)	-0.03 (194)	-0.04 (163)	-0.47 (209)	-	
	Frequency	-0.20 (167)	-0.07 (107)	-0.21 (235)	-0.63 (242)	-0.11 (232)	-0.09 (224)	-0.07 (187)	-0.38 (243)	0.23 (208)	-

Notes: BDEPQ = Benzodiazepine Dependence Questionnaire, BWSQA = Benzodiazepine Withdrawal Symptom Questionnaire during reduction or cessation of BZDs, BWSQB = Benzodiazepine Withdrawal Symptom Questionnaire when dose of BZDs was stable, SRD = Self-Rated Dependence, BAI = Beck Anxiety Inventory, BDI = Beck Depression Inventory, PSQI = Pittsburgh Sleep Quality Index, Dose = high estimate of diazepam-equivalent dose of BZDs, Half-life = dose weighted average half-life of BZDs taken, and Frequency = how often were BZD taken.

was a better fit for the obtained matrix ($GOF = 0.972, AGOF = 0.903, RMSR = 0.031, \chi^2_6 = 14.94, p = .021$). While the chi square value indicates a significant difference between the model and the matrix the GOF, AGOF, and RMSR indicate an acceptable fit. The difference in chi squares between the one and two factor models ($\Delta\chi^2_3 = 44.95, p < .05$) indicated that the two factor model is a significantly better fit. The largest residual was -0.102, between BWSQ and EPQ-N scores indicating a relationship between these variables not sufficiently accounted for by the model being tested. These variables both load on the 'questionnaire' method factor. An improvement in the fit might be obtained by adding additional factors to the model but this would be at the cost of parsimony. As the two factor model had an adequate fit, it was accepted as the best balance of fit and parsimony.

If LISREL (Jöreskog & Sörbom, 1989a) had been used to analyse the above model the correlation between the two factors could have been set to zero as recommended by (Cole, 1987). This would be akin to an orthogonal rotation in an exploratory factor analysis and would allow some statement about the proportion of variance in BDEPQ scores uniquely associated with a latent dependence variable. However, SIMPLIS has no mechanism for setting the relationship between latent variables, instead it gives estimates of their strength. In the model described above the correlation between the 'dependence' and 'questionnaire' factors was 0.464. This tends to reduce the strength of the conclusions from the above analysis, because it suggests that had this relationship been set to zero the fit of the model would not have been as good. The relationship between the 'questionnaire' and 'dependence' factors suggests that a large proportion of variance in BDEPQ scores is common with the BDI, BAI, and EPQ-N as can be seen by inspecting the MTMM shown in Table 9. In other words the BDEPQ appears to have a reasonable degree of convergent validity but has only moderate divergent validity.

A subset of the wave two MTMM matrix shown in Table 10 was analysed using a similar approach. Scores on the BDEPQ, BWSQA, BWSQB, BAI, BDI, and PSQI and respondent self-ratings of dependence (SRD) were firstly transformed using PRELIS. A matrix of polyserial, polychloric, and product moment correlations was calculated by PRELIS from transformed data. Out of the 248 responses to the second wave of Baillie (1992) only half ($51.2\%, n = 127$) gave complete responses to all of the above questionnaires. SIMPLIS was used to conduct a CFA of the matrix. Initially a single factor model was tested and fitted the data moderately well ($GOF = 0.894, AGOF = 0.789, RMSR = 0.074, \chi^2_{14} = 48.14, p < .05$). The largest residual was 0.215 between BDEPQ and BWSQB scores indicating that a single factor model did not account for all of their covariance.

A two factor model with one trait factor (dependence) and one method factor (questionnaire), similar to that identified for the first wave, was tested. There was some improvement in the fit of this two factor model over the above one factor

model ($GOF = 0.921, AGOF = 0.779, RMSR = 0.073, \chi^2_{10} = 38.96, p < .05$). However, the difference in chi squares was not significant ($\Delta\chi^2_4 = 9.18, p = ns$) indicating that the improvement was likely to be due to chance. There were large residuals of 0.235, -0.119, -0.138, and -0.144 between the BWSQB and other variables (BDEPQ, BAI, & BDI).

Because the BWSQ form and scoring method had changed between the two waves[3] and responses to the A form (BWSQA) were highly positively skewed it was decided to omit the BWSQA scores from the model and to rely upon the B form. The B form is most similar to the BWSQ used in the first wave because of the way respondents completed the BWSQ in wave one. The model tested involved a trait factor (dependence) related to BDEPQ, BWSQB and respondent self-rated dependence and a method factor (questionnaire) involving the BDEPQ, BWSQB, BAI, BDI, and PSQI scores. The fit of this altered two factor model was much improved ($GOF = 0.960, AGOF = 0.898, RMSR = 0.048, \chi^2_{11} = 18.36, p = ns$) with the chi square test indicating no significant difference between the matrix and the model. The largest residual was below the criteria recommended by (Cole, 1987). There was a significant drop in the chi square values ($\Delta\chi^2_1 = 20.60, p < .05$) indicating an improvement in fit.

While the model fitted the data adequately, scores on the BDEPQ ($t_{119} = -0.97, p = ns$) and BWSQB ($t_{119} = -0.84, p = ns$) did not significantly load on the dependence factor. Conceptually the BDEPQ, BWSQ and self-rated dependence should load highly on a dependence factor. That they did not indicates a poor fit between the data and the conceptual model under consideration and also tends to suggest a lack of convergent validity for the BDEPQ.

The selected models for MTMM matrices from both waves give some support for the convergent validity of the BDEPQ. They also indicate that a substantial proportion of variance in BDEPQ scores is shared with self-report measures of anxiety, depression and to a lesser extent neuroticism. The finding that two factor models fitted the obtained data better than a single factor suggests some degree of divergent validity for the BDEPQ however this is not as substantial as the scale's convergent validity. While the relationship between BDEPQ scores and CIDI diagnoses could not be formally examined it appears that these two measures share some variance. The above analyses have demonstrated that BDEPQ scores are made up of at least three parts:

- variance common to other measures of dependence,

[3]In wave one participants were asked to rate the severity of each symptom then to decide whether the symptom had occurred during a dose reduction or when dose was constant. Very few respondents managed to make the distinction between symptoms occurring during a dose reduction or when dose was constant. In wave two respondents were asked to first rate all symptoms for the times when their dose of BZDs had been reduced (BWSQA) and then to rate the same symptoms again for other times when dose had been constant (BWSQB).

- variance common to other questionnaire measures of psychological distress, and
- error variance.

Some proportion of the variance in BDEPQ scores remained unexplained (12% in wave one, 41% in wave two) which may be unique true-score variance. Whether this unique variance has any additional utility in assessing dependence over existing measures remains to be seen.

Predictive validity

The ability of BDEPQ scores in the first wave to predict patterns of BZD use in the second wave and any withdrawal symptoms experienced in the time between the two waves was evaluated using multiple regression analysis.

Prediction of future withdrawal symptoms

Of the 248 people who responded to both the first and second waves of Baillie (1992), 112 (45.2%) had attempted to stop or reduce their dose of BZDs in the three to four months between the waves. The average score on the BWSQA was 3.7 ($sd = 4.8, median = 1.5$) with scores ranging from 0 to 22. The range of scores on the BWSQ is from 0 to 40. Thus the typical experience of withdrawal in the period between the waves was of between one and three symptoms at a moderate level of severity.

The BDEPQ was developed excluding items about BZD withdrawal so any relationship between the BDEPQ and BWSQ cannot be accounted for by an overlap in their items. Scores on the BDEPQ from the first wave were correlated 0.532 ($n = 88, p < .05$) with scores on the BWSQA from the second wave. Thus the BDEPQ has some ability to predict the severity of withdrawal in people who try to reduce their dose of BZDs. It was hypothesized that the BDEPQ would have an independent ability to predict future withdrawal symptoms. To assess the relationship between BDEPQ and other measures taken at wave one, and BWSQA scores at wave two a regression analysis was conducted. Demographic characteristics (age and sex), use of other drugs (tobacco and alcohol), scores on the BDEPQ and other questionnaires, BWSQ scores, and patterns of BZD use (dose, frequency and duration of use, and half-life) from wave one were entered into a regression equation to predict BWSQA scores from the second wave.

The regression equation accounted for a significant proportion of variance in BWSQA scores ($R^2 = 0.585, F_{14,55} = 5.544, p < .05$). BWSQ and BDI scores, standard drinks of alcohol consumed in the last week, and diazepam-equivalent dose all from the first wave were significant independent predictors of BWSQA scores. Scores on the BDEPQ at the first wave were not independently related to BWSQA scores, a result that did not support the hypothesis of an independent

predictive ability. Thus the best predictor of severity of BZD withdrawal appear to be previous withdrawal experiences, severity of depression, greater doses of BZDs, and smaller amounts of alcohol consumed. Importantly EPQ-N scores were not independently predictive of the severity of withdrawal as suggested by Rickels et al. (1990a). The negative independent relationship between standard drinks of alcohol consumed prior to wave one and BWSQA scores at wave two may be explained by assuming that alcohol intake is relatively constant and that greater alcohol intake masked BZD withdrawal symptoms during the period between the waves. This could operate through cross-tolerance, by altering a persons awareness of their mental and physical 'state', or through incorrectly labeling BZD withdrawal symptoms as signs of intoxication or hangover and thus not recording them in the BWSQA. While BDEPQ scores predict severity of future withdrawal in the absence of other variables this effect, is not independent of other information.

Prediction of future changes in dose. In the second wave questionnaire respondents were asked if they had increased or decreased their dose of BZDs since the first questionnaire. It was hypothesized that BDEPQ scores would independently predict changes in BZD use such that those with higher BDEPQ scores would be less likely to reduce or stop their BZDs than those with lower BDEPQ scores. There was a significant correlation between BDEPQ scores from wave one and ratings of changes in dose made at wave two ($r = 0.172, n = 175, p < .05$).

To test the hypothesis of an independent relationship, the same set of variables used in the previous section were entered into a regression equation with respondent rating of changes in BZD dose as the dependent variable. The regression equation did not account for a significant amount of variance in ratings of dose changes ($R^2 = 0.149, F_{14,130} = 1.62, p = ns$) indicating that the BDEPQ and other wave one variables did predict changes in dose as assessed by participant rating.

For respondents to make a judgment about changes in the BZD dose over the three to four months between the mailouts, they have to recall their earlier dose and frequency of use. Recollection is subject to error so the relationship between BDEPQ scores and changes in dose of BZDs were formally tested. Cohen and Cohen's (1985) recommendation to use hierarchical regression analysis to evaluate predictors of change was initially followed. Their recommended method involves a hierarchical analysis with three separate regressions: (1) the covariate (BZD dose at wave one) and the dependent variable (BZD dose at wave two), (2) the covariate, the predictors (BDEPQ scores and other predictive information at wave one) and the dependent variable, and (3) the covariate by predictors interactions and the dependent variable. The third step is intended as a test for homogeneity and if significant the analysis is invalidated. When such an analysis was run the third step could not be carried out because the number of variables in the regression exceeded the degrees of freedom. Thus an analysis of change in dose

could not be carried out with the same number of predictors used in the other analyses of the predictive validity of the BDEPQ. Instead predictors of BZD dose at wave two rather than change in BZD dose were examined.

The correlation between BDEPQ scores at wave one and diazepam-equivalent dose at wave two was 0.242 ($n = 177, p < .05$) indicating a small relationship. A regression equation including demographic characteristics (age and sex), use of other drugs (tobacco and alcohol), scores on the BDEPQ and other questionnaires, BWSQ scores, and patterns of BZD use (dose, frequency and duration of use, and half-life) accounted for 54.2% of variance in dose of BZDs taken at wave two ($R^2 = 0.542, F_{14,127} = 10.753, p < .05$). Partial correlation analysis revealed that dose of BZDs, frequency of BZD use and duration of BZD use form wave one were significant independent predictors of dose at wave two. BDEPQ scores did not independently predict dose at wave two indicating that the correlation of 0.242 reported above is shared with other variables.

The BDEPQ as a screening test for diagnoses of dependence

So far BZD dependence has been considered as a continuum. There are many instances were interpretation of a test is made easier by cut-off scores. It is easier for test users to make a categorical statement from test scores than it is to consider the respondent on a dimension. For this reason alone I analysed the ability of the BDEPQ to act as a screening test for diagnoses of BZD dependence made using the CIDI. For this analysis it is assumed that CIDI diagnoses of dependence are the 'Gold Standard' even though this proposition has been disputed above.

A Receiver Operating Characteristic (ROC) curve was plotted from the sensitivity and false alarm rate by treating each score on the BDEPQ as a cut-off point. Sixty-eight participants had complete information on both the BDEPQ and the CIDI. Of these 68, 21 (30.9%) had either a current CIDI diagnosis of DSM3R or ICD10 BZD dependence or had met criteria for such a diagnosis at some time in the past. ROC analysis has two objectives: selecting an optimal cut-off score, and testing whether the screening test predicts the 'gold standard' better than chance.

Figure 2 shows a graph of the ROC curve for the BDEPQ. The obtained sensitivity and false alarm rates (1 - specificity) are shown as points. A natural logarithm function has been fitted to this obtained data. Selected points are labeled with the BDEPQ scores they reflect. A diagonal line has also been plotted to repented the screening profile of a random or chance test. Points on the BDEPQ ROC curve farthest from this line are better cutting points. Two cutting points emerge from inspection of Figure 2, these are scores of 23 and 34. The choice between these points depends on the relative importance of the correctly identifying people who are BZD dependent compared with the costs of falsely selecting people who the CIDI would not diagnoses as BZD dependent. If correctly identifying BZD dependence was of greater importance a cutting score of

23 would be appropriate. In contrast if the costs of falsely selecting a person as BZD dependent were greater then 34 would be a better choice.

The Area Under the Curve (AUC) has become accepted as the standard method of testing the hypothesis that the screening test is better than chance. The AUC ranges from 0 to 1 with values closer to 1 indicating better screening. A test which provides no diagnostic information would show an AUC of 0.5, indicating that it performed no better than chance. The AUC for the BDEPQ was 0.742 with a standard error of 0.069. From the standard error a 95% confidence interval from 0.607 to 0.878 was calculated. This indicates 95% certainty that the true AUC is not 0.5.

Gavin, Ross, and Skinner (1989) have used ROC analyses to evaluate the ability of the Drug Abuse Screening Test (Skinner, 1982, DAST) to screen for a diagnosis of dependence or abuse of any drug except alcohol or tobacco under the DSM3 nosology. They report that the DAST has an AUC of 0.93 which is significantly better than described above. Gavin et al. (1989) collected a sample of people attending a drug dependence treatment facility and a substantial proportion of the sample were given the 'gold standard' diagnosis. Their sample was also much larger than the 68 people included in the above analysis. Because of these factors, difference in the population sampled, proportion meeting criteria for a diagnosis, and sample size the AUC results are not directly comparable.

Limitations

In the development sample the ammount of missing information in completed questionnaires increased with the age of the respondent. Were no checking for the complete responses can be made, such as in a mail survey, the age of respondents should be considered.

Measures of withdrawal

As no items specifically designed to assess BZD withdrawal symptoms are included in the BDEPQ, the user is left to choose between the many available BZD withdrawal scales. Table 11 shows the content of some of the more recent BZD withdrawal scales.

The scales in Table 11 have different properties making them suitable for different uses.

Ashton (1991) has formalized the list of symptoms described in Ashton (1984) into a rating scale. This scale is perhaps the most complete listing of symptoms that can possibly occur during BZD withdrawal. Some of the symptoms are relatively rare – making it likely that the scale would have a low internal consistency. This scale is best used by a trained clinician based

Figure 2: ROC curve for the BDEPQ as a screening test for CIDI diagnoses of BZD dependence

Notes: Observed data are represented as points in the figure, with the solid line indicating a line of best fit of the form $y = a + b \ln x$. *The dotted line represents the ROC curve of a test with no diagnostic value.*

Table 11: Symptoms of benzodiazepine withdrawal included in withdrawal rating scales

(Ashton, 1984)	DSM3R (APA, 1987)	(Busto et al., 1989) (CIAW-B)	(Rickels et al., 1990b) (PWC)	(Tyrer et al., 1990) (BWSQ)
nausea/vomiting	nausea or vomiting		nausea	
			vomiting	
weakness	malaise or weakness	feels weak	weakness	feeling sick
flushing/sweating	autonomic hyperactivity eg tachycardia, sweating	sweating	diaphoresis	
palpitations		heart racing		
overbreathing				
panic attacks	anxiety or irritability		anxious or tense	anxiety, nervousness
agoraphobia/phobias		anxious, nervous or jittery		shaking or trembling
		fearful		
rage/aggression/ irritability		irritability	irritability	

Table 11: Symptoms of benzodiazepine withdrawal included in withdrawal rating scales *Continued*

(Ashton, 1984)	DSM3R (APA, 1987)	(Busto et al., 1989) (CIAW-B)	(Rickels et al., 1990b) (PWC)	(Tyrer et al., 1990) (BWSQ)
excitability		restlessness and agitation	restlessness	
			agitation	
	orthostatic hypotension			
tremor	coarse tremor of hands, tongue, and eyelids	tremor in hand	tremor, tremulousness	
muscle twitches			muscle fasciculations	muscle twitching
			muscle cramps	
insomnia/nightmares	marked insomnia	unrestful sleep	insomnia	
		insufficient sleep	nightmares	
drowsiness/fatigue		fatigued	fatigue	
fits	grand mal seizures		convulsions	
unreality			depersonalization	feeling unreal

Table 11: Symptoms of benzodiazepine withdrawal included in withdrawal rating scales *Continued*

(Ashton, 1984)	DSM3R (APA, 1987)	(Busto et al., 1989) (CIAW-B)	(Rickels et al., 1990b) (PWC)	(Tyrer et al., 1990) (BWSQ)
poor memory/ concentration		difficulty concentrating	difficulty with concentrating	loss of memory
perceptual distortion			perceptual distortions	feeling of things moving when they are still
hallucinations			delusions, hallucinations	auditory or visual hallucinations
obsessions		worrying about misfortunes		
depression			dysphoric mood loss of drive	feeling depressed
			lethargy	
paranoid thoughts			other psychotic reactions	
craving				
headache		head feels full or achy	headaches	

Table 11: Symptoms of benzodiazepine withdrawal included in withdrawal rating scales *Continued*

(Ashton, 1984)	DSM3R (APA, 1987)	(Busto et al., 1989) (CIAW-B)	(Rickels et al., 1990b) (PWC)	(Tyrer et al., 1990) (BWSQ)
pain				pains in muscles
tingling, numbness altered sensation		numbness or burning in face, hands or feet		pins and needles in hands, arms or legs
stiffness		muscle aches or stiffness		
ataxia				
dizziness/ lightheadiness			dizziness	dizziness
			lightheadedness	feeling faint
blurred/double vision		blurred vision		
tinnitus			tinnitus	
speech difficulty			difficulty expressing thoughts	

Table 11: Symptoms of benzodiazepine withdrawal included in withdrawal rating scales *Continued*

(Ashton, 1984)	DSM3R (APA, 1987)	(Busto et al., 1989) (CIAW-B)	(Rickels et al., 1990b) (PWC)	(Tyrer et al., 1990) (BWSQ)
hypersensitivity (light, sound, taste, smell)		sensitivity to light	increased acuity for sound or smell	sensitive to noise, light, smell, or touch
diarrhoea/constipation			constipation	
			diarrhea	
appetite/weight change		loss of appetite	loss of appetite	loss of appetite
dry mouth				
metallic taste				peculiar taste
difficulty in swallowing				
thirst				
frequency/polyuria, pain on micturation				

Table 11: Symptoms of benzodiazepine withdrawal included in withdrawal rating scales *Continued*

(Ashton, 1984)	DSM3R (APA, 1987)	(Busto et al., 1989) (CIAW-B)	(Rickels et al., 1990b) (PWC)	(Tyrer et al., 1990) (BWSQ)
incontinence				
menorrhagia, PMT				
skin rash/itching				
stuffy nose/sinusitis				
influenza-like symptoms				
sore eyes				sore eyes
		feels upset		
			poor coordination	unable to control movements
			confusion	

on some structured interview with subjects. No information on the inter-rater reliability is available so those wishing to use the scale should conduct reliability trails after interviewers have been trained.

Clinical Institute Assessment of Withdrawal - Benzodiazepines (CIAW-B) The CIAW-B was developed using the most sophisticated methods employed on any of the withdrawal rating scales. Items were selected from a pool if they showed changes when maximum changes in blood BZD levels were detected during withdrawal (Busto et al., 1989). This means that the scale is most responsive to acute withdrawal and is perhaps most suited to use in studies of withdrawal. This scale requires training and fortunately video tapes are available for training.

Physician Withdrawal Checklist (PWC) This scale, described in Rickels et al. (1990b), is perhaps the most widely used BZD withdrawal scale in the published literature (Rickels et al., 1990a, 1990b, for example). Unfortunately little information about its properties have been published. Again it is completed by a trained clinician.

Benzodiazepine Withdrawal Symptom Questionnaire (BWSQ) The BWSQ (Tyrer et al., 1990) provides the only specific self-report measure of BZD withdrawal. Two forms are available, one to assess any history of BZD withdrawal symptoms and the other to examine symptoms over a defined period. This scale attempts to distinguish between occurance of symptoms at any time and when associated with changes in BZD dose by asking for separate ratings under these two circumstances. Little psychometric information is available.

Many authors (Lader, 1983; Noyes et al., 1991; Petursson & Lader, 1981; Power et al., 1985; Rickels et al., 1990b; Schweizer et al., 1991) employ general measures of anxiety such as the Hamilton Anxiety Rating Scale (Hamilton, 1959, HARS). Although this practice is widespread it would be preferable to use the CIAW-B (Busto et al., 1989) or some other BZD withdrawal scale.

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For copies of the BDEPQ, additional information about scoring or interpretation of scores contact Andrew Baillie, CRUfAD, 299 Forbes Street, Darlinghurst NSW 2010; Ph (02) 332 1012, Fax (02) 332 4316, email andrewb@crufad.unsw.edu.au.

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Benzodiazepine Dependence Questionnaire (BDEPQ)

Instructions: In the questions that follow you will be asked about your experience using medications known as sleeping pills, sedatives, hypnotics, 'benzos' or minor tranquillisers. These medications are also known by their trade names of 'Valium', 'Serepax', 'Mogadon', 'Normison', and 'Rohypnol' to list a few. All of these will be called **sedatives, tranquillisers or sleeping pills** *in the questions. When answering the questions please think about your experiences* **over the last month**. *Place a mark in the box below the response that best suits your experience in the last month.*

1. In the last month, have you taken another sedative or tranquilliser as soon as the effects of the previous one began to wear off ?

Never ☐ **Sometimes** ☐ **Often** ☐ **Always** ☐

2. Have you taken sedatives, tranquillisers or sleeping pills in the last month because you like the way they make you feel ?

Always ☐ **Often** ☐ **Sometimes** ☐ **Never** ☐

3. In the last month, have you felt that you cannot face anything out of the ordinary without a sedative or tranquilliser ?

Never ☐ **Sometimes** ☐ **Often** ☐ **Everyday** ☐

4. Do you feel that you cannot get through the day without the help of your sedatives or tranquillisers ?

Never ☐ **Sometimes** ☐ **Often** ☐ **Everyday** ☐

5. Do you need to carry your sedatives or tranquillisers with you ?

Always ☐ **Often** ☐ **Sometimes** ☐ **Never** ☐

6. Have you tried to reduce the number of sedatives, tranquillisers or sleeping pills you take because they interfered with your life ?

A great deal ☐ **Somewhat** ☐ **A little** ☐ **No** ☐

7. Have you found that you needed to take more tranquillisers, sedatives or sleeping pills to get the same effect in the last month compared to when you first took them ?

No ☐ **Sometimes** ☐ **Often** ☐ **Always** ☐

8. Do you need to take sedatives, tranquillisers or sleeping pills to deal with the problems in your life ?

Never ☐ **Sometimes** ☐ **Often** ☐ **Everyday** ☐

9. Do you feel terrible if you do not take a sedative, tranquilliser or sleeping pill ?

Every day ☐ **Often** ☐ **Sometimes** ☐ **Never** ☐

10a. In the last month, have you been worried that your doctor might not continue to prescribe the sedatives, tranquillisers or sleeping pills you are taking ?

Never ☐ | **Sometimes** ☐ **Often** ☐ **A lot** ☐

↓ | 10b. How strong has this worry been ?

↓ | **Mild** ☐ **Moderate** ☐ **Severe** ☐

11. Could you stop taking sedatives, tranquillisers or sleeping pills tomorrow without any difficulties ?

- ☐ No, it would be impossible
- ☐ Perhaps, with a lot of difficulty
- ☐ Yes, with some difficulty
- ☐ Yes, without difficulty

12. Do you count down the time until you can take your next sedative, tranquilliser or sleeping pill ?

Always ☐ **Often** ☐ **Sometimes** ☐ **Never** ☐

13a. Have you experienced relief when you have taken sedatives, tranquillisers or sleeping pills in the last month ?

Never ☐ | **Sometimes** ☐ **Often** ☐ **Always** ☐

↓ | 13b. How strong is that relief ?

↓ | **Mild** ☐ **Moderate** ☐ **Intense** ☐

14a. In the last month, have you felt bad or sick as the effects of sedatives, tranquillisers or sleeping pills wore off ?

☐ Yes *Answer the next question*

☐ No *Skip to question 15*

14b. Have you taken another sedative, tranquilliser or sleeping pill to reduce these unpleasant after-effects ?

Never	**Sometimes**	**Often**	**Always**
☐	☐	☐	☐

15. In the last month, have you taken sedatives, tranquillisers or sleeping pills against your doctor's advice or more frequently than recommended ?

Never	**Occasionally**	**Sometimes**	**Often**
☐	☐	☐	☐

16. Are you concerned about the number of sedatives, tranquillisers or sleeping pills you have taken in the last month ?

A great deal	**A lot**	**A little**	**Not at all**
☐	☐	☐	☐

17. Have you taken more sedatives, tranquillisers or sleeping pills in one day or night than you planned to ?

Every day	**Often**	**Sometimes**	**Never**
☐	☐	☐	☐

18a. Have you found the effects of sedatives, tranquillisers or sleeping pills pleasant ?

Never	**Sometimes**	**Often**	**Always**
☐	☐	☐	☐

↓

18b. How strong is the pleasant feeling ?

Mild	**Moderate**	**Intense**
☐	☐	☐

↓

19. Have you taken sedatives, tranquillisers or sleeping pills for a longer period than you intended to when you started ?

Never	**Sometimes**	**Often**	**A lot**
☐	☐	☐	☐

20a. Have you felt tense or anxious as your prescription for sedatives, tranquillisers or sleeping pills began to run out ?

Never	**Sometimes**	**Often**	**Every time**
☐	☐	☐	☐

↓

20b. How strong have these feelings been ?

Mild	**Moderate**	**Severe**
☐	☐	☐

↓

21a. Have you felt an urge or a desire to take sedatives, tranquillisers or sleeping pills in the last month ?

Never ☐	**Sometimes** ☐	**Often** ☐	**Every day** ☐

↓

21b. How strong is that urge or desire ?

	Mild ☐	**Moderate** ☐	**Intense** ☐

↓

22. Have you taken sedatives, tranquillisers or sleeping pills in the last month when you did not really need them ?

Never ☐	**Sometimes** ☐	**Often** ☐	**Everyday** ☐

Instructions: In the next set of questions please tick the box below the answer that matches what you think.

23. I feel powerless to prevent myself taking a sedative or tranquilliser when I am anxious, uptight or unhappy.

Strongly disagree ☐	**Somewhat disagree** ☐	**Somewhat agree** ☐	**Strongly agree** ☐

24. I would not be able to handle my problems unless I take a sedative or tranquilliser.

Strongly agree ☐	**Somewhat agree** ☐	**Somewhat disagree** ☐	**Strongly disagree** ☐

25. I get so upset over small arguments, that I need to take a sedative or tranquilliser.

Strongly agree	**Somewhat agree**	**Somewhat disagree**	**Strongly disagree**
☐	☐	☐	☐