

<http://researchcommons.waikato.ac.nz/>

Research Commons at the University of Waikato

Copyright Statement:

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

The thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- Any use you make of these documents or images must be for research or private study purposes only, and you may not make them available to any other person.
- Authors control the copyright of their thesis. You will recognise the author's right to be identified as the author of the thesis, and due acknowledgement will be made to the author where appropriate.
- You will obtain the author's permission before publishing any material from the thesis.

Solvent Abuse in New Zealand: Descriptive Data

A thesis

submitted in partial fulfillment

of the requirements for the Degree

of

Master of Social Science

at the

University of Waikato

by

Eileen F. Britt

University of Waikato

1986

Abstract

The aims of this study were to develop and evaluate an assessment procedure and to use this instrument to gather descriptive data on solvent abuse in New Zealand. The Solvent Abuse Questionnaire (SAQ) was devised to identify type of solvent abuse. Its psychometric properties were established using samples of 41 solvent abusers and 15 non-abusers. Findings suggest that the SAQ has potential to accurately discriminate different types of solvent abuser and thus to serve as a guide to appropriate treatment. Descriptive data obtained from subjects' responses to the questionnaire suggests that the solvent abusing sample shared many characteristics with solvent abusers described in previous research on solvent abuse, both overseas and in New Zealand. Furthermore, the solvent abusing subjects appeared different to the non-abusing subjects, reporting more feelings of depression and self-dislike, and more potential side-effects of solvent abuse (i.e. impaired concentration, frequent nasal discharge, nose-bleeds).

Acknowledgements

I would like to thank: the Principal and staff at the school where the study was conducted; the Department of Social Welfare and the Youth Resource Centre; Cheryl, Heather and James for acting as reliability checks; Elizabeth for proof-reading; and the young people who participated in the study.

I also wish to express my thanks to those people who supervised my thesis at one stage or another - Graeme Field, John F Smith, Dr Barry Parsonson, Dr Bill Temple, with special thanks to Katharine Blackman.

Finally, thanks are due to Andrew for continuing to listen to my ramblings, for picking me up when I needed it, and for the many long hours he spent working along side me on this thesis - truly a labour of love!

Contents

	Page
Abstract	ii
Acknowledgements	iii
Contents	iv
List of Tables	v
List of Figures	vii
Introduction	1
Method	12
Results	21
Discussion	82
Appendix A Solvent Abuse Questionnaire Manual	99
Appendix B Solvent Abuse Questionnaire	105
Appendix C Case Histories	111
Appendix D Item Total-Correlations and Alpha if the Item is Deleted	117
References	118

List of Tables

Table		Page
1	Temporal Stability of Items Expected to Remain the Same Score on Repeated Administrations	25
2	Inter-Scorer Reliability for the Behaviour Checklist	28
3	Summary of Subjects' Test Behaviour for the Behaviour Checklist as Assessed by the Experimenter	31
4	Agreement between Field-worker Classifications and SAQ Classifications of the Solvent Abusers	34
5	Internal Consistency of the SAQ Responses of: Non-abusers, Occasional and Possible Habitual Abusers, and Habitual Abusers	37
6	Internal Consistency of Groups of Related Items	40
7	Range, Mean and Standard Deviations of Solvent Abusers and Non-Abusers Total SAQ Scores	43
8	Number of Subjects Receiving each SAQ Classification	46
9	Substances Reported to be Abused	49

10	Substances Reported by Subjects to be their Favourite	52
11	Classifications Received by the Solvent Abusers using the SAQ and Masterton's (1979) Criteria	55

List of Figures

Figure		Page
1	Subjects' Responses to Item 19: "I do not like myself"	58
2	Subjects' Responses to Item 31: "I feel that I am not a very good person"	58
3	Subjects' Responses to Item 21: "I feel that I am not very good at doing things"	61
4	Subjects' Responses to Item 28: "I cannot do things as well as I used to"	61
5	Subjects' Responses to Item 3: "I am unhappy"	64
6	Subjects' Responses to Item 11: "I feel that the future is hopeless"	64
7	Subjects' Responses to Item 2: "I do O.K. at school"	67
8	Subjects' Responses to Item 10: "I do not like school"	67
9	Subjects' Responses to Item 15: "I have lost interest in just about everything"	70
10	Subjects' Responses to Item 32: "I have lost interest in my friends"	70
11	Subjects' Responses to Item 27: "I do not care about my family"	73
12	Subjects' Responses to Item 34: "Recently I have been worried about family troubles"	73

13	Subjects' Responses to Item 5: "I feel more tired than I used to"	76
14	Subjects' Responses to Item 13: "It takes extra effort than it used to to get started doing things"	76
15	Subjects' Responses to Item 24: "Recently I have had a bleeding nose"	79
16	Subjects' Responses to Item 29: "Recently I have had a runny nose"	79
17	Subjects' Responses to Item 33: "Recently my concentration has been poor"	81

Solvent abuse is a generic term used to describe the deliberate inhalation of volatile vapours to induce sensations of euphoria and exhilaration (Bowers & Sage, 1983; Kupperstein & Susman, 1968). Glue-sniffing is the name most commonly used by the general public to describe the practice (Watson, 1976).

Volatile substances have been used recreationally throughout history and in the late 1950's solvent abuse reached epidemic proportions in the United States (Barnes, 1979; Bass, 1970; Caddell, 1983). Since then, the practice has spread and is now considered a problem in a number of other countries, including Britain, Japan, Sweden, Australia and New Zealand (Britt, Field & Thomas, 1985; Russ, Clarkson, Woodroffe & Cheng, 1981; Stewart, 1981; Watson 1976).

A wide variety of substances have been abused, including adhesives, aerosols, cleaning fluids, and petroleum products (Birdling, 1981; Press & Done, 1967a; Watson, 1979, 1980). In fact, almost any fat soluble substance which is volatile at room temperature may be used (Brown 1983, Malcolm, 1968; Russ et al, 1981). Many of these substances can be found around the home, or may be obtained from hardware stores or service stations (Britt et al, 1985; Press & Done, 1967a; Stewart, 1981; Sutherland, 1982).

The vapours are inhaled using a variety of methods. An inflated plastic or paper bag containing the solvent may be held over the nose and mouth (Bowers & Sage, 1983; Britt et al, 1985; Watson, 1980). Alternatively, cloth, such as a tennis wrist-band (Britt et al, 1985), saturated in the substance may be used (Clements & Simpson, 1978; Litt & Cohen, 1970; Peers, 1981).

Solvent abuse tends to be a group activity, which may be quite ritualized, with the bag being passed around the group (Britt et al, 1985; Bowers & Sage, 1983; Caddell, 198; Stybel, Allen & Lewis, 1976). A session may last from a few minutes to several hours (Press, 1963; Stewart, 1981; Watson, 1980). A session usually ends when: the desired sensation has been achieved; the abuser becomes dizzy or loses consciousness; or the vapours are no longer in sufficient concentration to gain any effect (Arnold, 1983; Cohen, 1975; Glaser & Massengale, 1962; Kupperstein & Susman, 1968; Merrill, 1978).

The effects, which develop progressively, are similar to those of alcohol (Bowers & Sage, 1983; Press & Done, 1967b; Rogers, 1982; Watson, 1977, 1980). These include central nervous system excitation in the early stages, followed by central nervous system depression, which may progress through to loss of consciousness (Benignus, 1981; Biggs, Bender & Foreman, 1983; Edwards, 1982; Ehyai & Freemon, 1982).

However, unlike alcohol, the onset of effects and recovery from them is rapid (Britt et al, 1985; Brown, 1983; Nicoli, 1983). The effects may start within a few minutes of initiating the abuse and may last up to two hours (Black, 1982a,b; Peers, 1981; Press & Done, 1967b; Watson, 1980). The hangover resulting from solvent abuse does not seem to be as severe as the hangover from alcohol abuse, with only some solvent abusers reporting headaches, drowsiness and nervousness the next day (Caddell, 1983; Cohen, 1979; Grant, 1984; Stewart, 1981; Watson, 1980).

To maximise the effect, the substance is sometimes warmed to increase its volatility or the bag may be placed over the abuser's head (Bowers & Sage, 1983; Caddell, 1983; O'Connor, 1970; Peers, 1981). These are dangerous practices as the solvent may ignite or the abuser may lose consciousness with the bag still over his/her head and suffocate (Anderson, Dick, McNair, Palmer & Ramsey, 1982; Edwards, 1982; Watson, 1976, 1978, 1979b).

Most deaths associated with solvent abuse result from the 'sudden sniffing death syndrome' (Bass, 1970; Nicoli, 1983). That is, severe cardiac arrhythmias occurring either when stress or vigorous activity is associated with solvent abuse, or when fluorocarbons, found in aerosols, are inhaled (Anderson, et al, 1982; Bass, 1970; Hayden & Comstock, 1976; Reinhart, Azar, Maxfield, Smith, Mullin & Del, 1971). Injury and death may also result from retarded motor behaviour causing accidents, or from a sudden allergic

reaction to a particular solvent (Barker & Adams, 1963; Merrill, 1978; Rogers, 1982; Watson, 1976).

Solvent abuse has been linked with a number of acute and chronic toxic effects. These include blood and endocrine abnormalities, respiratory damage, hepatic and renal damage, and central nervous system damage (Ehyai & Freemon, 1982; Fornazzari, Wilkinson, Kapur & Carlen, 1983; Lazar, Ho, Melen & Daghestani, 1983; Prasad, 1984; Schikler, Lane, Seitz & Collins, 1984).

A number of factors such as peer pressure, psychological vulnerability, disorganised home life and a demoralising, hopeless social situation, have been associated with solvent abuse (Biggs et al, 1983; Korman, Trimboli & Semler, 1980; Peers, 1981; Watson, 1977, 1980). However, these factors seem to play different roles depending on the type of solvent abuse involved (Cohen, 1979; Korman et al, 1980; Lockhart & Lennox, 1983; Masterton, 1979). The causal model, proposed by Britt et al (1985) illustrates how these factors might lead to solvent abuse.

Characteristics of Abusers

Solvent abusers are usually between eight and 19 years of age (Britt et al, 1985; Campbell & Watson, 1978; Watson, 1977, 1979), although a broad age group, ranging from children as young as five years of age to adults has been known to abuse solvents (Bowers & Sage, 1983; Hershey & Miller; Korman et al, 1980).

It was thought that solvent abusers were predominantly male, with male/female ratios ranging from 20:1 to 5:1 (Barker & Adams, 1963; Cohen, 1975; Press & Done, 1967a). However, it now seems that the number of females abusing solvents has been increasing (Barnes, 1979; Britt et al, 1985; Korman et al, 1980; Stewart, 1981).

Solvent abuse seems to be most prevalent amongst ethnic minority groups in Britain and the United States (Barnes, 1979; Press & Done, 1967a; Watson, 1977, 1979). This also seems to be the case in New Zealand where there is a preponderance of Maori and Polynesian youth abusing solvents (Arnold, 1983; Birdling, 1981; Britt et al 1985; Douglas, 1984; Grant, 1984). In addition, the incidence of solvent abuse is highest amongst lower socio-economic groups (Hamilton, Baldwin, Barker & Coker, 1983; Lockhart & Lennox, 1983; Masterton, 1979). This may well account for the higher incidence amongst minority groups (Barnes, 1979; Glaser & Massengale, 1962).

Poor academic achievement and truancy are common amongst solvent abusers (Britt et al, 1985; O'Connor, 1979; Press & Done, 1967a; Watson, 1980). However, this educational failure seems to be related to poor motivation and the abuser's disadvantaged background rather than to low intelligence (Barnes, 1979; Dodds & Santostefano, 1964).

Cahoon & Crosby (1972) provide an analysis of drug abuse, which appears to be particularly useful for solvent abuse. This model describes the roles which different variables may play in affecting the behaviour of different types (i.e. occasional or habitual) of abuser. This conceptualization, based on the operant conditioning model, suggests that positive reinforcement through social support may initiate solvent abuse and act as a continuing reinforcement for occasional abuse, whilst other variables become operative for habitual abuse. Using this conceptualization, more long term, but still occasional, abuse may be viewed as a function of positive reinforcement resulting from the direct effect of the drug (i.e. the euphoric effect). This sort of abuse is, therefore, considered no more psychologically addictive than a good book, movie or one's favourite food (Cahoon & Crosby, 1972).

Habitual abuse may be seen as an attempt to terminate aversive stimuli in the environment, for example by allowing the solvent abuser to escape the reality of poor living conditions (Britt et al, 1985; Gay, Meller & Stanley, 1982; Masterton, 1979). The abuse, therefore, is negatively

reinforced through the reduction of the aversive environmental stimuli. If the environment is sufficiently aversive, then consistent and persistent use is likely to develop (Cahoon & Crosby, 1972). Cahoon & Crosby (1972) point out that this may describe why the favourite drugs in the ghettos of the United States are pain killers and may account for the cultural and racial differences in drug abuse. Habitual abuse may also be seen as the result of negative reinforcement from a reduction of aversive stimuli such as anxiety and depression (Cahoon & Crosby, 1972).

The implication of Cahoon & Crosby's (1972) analysis of drug abuse is that solvent abuse may be under the control of several variables, as suggested by past researchers (Britt et al, 1985; Lockhart & Lennox, 1983; Masterton, 1979), and that variables that were important in the early phases of solvent abuse may not presently be maintaining the behaviour. These are important considerations when devising treatment programmes. That is, treatment packages that are applied uniformly to heterogeneous groups of drug abusers, or different types of solvent abuser, are likely to fail (Lutzker & Martin, 1981).

Masterton (1979) suggests that there are two broad types of solvent abuser, similar to Cahoon & Crosby's (1972) analysis, but each with two subtypes:

1. occasional abusers
 - a) experimental
 - b) social-recreational
- and 2. habitual abusers
 - a) socially determined
 - b) psychologically determined.

The occasional solvent abuser's family, social and personal adjustments tend to be positive compared to those of the habitual abuser (Press, 1963; Stewart, 1981). Because their abuse is only occasional, physical and social deterioration associated with the abuse is rare (Lockhart & Lennox, 1983; Masterton, 1979).

Persons who are classified as experimental abusers are occasional solvent abusers who abuse once or twice out of 'peer pressure', 'boredom', or 'curiosity' and then quickly discard the practice either because the experience was unpleasant or was not sufficiently reinforcing to continue (Cohen, 1979; Masterton, 1979; Merrill, 1978; O'Connor, 1979). Social-recreational solvent abuse occurs approximately once or twice a month for about two hours, usually in the company of a regular established group of friends, similar to adult use of alcohol at parties

(Cohen, 1979; Kupperstein & Susman, 1968; O'Connor, 1979; Stewart, 1981).

Habitual abusers "frequently abuse one or more solvents for more than three months" (Masterton, 1979, p.66) and are more likely to abuse alone (Birdling, 1981; Black, 1982b; Gay et al, 1982). Like other adolescent drug abuse, it is estimated that only about five percent of solvent abusers are habitual abusers and these are youth who are likely to experience other drug problems (Caddell, 1983; Cohen, 1979; Whitehead & Brook, 1973).

Habitual abusers are less likely to simply discard the practice than occasional solvent abusers (Caddell, 1983; Cohen, 1979; Gay et al, 1982; Masterton, 1979). For the habitual abuser the abuse may be a form of coping mechanism, which provides them with an escape from reality and a means of coping with feelings such as depression, insecurity, inadequacy and hopelessness (Caddell, 1983; Korman et al, 1980; Press & Done, 1967a; O'Connor, 1979). The state of intoxication itself, is therefore, presumed to be reinforcing so that the habitual abuser becomes psychologically dependent upon this state (Edwards, 1982; O'Connor, 1979; Press & Done, 1967b). Habitual abusers may exhibit physical as well as social and psychological deterioration ((Bigler, 1979; Korman, et al, 1980; Press & Done, 1967b).

Socially-determined solvent abuse is seen as part of a distinctive subculture (Gay et al, 1982; Masterton, 1979). Such individuals tend to identify with an often discriminated against ethnic minority group and come from families of low socio-economic status (Lockhart & Lennox, Masterton, 1979). Psychologically-determined solvent abuse is considered to occur in all social classes and is regarded as a means of coping with distress of an underlying problem, such as depression (Caddell, 1983; Lockhart & Lennox, 1983; Masterton, 1979).

Assessment

Despite the obvious need for an assessment device which delineates different types of solvent abuser and which has good reliability and validity, there is no standardised assessment device for solvent abuse. It appears that researchers have either not tried to discriminate between different types of solvent abuser, or have devised criteria from past experience or previous literature, and/or used psychometric instruments not designed specifically for solvent abuse (Lockhart & Lennox, 1983). It would be useful if the above research on the characteristics of solvent abusers and different types of abuse could be drawn together to form an assessment device which would delineate abusers from non-abusers and occasional abusers from habitual abusers.

Treatment

Aversion therapy seems to have been the primary treatment for solvent abuse (Blanchard, Libet & Young, 1973; Kolvin 1967; Lowenstein, 1982; Maletzky, 1979; Skinner, 1978), although hypnotherapy, client-centred counselling and family therapy have also been used (Framrose, 1982; O'Connor, 1982). The outcome of these studies has generally been poor, with changes not being maintained beyond treatment. Inadequate assessment may account for these limited results. More appropriate treatments, such as providing alternative or incompatible behaviours to the solvent abuse, may have been suggested if the solvent abuse was assessed more fully.

Aims

There were three aims to the present study. The first aim was to devise an assessment procedure to estimate the intensity (i.e. non-abuse, occasional, or habitual) of solvent abuse using Masterton's (1979) criteria. This device, the Solvent Abuse Questionnaire (SAQ), would utilise distinguishing characteristics (Callner, 1975) identified in past research (Barnes, 1979; Bowers & Sage, 1983; Lockhart & Lennox, 1983; Masterton, 1979; O'Connor, 1979). The second aim was, to perform a preliminary evaluation of the psychometric properties of this instrument. The third aim

was to use this device to gather descriptive data on solvent abuse in New Zealand.

Method

Subjects

Forty one solvent abusers and 15 non-abusers were contacted through youth centres in Christchurch and Hamilton, an intermediate school in Hamilton, and the Department of Social Welfare institutions in Hamilton.

Thirty-seven (93%) solvent abusers were of Maori/Polynesian origin, 23 (56%) were male and 18 (44%) were female. Their ages ranged from 12 to 17, with the majority (80%) of subjects falling within the 13-15 year-old range. In the comparison group, 14 (93%) subjects were of Maori/Polynesian origin, nine (53%) were male and six (47%) were female. Their ages ranged from 12-17 years, with the majority (80%) of subjects falling into the 13-15 year-old range.

Setting

The questionnaires were individually administered at the youth centres, the school, or the Department of Social Welfare institution. In all cases an office was used to decrease distractions and to ensure confidentiality.

Experimenters

The author, a graduate student in psychology, administered the SAQ. Two graduate students and one undergraduate student in psychology acted as observers for reliability checks.

Materials

The SAQ Manual (appendix A) gives detailed information on the construction, administration and interpretation of the SAQ (appendix B), which was designed to classify solvent abusers primarily into occasional and habitual abuse categories proposed in recent research on solvent abuse (Cahoon & Crosby, 1972; Gay et al, 1982; Lockhart & Lennox, 1983; Masterton, 1979). In addition a third category, possible habitual abuse, was included in order to cope with short term high rate abuse. That is, those subjects who

were abusing at a high rate, but had not been abusing solvents long enough to meet Masterton's criterion of at least three months for habitual abuse, were labelled possible habitual abusers, suggesting that given more time they would be likely to fulfil the criteria for habitual abuse.

The questionnaire is comprised of 35 self-statements which describe characteristics most frequently suggested as useful for distinguishing different types of solvent abuser (Cohen, 1979; Masterton, 1979; O'Connor, 1979; Stewart, 1981)

Procedure

The SAQ was individually administered to all subjects. The SAQ was re-administered to five subjects, with intervals ranging between four weeks and four months between administrations. These were subjects on whom case history information was collected. The SAQ was administered twice to three of the subjects and three times to the remaining two subjects.

Psychometric EvaluationConsistency of Responding.

The internal consistency of the SAQ was calculated using Cronbach's (1951) alpha coefficient (cited in Anastasi, 1982), item total and inter-item correlations were calculated.

Split half reliability was calculated, using Spearman-Brown's coefficient (Anastasi, 1982). The SAQ was divided into two parts, of 17 items each, with related items assigned to each half.

Cohen's (1960) coefficient (cited in Anastasi, 1982) was used to calculate the consistency of responding over time. The SAQ was administered three times to two subjects and twice to a third, with intervals ranging from four weeks to four months between administrations. Because these subjects reported that they had either ceased abusing solvent or had reduced their solvent abuse between administrations, their responses to items 4, 8, 12, 16, 17, 25, 30 only were examined for temporal stability. Subjects were expected to obtain the same score on these items on repeated administrations, regardless of whether solvent abuse had decreased between administrations, as they were put to them as factual questions referring to their past pattern of abuse.

Inter-Scorer Consistency.

Inter-scorer consistency was assessed using video-taped administrations of the SAQ. An undergraduate student in psychology was video-taped as he 'role-played' the four types of solvent abuser. Three psychology students viewed the video-tape and individually scored each abuser's responses on the SAQ. Cohen's (1960) coefficient was used to calculate the inter-observer reliability.

Face Validity.

Face validity was assessed by collating the information recorded on subjects' test behaviour on the face sheet of the SAQ. Additionally, 10 people who worked with solvent abusers and 10 people who did not were asked what the SAQ appeared to be measuring.

Concurrent Validity.

Concurrent validity was assessed in accordance with Anastasi (1982) by correlating field workers' (i.e. social workers, teachers and youth workers) classifications of solvent abusers as occasional or habitual abusers with the SAQ classifications accorded to subjects by their total scores on the SAQ. Field workers were asked to classify the solvent abusers they referred on the basis of the following

descriptions:

1. Occasional: has abused solvents once or twice only, or abuses once or twice a month. Has or is likely to discard the practice because s/he finds it unpleasant or feel that they have better things to do. They are average achievers and have positive social, familial and personal adjustments. They talk of solvent abuse as being fun and exciting.
2. Habitual: has abused one or more solvents for more than three months on a weekly or daily basis. They may be depressed, anxious or withdrawn, and have low self-esteem. Solvent abuse provides them with a sense of belonging to the peer group and prestige among its members, or with a means of coping. The state of intoxication itself is pleasurable, i.e. they describe solvent abuse in terms of the pleasant effects it has. They are most likely to abuse alone.

Cohen's (1960) reliability coefficient was used to calculate the agreement between the SAQ classifications and the field workers' classifications.

Correlations between subjects' SAQ scores and the rate and length of their abuse were calculated using Pearson's Product-Moment coefficient (Anastasi, 1982). Information on

the rate and length of abuse was obtained from case histories of five subjects (appendix C) and from subjects' ($n=41$) responses to item 25 and item 30.

Construct Validity.

The construct validity of the SAQ was estimated in three different ways in accordance with Anastasi (1982). Firstly, subjects' total scores were correlated with the length and rate of their abuse (i.e. items 25 and 30), using Pearson's Product-Moment Coefficient (Anastasi, 1982). Secondly, the internal consistency of the scores of habitual abusers, possible habitual abusers, and occasional abusers combined, and non-abusers on the SAQ were calculated. Thirdly, the internal consistency of groups of items, which were assumed to be related were calculated using Cronbach's (1951) alpha coefficient. The item groups were: demographics of the solvent abuse (items 4, 12, 17, 25, 30); reasons for the abuse (items 1, 6, 14, 16, 22); side effects experienced (items 8, 16, 24, 29, 33); consequences of the abuse (items 18, 20, 26, 35); other interests (items 7, 15, 23, 27, 32, 34); self-esteem (2, 10, 19, 21, 31); and depression (items 3, 5, 9, 11, 13).

Content of Responses

There are three different ways of classifying the subjects. That is, they could be classified as either:

1. occasional, possible habitual, or habitual abusers based on their total SAQ scores
2. occasional or habitual abusers based on Masterton's (1979) criteria for habitual abuse of "frequent abuse of one or more solvents for more than three months" (p.66)
3. occasional, or habitual abusers based on their responses to item 25 (length abuse) and 30 (rate of abuse)

Subjects responses were analysed using these classifications.

The scores of abusers and non-abusers on the SAQ were collated and compared. The number of abusers receiving occasional and habitual classifications was also collated and these results were then compared to the classifications subjects would have received using Masterton's (1979) criteria for occasional and habitual abuse. Subjects' responses to items 25 and 30, which relate to the rate and length of abuse, were used to classify them as occasional or habitual abusers according to Masterton's criteria.

Subjects were then sorted into the following three groups according to their responses to items 25 and 30: non-abusers ($n=15$), occasional abusers ($n=9$), and habitual abusers ($n=26$). Occasional abusers were subjects who received a combined score on items 25 and 30 of less than five and habitual abusers were subjects whose combined score was greater than five. Subjects with a score equal to five were omitted ($n=6$). Thus, occasional abusers were subjects who reported either infrequent abuse or, only recently began abusing solvents, whereas habitual abusers were subjects who reported frequent (i.e. weekly or daily) abuse for more than three months. Subjects who obtained scores equal to five were omitted because the characteristics of their solvent use did not fulfill the criteria of occasional abuse or habitual abuse (i.e. possible habitual abusers) These subjects would be classified as occasional abusers using Masterton's criteria.

The responses on 17 SAQ items of these three groups were then compared. These items did not relate directly to solvent abuse (i.e. items: 2, 3, 5, 10, 11, 13, 15, 19, 21, 24, 27, 28, 29, 31, 32, 33, 34). Subjects' responses regarding substances they had abused were also compared.

Results

Psychometric EvaluationConsistency of Responding

The internal consistency of the SAQ was high ($r=.95$). Deletion of any particular item from the scale had little effect on alpha, which remained high. Item-total correlations ranged from $r=.03$ (item 27) to $r=.86$ (item 25), with a mean item-total correlation of $r=.55$ and a standard deviation of $r=.19$ (appendix D).

All but five items correlated significantly ($p<.05$) with more than 50% of the other items. Items which were highly correlated (i.e. $r>.70$, $p<.05$) were:

1. the degree the effects were liked (item 1 and item 22) with the:
 - a) amount of substance used (item 17, $r=.78$ and $r=.91$, respectively)
 - b) degree parents were perceived to worry about solvent abuse (item 20, $r=.80$ and $r=.80$, respectively)
 - c) length of abuse (item 25, $r=.86$ and $r=.85$, respectively)
 - and d) rate of abuse (item 30, $r=.81$ and $r=.78$, respectively)

2. solitary solvent abuse (item 4) with the:
 - a) degree parents were perceived to worry about solvent abuse (item 20, $r=.71$)and b) length of abuse (item 25, $r=.71$)
3. lack of interest in other activities (item 7) with the length of abuse (item 25, $r=.71$)
4. the number of blackouts (item 8) with the rate of abuse (item 25, $r=.73$)
5. having to abuse solvents to get through the day (item 9) with:
 - a) not enjoying anything unless intoxicated (item 23, $r=.71$)and b) the rate of abuse (item 30, $r=.71$)
6. the amount of solvent used (item 17) with the:
 - a) length of abuse (item 20, $r=.75$)and b) rate of abuse (item 30, $r=.77$)
7. the degree parents were perceived to worry about solvent abuse (item 20) with the:
 - a) length of abuse (item 25, $r=.86$)
 - b) rate of abuse (item 30, $r=.78$)
8. the length of abuse (item 25) with the rate of abuse (item 30, $r=.87$)

and 9. how often parents had tried to stop the abuse (item 35) with:

- a) the degree parents were perceived to worry about the abuse (item 20, $r=.83$)
- b) the length of abuse (item 25, $r=.73$)
- c) police contact because of solvent abuse (item 26, $r=.70$)

and d) the rate of abuse (item 30, $r=.73$)

Split half reliability was high, with Spearman-Brown $r=.82$. Temporal stability (Table 1) for items 4, 8, 12, 16, 17, 25, and 30 was high ($r=.91$) overall, with individual item test-retest reliabilities ranging from $r=.60$ to $r=1.0$.

Table 1. Temporal Stability of Items Expected to Remain the
Same Score on Repeated Administrations.

Item	Agreed	Disagreed	<u>r</u>	<u>n</u>
4	5	0	1.00	5
8	5	0	1.00	5
12	3	2	0.60	5
16	5	0	1.00	5
17	4	1	0.80	5
25	5	0	1.00	5
30	5	0	1.00	5
Total	32	3	0.91	40

Inter-Scorer Consistency

Inter-scorer reliability ($n=12$) was high for individual item scores ($r=.99$) and for classification into each of the categories ($r=.92$), although lower for the total score ($r=.75$).

The inter-scorer reliability ($n=12$) for the test behaviour checklist (Table 2) was moderate overall ($r=.75$), with individual test behaviour reliabilities ranging from $r=.58$ (attention and effort) and $r=1.0$ (need for explanations).

Table 2. Inter-Scorer Reliability for the
Behaviour Checklist.

Behaviour	Agreed	Disagreed	<u>r</u>
Explanations	12	0	1.00
Rapport	8	4	0.67
Response Speed	10	2	0.83
Attention Span	7	5	0.58
Praise Needed	10	2	0.67
Effort	7	5	0.58
Total	54	18	0.75

Face Validity

The majority (85%) of subjects required at most three explanations and most (98%) appeared to make a fair or good effort. Rapport was considered to have been easily attained with 63% of the subjects and the speed of response was rated average or fast for 85% of subjects. It was judged to be easy to maintain most (90%) subjects' attention, with only one subject requiring a lot of praise (Table 3).

Of the 10 field workers and 10 people naive about solvent abuse, all replied that the SAQ appeared primarily to be measuring solvent abuse, as well as a number of other factors such as attitude to self and school, interests, and sense of happiness.

Table 3. Summary of Subjects' Test behaviour from
the behaviour checklist as assessed by
the experimenter.

Test Behaviour	<u>N</u>	%
Explanations Needed		
Only 1	21	51.22
2 or 3	14	34.15
More than 3	6	14.60
Rapport		
Easily attained	26	63.41
Slowly attained	14	34.15
Poor	1	2.40
Speed of Response		
Fast	13	31.71
Average	22	53.66
Slow	6	14.60
Attention Span		
Very attentive	12	29.27
Average	25	60.98
Distractible	4	9.70
Need for Praise		
Little needed	21	51.22
Some needed	19	46.34
Much needed	1	2.40
Effort		
Good	19	46.34
Fair	21	51.22
Perfunctory	1	2.44

Concurrent Validity

Agreement between the field worker classifications and the SAQ classifications (Table 4) was moderate but significant overall ($r=.72$, $p<.05$) and for the habitual abuse category ($r=.69$, $p<.05$). There were insufficient numbers for statistical analysis of the occasional abuse category.

Correlations between SAQ scores and the rate and length of solvent abuse, from the case history data ($n=5$), were $r=.99$ and $r=.64$, respectively. The correlation between the SAQ score and the rate of solvent abuse was significant at the .05 level.

Correlations between SAQ total scores ($N=41$) and the scores on item 25 (length of abuse) and item 30 (rate of abuse) were $r=.53$ and $r=.40$, respectively. Both correlations were significant at the .05 level.

Table 4. Agreement (r) between Field-worker
Classifications and the SAQ Classifications.

Classification	Agreed	Disagreed	<u>r</u>	<u>p</u>
Occasional	2	0	1.0	*
Habitual	11	5	0.69	< .05
Total	13	5	0.72	< .05

* Insufficient data

Construct Validity

Correlations of subjects' total scores with the length and rate of their abuse (i.e. items 25 and 30) were $r=.53$ and $r=.40$, respectively.

The internal consistency (Table 5) of the SAQ for different types of abusers and the non-abusers was high ($p<.05$).

Table 5. Internal Consistency of SAQ Responses of:
Non-Abusers, Occasional and Possible
Habitual Abusers, and Habitual Abusers.

Classification	<u>n</u>	Alpha	<u>p</u>
Non-Abusers	15	0.91	< .05
Occasional and Possible Habitual	15	0.59	< .05
Habitual	26	0.73	< .05

The internal consistency of the groups of related items generally was high, given the small number of items in each group (Table 6). Alpha was significant ($p < .05$) for the group of items referring to the demographics of the abuse.

Table 6. Internal Consistency of Groups of Related
Items.

Topic	Items	Apha
Demographics of Abuse	4 12 17 25 30	.89
Reasons for Abuse	1 6 14 22	.87
Side Effects of Abuse	8 16 24 29 33	.74
Consequences of Abuse	18 20 26 35	.89
Other Interests	7 15 23 27 32 34	.61
Self Esteem	2 10 19 21 31	.69
Depression	3 4 9 11 13	.81

Content of Responses

Because subjects were not randomly selected, but rather for the solvent abuse group were nearly an exhaustive sample, the use of inferential statistics to generalise to all solvent abusers would be inappropriate (Runyon & Harber, 1980).

Total SAQ Scores

The solvent abusers' total scores on the SAQ averaged 70.25 (range from 43-98), with a standard deviation of 14.32 (Table 7). The non-abusers obtained total scores on the SAQ ranging from 17 to 50, with a mean score of 22.6 and a standard deviation of 8.57.

Table 7. Range, Mean (M) and Standard Deviations (SD)
of Solvent Abusers' and Non-Abusers' Total SAQ
Scores.

	<u>N</u>	Range	<u>M</u>	SD
<hr/>				
Abusers				
Males	23	43-96	69.41	13.73
Females	18	45-98	71.28	15.35
Total	41	43-98	70.25	14.32
Non-Abusers				
Males	8	17-50	24.38	11.59
Females	7	17-23	20.57	2.37
Total	15	17-50	22.60	8.57

The majority of solvent abusers (63%) were classified on the basis of their SAQ total score (see Appendix A) as habitual solvent abusers. Eight subjects were classified as possible habitual abusers, and seven as occasional abusers. (Table 8).

Table 8. Number of Subjects Receiving each
Classification.

Classification	<u>N</u>	%
Occasional	7	17
Possible Habitual	8	20
Habitual	26	63

Substances Abused.

The solvent abusers reported having abused a variety of substances (Table 9). Petrol was the substance abused by subjects most frequently (59%), followed by unspecified adhesives (54% of subjects) and 'Ados'¹ (51% of subjects). 'CRC'² (29% of subjects), 'Kwik Grip'³ (27% of subjects) and 'Twink'⁴ (24% of subjects).

Habitual abusers (Table 9) reported to have abused a greater variety of substances, than occasional abusers. Petrol was more frequently reported to be a substance of abuse by habitual abusers (73%), whilst occasional (43%) and possible habitual abusers (75%) more frequently reported to abuse Ados (Table 9).

1 A commercially available contact adhesive manufactured by Ados Chemical Company, Limited, New Zealand

2 A commercially available petroleum based motor lubricant manufactured by CRC Chemicals (New Zealand) Ltd

3 A commercially available contact adhesive manufactured by Selley's Chemical Company, Australia

4 A commercially available correcting fluid manufactured by Mitchell & Dean Limited, New Zealand

Table 9. Substances Reported to be Abused

Substance	% Subjects Abusing Substance			
	Occasional	Possible Habitual	Habitual	Total

Ados	43	75	46	51
Cement Paint	0	0	4	2
CRC	0	25	38	29
Floor Polish	0	0	4	2
Flyspray	0	0	4	2
Lighterfluid	14	0	30	22
Methylated Spirits	0	0	4	2
Petrol	14	38	73	59
Kwik Grip	29	50	19	27
Screening Seal	0	0	4	2
Spray Paint	29	0	12	12
Twink	14	38	19	24
Unspecified Adhesives	29	50	58	54

The most frequently cited favourite substance (Table 10) was 'Ados' (44% of solvent abusers), followed by 'Twink' (12%) and unspecified adhesives (12%). Lighterfluid and petrol were the favourite substances of 10% of solvent abusers.

Table 10. Substances Reported by Subjects to be
their Favourite

Substance	% Subjects Reporting as Favourite
Ados	44
CRC	8
Lighterfluid	10
Petrol	10
Kwik Grip	2
Spray Paint	2
Twink	12
Unspecified Adhesives	12

Masterton's Criteria

According to Masterton's (1979) criteria 15 subjects would be classified, according to their responses to items 25 and 30, as occasional abusers. Only seven subjects were classified as occasional abusers using the SAQ. Of the eight subjects classified as possible habitual abusers on the SAQ, half would be classified as occasional abusers and half as habitual abusers using Masterton's criteria. Thirty-one subjects would be classified as habitual abusers using either/or both the SAQ and Masterton's (1979) criteria (Table 11). Of these, 21 subjects would be classified as habitual on both, and 10 subjects so classified on only one of these systems.

Table 11. Classifications Received by the Solvent
Abusers using the SAQ and Masterton's
(1979) Criteria.

SAQ Classification

		Occasional	Possible Habitual	Habitual
Masterton's Criteria	Occasional	6	4	5
	Habitual	1	4	21

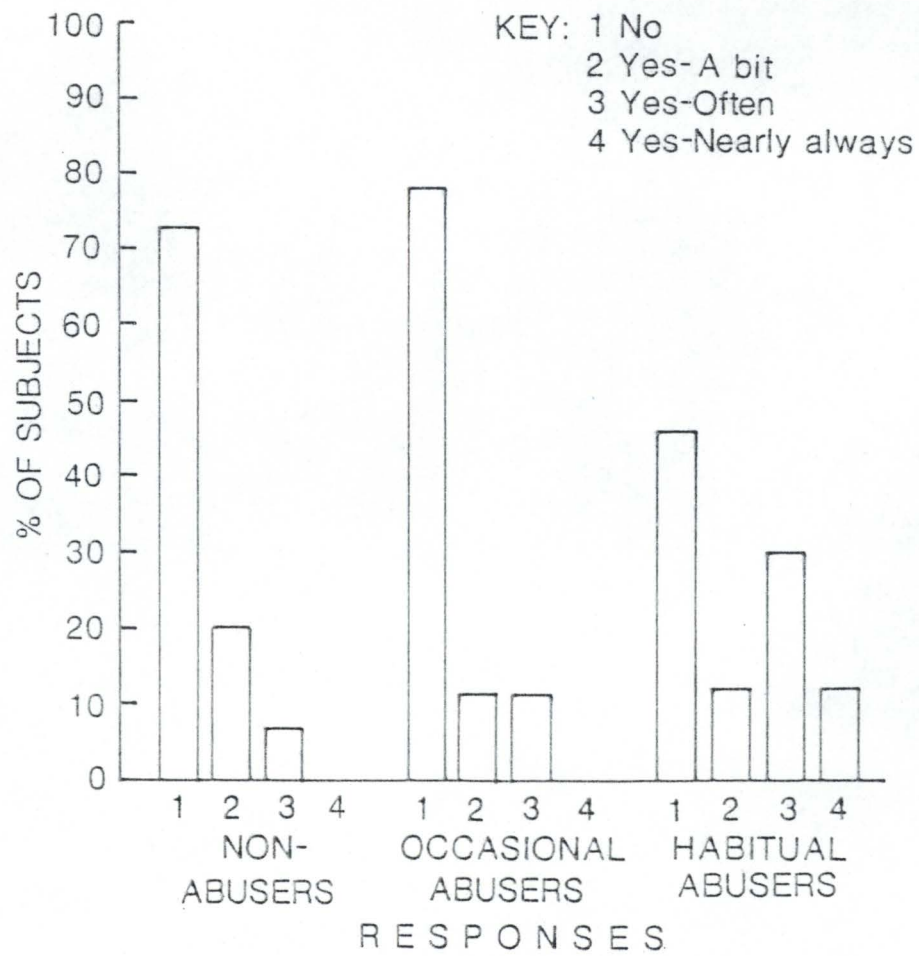
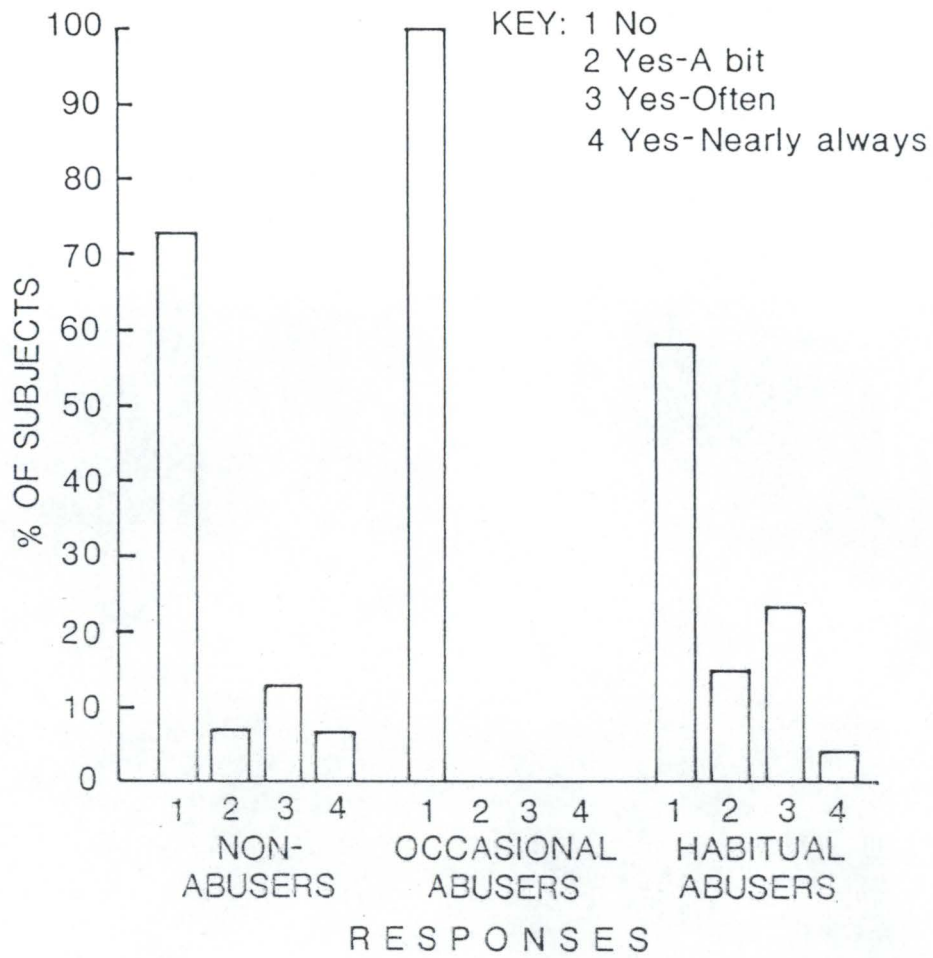
Items 25 and 30Self Like-Dislike.

The responses of the non-abusers and habitual abusers to item 19 were similar (Figure 1). All of the occasional abusers reported that they liked themselves, 27% of the non-abusers and 42% of the habitual abusers reported that there were times when they did not like themselves.

Non-abusers and occasional abusers responded similarly to item 31 (Figure 2). Over 70% of non-abusers and occasional abusers reported that they considered themselves to be a good person, whereas over 50% of habitual abusers reported that they considered themselves not a very good person.

Figure 1. Subjects' Responses to Item 19: "I do not like myself".

Figure 2. Subjects' Responses to Item 31: "I feel that I am not a very good person".



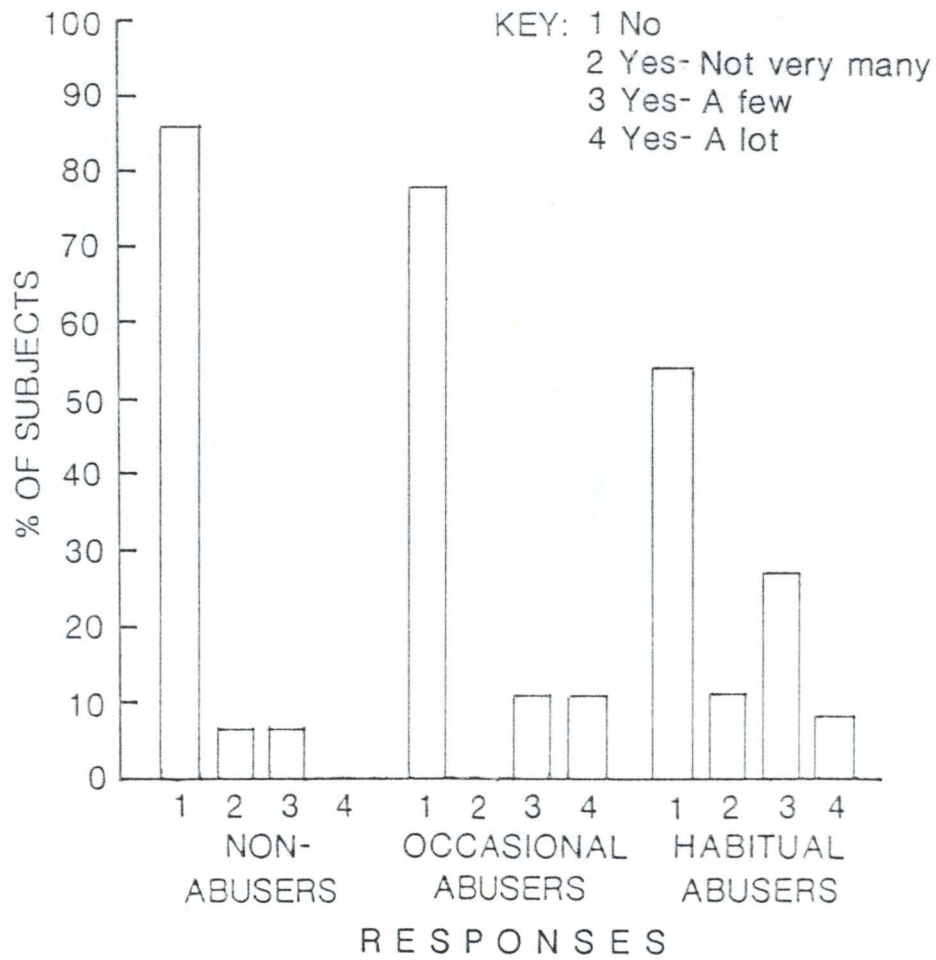
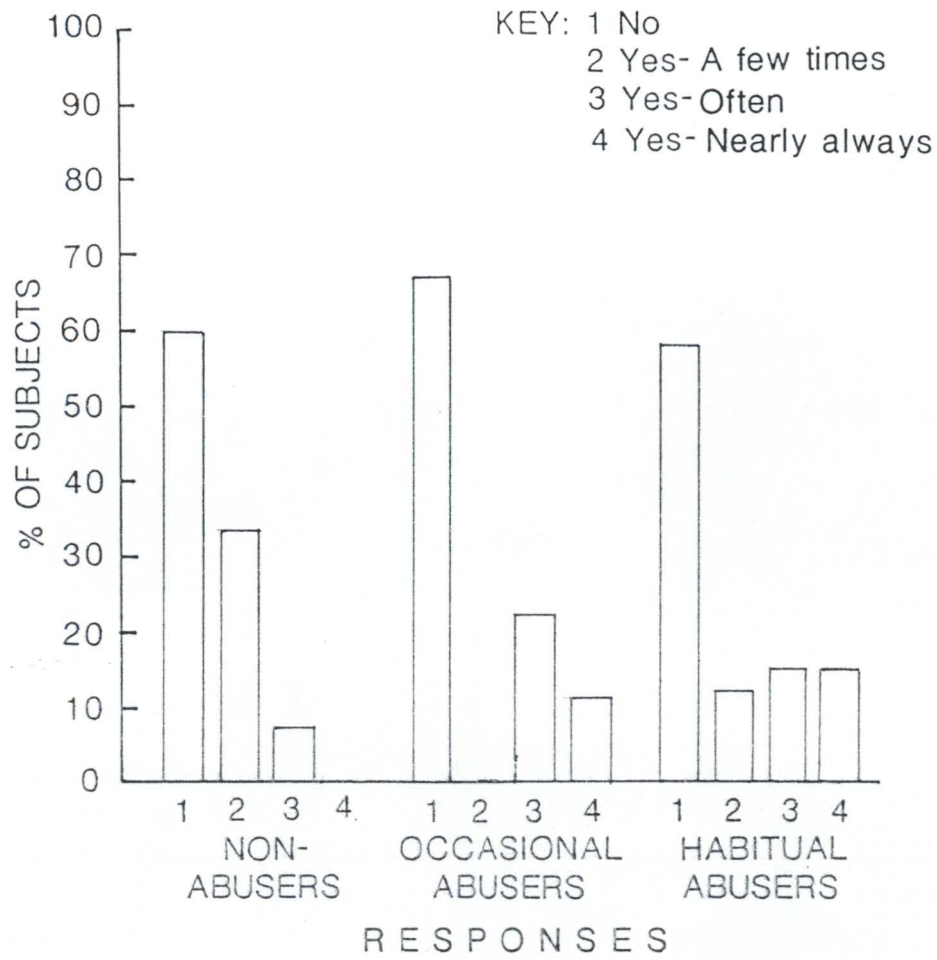
Sense of Achievement.

All three groups responded similarly to item 21 (Figure 3), with over half of subjects from each group reporting that they were good at doing things. However, 11% of the occasional abusers and 16% of the habitual abusers reported that they nearly always felt that they were not very good at doing things, no non-abusers reported this.

Non-abusers and occasional abusers responded similarly to item 28 (Figure 4). Eight-five percent of non-abusers and 78% of occasional abusers reported that they could do most things as well as usual. Only 54% of the habitual abusers reported this.

Figure 3. Subjects' Responses to Item 21: "I feel that I am not very good at doing things".

Figure 4. Subjects' Responses to Item 28: "I cannot do things as well as I used to"

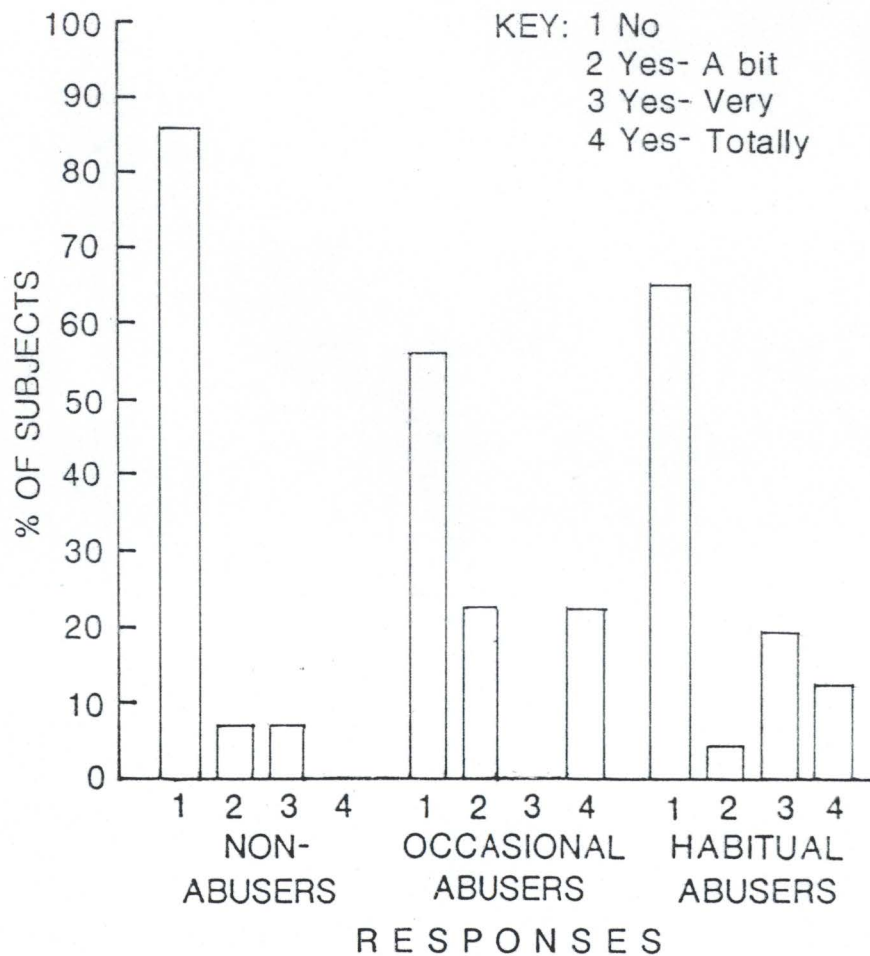
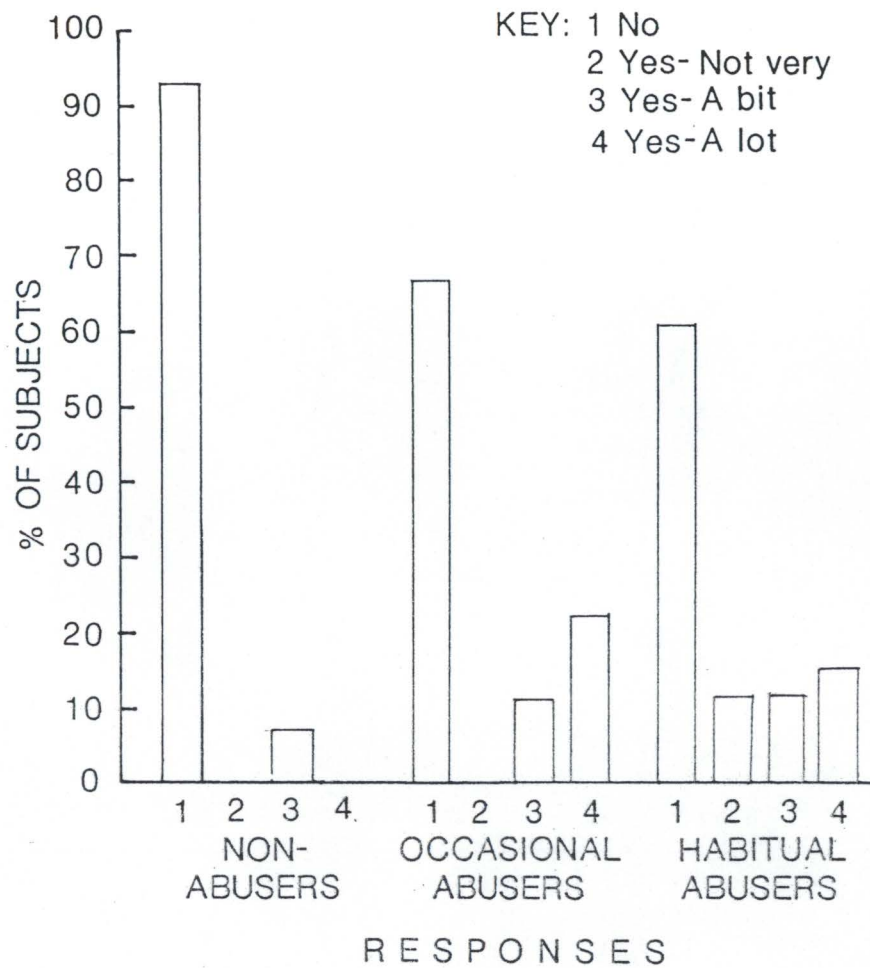


Contentment and Future Outlook.

The two groups of solvent abusers responded similarly to items 3 (Figure 5) and 11 (Figure 6). Thirty-three percent of the occasional and 38% habitual abusers reported that they were unhappy and that they considered the future hopeless. Only 15% of non-abusers reported that they were unhappy and that they considered the future hopeless.

Figure 5. Subjects' Responses to Item 3: "I am unhappy".

Figure 6. Subjects' Responses to Item 11: "I feel that the future is hopeless".



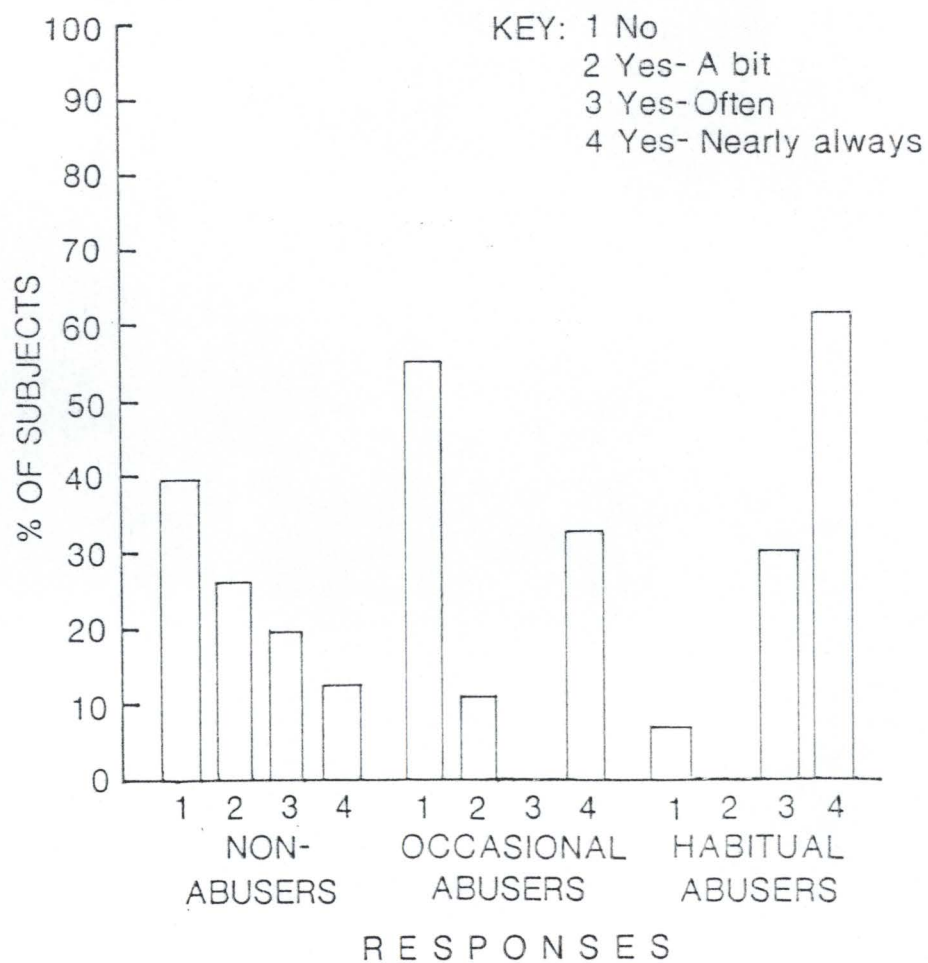
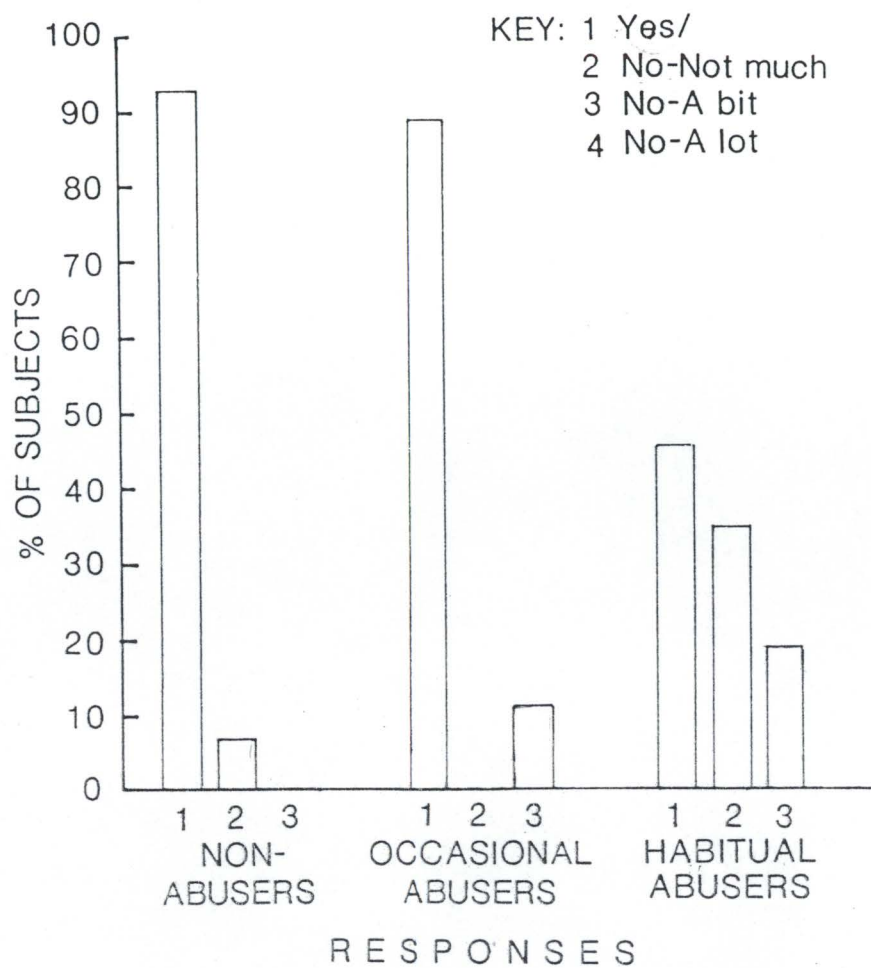
School.

Non-abusers and occasional abusers responded similarly to item 2 (Figure 7). Whereas over 85% of both non-abusers and occasional abusers reported that they did 'okay' at school, over half (54%) of the habitual abusers reported that their school performance was worse than others.

All three groups tended to respond differently to item 10 (Figure 8). Over half (55%) of the occasional abusers reported that they liked school, 60% of the non-abusers and 93% of habitual abusers reported that they disliked school.

Figure 7. Subjects' Responses to Item 2: "I do okay at school".

Figure 8. Subjects' Responses to Item 10: "I do not like school".



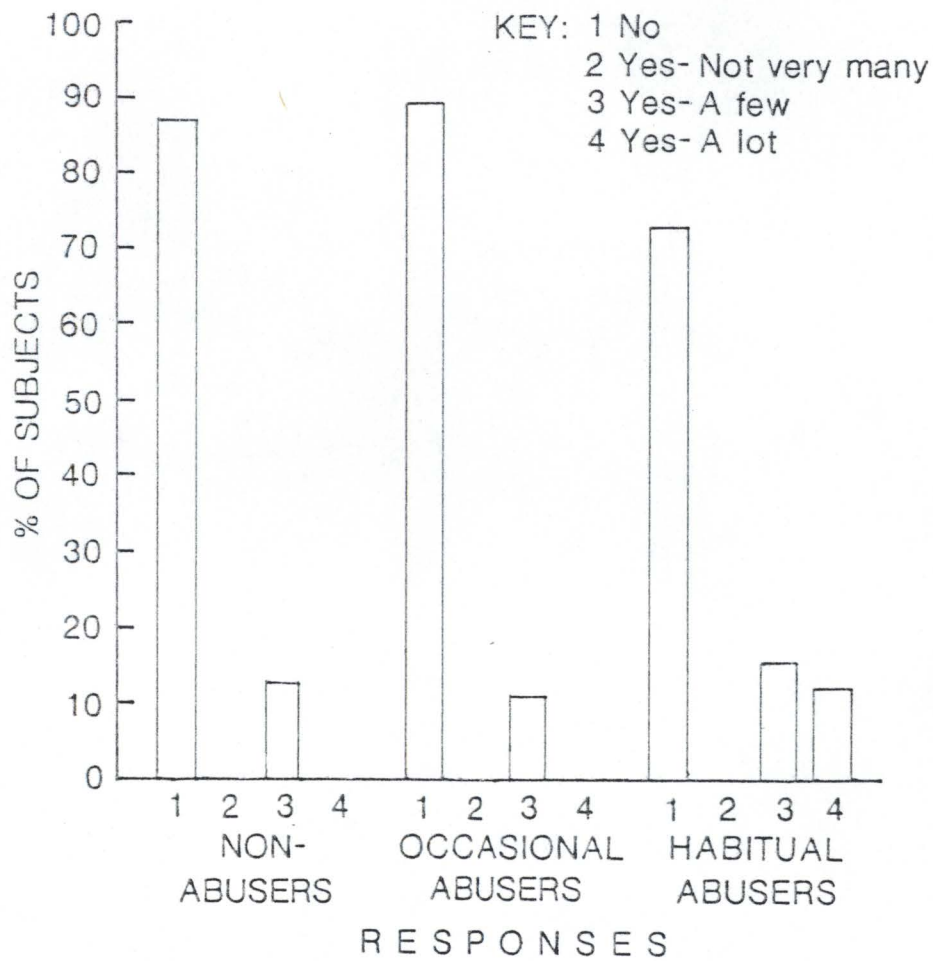
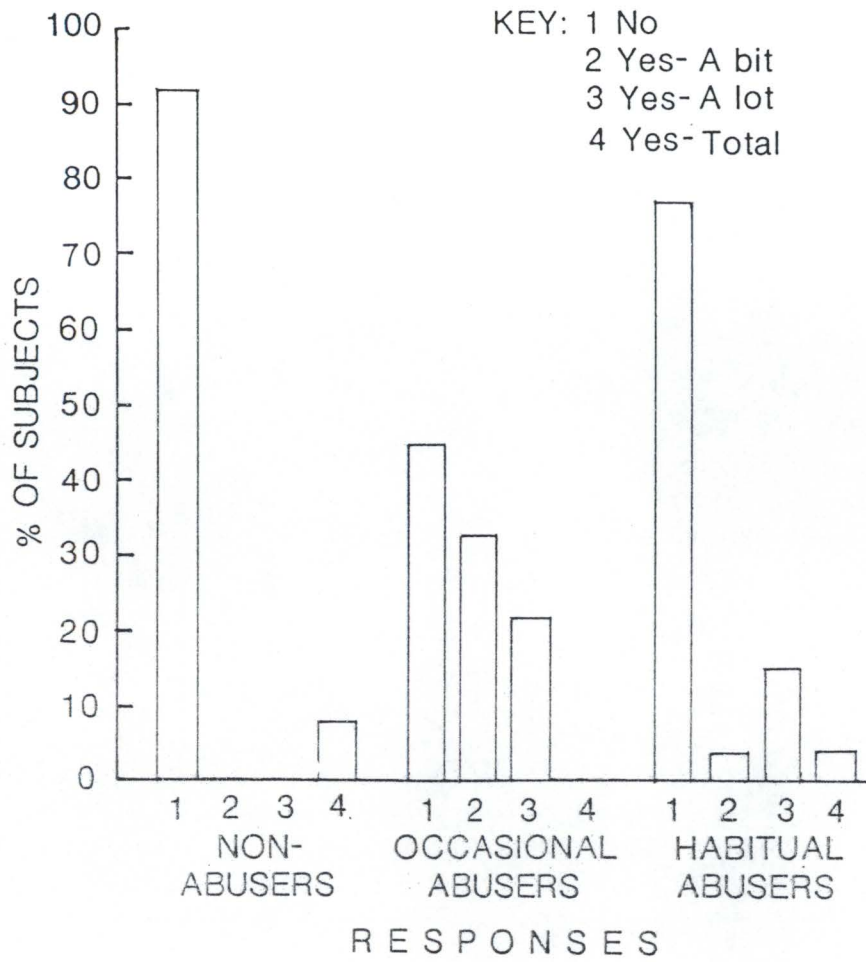
Interests.

Non-abusers and habitual abusers responded similarly to item 15 (Figure 9). The majority (92%) of non-abusers and habitual abusers (77%) reported no loss of interests, whereas over half (55%) of the occasional abusers reported some loss of interests.

All three groups responded similarly to item 32 (Figure 10). Over 70% of subjects in each group reported no loss of interest in friends. However 12% of habitual abusers reported that they had lost interest in most of their friends, whereas none of the non-abusers or occasional abusers reported this.

Figure 9. Subjects' Responses to Item 15: "I have lost
interest in just about everything".

Figure 10. Subjects' Responses to Item 32: "I have lost
interest in my friends".



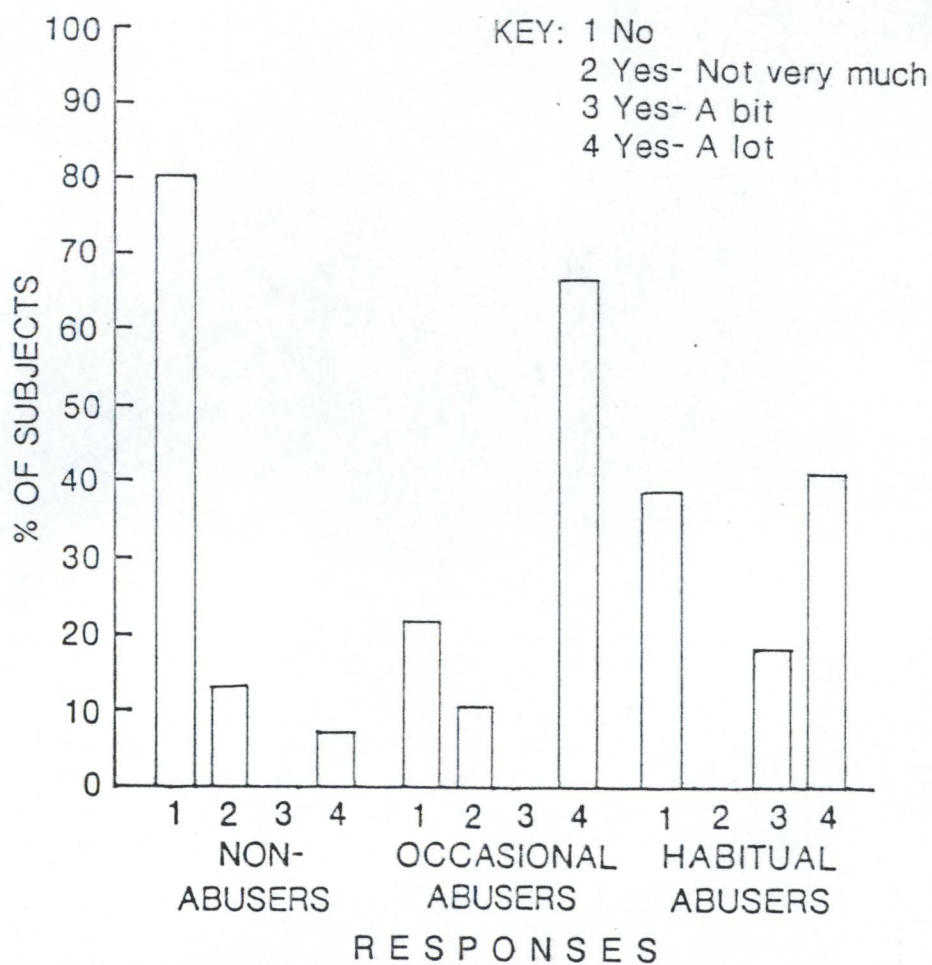
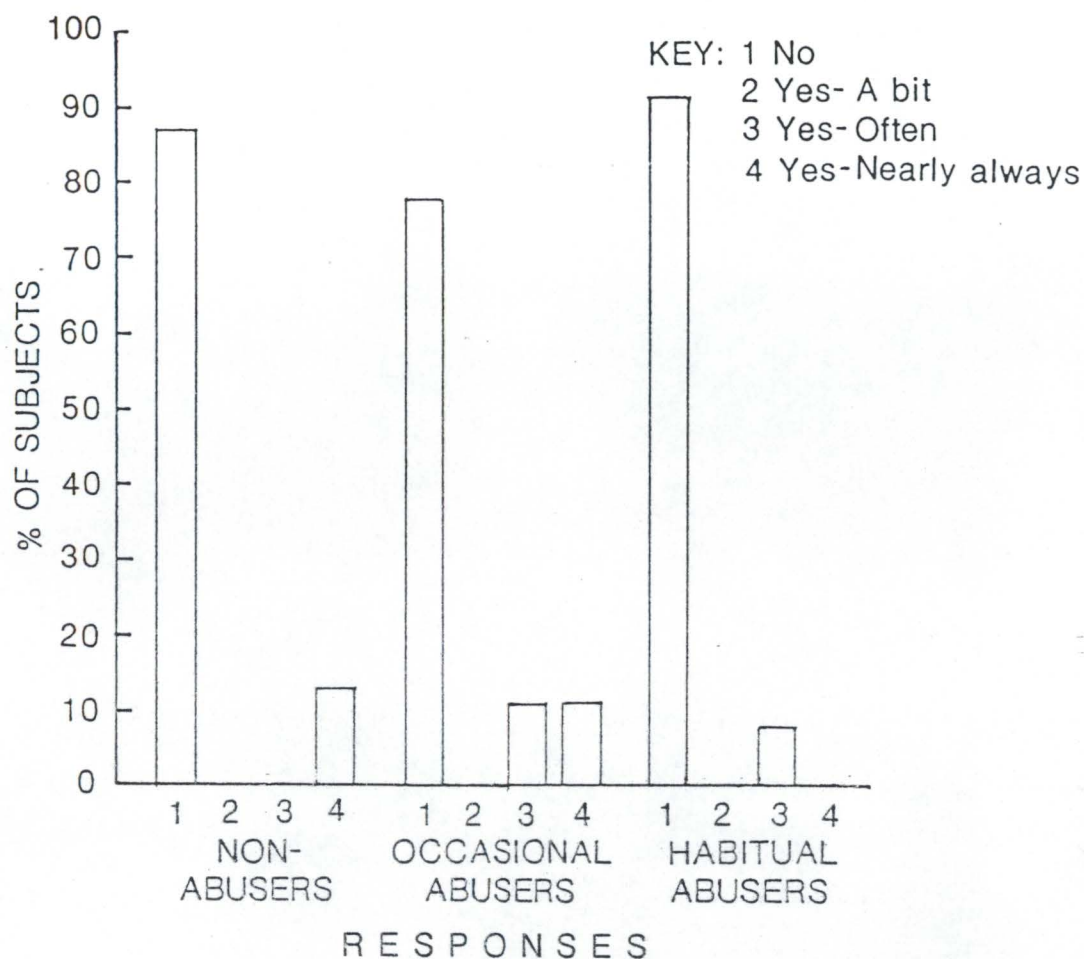
Family.

All three groups responded similarly to item 27 (Figure 11), with over 75% of subjects from each group reporting that they cared about their families. Occasional abusers reported to care least often.

The occasional and habitual abusers responded differently from non-abusers to item 34 (Figure 12). Over half of both of the solvent abusing groups reported that they were worried about family troubles. Only 20% of non-abusers reported that they were worried about family troubles. Occasional abusers reported to be worried about family troubles most often.

Figure 11. Subjects' Responses to Item 27: "I do not care about my family".

Figure 12. Subjects' Responses to Item 34: "Recently I have been worried about family troubles".



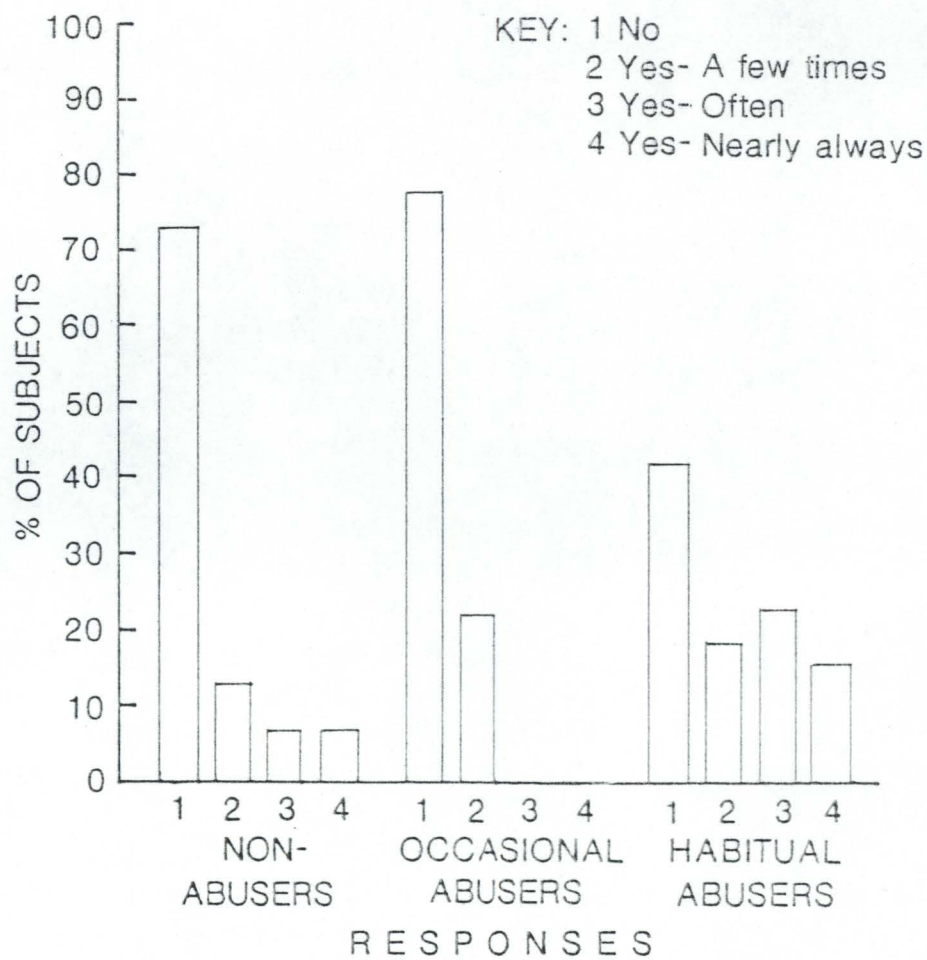
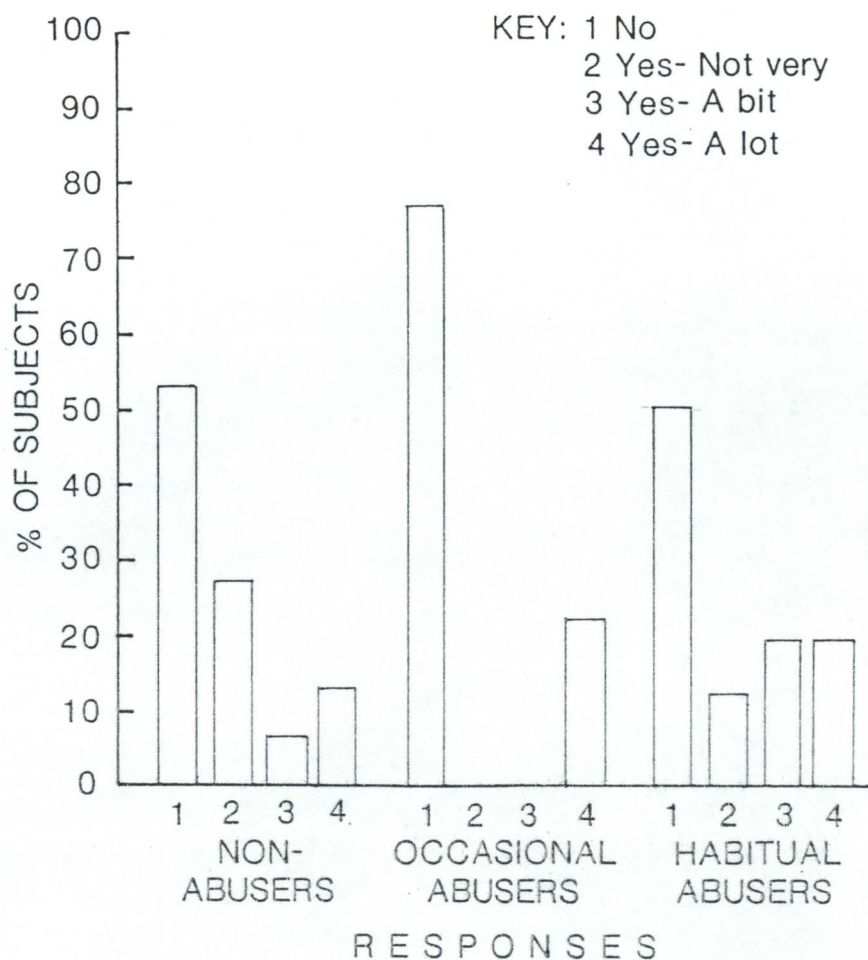
Fatigue and Motivation.

Non-abusers and habitual abusers responded similarly to item 5 (Figure 13). Approximately half of the non-abusers and habitual abuser reported that they were feeling more tired than usual. Only 22% of occasional abusers reported this.

Non-abusers and occasional abusers responded similarly to item 13 (Figure 14). Over 70% of both non-abusers and occasional abusers reported that they did not experience difficulty starting things. Only 42% of the habitual abusers reported this.

Figure 13. Subjects' Responses to Item 5: "I feel more tired than I used to".

Figure 14. Subjects' Responses to Item 13: "It takes extra effort than it used to to get started doing things".



Side-Effects.

Non-abusers and occasional abusers responded similarly to item 24 (Figure 15). Twelve percent of habitual abusers reported that they often or nearly always had a bleeding nose. None of the non-abusers or the occasional abusers reported this. However, the majority (i.e. 80% or more) of subjects in each group reported no recent nose-bleeding.

The abusing groups responded similarly to item 29 (Figure 16). Twenty-two percent of occasional abusers and 43% of habitual abuser reported recent runny noses, whilst all of the non-abusers reported that they had not recently had a runny nose.

All three groups responded differently to item 33 (Figure 17). The majority (80%) of non-abusers reported that their concentration had not been poor recently. Only 56% of occasional abusers reported this, and the majority (73%) of habitual abusers reported poor concentration.

Figure 15. Subjects' Responses to Item 24: "Recently I have had bleeding nose".

Figure 16. Subjects' Responses to Item 29: "Recently I have had a runny nose".

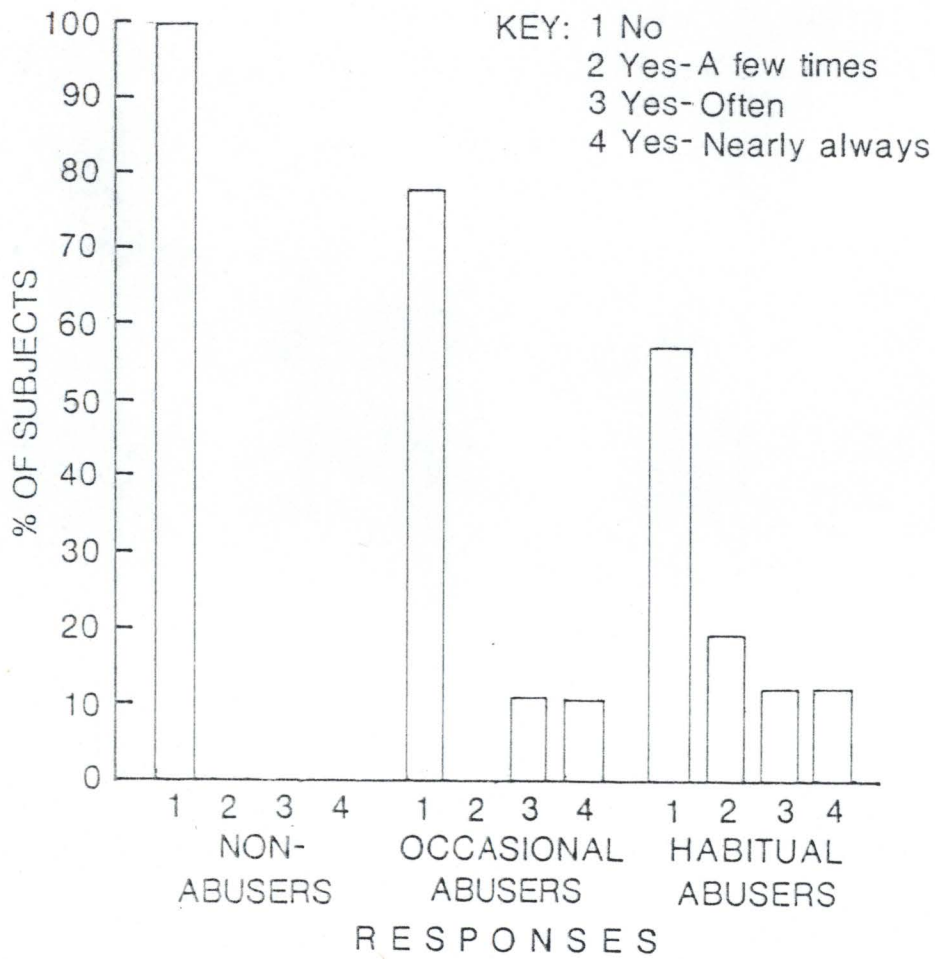
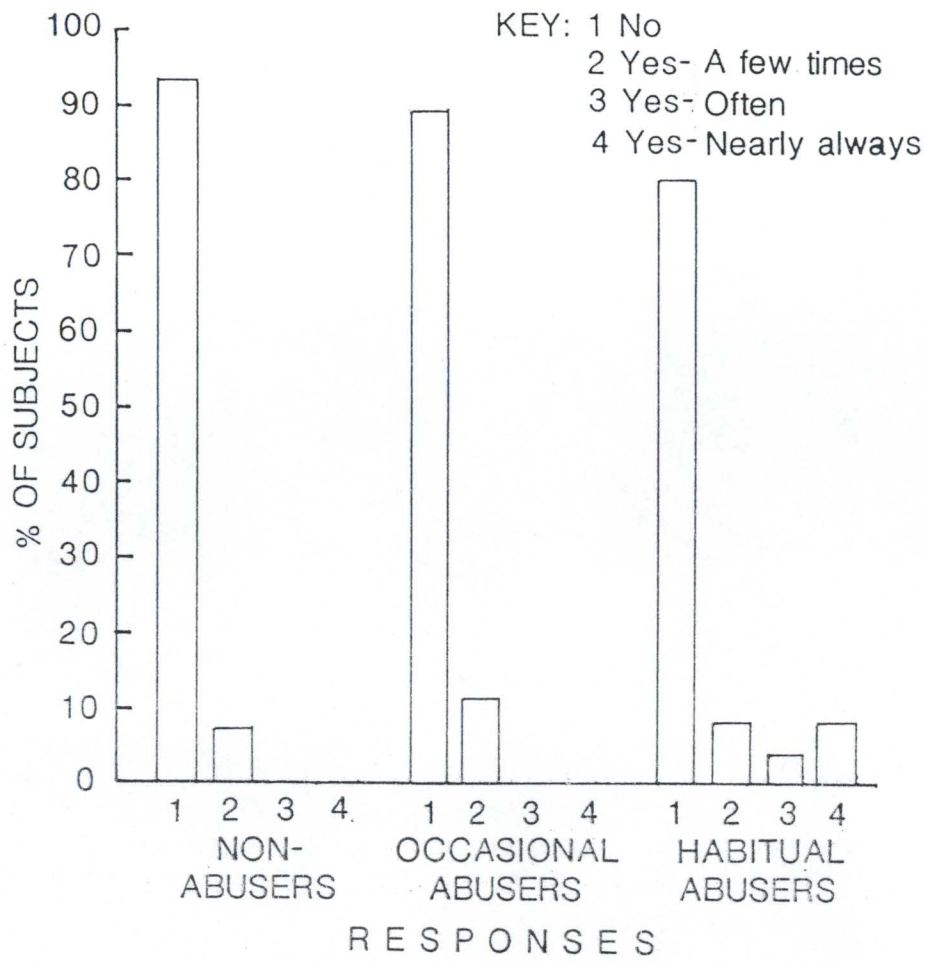
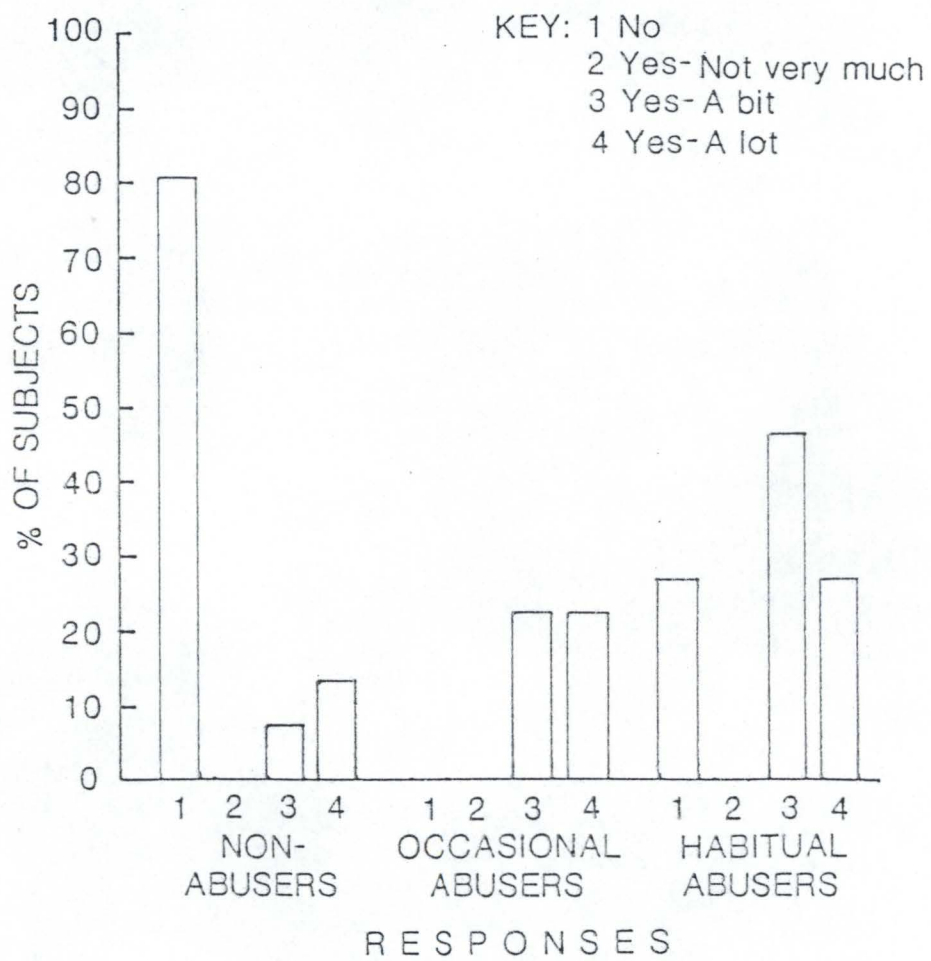


FIGURE 17. Subjects' Responses to Item 33: 'Recently my
Concentration has been poor'.



Discussion

Psychometric Evaluation

The SAQ appears to be a reliable instrument. It has high overall internal consistency, high split half reliability, and high inter-observer reliability. Due to time constraints and limited resources it was not possible to gather test-retest data. Some suggestion of consistency of responding over time was obtained from five subjects who were re-tested after having ceased or reduced their solvent abuse.

The SAQ appears to have good face validity. Field workers and the people naive about solvent abuse all considered that the SAQ was measuring solvent abuse and, in general, rapport was easily attained. Also, subjects interest appeared to be stimulated by the SAQ as they frequently volunteered additional information and, after the SAQ had been administered, they often asked questions about the device or about solvent abuse in general.

The SAQ was assumed to have good content validity as it was based on characteristics stated in past research (Cohen, 1979; Lockhart & Lennox, 1983; Masterton, 1979; O'Connor, 1979; Watson, 1980) as useful for identifying different types of solvent abuser. Furthermore, the high correlation

obtained between items 25 (length of abuse) and 30 (rate of abuse) supports Masterton's (1979) classification of solvent abusers, upon which the SAQ was based, which uses rate and length of abuse as defining criteria.

There also appears to be support for the SAQ's concurrent validity. Overall, agreement between field worker classifications of type of abuse (i.e. occasional or habitual) and the SAQ classifications was moderate but statistically significant, although when asked to provide the classification, the field-workers often commented that they did not know the subjects "all that well" and did not know some of the details included in the definitions with which they were provided. The significant correlations between subjects' SAQ scores and the rate and length of abuse also lends support to the concurrent validity of the SAQ.

Unfortunately, the SAQ's predictive validity was not assessed in the present study. Thus, it is uncertain whether the SAQ has any utility as a predictive instrument, such as in predicting treatment outcome.

The statistically significant correlations between subjects' total scores and the length and rate of their abuse suggests the SAQ total scores will change with the rate and length of abuse, providing evidence of the SAQ's construct validity. Additionally, the high internal consistencies for groups of items presumed to be related suggests that these items were in fact related as subjects tended to answer the items similarly. Furthermore, it appears from the moderate correlation between the SAQ classifications and the field workers' classifications of the solvent abusers that the SAQ was measuring solvent abuse.

That subjects obtained a range of scores on the SAQ, with only one non-abuser obtaining a total score which fell into the range of the solvent abusing subjects' total scores, provides further evidence of the SAQ's construct validity. Furthermore, on the critical items referring to solvent abuse, the non-abuser's responses were negative. Thus, his answers to the remaining items suggested that he was depressed or had a negative self-image, therefore, putting him within the occasional abuse category in terms of total score. It was the experimenters impression that this subject was depressed.

The high internal consistencies of the responses of habitual abusers, occasional and possible habitual abusers combined, and non-abusers on the SAQ suggests that, subjects in these groups were responding to the instrument in a similar way. Additionally, each group appears to have responded differently from the other groups. These findings lend tentative support to the utility of the SAQ as an instrument for assessing solvent abuse and for discriminating between non-abusers and between different types of abuser.

Research suggests that, like other forms of adolescent drug abuse, only five percent of abusers can be classified as habitual abusers (Caddell, 1983; Whitehead & Brook, 1973), the SAQ classified the majority of subjects (63%) as habitual solvent abusers. A possible explanation for this is that habitual solvent abuse is more visible. It occurs at a high rate and other problems associated with the abuse (e.g. school difficulties, side-effects) may mean that habitual abusers are more likely to come to adult attention. The present study relied on referrals from people other than the solvent abusers themselves and included agencies (e.g. Department of Social Welfare Institutions) that are likely to contain (i.e. because of the multiple problems of their clientele) habitual rather than occasional abusers. This bias could have been reduced by sampling entire groups of young people (e.g. classrooms) from a greater range of sources.

An alternative explanation for the large number of habitual abusers in the present study is that the SAQ may have a high false positive rate for identification of habitual abusers. This appears unlikely as the SAQ classifications tended to agree with the classifications subjects were accorded using Masterton's (1979) criteria for habitual abuse (i.e. "frequent abuse of one or more solvents for more than three months" (p.66)). Compared to Masterton's criteria, the SAQ disagreed on the classification of 10 subjects, five of whom were classified as habitual and five of whom were classified as occasional, according to Masterton's criteria.

Content of Responses

The generality of the findings of the present study are limited. The sometimes secretive nature of solvent abuse and the nomadic lifestyle (Sutherland, 1982) of some abusers made it difficult to obtain an unbiased random sample, and it was difficult to re-trace the same solvent abusers for re-testing.

In general subjects in the present study (i.e. according to demographic information, substances reported to be abused) appear similar to the general population of solvent abusers in New Zealand and overseas (Barnes, 1979; Birdling, 1981; Press & Done, 1967a; Watson, 1980).

However, because the subjects were not obtained randomly, the interpretation of the results is limited to descriptive details regarding the sample, which cannot necessarily be extrapolated to the general population. Comparisons can be made between the sample groups and with the findings of past research.

Demographic information obtained from the subjects supports the findings of past research regarding the age and race of solvent abusers (Barnes, 1979; Press & Done, 1967a; Watson, 1977, 1979), although the proportion of females was higher than expected. The high number of females obtained in the present study may be a true reflection of an increase in solvent abuse amongst females, suggested in previous research (Bowers & Sage, 1983; Korman et al, 1980; Stewart, 1981). Such an increase is not surprising given that females, and in particular females of Maori/Polynesian origin, have the highest rate of unemployment in New Zealand and that high unemployment is associated with a high incidence of solvent abuse (Barnes, 1979; Hamilton et al, 1983; Press & Done, 1967a). Similar hypotheses have been used to explain the increased rate of smoking among Maori/Polynesian females in New Zealand (Hay, 1983).

As in past research (Arnold, 1983; Birdling, 1981; Press & Done, 1967a; Watson, 1980), a range of substances appear to have been abused by each person. Habitual abusers reported having abused a greater variety of substances than did occasional abusers. Of concern here is the finding that

59% of the subjects reported having abused petrol and that it was the substance of choice for 10% of subjects. Petrol, especially in New Zealand where there is a high lead content, is one of the more dangerous substances to abuse and is associated with a number of medical complications, such as blood abnormalities, hepatic, renal, and permanent neurological damage (Arnold, 1983; Brown, 1983; Edwards, 1982; Hayden & Comstock, 1976; Press & Done, 1967b). There also does not appear to be any research on the effects of abusing a variety of substances. It may be that certain combinations of substances are more harmful than others, or have a greater effect than any substance alone.

The high correlation between subjects responses to items on the rate, length, effects and amount of substance abused supports past research which suggests that habitual abuse (i.e. long duration and high rate solvent abuse) is associated with increased amounts of substance being used and the increased desire for the effects of the abuse. Thus providing further evidence for the increased tolerance for solvents observed by some researchers (Press & Done, 1967b) and the greater likelihood of psychological dependency in habitual solvent abuse.

The high correlation between the rate of abuse and the number of blackouts experienced appears to support previous studies which have found neurological damage with prolonged solvent abuse. Length of the abuse was highly correlated with solitary abuse, supporting previous research which

lists solitary abuse as a characteristic of habitual abuse. A possible reason for this association is that with more prolonged abuse, the rate also increases, and as soon as the rate of abuse is above that of the abusers peer group solitary abuse is likely. That solitary abuse and number of blackouts were associated with the rate and length of abuse highlights the increased danger of prolonged solvent abuse.

Length of abuse was more highly associated with a decrease in other activities, than the rate of abuse. This perhaps reflects the increasing role solvent abuse plays over time, to the detriment of other activities. Not surprisingly, subjects who reported that they needed to engage in solvent abuse to get through the day, also reported high rates of solvent abuse and that they did not enjoy themselves unless they were intoxicated.

Attempts by the solvent abusers parents to stop the abuse were associated with solvent abusers perception of their parents as being worried about the abuse. Parental attempts to stop the abuse were also associated with the rate and length of abuse and the number of police contacts because of solvent abuse. This may be because parental attention and consequent concern may not be aroused when solvent abuse is a relatively novel and infrequent activity. With increasing abuse the likelihood of detection increases and it may become difficult for parents, who perhaps hoped that if they did not pay any attention to the behaviour then it would stop, to not pressure the solvent abuser to stop.

especially if the abuse has resulted in their coming the attention of the police.

The three groups of subjects (i.e. non-abusers, occasional abusers and habitual abusers), whilst sharing some characteristics, tended to respond differently on the SAQ. The non-abusers responses suggest that they:

1. consider that they are a good person,
but at times dislike themselves
 2. are good at doing things and do most things
as well as usual
 3. are happy and consider that there is hope
for the future
 4. consider that they do alright at school,
but dislike school
 5. have not lost interest in things or their
friends
 6. care about their family, but are not worried
about family troubles
 7. are tired, but do not experience difficulty
starting things
- and 8. do not have a frequent bleeding or runny nose,
or have impaired concentration.

In general, they were positive about themselves, their abilities, and the future, and did not report loss of interest, lack of motivation or, as expected, any side-effects of solvent abuse. They did, however, report some fatigue and reported to dislike themselves at times.

On the other hand, it appears from the occasional abusers responses that they:

1. like themselves and consider that they are a good person
 2. do not consider themselves to be good at doing things, but consider that they can do most things as well as usual
 3. are unhappy and consider the future hopeless
 4. consider that they do alright at school and like school
 5. have lost interest in some things, but not in their friends
 6. care about their family, but not as often as the other groups, yet are most worried about family troubles
 7. are not tired and do not experience difficulty starting things
- and 8. do not frequently have a bleeding nose, but do have a runny nose and impaired concentration.
- Thus, occasional abusers reported some positive and some negative characteristics, and some side-effects of solvent abuse.

In comparison, the responses of habitual solvent abusers suggest that they:

1. dislike themselves and do not consider that they are a good person
 2. do not consider themselves to be good at doing things and can not do things as well as usual
 3. are unhappy and consider the future hopeless
 4. consider that they do worse at school than others and dislike school
 5. have loss interest in things, sometimes including friends
 6. care about their family and are worried about family troubles
 7. are tired and experience difficulty starting things
- and 8. report a bleeding nose most often, and have a runny nose and impaired concentration.

Habitual abusers, therefore, tended to adopt a negative attitude towards themselves, their abilities, and the future, and reported a loss of interest, (including loss of interest in friends), fatigue and lack motivation, and all three side-effects of solvent abuse.

With increasing abuse, subjects reported more of the potential side-effects of solvent abuse, and more feelings of depression and self-dislike. Both solvent abusing groups reported that they were unhappy, considered the future

hopeless and were concerned about family troubles. It is possible that the unhappiness, sense of hopelessness and family troubles led to the abuse, however, without further research, a causal link cannot be established. Research suggests that there may be a causal link between unhappiness, sense of hopelessness about the future, and solvent abuse (Barnes, 1979).

It also could be that family troubles, self-dislike and sense of hopelessness are a result of engaging in solvent abuse. The negative consequences of solvent abuse, such as parental and public disapproval, may lead to increased tension within the family, negative affect and a more pessimistic outlook. That occasional abusers reported to be worried about family troubles more than did habitual abusers may be that family troubles, especially if their abuse is the cause, may be relatively new to occasional abusers and, therefore, more worrying to them, compared to habitual abusers who may be more familiar with such difficulties and, therefore, less disturbed by them. Alternatively, family troubles may be a causal factor for occasional abuse only. It should, however, be noted that these findings are based on small samples.

The recent runny nose reported by the solvent abusing subjects is most likely a side-effect of solvent abuse, with habitual abusers reporting a more frequent runny nose because their abuse is more intense. This finding supports previous research which lists frequent nasal discharge as

one of the side-effects and useful signs for the detection of solvent abuse. Another sign of solvent abuse is a frequently bleeding nose (Birdling, 1981; Stewart, 1981). However, in the present study, nose-bleeds were reported infrequently by non-abusers and abusers. This finding may be because adhesives tended to be the substance of choice rather than petrol which may be most likely to produce nose-bleeds. That habitual abusers in the present study were most likely to abuse petrol and also reported the most nose-bleeds supports this notion.

Solvent abuse was also associated with impaired concentration, as suggested in previous research (Cohen, 1979; Press & Done, 1967b), with the degree of impairment reported increasing with the intensity of solvent abuse. The results of the present study also suggest that impaired performance may be a symptom of solvent abuse. Impaired performance may be a function of impaired concentration.

In contrast to the habitual abusers, the occasional abusers and non-abusers responses tended to be more positive, reporting that they: did "okay" at school, did not have difficulty starting things, could do most things as well as usual, and were a good person. Habitual abusers possibly responded differently to these items because they were experiencing more of the side-effects of solvent abuse, such as increased tiredness and impaired concentration, which was impairing their performance at school and on other activities. Also, because habitual abusers are regularly

engaging in what is regarded as an antisocial behaviour, it is unlikely that they will consider that they are a good person.

Surprisingly, non-abusers and habitual abusers both responded negatively to three items, reporting that they, unlike occasional abusers, were more tired than usual, disliked themselves and disliked school. A possible explanation for this is that increased fatigue, self-dislike, and dislike of school may be a common complaint in adolescence (Papalia & Olds, 1978). Occasional abusers being more carefree, adventurous, and extroverted (Wolfson, 1982) perhaps do not report these things.

Habitual abusers may report fatigue, self-dislike and a dislike of school more than non-abusers because of the added effect of engaging in frequent solvent abuse. Increased fatigue may be a side-effect of habitual solvent abuse. Greater feelings of self-dislike may result from engaging in an antisocial behaviour. Alternatively, it could be that intense self-dislike is a causal factor in habitual solvent abuse. Habitual abusers may dislike school the most because they are likely to experience increased trouble and difficulty at school because of their solvent abuse.

Occasional abusers did, however, respond more negatively than the non-abusers and habitual abusers to item 15, reporting a loss of interests, whereas the other two groups did not report such a loss, although this finding is

based on small samples. A possible explanation for this finding is that there is no reason for non-abusers to experience such a loss, and that habitual abusers because of their longer and more intense involvement in solvent abuse do not have any other interests to lose. Occasional abusers, in contrast, having just taken up solvent abuse are likely to experience some loss of other interests.

However, all three groups reported that they were interested in their friends and cared for their families, suggesting that friends and family may be important to most adolescents, regardless of whether they abuse solvents or not. This finding does not support the New Zealand stereotype of solvent abusers as 'street-kids' who do not care about their families. A possible explanation for the difference could be that the present study did not include 'street-kids' in its sample, although many of the solvent abusers interviewed had lived on the streets at some time. Alternatively, solvent abusers supposed lack of concern for their families may be a fallacy. This stereotype, portrayed by the media, does not appear to be research based, as none of the previous New Zealand studies have explored solvent abusers' attitudes to their families. Habitual abusers may be more likely to report at least some loss of interest in friends because they are more likely to encounter at least some peer disapproval and are more likely to abuse solvents to the detriment of other activities.

Conclusion

The present study focused on the general categories of occasional and habitual abuse, rather than the subtypes suggested by Masterton (1979). The reason for this was that the general categories were considered more valid, reliable and to provide a more useful distinction in terms of treatment planning and resource allocation.

Masterton's (1979) subtypes do not appear to be empirically based and the distinction between socially-determined habitual abuse and psychologically-determined habitual abuse is a questionable one. In fact, it would appear that both types of habitual abuse are psychologically-determined, but one (i.e. Masterton's socially-determined abuser) has a poorer social background than the other (i.e. Masterton's psychologically-determined abuser). Furthermore, more is known about the distinguishing characteristics of occasional and habitual solvent abuse than for the subtypes. Hence, the distinction is more likely to be a reliable one for the general categories, than for the subtypes.

It also appears that the treatment would be similar for habitual abusers regardless of subtype. The distinction between the subtypes may, however, have some use for prognosis. That is, abusers who are psychologically-dependent upon solvents and who have a poor

social background (i.e. Masterton's socially-determined abusers) are likely to have a poorer prognosis than abusers who a psychologically-dependent with a good social background (i.e. Masterton's psychologically-determined abuse).

Limited numbers and resources meant that a normative study of the assessment device was not possible. However, initial evidence of the reliability and validity of the SAQ has been provided. Further standardisation with a larger, more comprehensive sample of solvent abusers is needed.

The strengths of the present study, within its limitations, is that it has provided data on solvent in abuse in New Zealand, based on subjects obtained from a variety of sources. Also, despite the fact that no normative data were collected, the assessment instrument produced shows promise as a device to classify solvent abusers and indicate appropriate treatment procedures, where no previous assessment procedure has been available. It is hoped that the present study will act as a stimulus for future research into solvent abuse, its assessment and treatment.

Appendix A

Solvent Abuse Questionnaire ManualIntroduction

The Solvent Abuse Questionnaire (SAQ) was designed to classify respondents as non-abusers, occasional abusers and habitual abusers according to Masterton's (1979) criteria. It comprises 35 self-statements which describe characteristics most frequently suggested to be useful for identifying different types of solvent abuse (Gay et al, 1982; Masterton, 1979; O'Connor, 1979; Stewart, 1981; Watson, 1980).

The SAQ was designed primarily for use with 9 to 17 year olds. The main group identified as abusing solvents (Britt et al, 1985; Caddell, 1983; Grant, 1984; Watson, 1977a). However, the SAQ may also be useful for solvent abusers outside this age range, especially if they are still at school. For those solvent abusers who have left school, the SAQ may still be useful, although the questions related to school will need to be put into past tense.

Classification is important as different types of solvent abuse are likely to be occurring for different reasons and, therefore, require different interventions (Britt et al, 1985; Cahoon & Crosby, 1972; Cohen, 198 ; Gay et al, 1982). The SAQ may be a useful guide for decision making regarding intervention. It also may have some utility as a means of assessing the effectiveness of intervention. The SAQ also provides information about other areas such as depression, with several items taken from the Beck Depression Inventory (Beck, Ward, Mendelson, Mock & Erbaugh, 1961), which may be useful areas to target in addition to solvent abuse.

Administration

The SAQ was designed for use by those involved in helping solvent abusers, such as psychologists, social workers and youth workers. No special training is required to administer the SAQ, although a knowledge of solvent abuse may be useful, especially in establishing rapport.

Administration time was approximately 10-20 minutes, depending on the individual. Habitual abusers, especially those who had been abusing solvents for a number of years tended to require longer administration time.

The SAQ should be individually administered in a quiet

place, free from distractions. Effort should be made to put the solvent abuser at ease and to establish rapport before administration.

It is recommended that the administration begin with a brief explanation of the reason for testing, such as:

"You know how there are some people who sniff and they can give up whenever they want and then there are others who find it hard to stop even if they don't like it anymore - a bit like an alcoholic. Well, this questionnaire is designed to tell what sort of solvent abuser you are."

This not only informs the respondent of the reason for testing, but also appears to stimulate their interest.

Demographic information should then be collected. This includes a list of different solvents the respondent has used. Their favourite solvent should be underlined and used later in the questionnaire where 'Name of Substance' is written in brackets.

The questionnaire proper should begin with the following statement:

"I am going to read some sentences to you.

What I want you to do is say 'Yes' or 'No'

depending on whether you are like that or not.

O.K? Now...."

and begin reading through the items, circling the subjects answer and associated score, and following up with more specific questions where indicated.

If explanations are required, then these should be brief and easy for the respondent to understand. Usually a simple re-wording of the self-statement to a question will suffice. For example:

"It takes extra effort than it used to to get started doing things."

could be altered to:

"Do you find that it takes extra effort to get started doing things than it used to?"

In some cases it may be useful to check the respondent's answers to questions involving double negatives, such as items 19, 27 and 31. This can be done by feeding back the meaning of their answer as a question. For example, if someone answered 'No' to:

"I do not care about my family"

their answer could be checked by asking:

"You care about you family?"

The section on test behaviour, on the face sheet, should be completed as soon as possible after administration. Simply place a tick in the box which best describes the respondent's behaviour during administration.

Scoring

Scores should be written in the spaces provided down the right hand side of each page. The scores can then be summed down the page and the subtotal written at the bottom. The grand total, recorded on the face sheet, is simply the sum of the five subtotals.

Interpretation

The grand total gives an indication of whether the abuse is occasional, habitual or possible habitual as follows:

30-55	occasional
55-65	possible habitual
65-132	habitual

The cut-off points for these categories were calculated so as to not allow for many characteristics of habitual abuse to be indicated without inclusion in the habitual category.

Appendix B

SOLVENT ABUSE QUESTIONNAIRE

NAME: _____ AGE: _____

SOLVENT(S): _____

DATE: _____

FINDINGS:

TEST BEHAVIOUR:

Explanations Needed:

<input type="checkbox"/> only 1	<input type="checkbox"/> 2 or 3	<input type="checkbox"/> over 3
---------------------------------	---------------------------------	---------------------------------

Rapport:

<input type="checkbox"/> easily attained	<input type="checkbox"/> slowly attained	<input type="checkbox"/> poor rapport
--	--	---------------------------------------

Speed of Response:

<input type="checkbox"/> fast	<input type="checkbox"/> average	<input type="checkbox"/> slow
-------------------------------	----------------------------------	-------------------------------

Attention Span:

<input type="checkbox"/> very attentive	<input type="checkbox"/> average	<input type="checkbox"/> distractible
---	----------------------------------	---------------------------------------

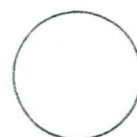
Need for Praise:

<input type="checkbox"/> little needed	<input type="checkbox"/> some needed	<input type="checkbox"/> much needed
--	--------------------------------------	--------------------------------------

Effort:

<input type="checkbox"/> good effort	<input type="checkbox"/> fair effort	<input type="checkbox"/> perfunctory
--------------------------------------	--------------------------------------	--------------------------------------

GRAND TOTAL



SCORE

1. I like the effects I get from sniffing (Name of Substance)

NO	YES	If yes, how much do you like the effects?		
1		Not Very	A Bit	A Lot
		1	2	3

2. I do okay at school

YES	NO	If no, how much worse than everybody else are you?		
1		Not Very	A Bit	A Lot
		1	2	3

3. I am unhappy

NO	YES	If yes, how unhappy are you?		
1		Not Very	A Bit	A Lot
		2	3	4

4. I sniff alone

NO	YES	If yes, how often do you sniff alone?		
1		A Few Times	Often	Nearly Always
		2	3	4

5. I feel more tired than I used to

NO	YES	If yes, how tired have you been feeling?		
1		Not Very	A Bit	A Lot
		2	3	4

6. I sniff (Name of Substance) because its exciting and fun

NO	YES	If yes, how exciting is it?		
1		Not Very	A Bit	A Lot
		2	3	4

7. I enjoy doing other things apart from sniffing (Name of Substance) such as sports or hobbies

NO	YES	If yes, how many other things do you enjoy doing?		
4		Not Very Many	A Few	A Lot
		3	2	1

SUB-TOTAL



SCORE

8. When sniffing I have blacked out

NO YES If yes, how often has this happened?

1	Less Than 5	5 to 10	More Than 10
	2	3	4

9. Sometimes I have had to sniff (Name of Substance) to get through the day

NO YES If yes, how often does this happen?

1	A Few Times	Often	Nearly Always
	2	3	4

10. I do not like school

NO YES If yes, how often do you feel like this?

1	A Bit	Often	Nearly Always
	2	3	4

11. I feel that the future is hopeless

NO YES If yes, how hopeless do you feel it is?

1	A Bit	Very	Totally
	2	3	4

12. I sniff with the same group of friends

NO YES If yes, how often do you do this?

3	A Bit	Often	Nearly Always
	2	1	1

13. It takes extra effort than it used to to get started doing things

NO YES If yes, how often do you feel like this?

1	A Few Times	Often	Nearly Always
	2	3	4

14. I sniff (Name of Substance) because I am Bored

NO YES If yes, how often do you sniff because you are bored?

Not Much	A Bit	A Lot
2	1	1

SUB-TOTAL



SCORE

15. I have lost interest in just about everything

NO YES If yes, how much loss?

1	A Bit	A Lot	Total
2	3	4	

16. After sniffing I have found myself in some place without knowing how I got there

NO YES If yes, how many times has this happened?

1	Not very Many	A Few	A Lot
2	3	4	

17. I use the same amount of (Name of Substance) a week as when I first started sniffing

YES NO If no, how much more do you use?

1	Not Very Much More	A Bit	A Lot
2	3	4	

18. I have been in trouble at my school because of my sniffing

NO YES If yes, how many times?

1	Not Very Many	A Few	A Lot
2	3	4	

19. I do not like myself

NO YES If yes, how often do you feel this way?

1	A Bit	often	Nearly Always
2	3	4	

20. My parents know that I sniff

NO YES If yes, how much do they worry about it?

1	Not Very Much	A Bit	A Lot
3	3	4	

21. I feel that I am not very good at doing things

NO YES If yes, how often do you feel like this?

1	A Few Times	Often	Nearly Always
2	3	4	

SUB-TOTAL



SCORE

22. I sniff (Name of Substance) because I like the effect it has on me

NO YES If yes, how much do you like the effects?

1	Not Very Much	A Bit	A Lot
	2	3	3

23. I don't enjoy anything anymore except when I am high from sniffing

NO YES If yes, how often do you feel like this?

1	A Bit	Often	Nearly Always
	2	3	4

24. Recently I have had a bleeding nose

NO YES If yes, how often?

1	A Few Times	Often	Nearly Always
	2	3	4

25. I have sniffed (Name of Substance) only once

YES NO If no, for how long have you been sniffing?

1	1 Month	1-3 Months	More Than 3 Months
	1	2	3

26. I have been spoken to by the police because of my sniffing

NO YES If yes, how many times?

1	Not Very Many	A Few	A Lot
	2	3	4

27. I do not care about my family

NO YES If yes, how often do you feel like this?

1	A Bit	Often	Nearly Always
	2	3	4

28. I cannot do things as well as I used to

NO YES If yes, how many things?

1	Not Very Many	A Few	A Lot
	2	3	4

SUB-TOTAL



SCORE

29. Recently I have had a runny nose

NO YES If yes, how often?

1	A Few Times	Often	Nearly always
	2	3	4

30. I have sniffed (Name of Substance) once or twice only

YES NO If no, how often do you sniff?

1	1-2 Times a Month	Weekly	Daily
	1	3	4

31. I feel that I am not a very good person

NO YES If yes, how often do you feel like this?

1	A Bit	Often	Nearly Always
	2	3	4

32. I have lost interest in my friends

NO YES If yes, how many?

1	Not Very Many	A Few	Most
	2	3	3

33. Recently my concentration has been poor

NO YES If yes, how much?

1	Not Very Much	A Bit	A Lot
	2	3	4

34. Recently I have been worried about family troubles

NO YES If yes, how much has this worried you?

1	Not Very Much	A Bit	A Lot
	2	3	4

35. My parents have tried to make me stop sniffing (Name of Substance)

NO YES If yes, how much?

1	Not Very Much	A Bit	A Lot
	3	3	4

SUB-TOTAL



Appendix C

Case HistoriesCase 1

Karen was 12 years old and from a reconstituted family of low socio-economic status (i.e. level 5 on Elley & Irving's (1976) socio-economic index). Thirteen people were living in their four bedroomed house. Karen reported that, over the last three months, she had abused solvents approximately twice weekly for about two hours. Solvent abuse occurred after school, mainly on Fridays, and on one other day during the week, with a regular group of friends from school. The solvent (correcting-fluid i.e. 'Twink' or adhesives) was stolen by one of the group members, usually from school. Hence, Karen had not had to spend money on solvents.

Karen rated her solvent abuse as a 'slight' problem. She said she had tried to stop in the past by staying away from her friends but with no success. She obtained a score on the SAQ of 73, indicating that she was a habitual abuser.

Case 2

Paula was 14 years old and described her parents as "strict Christians who were once alcoholics". Apparently her mother had frequently recited passages from the Bible at her and had said that Paula had the devil in her. In addition, Paula reported that she had an older brother who regularly used marijuana and a younger brother who also abused solvents.

Paula had been placed in a Department of Social Welfare Home in Hamilton following expulsion from the only High School in her home town as a result of abusing solvents. She rated her solvent abuse as a 'moderate' problem and reported abusing solvents for the past two years. She had tried an array of substances such as: adhesives, petrol, spray paint, fly spray and floor polish. Adhesives were her favourite. Paula said she had, on one occasion, used alcohol as well as solvents, however this made her feel ill and vomit so she had not done so again.

As a result of being placed in the restricted environment of the Home, it seemed that Paula had been able to not abuse solvents for four weeks. However, in the past, on leaving the Home, she had returned to solvent abuse. This was despite Paula vowing to give up solvent abuse because of the adverse effects she had noticed it was having on her, such as poor concentration, a continuous smell and

taste of solvents in her nose and mouth, and decreased ability to play sport.

Paula reported abusing solvents weekly prior to her most recent placement in the Home. This occurred mainly in the weekends from Friday night through to Monday morning, but also sometimes during the week. She usually abused solvents with her cousins, but reported having also abused solvents alone. Each member of the group would put in money to buy the a large amount of solvent (e.g. a can of adhesive) or would supply their own smaller amounts. When Paula did not have any money, she would steal money to purchase the solvent or would steal the solvent.

Paula obtained a score on the SAQ of 87 and, therefore was classified as a habitual abuser.

Case 3

Lynda was a 13 year old from school and same group of solvent abusers as Karen (Case 1).

Lynda was the only child of her father's first marriage and was still living at home. Both Lynda and a sister, who accompanied her to the first session, described their father as an alcoholic, who was apparently receiving medical care for his condition. The alcoholism was causing the family

some financial hardship. Lynda's sisters, who lived nearby, appeared to be both protective and supportive of Lynda.

Lynda reported abusing solvents over a period of approximately 12 months. She reported abusing solvents everyday after school, for about two hours, and in the weekends before going to dances. Solvents which Lynda had abused were: 'Twink', spraypaint, petrol, adhesives and lighterfluid, the latter being her favourite.

Lynda rated her solvent abuse as a 'serious' problem, explaining that she had noticed over the last week that she had been having difficulty reading and spelling, which she attributed to the solvent abuse. Lynda reported that she wanted to stop abusing solvents because she was getting into too much trouble at school and was close to expulsion.

Lynda obtained a score on the SAQ of 98, indicating that she was a habitual abuser.

Case 4

Trish was 15 years old, unemployed, and currently living with her mother, although she had once been a 'street kid'. Her family were of low socio-economic status (i.e. level 5 on Elley & Irving's (1977) socio-economic index). Trish's younger sister apparently had recently begun abusing solvents after using some adhesives Trish had at home.

She had been a poly-drug abuser and had recieved apparently successful help for her hard drug abuse. However, the solvent abuse had persisted.

Trish reported abusing solvents for five years. The frequency and duration increased to the extent that over the last year she was abusing daily for 5-12 hours. Substances Trish reported to have abused included adhesives and petrol, but predominantly a light lubricating oil (i.e. 'CRC'). She normally abused with a friend, but also reported abusing alone. The substance was always stolen. Trish reported often using alcohol in combination with solvents.

Past attempts by Trish to stop abusing solvents had failed. Peer pressure was given as the primary reason for this failure. Although she said she had collapsed three years ago whilst abusing solvents, had sores from the abuse, was slow at thinking and forgetful, Trish said she did not rate her solvent abuse as a problem.

Trish obtained a score on the SAQ of 97 and, therefore, was classified as a habitual abuser.

Case 5

Jack was a 13 year old who had recently appeared in the Children and Young Persons Court after apparently breaking into his school whilst intoxicated by solvents.

Jack was from a middle class family (i.e level 3 of Elley & Irving's (1976) socio-economic index), who were unaware of his solvent abuse until his court appearance. According to Jack, he had been abusing solvents for only two months, once or twice a month. He had only abused adhesives.

Having been found out, Jack had decided to stop abusing solvents. He appeared to have plenty of resources and was involved in a lot of other activities such as sports and Maori culture classes, and unlike the other cases, it seemed that most of Jack's friends did not participate in, and did not approve of, solvent abuse.

Jack obtained a score on the SAQ of 51 and was classified as an occasional abuser.

Appendix D

Item	Item-Total Correlation	Apha if Item Deleted
1	.8283	.9460
2	.4570	.9490
3	.4867	.9487
4	.6806	.9474
5	.3408	.9498
6	.5454	.9485
7	.6737	.9473
8	.6904	.9474
9	.7514	.9022
10	.5952	.9479
11	.4793	.9488
12	.4532	.9489
13	.4894	.9487
14	.5071	.9486
15	.3509	.9495
16	.7199	.9468
17	.7164	.9469
18	.6685	.9473
19	.3040	.9499
20	.8312	.9457
21	.3307	.9498
22	.8122	.9460
23	.7353	.9468
24	.2712	.8524
25	.8640	.9456
26	.6228	.9477
27	.0308	.9512
28	.4728	.9488
29	.4824	.9488
30	.8113	.9459
31	.4778	.9488
32	.2487	.9500
33	.6126	.9478
34	.5291	.9486
35	.7771	.9463

References

- Anastasi, A. (1982). Psychological Testing (5th ed). New York: MacMillan Publishing Co.
- Anderson, H.R., Dick, R., MacNair, R.S., Palmer, J.C. & Ramsey, J.D. (1982). An investigation of 140 deaths associated with volatile substance abuse in the United Kingdom (1871-1981). Human Toxicology, 1, 207-221.
- Arnold, A. (1983). A Study of Solvent Abuse Awareness in Selected New Zealand Schools. National Society of Alcohol and Drug Dependency 10th Biennial Summer School, New Zealand.
- Barker, G.H. & Adams, W.T. (1963). Glue sniffers. Sociology & Social Research, 47, 298-309.
- Barnes, G.E. (1979). Solvent abuse: A review. International Journal of the Addictions, 14, 1-26.
- Bass, M. (1970). Sudden sniffing death. Journal of American Medical Association, 22, 2075-2079.
- Beck, A.T., Ward, C.H., Mendelson, M., Mock, J.E. & Erbaugh, J.K. (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 53-63.
- Benignus, V.A. (1981). Health effects of toluene: A review. Neurotoxicology, 2, 567-588.

- Biggs, S.J., Bender, M.P. & Foreman, J. (1983). Are there psychological differences between persistent solvent-abusing delinquents and delinquents who do not abuse solvents. Journal of Adolescence, 6, 71-86.
- Bigler, E.D. (1979). Neuropsychological evaluation of adolescent patients hospitalised with chronic inhalant abuse. Clinical Neuropsychology, 1, 8-12.
- Birdling, J. (1981). The Sniffing Problem. National Society of Alcohol and Drug Dependency Summer School on Alcohol, Drug and Chemical Dependency, Wellington, New Zealand.
- Black, D. (1982a). Glue sniffing: Editorial. Archives of Diseases in Childhood, 57, 893-894.
- Black, D. (1982b). Misuse of solvents. Health Trends, 14, 27-28.
- Blanchard, E.B. Libet, J.M. & Young, L.D. (1973). Apneic aversion and covert sensitization in the treatment of a hydrocarbon inhalation addiction: A case study. Journal of Behaviour Therapy & Experimental Psychiatry, 4, 383-387.
- Bowers, A.J. & Sage, L.R. (1983). Solvent abuse in adolescents: The who? what? and why? Child: Care, Health & Development, 9, 169-179.

Britt, E.F., Field, G.E. & Thomas, D.R. (1985).

Solvent Abuse: The Hamilton Situation. Report for the Department of Social Welfare. Government Printers, New Zealand.

Caddell, A. (1983). Under the influence: Glue sniffing. Nursing Times, 79, 9-11.

Cahoon, D.D. & Crosby, C.C. (1972). A learning approach to chronic drug use: Sources of reinforcement. Behaviour Therapy, 3, 64-71.

Campbell, D. & Watson, J.M. (1978). A comparison of 18 glue sniffers. Community Health, 9, 207-210.

Clements, J.E. & Simpson, R. (1978). Environmental and behavioural aspects of glue sniffing in a population of emotionally disturbed adolescents. International Journal of the Addictions, 231, 653-654.

Cohen, J. (1960). A coefficient of agreement for nominal scales. Educational and Psychological Measurement, 20, 27-46.

Cohen, S. (1979). Inhalants and solvents. In M. Beschman & Friedman (Eds). Youth Drug Abuse: Problems, Issues, and Treatment. DC Heath & Co.

Cohen, S. (1975). Glue sniffing. Journal of the American Medical Association, 231, 653-654.

- Dodds, J. & Santostefano, S. (1964). A comparison of the cognitive functioning of glue-sniffers and non-sniffers. Journal of Pediatrics, 64, 53-55.
- Douglas, M.F. (1984). Solvent Abuse - Hamilton City Council Response. Welfare and Recreation Department, Hamilton City Council, New Zealand.
- Edwards, I.R. (1982). Solvent abuse. New Zealand Medical Journal, 95, 879-880.
- Ehyai, A. & Freemon, F.R. (1982). Progressive optic neuropathy and sensorineural hearing loss due to chronic glue sniffing. Journal of Neurology, Neurosurgery and Psychiatry, 46, 349-351.
- Elley, W.B. & Irving, J.C. (1976). Revised socio-economic index for New Zealand. New Zealand Journal of Educational Studies, 11, 25-36.
- Fornazzari, L., Wilkinson, D.A., Kapur, B.M. & Carlen, P.L. (1983). Cerebellar, cortical and functional impairment in toluene abusers. Acta Neurology Scandinavia, 67, 319-329.
- Framrose, R. (1982). From structure to strategy with families of solvent abusers. Family Therapy, 4, 43-60.
- Gay, M., Meller, R. & Stanley, S. (1982). Drug abuse monitoring: A survey of solvent abuse in the County of Avon. Human Toxicology, 1, 257-263

- Glaser, H.H. & Massengale, O.N. (1962). Glue- sniffing in children: deliberate inhalation of vapourised plastic cements. Journal of Amercian Medical Association, 28, 90-93.
- Grant, J.W. (1984). Glue-sniffing. Official Committee on Social and Familial Issues. Report to the Minister of Social Welfare, Hamilton New Zealand.
- Hamilton, D.V., Baldwin, D. Barter, G. & Coker, T. (1983). An investigation into the incidence of cigarette smoking, alcohol abuse, glue sniffing, and other drug abuse in 3rd and 4th year primary school children in the Fulham area. Midwife, Health Visitor and Community Nurse, 20, 233-238.
- Hay, D.R. (1983). Changes in Smoking Habits between the 1976 and 1981 New Zealand Population Censuses. National Heart Foundation of New Zealand.
- Hayden, J.W. & Comstock, E.G. (1976). The clinical toxicology of solvent abuse. Clinical Toxicology, 9, 169-184.
- Hershey, C.O. & Miller, S. (1982). Solvent abuse: A shift to adults. International Journal of the Addictions, 17, 1085-1089.

- Irving, J.C. & Elley, W.B. (1977). A socio-economic index for the female labour force in New Zealand. New Zealand Journal of Educational Studies, 13, 154-163.
- Kolvin, I. (1967). Aversive imagery treatment in adolescence. Behaviour Research and Therapy, 5, 245-248.
- Korman, M., Trimboli, F. & Semler, I. (1980). A comparative evaluation of 162 inhalant users. Addictive Behaviours, 5, 143-152.
- Kupperstein, L.R. & Susman, R.W. (1968). A bibliography on the inhalation of fumes and other toxic vapours - a substance abuse practice among adolescents. International Journal of the Addictions, 3, 177-197.
- Lazar, R.B., Ho, S., Melen, O. & Daghestani, A.N. (1983). Multifocal central nervous system damage caused by toluene abuse. Neurology, 33, 1337-1340.
- Litt, I.F. & Cohen, M.I. (1970). The drug-using adolescent as a pediatric patient. Journal of Pediatrics, 77, 195-202.
- Lockhart, W.H. & Lennox, M. (1983). The extent of solvent abuse in a regional secure unit sample. Journal of Adolescence, 6, 43-55.

- Lowenstein, L.F. (1982). Glue sniffing: Background features and treatment by aversion methods and group therapy. The Practitioner, 226, 1113-1116.
- Malcolm, A.I. (1968). Solvent sniffing and its effects. Addictions, 15, 12-21.
- Masterton, G. (1979). The management of solvent abuse. Journal of Adolescence, 2, 65-75.
- Merrill, E. (1978). Problems of children stuck on glue. Community Care, 221.
- O'Connor, D. (1982). The use of suggestion techniques with adolescents in the treatment of glue sniffing and solvent abuse. Human Toxicology, 1, 313-320.
- O'Connor, D.J. (1979). A profile of solvent abuse in school children. Journal of Psychology and Psychiatry, 20, 365-368.
- Papalias, D.E. & Olds, S.W. (1978). Human Development. New York: McGraw-Hill.
- Peers, I.S. (1981). A community approach to the problems of solvent abuse. Health Education Journal, 40, 33-40.
- Prasad, A.J. (1984). Endocrine abnormalities in solvent sniffers. Psychoneuroendocrinology, 9, 315-316.
- Press, E. (1963). Glue sniffing. Journal of Pediatrics, 63, 516-518.
- Press, E. & Done, A.K. (1967a). Solvent sniffing:

Physiological effects and community control measures for intoxication from the intentional inhalation of organic solvents I. Pediatrics, 39, 451-461.

Press, E. & Done, A.D. (1967b). Solvent sniffing:

Physiological effects and community control measures for intoxication from the intentional inhalation of organic solvents II. Pediatrics, 39, 461-622.

Reinhart, C.F., Azar, A., Maxfield, M.E., Smith, P.E., Mullin, L.S. & Del, W. (1971). Cardiac arrhythmias and aerosol "sniffing". Archives of Environmental Health, 22, 265-279.

Rogers, H. (1982). Glue sniffing among school children. Health Visitor, 55, 236-239.

Runyon, R.P. & Haber, A. (1980). Fundamentals of Behavioural Statistics (4th ed). Manila: Addison-Wesley Publishing Company.

Russ, G., Clarkson, A.R., Woodroffe, A.J., Seymour, A.E. & Cheng, I.K.P. (1981). Renal failure from "glue-sniffing". Medical Journal of Australia, 2, 121-122.

Schikler, K.N., Lane, E.E., Seitz, K. & Collins, W.M. (1984). Solvent abuse associated pulmonary abnormalities. Advances in Alcohol and Substance Abuse, 3, 75-81.

Skinner, B.F. (1978). Treatment of Voluntary Petrol

Inhalation in an Adolescent Maori Female. Case Study for the Diploma of Clinical Psychology, University of Waikato, New Zealand.

Stewart, G.A. (1981). Petrol and Solvent Abuse in the Wellington Region. Department of Social Welfare, Wellington, New Zealand.

Sutherland, I. (1982). When yer oan the glue yer mental. New Society, 59, 169.

Watson, J.M. (1980). Solvent abuse by children and young adults: A review. British Journal of the Addictions, 75, 27-36.

Watson, J.M. (1979). Solvent abuse: A retrospective study. Community Medicine, 1, 153-156.

Watson, J.M. (1977). Glue sniffing in profile. Practitioner, 218, 255-259.

Watson, J.M. (1976). The growing problem of glue sniffing. Social Work Today, 8, 10-11.

Woolfson, R.C. (1982). Psychological correlates of solvent abuse. British Journal of Psychology, 55, 63-66.