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**THE MINNESOTA MODEL TREATMENT
FOR SUBSTANCE DEPENDENCE:
PROGRAM EVALUATION IN A SWEDISH
SETTING**

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ABSTRACT

The Minnesota model treatment for substance dependence is a group-based psychosocial intervention program that rests on the principles and twelve-step program of Alcoholics Anonymous (AA). The model was introduced to Sweden in 1983-84, and is currently used as the main treatment method in twenty-five percent of the addiction treatment units in the country. This thesis describes the results of a program evaluation in one private Minnesota model setting, with the general aims of studying post-treatment substance use and functioning in important life domains, and factors enhancing respectively hampering favorable substance use outcomes. Two-hundred and forty-four individuals were interviewed during one of their first days of stay in treatment, and 188 (77.0%) respectively 148 (61%) were re-interviewed after 1 and 2 years. Results from **Paper I** indicated that participant's baseline alcohol dependence severity and treatment goals, and the degree of AA affiliation, satisfaction with treatment, and completion of aftercare, differentiated between those who turned out as abstainers, non-problem drinkers and problem drinkers during the first year after treatment. **Paper II** showed that participant's 1st year drinking outcomes, and also the degree of AA affiliation and satisfaction with treatment during the first year, predicted drinking outcomes during the subsequent second year. In **Paper III**, significant improvements were observed in family, psychiatric and legal life domains between the baseline assessment and 1-year follow-up, while no change was found in the employment and medical areas. Those who experienced problem drinking reported significantly more employment, family and psychiatric problems than non-problem drinkers and abstainers; no differences were found between the two favorable outcome groups. Finally, **Paper IV** indicated that women were more likely to engage in AA after treatment than men, as were those with pre-treatment AA experience, and abstinence as their treatment goal. The 1-year abstinence rates of the study sample resembled those obtained in previous larger single group evaluations of Minnesota model treatment in the U.S. Findings are discussed with reference to methodological concerns and previous research on the prediction of treatment outcomes.

Keywords: Minnesota model, Alcoholics Anonymous, program evaluation, outcome predictors, abstinence rates, Sweden, non-problem drinking, private sector, twelve-step treatment.

LIST OF PUBLICATIONS

This thesis is based on the following papers, which will be referred to by their Roman numerals.

- I. Bodin, M. C. & Romelsjö, A. (2006). Predictors of abstinence and non-problem drinking after 12-step treatment in Sweden. *Journal of Studies on Alcohol*, 67, 139-146.
- II. Bodin, M. C. & Romelsjö, A. Predictors of 2-year drinking outcomes in a Swedish treatment sample. *European Addiction Research*, in press.
- III. Bodin, M. C. & Romelsjö, A. Secondary outcomes: Group and individual change and relationships to drinking outcomes. Submitted manuscript.
- IV. Bodin, M. C. Gender aspects of affiliation with Alcoholics Anonymous after treatment. *Contemporary Drug Problems*, in press.

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CONTENTS

1	BACKGROUND.....	1
1.1	About this thesis	1
1.2	Substance use disorders.....	1
1.2.1	Diagnostic criteria	1
1.2.2	The disease concept of alcoholism	2
1.2.3	Prevalence of alcohol use disorders.....	3
1.2.4	Societal and individual costs.....	4
1.3	Etiology.....	4
1.3.1	Socio-demographic factors	4
1.3.2	Genetic factors.....	5
1.3.3	Personality, temperament and interpersonal factors	5
1.3.4	Societal factors	6
1.4	Recovery and treatment.....	6
1.4.1	The “two worlds” of alcohol problems	6
1.4.2	Treatment outcomes.....	7
1.4.3	Determinants of treatment outcomes.....	9
1.4.4	The Swedish treatment systems.....	10
1.5	The Minnesota model.....	12
1.5.1	The principles and steps of Alcoholics Anonymous.....	12
1.5.2	Treatment structure and contents.....	13
1.5.3	Birth and dissemination	13
1.5.4	AA in Sweden and relationships to formal treatment	14
1.5.5	Theoretical base and assumptions	15
1.5.6	The Minnesota model in Sweden today	16
1.5.7	Previous studies in Swedish Minnesota model settings.....	16
2	OBJECTIVES	19
3	MATERIALS AND METHODS	20
3.1	Design and procedures	20
3.2	Sample characteristics	21
3.3	Study attrition	23
3.4	Treatment structure, contents and retention.....	24
3.5	Measures	24
4	BACKGROUND TO THE INDIVIDUAL PAPERS.....	28
4.1	Paper I.....	28
4.2	Paper II.....	29
4.3	Paper III	29
4.4	Paper IV	30
5	MAIN FINDINGS	31
5.1	Paper I.....	31
5.2	Paper II.....	31
5.3	Paper III	31
5.4	Paper IV	32
6	DISCUSSION	33
6.1	Paper I.....	33

6.2	Paper II.....	34
6.3	Paper III.....	35
6.4	Paper IV	35
6.5	AA affiliation and treatment site revisited	36
6.6	Abstinence and remission rates	37
6.7	General methodological considerations	38
	6.7.1 Design limitations.....	38
	6.7.2 Correlation and causality.....	38
	6.7.3 The validity of self-reports.....	39
	6.7.4 Generalizability of findings.....	39
7	CONCLUSIONS	41
8	ACKNOWLEDGEMENTS	42
9	REFERENCES.....	43
10	SAMMANFATTNING.....	56

LIST OF ABBREVIATIONS

AA	Alcoholics Anonymous
ADS	Alcohol Dependence Syndrome
AUD	Alcohol Use Disorder
CBT	Cognitive-Behavioral Therapy
CI	Confidence Interval
DSM-IV	The Diagnostic and Statistical Manual of Mental Disorders, 4 th edition
GDP	Gross Domestic Product
ICD-10	The International Classification of Diseases, 10 th edition
MET	Motivational Enhancement Therapy
NA	Narcotics Anonymous
OR	Odd's Ratio
RCI	Reliable Change Index
sd	Standard Deviation
STD	Standard Drinks
TSF	Twelve-Step Facilitation Therapy
WHO	World Health Organization

1 BACKGROUND

1.1 ABOUT THIS THESIS

The Minnesota model treatment for substance dependence was introduced to Sweden in the 1980s, and it has been applied in public as well as private settings since then. This thesis describes the results of a program evaluation in one private Minnesota Model agency, a project which was initiated and funded by the same agency. The general project aims were to evaluate post-treatment substance use and functioning in important life areas, and to identify factors promoting or hampering favorable substance use outcomes. Though the aims and research questions, in a broad sense, were determined by the agency's need to gain knowledge about how their clients fared after treatment, they had no involvement in the specific research questions asked, or any decisions made during the project. One exception is the choice of study design, which was limited due to practical and ethical concerns of the treatment provider. Because the majority of previous Swedish program evaluations in similar treatment settings have not been made available for the scientific community as peer-reviewed publications, the thesis will hopefully fill a void in the Swedish treatment literature.

1.2 SUBSTANCE USE DISORDERS

1.2.1 Diagnostic criteria

Current diagnostic criteria for substance use disorders are stipulated in the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994), in the Text Revision of the 4th edition (DSM-IV-TR; American Psychiatric Association, 2000), and in the 10th edition of the International Classification of Diseases and Related Health Problems (ICD-10; World Health Organization, 1992). Both the DSM and ICD systems reflect the dual perspectives of the alcohol dependence syndrome on one hand, and of the less severe alcohol problems *abuse* (DSM-IV) and *harmful use* (ICD-10) on the other. The criteria for dependence are highly similar in the two systems, and the originally alcohol-related concept has been expanded to comprise other substances as well. In both systems, diagnostic criteria reflect symptoms of physiological dependence (tolerance and withdrawal), an impaired control over amount, onset and termination of substance use, an increased amount of time spent on obtaining and taking the substance or recovering from its effects, progressive neglect of important social, occupational or recreational activities, and a continued substance use despite knowledge of harmful problems and consequences. The DSM criterion describing “any unsuccessful effort or a persistent desire to cut down or control substance use”, and the ICD-10’s “a strong desire or sense of compulsion to take the substance”, have no correspondence in the other system.

The threshold value for a diagnosis of alcohol dependence is 3 out of 7 (DSM-IV), or 3 out of 6 (ICD-10) criteria, clustered during the same 12-month period. Any three criteria may be met to reach the diagnostic threshold, and the presence of physiological dependence is possible but not a requirement for a dependence diagnosis. As a consequence, alcohol dependent individuals may show a considerable variation in drinking behavior and severity (Epstein, 2001).

The second major types of alcohol use disorders (AUDs) reflect the alcohol problems perspective, and are named *substance abuse* in DSM-IV, and *harmful use* in ICD-10. While the DSM-IV criteria for abuse reflect psychosocial consequences of substance use, the ICD-10 category harmful use pertains to substance related physical or psychological harm, impaired judgement or dysfunctional behavior of the individual. These differing foci of the alcohol problems diagnoses make them more susceptible to cultural variations in drinking patterns and social standards, and the agreement between the DSM-IV and ICD-10 systems, as well as the test-retest reliability, is lower for abuse and harmful use than for the dependence classifications (Schuckit et al., 1994; Üstün et al., 1997).

1.2.2 The disease concept of alcoholism

The dependence classifications have been heavily influenced by the disease concept of alcoholism, and by Edwards & Gross' description of the alcohol dependence syndrome from 1976. The disease concept gradually evolved over two centuries, and culminated in Jellinek's *The Disease Concept of Alcoholism* in 1960. In spite of that Jellinek described the interpersonal and inter-cultural variations among problem drinkers, and also warned against "accepting the exclusiveness of the picture of alcoholism as propounded by Alcoholics Anonymous" (1960, p. 38), he is often described as the father of a unitary disease concept. Among the five subtypes of problem drinkers which he labelled with Greek letters, Jellinek considered only the gamma and delta drinkers as afflicted by disease. The hypothesized common denominators of the gamma's and delta's were an acquired increased tissue tolerance to alcohol, an adaptive cell metabolism, and withdrawal symptoms and craving following on interruption of drinking (*i.e.* physiological dependence). However, while the delta drinkers (exemplified by the habitual everyday drinker in wine-countries such as France), had an inability to abstain because of the occurrence of withdrawal symptoms, they did not experience "loss of control" when drinking. In contrast, the gamma drinkers were able to abstain after a drinking bout, but experienced "loss of control" once they had started drinking. Jellinek considered the gamma type of alcoholism as producing the greatest damage to interpersonal relationships, to health, and to financial and social standing. The descriptions of gamma drinkers were based on surveys of members of Alcoholics Anonymous (AA), for whom "loss of control" denoted the stage in their drinking history when the ingestion of one

alcoholic drink set up a chain reaction, experienced as a physical demand for more alcohol. This type of alcoholism was described as irreversible and progressive, and complete abstinence was considered as the only path to remission.

In 1976, Edwards and Gross proposed a description of the alcohol dependence syndrome (ADS), where control was described as “variably and intermittently impaired”, rather than completely lost. Besides a subjective awareness of a compulsion to drink, the ADS also included a narrowing of the repertoire of drinking behavior, a salience of drink-seeking behavior, increased tolerance, repeated withdrawal symptoms, relief or avoidance of withdrawal symptoms by further drinking, and rapid reinstatement of the syndrome after periods of abstinence. The syndrome marked a more clear separation between alcohol dependence and alcohol-related problems, a view which also appeared in a WHO statement the following year, and in subsequent versions of the ICD and the DSM-systems. The same WHO statement summarized the ADS as manifested by alterations at the behavioral, subjective and psychobiological levels, with an impaired control over alcohol intake as the leading symptom, as existing in degrees, and as being modified by personal and environmental factors (Edwards et al., 1977, p. 17).

The core features of the disease concept have been questioned on several grounds; the behavioral nature of the problem makes the disease conceptualization difficult to grasp (Epstein, 2001), and its’ proposed progression and irreversible nature has been refuted by studies indicating non-abstinent remission in alcohol dependent individuals (*e.g.* Davies, 1962; Nordström & Berglund, 1987; Vaillant, 1996). In the preliminary version of the forthcoming guidelines for Swedish addiction care by the National Board on Health and Welfare, it is stated that the current knowledge does not allow the conclusion that dependence is a disease, and that the only reasonable approach to AUD is to consider them as multifactorial phenomena. The guidelines advocate a pragmatic and open-minded stance in treatment, where the diversity among individuals with AUD is acknowledged and the solutions are tailored to meet individual needs. It is also noted that the ADS, which describes the clustering of symptoms but says nothing about etiology, does not preclude the use of the disease concept by those in educational or health-promoting work, who consider it valuable (Socialstyrelsen, 2006).

1.2.3 Prevalence of alcohol use disorders

AUD prevalence estimates vary between studies and cultures, but the mean 12-month prevalence of alcohol dependence is 5.0% for men and 1.4% for women in European countries (Rehm et al., 2005), and 5.4% for men and 2.3% for women in the United States (Grant et al., 2004). For alcohol abuse in the U.S., rates are 6.9% for men and 2.6% for women, suggesting that altogether 8.5% of the general U. S. population suffer from an AUD

at a given point in time (Grant et al., 2004). There is a paucity of general population studies in Sweden, but regional estimates from the Stockholm area suggest that 6.0% of the men and 3.0% of the women meet criteria for alcohol dependence (Hvitfeldt et al., 1999).

1.2.4 Societal and individual costs

The total alcohol related societal costs fall between 2-8% of the GDPs in different studies and countries (Andréasson, 2000). Also Swedish estimates vary, from the 6% of the GDP and corresponding 110 billions Swedish crowns reported by Johnson (2000), to the considerably lower estimates of 1% of GDP and 20 billions Swedish crowns, recently published by Jarl et al. (2006). Globally, alcohol accounts for approximately 4 percent of the disease burden, of which one third is attributable to the alcohol use disorders, with variations from less than 20% in African and formerly socialist countries, to more than half in high income, low-mortality countries (Room et al., 2005).

It is known that the 10% heaviest drinkers in a population make up for 30-60% of the total alcohol consumption (Lemmens, 2001). The “prevention paradox” is the notion that a small decrease in exposure to a risk factor in the entire population may result in greater gains in health, than a larger decrease in this smaller group of high-risk individuals. Support for this hypothesis has been found in studies indicating that the bulk of acute alcohol related problems are found among individuals with low or moderate alcohol consumption (*e.g.* Kreitman, 1986; Rossow & Romelsjö, 2006).

1.3 ETIOLOGY

As previously noted, the multi-faceted etiology of AUDs is widely acknowledged today, and most researchers subscribe to a bio-psycho-social perspective regarding their development as well as maintenance and treatment. Factors that have been associated with an increased risk for AUD development, are briefly summarized below.

1.3.1 Socio-demographic factors

As noted in section 1.2.3, AUDs are more than twice more common among men than among women, a fact which in part may be explained by men’s higher alcohol consumption (Nolen-Hoeksema, 2004). Epidemiologic studies from the U.S. suggest the gender gap is closing; the male: female ratio for lifetime alcohol dependence dropped from 5:1 in the 1980s to approximately 2.2:1 during the 1990s (Greenfield, 2002). With respect to age, prevalence rates are higher in younger age intervals (18-29 years) than in older cohorts (Grant et al., 2004). Early problem onset has been associated with higher social and psychiatric problem levels, and of more severe substance use later in life, *i.e.* the earlier the onset, the more multi-

factorial the problem (Pedersen, 2005; Vaillant, 1995).

In a Swedish report on alcohol habits and social class, Leifman (1998) concluded that the previously noted positive relationship between class and consumption has generally weakened, and in the 1990s, consumption levels were fairly equal between classes. However, the frequencies of binge drinking are higher among the less advantaged classes, a difference that probably accounts for a large part of the higher rates of alcoholism, alcohol related psychosis, intoxication, and alcohol related mortality, found in these groups. In general, class differences are more pronounced among males than among females. Ljung et al. (2005) found that after ischemic heart disease, the largest absolute differences in Disability Adjusted Life Years between Swedish men in the highest and lowest socio-economic classes, were found for alcohol dependence.

1.3.2 Genetic factors

The genetic vulnerability towards AUD development is believed to result from a complex interplay of several genes, and pharmacogenetic factors which might affect the absorption, distribution, metabolism of and organ sensitivity to alcohol (Schuckit, 1994). Results from family, twin and adoption studies indicate that genetic factors account for 40-60% of the risk for development of alcohol dependence (Pedersen, 2005). The prospective study of alcoholism development has shown that it is more frequent among those who have alcoholic relatives (Vaillant, 1995), and a low level of response to alcohol is more frequent among sons and daughters of alcoholics, compared to those with no family history of alcoholism (Eng et al., 2005; Schuckit et al., 2000). The genetic contribution is higher for alcohol dependence than for alcohol abuse (Walters, 2002), and higher for men than for women (Light et al., 1996). While the age for drinking debut is to a high extent environmentally determined, the time from debut to AUD development seems to be more affected by genetic factors (Pedersen, 2005). Among genetic marker studies, the most established finding is the protective effect of the inactive form of the ALDH2 gene (ALDH2-2), which is prevalent among Asians but rare in Caucasians, and which is associated with an aversive “flushing reaction” when alcohol is consumed (Cook & Gurling, 2001).

1.3.3 Personality, temperament and interpersonal factors

The notion of a pre-alcoholic personality, predisposing the individual towards AUD development, has not been confirmed by research for the large majority of alcoholics (Miller, 2003; Vaillant, 1995). However, antisocial, aggressive and impulsive personality characteristics, a maladaptive self-concept, conduct disorder and hyperactivity in childhood, have been associated with an increased risk for future AUD development (Cox et al., 2001; af

Klinterberg et al., 1993), and more specifically, for what has been labelled as Dionysian types of alcoholism (*e.g.* Type II's and Type B's) (Babor, 1996). For the Apollonian types, which constitute 55-75% of all alcoholics and which have a better prognosis, personality and temperamental factors seem to be of minor importance (Pedersen, 2005). There is also a high co-occurrence of AUD and other psychiatric disorders such as antisocial and borderline personality disorders, anxiety and affective disorders (Kessler et al., 1997).

With regard to interpersonal risk factors, familial dysfunction and deviant peer relationships during adolescence are associated with an elevated risk for future AUD development (Cox et al., 2001). Pedersen (2005) proposes that poor coping abilities, which increase the risk for AUD in adolescents, result from a complex interplay between the quality of attachment to parents, parenting style, the presence of stress or trauma, and the biological constitution of the child.

1.3.4 Societal factors

The risk for development of alcohol use disorders in a society, as well as for many other adverse health effects, generally increases with the level of the total alcohol consumption (Lemmens, 2001; Rehm et al., 2003). Since the consumption of alcohol is strongly influenced by factors affecting its price and availability, alcohol policies are important for alcohol related public health outcomes (Babor et al., 2003a). Between 1996 and 2004, the annual per capita alcohol consumption in Sweden increased from 8 litres to 10.5 litres, and during approximately the same period (1998-2004), the number of heavy drinking occasions increased by 40 percent (Leifman, 2005). Heavy drinking patterns have been found to be detrimental to health, and the social standards surrounding such drinking and social interactions vary between cultures (Lemmens, 2001; Room et al., 2005). The importance for health care workers to address consumption patterns and the adversity of binge drinking in their contacts with patients, has been emphasized (Andréasson & Allebeck, 2005).

1.4 RECOVERY AND TREATMENT

1.4.1 The “two worlds” of alcohol problems

The majority of those who resolve their drinking problem do so without any formal or informal treatment, and the study of natural resolution processes has gained increasingly more attention during the last decades. The initiation of stable natural resolutions is often preceded by a mounting of negative experiences in social relationships, health, work, financial standing and legal issues. After some time of moderation or abstinence, improvements in social relationships and health related behaviors seem to reinforce maintenance of the change (Blomqvist, 1996; Tucker, 2003).

Among all individuals with drinking problems, only 25% enter formal treatment or seek help from voluntary organizations such as AA (Tucker, 2003). The observation that problem drinkers in general and clinical populations commonly differ on several characteristics, has become known as the “two worlds” of alcohol problems (Room, 1977). Problem drinkers who enter treatment usually are significantly older, have lower degrees of social stability and social resources, lower incomes, higher drinking and psychiatric severity, and more social consequences, than their non-treated counterparts (*e.g.* Blomqvist, 1999; Matzger et al., 2005; Weisner, 1993).

Though recent research has indicated common denominators between the “two worlds” when it comes to the initiation and maintenance of change processes (Matzger et al., 2005), they seem to differ in terms of recovery paths. While considerable proportions among problem drinkers in general populations revert to moderate, controlled alcohol consumption, abstinence is a more likely outcome among treated problem drinkers (Klingemann, 2001; Tucker, 2003). These differences seem to depend on the character of the drinking problem and the social situation. The problem drinkers in Vaillant’s Core City sample who returned to social drinking, had less often been alcohol dependent, had fewer alcohol related medical and work problems, had less often attended a clinic or AA, and had less frequently been engaged in binge drinking, than those who became abstainers or those whose alcoholism progressed (Vaillant, 1995). In another prospective study of a non-treated sample, Humphreys et al. (1995) found that compared to those who became abstainers, the moderate drinkers had less severe dependence problems, higher occupational status and more social support from spouse and family at baseline. Also epidemiological research has indicated that dependence severity is negatively predictive of non-abstinent recovery, and positively predictive of abstinent recovery, for treated as well as untreated alcohol dependent individuals (Dawson et al., 2005).

1.4.2 Treatment outcomes

The Project MATCH, being the largest randomized controlled trial of psychosocial treatment for any kind of disorder ever performed (Heather, 2001), was designed to test a number of matching hypotheses. More than 1700 alcohol dependent clients were randomly assigned to manualized cognitive-behavioral coping skills therapy (CBT), motivational enhancement therapy (MET), or twelve-step facilitation therapy (TSF). Treatments were delivered individually as regular Outpatient treatment ($n = 952$), or as Aftercare to residential treatment ($n = 774$). All therapies were delivered during twelve weeks, with weekly sessions for CBT and TSF, and four MET sessions during the same period (Project MATCH Research Group, 1997a). The three therapies were chosen on several grounds, such as their applicability to existing treatment systems, and their contrasting views on dimensions such as treatment goals

and control over drinking (Donovan et al., 1994). In cognitive-behavioral coping skills therapy (Kadden et al., 1992), problem drinking is assumed to reflect generally poor coping skills, and the overall goal is to replace the maladaptive coping with more adaptive methods. Consequently, the therapeutic focus is on the identification of thoughts, emotions and situations that commonly precipitate relapse, and the acquisition of alternative ways to deal with such high-risk situations. Motivational Enhancement Therapy (Miller et al., 1992) is based on general principles of motivational and behavioral psychology. The role of the therapist is to assist the client in the mobilization of his or her own resources for initiating and sustaining behavior change. Central treatment components are an objective feedback of assessment, empathic and reflective listening, the avoidance of argumentation, support of client self-efficacy, and an emphasis on the client's responsibility for change. In TSF (Nowinski et al., 1992), the aim is to accustom the client to the steps and principles of Alcoholics Anonymous (described in section 1.5.1), in order to facilitate subsequent AA affiliation. Among the core topics are the first three steps of the AA program, which address the acceptance of alcoholism as a progressive illness over which willpower has no control and for which abstinence is the only viable alternative, and the need of surrender to some Higher Power, in order to achieve sustained sobriety.

Results from the Project MATCH revealed surprisingly few matching effects, and no strong conclusion could be drawn concerning the generic matching hypothesis (Project MATCH Research Group, 1997b). With regard to main effects of treatment, no reliable group differences were observed for the continuous outcome measures (Percentage of Days Abstinent, Drinks per Drinking Day), in any of the two arms at the 1-year or 3-year follow-ups (Project MATCH Research Group, 1997a; 1998). In the Outpatient arm, abstinence rates were higher in TSF than in CBT and MET during months 4-15 after treatment (24 vs. 15 respectively 14 percent), and during months 37-39 after treatment (36 vs. 24 respectively 27 percent). Differences in abstinence rates did not appear in the Aftercare arm.

In spite of being the far most common psychosocial approach in addiction treatment in the U.S., randomized controlled trials of the Minnesota model treatment are rare. In one Finnish study, a "Hazelden-type" of treatment was compared to a more traditional social-psychiatric inpatient treatment (Keso & Salaspuro, 1990). While no between-group differences in alcohol consumption were observed at the 2, 4, 6 and 8 month follow-ups, the proportion of abstinent patients was significantly higher in the Hazelden-type group during months 8-12, (26.3 % vs. 9.8 %). In another randomized clinical trial described in Meyers & Miller (2001), traditional twelve-step treatment and the Community Reinforcement Approach resulted in similar drinking outcomes at proximal (1-6 months) as well as distal (16-25 months) follow-ups. Wells et al. (1994) found similar drug use outcomes for cocaine abusers randomly assigned to a traditional twelve-step recovery support group, and a relapse prevention condition. Finally,

Carroll et al. (1998) evaluated effects of CBT and TSF in patients with cocaine dependence and concurrent alcohol abuse or dependence. A Clinical Management (CM) condition was employed to control for unspecific effects of psychotherapy. Results showed that CBT and TSF were equally and significantly more effective than CM in producing longer periods of abstinence from cocaine and alcohol.

The recent and comprehensive overviews of alcoholism treatment outcome research by the Swedish Council on Technology Assessment in Health Care (SBU, 2001; Berglund et al., 2003), and Miller et al. (2003), have resulted in largely overlapping conclusions. Treatment, as compared to no treatment, has effects equal to those found in other areas of health care research. Among psychosocial interventions, strong empirical support exists for brief interventions, MET, the community reinforcement approach, and CB approaches such as coping and social skills training. However, the conclusions drawn with respect to Minnesota model treatment diverge in the two reports. Miller et al (2003) emphasize that traditional twelve-step treatment, constituting the bulk of addiction treatment in the U.S., is made up by components that have no or little empirical support, and a replacement with scientifically approved methods is strongly advocated. In contrast, the Swedish report embraces Minnesota model treatment in the “12-step treatment” category, which has been found to be equally effective as empirically supported specific approaches such as CBT and MET.

1.4.3 Determinants of treatment outcomes

1.4.3.1 Client characteristics

Individual characteristics that commonly increase the likelihood of favorable substance use outcomes are indices of social stability such as having an employment and being married, and also being female. In contrast, a higher substance use severity, psychiatric severity and social networks supportive of drinking or using drugs, reduce the likelihood of beneficial outcomes (McKay and Weiss, 2001; McLellan and McKay, 1998). Project MATCH identified client’s baseline motivation to change drinking behaviors and self-efficacy, measured at the end of treatment, as positively predictive of drinking outcomes (Cooney et al., 2003; DiClemente et al., 2001). With regard to proximal antecedents of relapse, the empirically supported prevention model by Marlatt & Gordon (1985) identifies non-sufficient coping responses to high risk situations as strong predictors. The most prominent high-risk situations are the experience of negative or unpleasant emotional states, interpersonal conflicts and social pressures to drink alcohol.

1.4.3.2 Treatment characteristics

The correlations between treatment amount, duration and format (outpatient, inpatient), and

drinking outcomes, are generally weak. However, there is reason to consider drinking severity in the choice between these alternatives. Clients with less severe drinking problems generally benefit from only a few sessions of outpatient treatment, while more comprehensive treatments and inpatient formats should be considered for severely dependent clients (SBU, 2001). Treatments which are clearly defined, structured and have a therapeutic focus on the drinking problem, yield better drinking outcomes than more unspecific, generally supportive interventions (SBU, 2001). The finding that private treatment programs tend to have better outcomes than programs with public ownership, is most likely explained by that private programs serve as proxies for higher levels of social stability among clients (Monahan & Finney, 1996). Therapist empathy has been identified as a powerful predictor of treatment outcomes (Miller et al., 2003); a confrontational therapist style has been associated with more resistance from clients and poorer drinking outcomes, than a style characterized by reflective listening (Miller et al., 1993). Longer retention in treatment is associated with better outcomes (McLellan & McKay, 1998; Moos & Moos, 2003). With regard to aftercare participation, non-randomized studies have found strong support for the importance of program aftercare for improved substance use outcomes, while findings from experimental studies diverge (Donovan, 1998; McKay, 2001). In the case of psychiatric comorbidity, interventions targeting both or all conditions need to be coordinated and delivered concurrently, to improve outcomes (Mueser & Kavanagh, 2001). Finally, AA affiliation has been positively correlated with better drinking outcomes in general, and with abstinence in particular (Tonigan et al., 2003).

1.4.4 The Swedish treatment systems

1.4.4.1 General description

About two decades ago, an international comparison indicated that Sweden assigned more resources per capita to alcoholism treatment than most other countries (Takala et al., 1992), and according to Room et al. (2003), there is reason to believe that this finding still holds true. Interventions targeting alcohol problems have a centennial tradition of being a collaborative effort of the state and the municipalities, non-profit organizations and of private and public foundations (Stenius, 1999). In contrast, the treatment system for drug problems developed as a branch within general psychiatry at the end of the 1960s, but later became the responsibility of the social services with the new Social Services Act in 1982. Since the beginning of the 1990s, the treatment for alcohol and drug problems has been more or less combined (Bergmark, 1998), although in the clinical work, separate wards within units are not uncommon. In 2003, eighty-four percent of the Swedish treatment units reported that they treat both alcohol and drug problems, and only 16% specialized in either alcohol (7%) or drug (9%) treatment (Socialstyrelsen, 2004).

Although larger than in other Nordic countries, the state administered compulsory care constitutes a small and decreasing part of the treatment systems (Palm & Stenius, 2002). The voluntary, publicly funded treatment for alcohol and drug problems is organized within two major systems. The health care system at the county council level is responsible mainly for the treatment of acute and medical complications, and the social services system at the level of the municipalities, which hold the main responsibility, takes on the rehabilitation over longer terms (Room et al., 2003). In the most recent report mapping individuals in substance misuse treatment in Sweden on one given day, 37% of the patients/clients received treatment within the social services of the municipalities, 26% were found within the health care system, while 10% were in treatments that were joint efforts of the two systems (Socialstyrelsen, 2004). Moreover, 16% of the patients were treated by private entrepreneurs, 5% by private-non-profit caregivers, 4% were in treatment provided by the legal system, and 1% were in compulsory care. Compared to the first report from 1999, the proportion of clients in private care on a given day in 2003 had increased by 9 percent, while the share of clients in the social services had decreased by 6 percent. A raise was observed also for outpatient treatment during the same period, from encompassing two thirds of all clients and patients in 1999, to three quarters in 2003 (Socialstyrelsen, 2004). The proportion of women in all units during 2003 was 31%, and slightly higher in outpatient treatment (32%) than in institutional care (26%).

It has been pointed to that there is a large gap between clinical practice and scientific evidence in the treatment of alcohol problems in Sweden (SBU, 2001, pp. 212-213). The specific treatment methods which have received empirical support all require a training that is lacking among many workers within the addiction field. This often results in more generally supportive interventions, which are less focused on the alcohol problem *per se*, and for which the research evidence is weak. However, the fact that the reported use of cognitive-behavioral therapy and motivational interviewing increased between 1999 and 2003, while interventions with less empirical support declined (Socialstyrelsen, 2004), suggests that a change might be on its way. The ongoing elaboration of guidelines for Swedish addiction care by the National Board on Health and Welfare, aims to further enhance the change process. The forthcoming definition of what should be considered treatment, will be sharpened to include only "...systematic and theoretically grounded techniques or methods that are used to help individuals break their misuse and to prevent relapse. Also medically supervised detoxification is included in the treatment definition" (Socialstyrelsen, 2006, p.16, my translation). Moreover, aside from the requirements of evidence based methods and treatment intention implied in the definition, treatment should be delivered in therapeutic contexts and by therapists with adequate competences (Socialstyrelsen, 2006).

1.4.4.2 *The social services and external referrals*

The social services have to make decisions about whether and which interventions should be offered to their different clients. The grounds for these decisions have been studied by Wallander & Blomqvist (2005), who found that the substance used, the frequency of use, and the client's views of their use as problematic or non-problematic, predicted the social workers choice of interventions. Rehabilitating interventions, being more costly than general caring interventions, were more often considered appropriate for younger individuals with no previous treatment history. In a related report, Blomqvist & Wallander (2004) found that twelve-step treatment was the dominating choice of treatment among the social workers, and that it was considered appropriate for a variety of reasons (*e.g.* because a client was unmotivated and thus needed to gain insight to his or her problem, or because a client already was motivated). The authors also note that though twelve-step treatment was the dominating choice, training in the twelve-step method had not been offered in any of the units during the 2 years preceding the study. This might perhaps be due to that one of the core features of Minnesota model treatment, the use of recovering alcoholics and addicts as counselors, does not easily lend itself to educational training.

1.5 THE MINNESOTA MODEL

1.5.1 The principles and steps of Alcoholics Anonymous

Though the application and practices of Minnesota Model treatment may vary between institutions, they all share as their core the principles and the twelve steps of Alcoholics Anonymous (AA) (Spicer, 1993). Starting in 1935 in the U.S., AA has become a world-wide movement with 100 000 groups and almost 2 million members (Alcoholics Anonymous, 2006). An AA group is a recurrent meeting, held at the same place and time on at least a weekly basis, and as a forum for mutual help, it constitutes the heart of AA (Room, 1993). On the basis of their contents, the twelve steps may be grouped into the decision steps, the action steps and the maintenance steps (Mäkelä et al., 1996). The decision steps (1-3) involve the recognition of powerlessness over alcohol and a need for help, and a decision to put oneself in the hands of a God of a personal understanding. The action steps (4-9) involve the writing of a moral inventory, sharing that inventory with another person, turning to a God of a personal understanding to remove character defects, and making amends for harm done to others. The maintenance steps (steps 10-12) entail an ongoing and continuous self-examination and self-correction, a deepening of the relationship with a personal God through prayer and meditation, and the carrying of the AA message to other alcoholics.

While the twelve steps constitute a set of suggested actions for the individual AA member, the "12 traditions" are organizational principles pertaining to AA as a whole. They define the AA group as the fundamental organizational unit, self-governing in all affairs, self-

supporting, declining outside contributions, and non-professional and non-affiliating in kind (Room, 1993). The twelve steps and traditions have been published in the “Big Book” of Alcoholics Anonymous (Alcoholics Anonymous, 2001, 4th ed.), and in “Twelve Steps and Twelve Traditions” (Alcoholics Anonymous, 1953), and they have been adopted and modified by other twelve-step fellowships such as Narcotics Anonymous (NA).

1.5.2 Treatment structure and contents

As previously noted, the applications of Minnesota model treatment vary between institutions, but it basically includes the elements described by Cook (1988). A 3-6 weeks initial treatment episode, most commonly delivered in residential settings, is followed by 6-24 months of program aftercare. The staff may include medical doctors, social workers, nurses, clergy, psychologists, and counselors, where the latter often are AA or NA recovered alcoholics or drug addicts. Based on AA principles, the therapy group is considered the main therapeutic tool, providing a place for identification with others in a similar situation. Group sessions may take the forms of problem solving groups aimed at specific personal issues, or of more confrontational sessions aimed at “breaking the denial” of the patient. Written assignments addressing ones “Life story” and substance-related negative consequences, are reported for in the therapy group. Other types of group sessions include daily reading groups, where patients make reflections or meditate upon AA or NA related literature. Daily lectures are given on topics relating to the twelve steps and traditions of AA, to the nature of dependence as conceptualized by the disease model, and to psychological, medical and social consequences of substance dependence. Family programs are included under the assumption that substance dependence is a disease which negatively affects all family members. AA attendance, and work with the first steps of the AA program, aims to further accustom the patients to AA practices. Finally, there might be opportunities for physical exercise. The daily treatment schedule usually contains nearly all of these program elements, and as a consequence, it is usually highly structured. The aftercare may include regular individual, group or family counselling, and AA attendance is customary.

1.5.3 Birth and dissemination

Between 1948 and 1950, which was approximately fifteen years after the formation of AA, its’ core principles were first brought into practice in three treatment centres in the state of Minnesota – Pioneer House, Hazelden and Willmar State Hospital. During the subsequent ten years, a gradual merging of AA principles with views from the medical, psychological and clergy professions took place, which lay the basis for the model as currently practiced (Spicer, 1993). A rapid growth in model dissemination in the U.S. was seen in the late 1970s and early 1980s, as insurance policies were changed to encompass alcoholism treatment

(Stenius, 1991). Today, the majority of U.S. programs embrace a 12-step approach and recommend AA attendance (McCrary & Miller, 1993).

Contemporary to the increased model dissemination in the U.S., the introduction to the Nordic countries took place, and in Sweden it first came into practice in 1983-84 (Larsson & Helleday, 1992; Stenius, 1991). The catalysts in the implementation process were the “pioneers” – individuals who had visited Minnesota model programs abroad because of a professional interest in alcoholism treatment, or because of a personal drinking problem. With regard to specific treatment characteristics, the “simple truth” of alcoholism embedded in the disease concept of alcoholism, and the reaching out towards socially stable alcoholics, were new elements that distinguished the model from the more traditional alcoholism treatment. Also, the use of sober alcoholics as treatment counselors, was a new and salient feature (Stenius, 1991).

The model was introduced to the country during a period when decentralization had opened up the scene for private initiatives and new treatment alternatives. Model implementation took place in public as well as private institutions. A survey which was responded to by 38 of the 40 Minnesota model institutions at the beginning of 1990s, showed that 37% were run by the municipalities, 21% by foundations etc., and 42% were private companies or corporations (Larsson & Helleday, 1992). A somewhat earlier survey indicated that the foundations and private corporations adhered more closely to the original Minnesota model principles in their staffing and treatment contents, than did the public Minnesota model institutions (Söderlund & Hellquist, 1988).

1.5.4 AA in Sweden and relationships to formal treatment

The first group in Sweden that clearly adhered to AA traditions and principles was started in Stockholm in 1956 (Anonyma Alkoholister, 1996). With the Swedish introduction of the Minnesota model during the 1980s, the number of AA groups increased dramatically, from 23 groups in 1980, to 278 in 1990 (Eisenbach-Stangl & Rosenqvist, 1998). In her thesis describing AA in Sweden, Helmersson Bergmark reported 421 groups in 1995, a figure almost identical to the 419 groups currently reported by Anonyma Alkoholister (2006), suggesting that the number of groups has stabilized. The groups are spread from Ystad in the south to Kiruna in the north, and together they offer more than 1100 weekly meetings. Approximately 30% of Swedish AA members are women, and the number of groups with special meetings for women increased from 1 in 1988 to 24 in 1994 (Helmersson Bergmark, 1995), and to 40 in 2006 (Anonyma Alkoholister, 2006).

It has been pointed to that AA is not a treatment, but a spiritual program and a way of living (Miller & Kurtz, 1994). However, in the treatment research literature, AA is often described

as an adjunct to treatment and a part of aftercare to an index treatment episode. Perhaps a more correct formulation when considering the Minnesota model is that AA affiliation is the long-term goal of treatment, for which the index episode is meant to serve as an introduction (Larsson & Helleday, 1992; Mäkelä et al., 1996). Thus, the treatment rests on AA principles and encourages AA engagement, in order to facilitate sustained affiliation after treatment termination. Room (1993) has noted that though AA has kept true to its traditions and remained non-affiliating to outside enterprises such as formal treatment, the distinctions between the organizations may be far from clear-cut for a client in a Minnesota model treatment program.

1.5.5 Theoretical base and assumptions

In an interview cited in Spicer (1993, p. 119), former Hazelden director Daniel Anderson describes the Minnesota model view on the etiology of substance dependence as follows:

“Nobody knows the locus of addiction. Is it in the person? Is it psychological? Is it physiological, constitutional? Is it in the culture? Actually, it’s all over...The Minnesota Model never focused primarily on a deep knowledge of etiology. We just made certain assumptions and tried to help people modify their behavior”.

On a more general level, these assumptions are reflected in the working principles of alcoholism as a no-fault, multi-phasic, chronic and primary illness (Spicer, 1993). AA describes the experience of alcoholism as an illness, having physical, mental and spiritual constituents (Kurtz, no date). It is important to note that the AA description of alcoholism developed from the self-lived experiences of alcoholics, and that AA does not claim, or aim, to provide a universal theory about the nature of alcoholism. Actually, according to their traditions, AA has no opinion on such “outside issues” (Kurtz, no date). Rather than making general statements on the topic, the essence of the AA message seems to be “this is what alcoholism was for most of us, and this is how we learned to manage our problem”. In this sense, one could say that AA is short of theory, and consequently, that the Minnesota model is short of theory. This stands in sharp contrast to existing behavioral therapies for substance related disorders, which developed from principles from social learning theory and from classical and operant conditioning theories, and which all have been validated as bearing strong influence on human behavior (McCrary, 1994). Though theoretically incompatible, the behavioral and AA perspectives on alcoholism in practice have important features in common. For example, they both help to identify high risk situations and alternative behaviors to drinking, and stress the importance of social networks supportive of drinking reduction or abstinence (McCrary, 1994).

1.5.6 The Minnesota model in Sweden today

The most recent report mapping substance misuse treatment suggests that 45% of the Swedish treatment units use the Minnesota model to some extent, and that 25% use it as the main method (Socialstyrelsen, 2004). Because the survey used in this report does not require the units to specify their treatment contents or staffing, there is most likely a substantial variation between the units in these regards.

In the beginning of the 1990s, a similar variation in treatment structure and staff education among model upholders led some agencies to start the Association for Minnesota model treatment in Sweden (Föreningen för Minnesotamodellen i Sverige; FFMS). The association was started with the aims to protect the name and quality of the model in the country. Currently, FFMS has 15 treatment providing member organizations, of which 11 are private companies, 3 are public institutions, and one is a non-profit foundation (FFMS, 2006). The training to 12-step counselling is 1.5 years in duration at present, and it is organized at the high-school level. The Swedish Certification Association for Alcohol and Drug Counselors was started in 1995 by representatives from different theoretical perspectives in public and private addiction counselling. Since the start in 1995, approximately 60% of the certified counselors have come from 12-step educations (Anders Skogman, personal communication 2006-09-22).

1.5.7 Previous studies in Swedish Minnesota model settings

The first Swedish institution to adopt Minnesota model principles was the psychiatric ward M79, later named M87, at Huddinge hospital (Anonyma Alkoholister, 1996). A randomized trial which aimed to compare M79 to standard outpatient alcohol treatment and a no-treatment control condition, was reported for by Andréasson et al. (1990). Due to large difficulties in the recruitment of subjects, and substantial attrition in the group assigned to inpatient Minnesota model treatment, the trial had to be discontinued.

Excluding master's theses and reports based on in-depth interviews, there are six previous outcome evaluations from Swedish Minnesota model settings. Table 1 and Table 2 describe the six evaluations with respect to study and sample characteristics. Except for the papers that make up Gerdner's doctoral thesis (1998), and the aborted trial by Andréasson et al. (1990), the studies have not been made available to the scientific community as peer-reviewed publications.

Table 1. Study characteristics of previous Minnesota model evaluations in Sweden.

Study	O	F	n	D	Dc	Re	ReC	T	Di	Ab
Larsson, 1990	Pri	I	295	Pt	Q	61	Na	12	N	49 ^c
Parmander & Allebeck, 1992	Pri	I	100	Pt	Q	65	Na	12	N	32 ^b
Sundin et al., 1994	Pri	I	520	Pt	Q	58	66	13-25/19	Y	50 ^b
Westerlund, 1995	Pu	O	69	Pt	Q	52	88	14-26/20	A	55 ^c
Gerdner et al., 1988; 1996	Pu	I	121	Pt	Q	67	92	3-20/10	A	13 ^a
Fridell et al., 2002	Pri	I	80	Pt	I	68	Na	24-48	Y	44 ^b

O: Ownership; Pu=Public, Pri=Private. F: Format; I=Inpatient, O=Outpatient. n: Number of individuals in initial sample. D: Design; Pt=Post-test only. Dc: Method for data collection; Q=Mailed questionnaire, I=Interview. Re: Follow-up rate (%). ReC: Response rate after replacing non-responses with collateral information. Na: Not applicable. T: Time to follow-up in months, range or mean when available. Di: Diagnostic assessment at treatment entry; Y=Yes, by DSM or ICD systems, N=No diagnostic assessment reported, A=Alternative diagnostic assessment, U=Unspecified diagnostic assessment. Ab=Proportion of participants reporting continuous abstinence during the follow-up period. ^aProportion of the initial sample. ^bProportion of follow-up completers. ^cProportion of treatment- and follow-up completers.

Table 2. Sample characteristics of previous Minnesota model evaluations in Sweden.

Study	F	Age	Ma	Em	El	Ac	Soc	Pr	E	Co	Alc
Larsson, 1990	26	40-49	32 ^a	68	26	21	79	6	13	2 ^b	63
Parmander & Allebeck, 1992	20	45	~50	70	39	x	65	19	12	x	73
Sundin et al., 1994	24	42	40	63	x	x	58	8	24	9	65
Westerlund, 1995	38	46	52	55	51	12	71	1	25	3	72
Gerdner et al., 1988; 1996	28	41	24	46	37	9	66	5	x	26	65
Fridell et al., 2002	38	47	49 ^a	x	28	27	40	23	36	0	72

Note: All values except for those describing Age are percentages. F: Females. Age: Values are means, medians or intervals enclosing the majority of the sample. Ma: Married or cohabiting. Em: Employed. El: Elementary school only. Ac: Academic degree. Soc: Referred by the social welfare system. Pr: Private payers. E: Referred by employer. Co: Coerced by the legal system or Swedish act on compulsory care (LVM). Alc: Alcohol use only. ^aReports only on married participants. ^b2.5 percent were "Other referrals" and included the legal system. x: Not reported.

Table 1 shows that all previous studies have used one-group, post-test only designs, and that all but one used mailed questionnaires for the follow-up assessment. In all studies, information on patient's background characteristics had been collected by unit staff during previous years, and in two cases, this included a diagnostic assessment of the substance abuse problem by DSM or ICD criteria. Follow-up rates fall in the range of 52-68 percent, but in three studies, non-responses have been replaced by information from collaterals, leading to higher rates. Table 2 shows that the samples are fairly similar with regard to age, proportions of female patients, marital status and employment status. Educational levels are reported to

be equal to or higher than those in the general population at the time (Gerdner, 1988; Parmander & Allebeck, 1992). In the study of compulsory treatment, employment levels are lower than those among the general membership at the time, and this sample also has poorer social stability in terms of marital status than the other samples (Gerdner, 1988).

The proportions of referrals from the social services range between 40 and 79 percent in the different samples, employer referrals between 12-36%, and private referrals range between 1-23%. In all studies, the large majority of patients (63-73%) use alcohol only at intake. Follow-up periods range between 10 and 48 months, and abstinence rates fall between 13-55% (Table 1), with higher rates when only treatment and/or follow-up completers are taken into account. Cross-tabulations commonly indicate worse drinking outcomes among younger individuals, better outcomes among those employed or married, and among AA attenders. Clearly, the diverse sample profiles and study methodologies render crude between-study comparisons of abstinence rates and other outcomes impossible. The study on outcome prediction by Gerdner et al. (1996), which is of relevance for Paper I of the present thesis, will be discussed in more detail in Section 4.1.

2 OBJECTIVES

The general objectives of this project were to study post-treatment substance use and functioning in important life domains, and factors enhancing respectively hampering favorable substance use outcomes, in a Swedish Minnesota model sample.

3 MATERIALS AND METHODS

3.1 DESIGN AND PROCEDURES

The data used in the four papers in this thesis were derived from the same dataset, collected during three 7-month periods between April 2002 and November 2004, employing a prospective single group study design. Before onset, the study was approved by the research ethical committee at Karolinska Institute (Dnr 02-128). Two-hundred and seventy eight individuals admitted to Alfagruppens treatment program were consecutively approached and informed about the non-demanding conditions for study participation. Those who provided informed consent (n=244, 87.8%) were interviewed face-to-face under confidentiality during one of their first days of stay in treatment (mean=3.3, sd=1.48).

Of the 244 participants, 9 (3.7%) were outpatients in Stockholm (n=5) and Gothenburg (n=4) units, 168 (68.8%) presented at the residential unit in Jälla, 70 kilometres from Stockholm, and 67 (27.5%) at the Öjebyn unit, in a rural district in the northern part of Sweden. Interviews were structured and all data collection relied on participants' self-report. After the initial interview, one-hundred and eighty-three participants (75.0%) approved of later follow-up contacts and searches in the inpatient care register, while 60 participants (24.6%) approved of follow-up contacts only. One person did not consent to either follow-up or register search after the initial interview, as he found it more cumbersome than he had initially thought. The baseline interviews lasted between 35-180 minutes, with a mean administration time of one hour and 32 minutes.

Twelve months (M=12.5, SD=0.60) and 24 months (M=24.4, SD=0.60) after the baseline assessment, 188 (77.0%) respectively 148 (61%) participants were re-interviewed. At the 12-month follow-up, 107 individuals (56.9%) were interviewed face-to-face and 81 (43.1%) over the telephone. The 12-month follow-up interviews lasted between 15-130 minutes, with a mean administration time of 56 minutes. At the 24-month follow-up, 20 (13.5%) were interviewed face-to-face and 128 (86.5%) over the telephone. One participant filled in the 2-year follow-up form on her own, following instructions from the present author, and returned it by mail. The 24-month follow-up interviews lasted between 10-75 minutes, with a mean administration time of 24 minutes. Participants were paid 100 SKR for participation in each follow-up interview.

The 244 baseline interviews were performed by the present author (n=170, 69.7%), by a person who intermittently worked with administrative duties in the Öjebyn unit (n=67, 27.5%), by two nurses in the Jälla unit (n=3, 1.2%), and one alcohol counselor in the outpatient unit in Gothenburg (n=4, 1.6%). The large majority of the 336 follow-up interviews were performed by the present author (n=317, 94.3%), and the remainder were

performed by the interviewer in the Öjebyn unit. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 12.0 for Windows.

3.2 SAMPLE CHARACTERISTICS

Table 3 shows the background characteristics of the initial sample. Because participants had been referred to treatment by the social welfare system (46.3%), employers (34.8%), the legal system (9.8%), public health insurance (1.2%), and 7.8% were private payers, the sample is more diverse than those of previous Minnesota model evaluations (Table 2, p. 17). Table 4 shows the problem severity of the sample in seven life domains, by source of referral. The majority of Jälla's patients came from Dalarna and the Mälardalen district, while the Öjebyn unit received patients from the surrounding northern parts of Sweden.

Consistent with much previous research, women reported significantly more family problems than men, while men reported more legal problems. Women also had significantly higher rates of harmful use of alcohol, and more often had a partner with problem use of alcohol or drugs. Compared to general population estimates during the baseline year provided by Statistics Sweden, the sample had higher unemployment rates (15% vs. 4%) (SCB, 2006a). With regard to educational levels, the proportion with elementary school only were slightly higher in the sample (25% vs. 19%), and university degrees were somewhat less frequent (24% vs. 31%) in the sample, compared to the general population (SCB, 2006b).

Comparing a sub-sample of alcohol-only problem drinkers in the present sample (n=190), to problem drinkers in the general population and public addiction care reported for by Storbjörk & Room (submitted), the present sample was found to hold a middle position with respect to educational levels (elementary school only: 23 vs. 15 and 32 percent, university degree: 28 vs. 46 and 23 percent, and marginalization (unemployment or institutionalization 17 vs. 3 and 33 percent). However, the problem drinkers in the present sample have a higher drinking severity (alcohol dependence 92 vs. 2 and 77 percent, weekly 5+ STD consumption 91 vs. 4 and 78 percent), than both the general population and public care samples. These differences might be due to that the present sample was entering inpatient care, while the public care data reported for by Storbjörk & Room were gathered in both inpatient and outpatient settings. Also, the fact that referring agents such as the social services might consider the abstinence goal of Minnesota model treatment as appropriate for clients with a more severe drinking problem, may have contributed to these differences.

Table 3. Background characteristics of initial sample.

Variable	Males (n=181)	Females (n=63)	Total (n=244)
Socio-demographics			
Age	43.0(11.1)	44.5(11.0)	43.4(11.0)
Married/cohabiting	35.9	38.1	36.5
Elementary school	27.6	19.0	25.4
Senior high-school	50.8	50.8	50.8
University degree	21.5	30.2	23.8
Homeless/social welfare housing	7.2	6.3	7.0
Living arrangements last 30 days			
Worked part or full-time	47.5	34.9	44.3
Sick-leave	23.2	31.7	25.4
Unemployed or vocational training	12.2	22.2	14.8
Retired	4.4	4.8	4.5
Institutionalized	8.8	0	6.6
Studying	1.7	3.2	2.0
Other	2.2	3.2	2.5
Substance use			
ICD-10 Alcohol dependence	81.8	90.5	84.0
ICD-10 Harmful use, alcohol	40.3*	58.7	45.1
ICD-10 Drug dependence	17.7	17.5	17.6
ICD-10 Harmful use, drugs	18.9	20.6	19.3
ASI-CS ^a Alcohol	.55(.28)	.61(.28)	.56 (.28)
ASI-CS Drugs	.05(.12)	.06(.13)	.05 (.12)
Problem severity ASI-CS^a			
Employment	.38(.33)	.43(.33)	.40 (.33)
Family	.21(.22)*	.29(.23)	.23 (.22)
Medical	.20(.33)	.24(.36)	.21 (.34)
Psychiatric	.21(.23)	.25(.22)	.22 (.23)
Legal	.11(.21)*	.04(.14)	.09 (.19)
Social variables			
Network with problem use	46.4	44.4	45.9
Partner with problem use	3.3***	22.2	8.2

Values are percentages, or means and (sd). ^aAddiction Severity Index Composite Scores.

ASI-CS range between 0.00-1.00; higher values denote higher problem severity.

* $p < .05$. *** $p < .001$, indicate significant gender differences.

Table 4. Problem severity at baseline by source of referral.

ASI-CS ^a	Social services (n=113)	Employers (n=85)	Legal system (n=24)	Public insurance (n=3)	Private payers (n=19)
Alcohol	.53(.29)**	.65(.22)	.37(.30)	.69(.22)	.60(.29)
Drug	.09(.15)***	.01(.15)	.06(.11)	.08(.13)	.05(.10)
Work	.48(.32)***	.23(.24)	.73(.27)	.27(.22)	.27(.33)
Family	.26(.24)	.19(.20)	.22(.18)	.64(.17)	.20(.22)
Medical	.23(.25)	.17(.30)	.31(.40)	.53(.46)	.15(.30)
Psychiatric	.25(.24)**	.16(.20)	.26(.24)	.52(.10)	.18(.22)
Legal	.13(.24)***	.04(.12)	.15(.19)	.10(.17)	.02(.09)

^aAddiction Severity Index Composite Scores.

ASI-CS range between 0.00-1.00; higher values denote higher problem severity.

3.3 STUDY ATTRITION

The 34 patients who rejected study participation were 21 men and 13 women, of whom 26 (76.5%) had come to treatment because of an alcohol problem, and 8 (23.5%) because of a drug problem. Fourteen (41.2%) were in the age interval 51-60 years, 8 (23.5%) were 41-50 years old, 8 (23.5%) were 31-40 years old, and four individuals (12%), were 21-30 years old. In sum, non- participants resembled the study sample with regard to sex and substances used, but were slightly older.

Among the 96 study participants who were lost to attrition over the 2-year period, 64 did not respond to repeated contact attempts, 24 did not agree to interview at follow-up contacts, and 8 (3.3%) had died. In this moment, which is four years after termination of the baseline interviews, an additional four individuals are known to be deceased.

In preparation of Paper I-IV, it became apparent that those lost to attrition were more disadvantaged than the follow-up completers in several aspects. With regard to the 1-year follow-up, the non-completers were less likely than the completers to be employed ($X^2_{(1)}=11.39$; $p < .01$), more likely to have injected illicit drugs during the last year ($X^2_{(1)}=18.15$; $p < .001$), to predominantly have a social network with problem use of alcohol or drugs ($X^2_{(1)}=10.91$; $p < .01$), and to be on probation at intake ($X^2_{(1)}= 5.15$; $p < .05$). Similarly, the 40 individuals lost between the 1st and 2nd follow-up had significantly more legal problems at the 1-year follow-up had the 2nd year completers ($Z=2.61$, $p < .01$), and they also had more alcohol problems ($Z=3.05$, $p < .01$), drug problems ($Z=3.35$, $p < .01$), and employment problems ($Z = 2.17$, $p < .05$). In sum, the non-completers were more encumbered than the completers with factors associated with poor outcomes.

3.4 TREATMENT STRUCTURE, CONTENTS AND RETENTION

The initial inpatient episode lasted 28-35 days, with each workday comprising a morning meditation, two 60-90 minute counselor-led therapy sessions in gender-specific groups, practical assignments, two lectures, and one peer group session. Each patient also attended 2-3 AA or NA meetings per week. Except for that social workers and psychologists were not part of staff, and that recreational activities other than walking and restricted opportunities for TV watching were unavailable, the treatment comprised the characteristics of Minnesota model treatment described by Cook (1988, see section 1.5.2 of this thesis). The majority (86.4 %) of unit counselors were 12-step recovering addicts and/or alcoholics. The administration of a short version of the Understanding of Substance Use Scale, indicated that compared to the norm values provided by Humphreys et al. (1996), the program counselors (n=22) had about the same degree of disease model beliefs (mean=19.8, sd=5.83 vs. mean=19.1, sd=6.00), noticeably less psychosocial learning beliefs (mean=8.8, sd=2.83 vs. mean=12.3, sd=3.90), and noticeably more eclectic orientation beliefs (mean=16.5, sd=3.49 vs. mean=12.1, sd=4.70). The initial treatment episode was completed by 227 (93%) and aborted by 17 (7%) of the 244 study participants.

The ordinary 11-month long aftercare adhered to 12-step principles and did not include structured homework or assignments. During the aftercare period, one AA/NA meeting per week was mandatory, but a higher attendance was strongly encouraged. In the case of relapse, patients were suspended for a period of 4 weeks, after which they could return to aftercare if they were not still drinking or using drugs. Among the 188 participants in the 1-year follow-up sample, 29 (15.4%) had proceeded to a stay in a half-way house after the initial treatment episode. In analyses, all participants who had completed their aftercare (whether it was the ordinary aftercare, or the half-way house stay), were treated as aftercare completers. Aftercare was completed by 121 (64.4%) of the 188 individuals in the 12-month follow-up sample, and among the 67 individuals (35.6%) who were coded as non-completers, 8 never started aftercare.

3.5 MEASURES

The interview form used in this study was originally constructed for the large-scale project “Women and men in Swedish addiction treatment”, run by the Centre for Social Research on Alcohol and Drugs (SoRAD) at Stockholm University between 2000-2002 (Room et al., 2003). The variables used in Paper I-IV, and two additional measures on AA affiliation and readiness to change, are described below.

Prior to study onset, the present author studied the manual of the Addiction Severity Index (ASI), the interviewer’s handbook created by SoRAD, and had contacts with SoRAD staff to

learn about interview administration. Interviews were practiced informally with friends acting as respondents. The interviewers met for a 1.5 day's training in administration of interviews, which was headed by the present author. After study onset, a regular contact was upheld with the interviewer in the Öjebyn unit.

Demographic variables. Client age (continuous), sex (male/female), civil status (married or cohabiting/single), having children (yes/no), owned or rented accommodation (yes/no), and education (more than 2 years of high school vs. not). Also, referring agent (social services/employer/legal system) was included.

Addiction Severity Index. The composite scores (CS) of the Addiction Severity Index (ASI; McLellan et al., 1980; McLellan et al., 1992) assesses problem severity within alcohol use, drug use, employment, family/social, medical, psychiatric and legal life domains during the last 30 days. The score range is 0.00-1.00, with higher values denoting higher severity. High internal consistency coefficients have been regularly reported for the alcohol, medical and psychiatric composite scores, while some studies have reported lower coefficients for the four remaining domains (Mäkelä, 2004). Short-term test-retest reliabilities of the ASI severity ratings were equal to or above 0.92 for all domains in early studies (McLellan et al., 1985), while later studies have indicated unsatisfactory coefficients in patients with homelessness or high psychiatric severity (Mäkelä, 2004).

Dependence and harmful use. The Composite International Diagnostic Interview (CIDI; WHO, 1994) was used for the AUD classifications. The CIDI is a structured interview based on the ICD-10 (WHO, 1992), which can be administered by non-clinicians. The test-retest reliability for CIDI lifetime alcohol dependence is very good (.75), and fair for harmful use (0.60), and reliability is known to be higher for the 12-month prevalence measures. For lifetime drug dependence and drug abuse, reliability coefficients for different substances range between .48 and .80 respectively .41 and .72. The concordance between CIDI and other diagnostic instruments is good for alcohol (.64-.69) and opiate dependence (.68 -.70), but poorer for other types of dependence, as for harmful use and abuse (Üstün et al., 1997).

Substance Related Harm. The experience of alcohol related harm in five life areas: friendship and social life, physical health, home life or marriage, work, studies, employment, and financial situation. Items were phrased "During the last 12 months, was there ever a time that you felt your alcohol use had a harmful effect on your [life area]? Response options are yes/no, generating a total score range of 0-5. For this harm scale, internal consistencies of .64 for women and .72 for men have been reported for current drinkers in general populations. The concordance with ICD-10 alcohol dependence symptoms is high (r 's > .64) (Rehm et al., 1999).

Alcohol Consumption. Alcohol consumption was measured with a graduated quantity frequency (GF) measure, tapping the frequency during the last 12 months with which the

respondent consumed at least 1, 5 and 12 standard drinks (STD), with a 12 gram ethanol contents. Examples of quantity were given for each beverage type, and the beverages were combined into a total number of STD. Consumption frequency was reported on an 8-interval scale: Not at all, 1-5 times per year, 6-11 times per year, once a month, 2-3 times per month, 1-2 times per week, 3-6 times per week and daily. The measurement of alcohol consumption is susceptible to several sources of bias, induced by for example memory deficits, social desirability factors, and unclear or complex items. The GF approaches represent one useful way to capture drinking patterns as well as volume, and are considered the state of the art in several aspects (Greenfield, 2000; Dawson & Room, 2000).

Treatment history. Previous treatment or support for alcohol or drug problems within emergency-admitted inpatient addiction care, non-emergency inpatient addiction care, other types of inpatient care, outpatient addiction treatment, home-visits from mobile teams within psychiatric care, methadone maintenance programs, inpatient psychiatric care, outpatient psychiatric care, other types of outpatient care, private care, intensive respectively non-intensive outpatient care within the social services, treatment centres, housing assistance, vocational training, compulsory care, treatment or support during imprisonment or when on probation, support from mutual help groups such as AA, NA or the Links, and other interventions (score range 0-20). Also, a pre-treatment AA experience was used as a dichotomous measure (Yes/No).

Drinking history. Age for problem drinking onset, and number of years of problem drinking.

Motivational variables. Motivation/readiness for change of drinking was measured with a Swedish translation of the Readiness to Change Questionnaire (Rollnick et al., 1992), based on the stages of change model by Prochaska & DiClemente (1986). The Swedish version has shown to be satisfactory in terms of test-retest reliability and construct validity, but to have poor predictive validity (Forsberg et al., 2004).

The second measure tapping motivational aspects was a question on treatment goal, with four response options: "Which of the following describe best what you would like to get from treatment regarding your drinking?" a) I want to completely stop drinking, b) I want to reduce or gain control over my drinking, c) I want to eliminate the problems that my drinking causes, irrespective of if I change my drinking or not, and d) I do not need to change my drinking. The stated goal to abstain has been found to be predictive of outcomes when used by Weisner et al. (2003).

Social variables. Number of close friends (continuous), having a spouse respectively social network with problem use of alcohol or drugs (yes/no for both), civil status during the last 3 years (single/not single).

Treatment retention. Completion of index episode (yes/no), completion of program aftercare

(yes/no), number of aftercare sessions (0-44).

Satisfaction with treatment. Overall satisfaction with treatment was measured at the 1-year follow-up on a 5 point scale, with higher values denoting higher satisfaction.

Public addiction care contacts during follow-up periods. Contacts initiated with the primary care, other general health care, specialized addiction care, psychiatric care or social services during the follow-up periods, which generated a score range of 0-5.

AA affiliation. The Alcoholics Anonymous Affiliation Scale (AAAS; Humphreys et al., 1998) is a 9-item scale tapping AA meeting attendance and behavioral indicators of AA affiliation, and was administered at the follow-ups. The seven behavioral indicators are coded yes = 1 and no =0, and include 1) ever considered oneself a member of AA, 2) ever called an AA member for help, 3) has an AA sponsor at present, 4) ever sponsored anyone in AA, 5) had a spiritual awakening through ones involvement with AA, 6) read AA literature in the last 12 months, and 7) has done service such as helped newcomers, setting up chairs, making coffee, cleaning up after a meeting, etc., in the last 12 months. Because the aim was to capture affiliation during a follow-up period of one year, items 1, 2 and 5 were rephrased to capture the last 12 months. Lifetime and past-year AA meeting attendance is coded as 0 for 0 meetings, .25 for 1-30 meetings, .50 for 31-90 meetings, .75 for 91-500 meetings, and 1.00 for more than 500 meetings. Altogether attendance and behaviors generate a score range of 0-9, where 0 denotes no AA affiliation and 9 the highest possible affiliation. The AAAS has high internal consistency with Cronbach's alphas of 0.84-0.85 in treated and untreated U.S. samples (Humphreys et al., 1998). The scale was cross-translated to Swedish by the present author and Dr Terry Hartig at the Institute for Housing and Urban Research, Uppsala University, who has English as his native tongue.

4 BACKGROUND TO THE INDIVIDUAL PAPERS

4.1 PAPER I

As previously noted, a high drinking severity is one of the more prominent predictors of continued problem drinking after treatment, and it is also more commonly followed by an abstinent recovery path, than by social or non-problem drinking, in treated as well as untreated individuals (*e.g.* Dawson et al., 2005; Miller et al. 1992; Vaillant, 1995). However, in their long-term follow-up of 60 males who had been classified as alcohol dependent on admission to treatment within hospital-based psychiatric care, Nordström & Berglund (1987) found that abstainers and social drinkers had similar drinking severity scores at baseline. Other factors that have been identified as discriminating between abstinence and non-problem drinking outcomes are a lower post-treatment AA attendance, and rejection of abstinence as treatment goal, in the latter group (Miller et al., 1992).

Gerdner et al. (1996) studied predictors of abstinent and non-abstinent drinking outcomes among voluntarily (n=89) and compulsorily (n=32) treated individuals in a public Swedish Minnesota model setting. The mean time for follow-up was 10 months. Results from multivariate analyses indicated that self-help group participation and first-time admission to treatment increased the likelihood of non-abstinent improvements in drinking. The likelihood of abstinence increased with “having a family”, and decreased with the reply time (*i.e.* the time elapsed before the questionnaire was returned). Coercion to treatment was unrelated to drinking outcomes.

To the author’s knowledge, a prospective study of factors differentiating between different outcomes has not been performed in a Minnesota model treatment sample. Against this background, the main objective of Paper I was to study factors distinguishing participants who had experienced continuous abstinence, non-problem drinking and problem drinking during their first year after treatment. Because of research suggesting that pre-treatment, treatment and post-treatment variables contribute to outcomes to different degrees, a second aim was to estimate the variance in outcome, explained by these variable types. In accordance with their 12-month follow-up self reports, participants were coded as continuous abstainers (n=76), non-problem drinkers (n=51) and problem drinkers (n=49). Abstainers were participants who reported no alcohol or drug use since discharge. Non-problem drinkers did not meet ICD-10 criteria for alcohol dependence, and they reported consuming ≥ 12 STD no more than 6-11 times during the follow-up year. Participants who met criteria for alcohol dependence, and reported a co-occurrence of ≥ 12 STD drinking were coded as problem drinkers. Bivariate and multivariate logistic regression analyses were performed, using the three pair-wise contrasts as dependent variables, to identify factors distinguishing the three

outcome groups.

4.2 PAPER II

That early substance use outcomes are predictive of longer-term outcomes has been shown in several studies (*e.g.* Miller et al., 1992), but few have investigated this issue in relatively well adjusted treatment samples. One Swedish study of 50 socially stable alcoholics showed that positive as well as negative drinking outcomes between the 2-year and 6-year follow-ups were highly stable; 80% of the patients who had favorable drinking outcomes during the first 2 years had positive outcomes also 3-6 years after treatment, and the corresponding figure for unfavorable outcomes was 72% (Öjehagen et al., 1994). All other variables measured, such as initial patient characteristics and employment and marital status at the 2-year follow-up, were unrelated to longer term outcomes.

Weisner et al. (2003) investigated the importance of individual, treatment and extra-treatment characteristics for longer term substance use outcomes in a private managed care sample in abstinence based treatment (n=784). Results indicated that abstinence at 6 months was the strongest predictor of abstinence at 5 years, and also AA attendance at 6-months and a baseline treatment goal of abstinence, predicted longer term status. Treatment intensity and length of stay were not associated with 5-year outcomes. Aside from this study, the relationships between shorter- and longer term outcomes in private abstinence oriented treatments have not been investigated. The aim of Paper II was to identify predictors of continuous abstinence during the 2nd year after treatment, while adopting the conceptual framework including individual, treatment and extra-treatment characteristics used by Weisner et al. (2003), and with data collected at the 1st year follow-up, as an additional predictor variable category.

The 55 participants who reported no alcohol or drug use during their 2nd year after treatment were coded as abstainers, while those who reported any drinking or drug use (n=93), and those who were lost to attrition between the 1st and 2nd follow-up interview (n=40), were coded as non-abstainers. Statistical analyses followed the same scheme as in Paper I, hence bivariate and multivariate logistic regression models were used to predict continuous abstinence during the 2nd year.

4.3 PAPER III

It is well known today that individuals and samples in treatment studies vary considerably in their problem severities in secondary domains (Delucchi & Bostrom, 2004), and the correlations with drinking severity are often modest (McLellan et al., 1981; Babor et al., 2003b). At the same time, individuals with favorable substance use outcomes are known to make greater improvements in secondary domains than those with poorer substance use

outcomes. Thus, as noted by Babor et al., (2003b), research has to date provided limited support for what has been referred to as a unitary, as well as for a multidimensional, view of alcoholism. After controlling for baseline severity among Project MATCH participants, Babor et al. (2003b) found that the higher the alcohol consumption after treatment, the less improvement was seen in social functioning, depression, alcohol-related consequences and days working. The study of the natural history of alcoholism has suggested that over the long term, abstinence or return to asymptomatic drinking is no guarantee for psychosocial recovery, but that heavy drinking renders such recovery impossible (Vaillant, 1995, p.383).

Paper III had two objectives. The first was to report on changes in secondary outcome domains between the baseline and 1-year follow-up assessments, on a group and individual level. With regard to individual change, the Reliable Change Index (RCI; Jacobson and Truax, 1991) was used to determine the proportions of individuals who had experienced a statistically reliable change. The second aim was to examine the support for a unitary versus a multidimensional model of alcoholism in the study sample. Correlations between the primary and secondary domains at baseline and at follow-up were investigated, and the 1st year status among abstainers, non-problem drinkers and problem drinkers were compared, adjusting for their baseline severity.

4.4 PAPER IV

Affiliation with Alcoholics Anonymous during and after treatment has quite consistently been associated with favorable drinking outcomes (Tonigan et al., 2003), and some research suggests that the engagement in AA specific behaviors (*e.g.* calling another AA member, working the 12 steps, and experiencing a spiritual awakening), bear more importance for beneficial outcomes than meeting attendance alone (Montgomery et al., 1995). Referring to social psychological research, Beckman (1993) has suggested that in spite of the AA organization as a whole being male-oriented, many of these AA specific behaviors may be more readily endorsed by women than by men. Research findings lending support to this assumption are that spirituality is more strongly related to life contentment for AA women than for AA men (Poage et al., 2004), and the higher degrees of religiosity and spirituality found among women in the general population (Kendler et al., 2003) and in treatment samples (Green et al., 2004). Previous studies incorporating gender aspects of post-treatment affiliation with Alcoholics Anonymous have focused on meeting attendance, disregarding behavioral indicators of affiliation. Also, though factors associated with post-treatment AA affiliation are well-documented (*e.g.* Emrick et al., 1993), these studies have not been gender specific. Against this background, the aims of Paper IV were to describe meeting attendance and behavioral engagement in AA, and to identify predictors of high AA affiliation, among men and women during their first year after treatment.

5 MAIN FINDINGS

5.1 PAPER I

In the final multivariate model in the contrast between the two favorable outcomes, the likelihood of abstinence increased by three times with the endorsement of a baseline treatment goal of abstinence (OR=2.97, 95% CI 1.18-7.45), and with post-treatment AA/NA affiliation (OR=1.23, 95% CI 1.02-1.50). The two groups were similar in psychiatric severity and alcohol and drug dependence severity at baseline. In this contrast, baseline variables and follow-up variables accounted for approximately the same amount of variance in outcome (13% and 15%), while treatment variables explained only 7%. The final model accounted for a relatively modest 25% of variance.

In the final multivariate models between problem drinking and the favorable outcomes, baseline dependence severity was still negatively predictive of non-problem drinking, but made no difference between abstainers and problem drinkers. The completion of program aftercare increased the likelihood of abstinence by 7 times and of non-problem drinking by 3 times, when contrasted with problem drinking. Problem drinkers were also distinguished by their lower satisfaction with treatment, and by having been in more public addiction care contacts during the follow-up period. While baseline client characteristics accounted for the most variance in the contrast between non-problem drinkers and problem drinkers (26%), treatment variables accounted for the most in the abstinence vs. problem drinking contrast (56%).

5.2 PAPER II

In the final multivariate model, which accounted for 47% of the variance in outcome, 1st year dependence severity, AA affiliation, and satisfaction with treatment were significantly predictive of continuous abstinence during the 2nd year. Few baseline variables were associated with, and baseline dependence severity was unrelated to, 2nd year outcomes. The multivariate models including treatment variables and variables describing 1st year status, each accounted for 25% and 36% of outcome variance. The number of aftercare sessions completed during the 1st year lost its predictive ability when adjusted for satisfaction with treatment and treatment site.

5.3 PAPER III

With respect to group means, a significant decrease ($p < .001$) in problem severity was observed for the alcohol, drug, family, psychiatric and legal domains of the ASI. In the

employment and medical domains, severity was slightly but non-significantly higher at the 1-year follow-up. With regard to the proportion of individuals who had experienced a statistically reliable improvement as measured by the RCI, and when taking into account only cases with a baseline severity that actually allowed for such an improvement to occur, rates were 24.8% (employment), 43.2% (medical), 47.7% (family), 62.5% (psychiatric), 85.8% (alcohol), 88.5% (legal), and 92.9% (drugs).

With regard to the relationships between drinking outcomes and secondary outcomes, analyses revealed generally weak relationships between the ASI alcohol composite and secondary domains at baseline as well as at follow-up. However, problem levels in employment, family and psychiatric problems were significantly higher among the problem drinkers than among non-problem drinkers and abstainers, after adjusting for the baseline severities in the alcohol and target domain. There were no differences between abstainers and non-problem drinkers in any domain at baseline or follow-up.

5.4 PAPER IV

While no gender differences were found for meeting attendance, a significantly higher proportion of the women reported that they had called an AA member for help, experienced a spiritual awakening, and read AA literature during the follow-up year. Though the differences were statistically significant only for these three behaviors, women reported higher frequencies than men for all seven behaviors measured. Bivariate logistic regression analyses identified a treatment goal of abstinence as predictive of high affiliation for both sexes, and in a multivariate context which included both sexes, being female, a treatment goal of abstinence, and a pre-treatment exposure to AA were significant predictors of high post-treatment affiliation.

6 DISCUSSION

6.1 PAPER I

Consistent with the long-term follow-up of behavioral self-control training by Miller et al. (1992), the abstainers in this sample were more likely than the non-problem drinkers to have endorsed abstinence as treatment goal at baseline, and they maintained an abstinence oriented (AA) approach to a higher degree after treatment. Thus, the bivariate relationships between AA attendance and abstinence observed in several of the previous Swedish Minnesota model evaluations, were found to prevail also in multivariate analyses. However, unlike Miller et al. (1992), but consistent with Nordström & Berglund (1987), the abstainers and non-problem drinkers had similar dependence severity levels at baseline (mean=4.3, sd=1.76 vs. mean=4.1, sd=1.70). Considering that higher severity commonly predicts abstinent recovery, one would expect the abstainers to have a more serious drinking problem from the start.

One factor that might have contributed to the results is that the limits for non-problem drinking, which allowed two dependence criteria to be met and ≤ 12 STD drinking nearly once a month, are liberal when compared to those used in previous studies. When the stricter definition for non-problem drinking by Miller et al. (1992) was adopted (=no signs of abuse or dependence), baseline dependence severity *was* significantly higher among the abstainers than among the 29 more stringently defined non-problem drinkers ($Z = -2.27$, $p < .05$), and predictive of abstinence in bivariate analysis (OR=1.27, 95% CI 1.02-1.60, $p < .05$). However, when abstinence as treatment goal and AA affiliation were added to the model, dependence severity lost its' predictive ability. This finding was most likely explained by that dependence severity was significantly correlated with treatment goal, those with a goal of abstinence had a higher severity than those with other goals (mean=4.83, sd=1.39 vs. mean=3.23, sd=2.06, $Z = -6.11$, $p < .001$, Mann-Whitney U test). In conclusion, with a stricter definition of non-problem drinking, abstainers had higher severity levels at baseline, but treatment goal and AA affiliation remained the only significant predictors in the multivariate context.

A paramount drawback of the procedure to define groups by the presence of alcohol dependence as well as consumption measures, was that 13 individuals in the follow-up sample were excluded from analyses. When the predictor variables in the final multivariate models instead were regressed upon contrasts including abstainers (n=76), non-dependent drinkers (n=62), and dependent drinkers (n=50), thus accounting for the entire follow-up sample, the majority of variables previously identified retained their predictive ability. One exception was that satisfaction with treatment no longer distinguished problem drinkers (*i.e.* the dependent drinkers) from the non-dependent and abstinent participants. This variable was a strong predictor when the 12+ STD measure was included to define problem drinking. A possible interpretation is that the most severely afflicted dependent problem drinkers (those

with dependence and $\leq 12+\text{STD}$), were most dissatisfied with treatment. Also, the completion of aftercare no longer made a difference between the problem and non-problem drinkers (*i.e.* the dependent and non-dependent drinkers), but only between the problem drinkers and the abstainers. This suggests that the association between aftercare and outcomes reflects a reversed causal relationship (*any* drinking led to suspension and a lower likelihood of returning for completion of aftercare), and not only that aftercare improves outcomes. Results of Paper I also raise the important question of whether the experience of being suspended also may have contributed to subsequent problem drinking. Since problem drinkers had the highest dependence severity at treatment entry, the suspension practice may actually have led to the rejection of the individuals who were most in need of external support after the primary treatment episode. If we – as is quite common in the addiction treatment literature – assume a positive effect between aftercare retention and improved outcomes, efforts should rather be made to keep these individuals in treatment.

It is important to note that the recurrent finding that severe alcohol problems in clinical samples often have the character of a vicious cycle, is not generalizable to problem drinkers in the general population, for whom remission is more likely, also in the absence of any treatment. The "two worlds" perspective on alcohol problems suggests that general statements about the reversible character of the alcohol dependence syndrome, as well as about its inevitable progression, should be avoided. Rather, the circumstances under which reversion and progression are most likely to occur, need specification.

6.2 PAPER II

The finding that participant's drinking severity during the 1st year was the strongest predictor of 2nd year outcomes, is consistent with previous research suggesting a relatively high stability of drinking outcomes over time, and that the first time after treatment is a somewhat crucial phase. At the same time, it is well known that abstinence rates decline over time, and a period of 2 years might not be sufficient to claim that outcomes are stable. In a re-analysis of data from a previously reported 8-year follow-up of 100 detoxification patients (Vaillant et al., 1983), 45% of 33 patients were found to have relapsed after 2 years of abstinence, 9% relapsed after 5 years, while none relapsed after 6 years of abstinence (Vaillant et al., 1996).

As in the study by Öjehagen et al. (1994), baseline variables were not directly related to the longer-term outcomes. In the light of that baseline dependence severity was a strong predictor of 1st year drinking outcomes – which in turn was the strongest predictor of 2nd year outcomes - this finding is not easily understood. Likewise, program aftercare during the 1st year did not remain predictive of 2nd year outcomes in the multivariate analyses, but the relationship between aftercare and 1st year outcomes, suggest that this variable might be of importance in a more indirect way. The results on AA affiliation are corroborated by previous research

showing that AA affiliation at one point in time may increase the likelihood of positive outcomes at later follow-ups (*e.g.* Weisner et al., 2003). Finally, findings suggest that satisfaction with treatment, its' complexity disregarded, might be of importance also for longer term outcomes.

6.3 PAPER III

Though Swedish ASI norms for the general population are unavailable, U.S. norms indicate that the general population and clinical samples have similar levels of employment and medical problems, while the clinical groups have a poorer functioning in remaining ASI domains (Weisner et al., 2000). Thus, the fact that no change was observed in the medical and employment domains in the present study sample, might reflect a non-clinical functioning in these areas from the start. Such a state of affairs would also make these two domains less susceptible to a statistical regression towards the mean (RToM), than the other domains. Though the use of the Reliable Change Index in this study takes the test-retest reliability of the measure into account, it does not address RtoM in other respects.

With regard to the relationships between drinking outcomes and secondary outcomes, this study adds to previous research lending some support for both a unitary as well as a multidimensional perspective on alcoholism. The correlations between the ASI alcohol composite and secondary domains were generally weak at baseline as well as at follow-up ($r_s < .30$). At the same time, those who experienced problem drinking (in this study, those with alcohol dependence and binges of 12 STD), had significantly poorer secondary outcomes than the abstainers and non-problem drinkers. Because there were no group differences between the two favorable outcome groups, a unitary conception of alcoholism in this sample seems to be more evident as a relationship between alcohol dependent drinking and poor secondary outcomes, than as a relationship between abstinence and secondary outcome improvements. These findings fit well with the conclusion by Vaillant on the topic of drinking and psychosocial adjustment: "The lesson of this (chapter) is not that abstinence is good, but that uncontrolled, symptomatic abuse of alcohol is painful." (1995, p. 277).

6.4 PAPER IV

One explanation to the higher AA engagement found among the women, borrows from a model on gender and socialization processes, suggesting that women to a higher degree than men define themselves by, and take actions to develop and maintain, close relationships to others (Cross & Madson, 1997). As suggested by Beckman (1993), such differences may facilitate for women to affiliate with AA, where relationships with a high level of emotional self-disclosure (*e.g.* in relationships with AA- sponsors), are encouraged.

Considering research showing that these AA related behaviors are of stronger importance for favorable drinking outcomes than AA attendance alone (Montgomery et al., 1995), these findings might help explain what has been referred to as the “gender paradox” of addiction treatment. This concept aims to capture the finding that women who enter addiction treatment often report more sexual and physical abuse, psychiatric problems, and social and family problems than the men, and at the same time have comparable or even slightly better substance use outcomes (Fiorentine et al., 1997). Investigating this issue in a drug treatment sample, the authors found support for that the paradox partly could be explained by the women’s higher engagement in group counselling. It is possible that the higher AA involvement among women, as suggested by this study, might be another explanatory factor for the gender paradox, but this issue requires further research.

Aside from being female, a treatment goal of abstinence and pre-treatment AA attendance also predicted high affiliation. Since “a desire to stop drinking” is the only requirement for AA membership (Alcoholics Anonymous, 1953), these results are hardly surprising. The findings also depict a group of individuals who have selected themselves for treatment because of a prior knowledge of AA. Such a group provides a sharp contrast to the individuals coerced to Minnesota model treatment in the study by Gerdner et al. (1996), who were less likely to attend AA after treatment, than were voluntarily admitted patients. The present findings make a complement to those of Gerdner et al. (1996), in this sense.

6.5 AA AFFILIATION AND TREATMENT SITE REVISITED

In the 1-year follow-up sample of 188 individuals, 111 (59%) had attended AA before they entered treatment, while a significantly higher proportion had been to AA after the initial treatment episode (185, 98.4%). The high post-treatment rates are not surprising given that AA was a mandatory part of aftercare. During the second year, *i.e.* after termination of aftercare, 106 participants (71.6% of the 2nd year follow-up sample, 56.4% of the 1st year follow-up sample), had attended AA. Compared to the AAAS norms for a diverse treatment seeking population provided by Humphreys et al. (1998), the mean post-treatment AA affiliation of the present sample was higher both for men (3.70 *vs.* 3.03) and women (4.56 *vs.* 2.89), and there was a reduced spread of scores around the means as well. However, the comparisons are hampered by the facts that the norms describe U. S. conditions, and they also represent values obtained at treatment entry. Unfortunately, the AAAS was used only at the follow-up assessments in the present study.

The significant relationship between treatment site (Jälla/Öjebyn) and drinking outcomes also deserves a special comment, even though this variable did not come through in the final models of Papers I and II. To investigate which other variables would reduce or eliminate this

relationship, treatment site was first regressed upon the contrast between the two favorable outcome groups (abstainers + non-dependent drinkers) vs. the dependent drinkers, thus including the entire 12-month follow-up sample in analyses. Subsequently, other central variables investigated in Paper I were added to the model, one at a time. Only one of these, the completion of aftercare, reduced the relationship between treatment site and outcomes to non-significant levels ($p < .07$). This might suggest that the outcome differences between the two sites were related, at least partly, to between-site differences regarding the completion of aftercare.

6.6 ABSTINENCE AND REMISSION RATES

Paper I indicated that 76 individuals had abstained continuously from alcohol and drugs during the 1st year, corresponding to 31% of the baseline sample ($n=244$), and 40% of the 1-year follow-up sample ($n=188$). The more conservative figure of 31% resembles the 1-year rates of 34% and 37%, derived from larger single-group evaluations of private residential Minnesota model treatment in the U.S., treating those lost to attrition as non-abstainers in analyses (Hoffmann & Miller, 1992; Stinchfield & Owen, 1998). In the large non-randomized study of a less advantaged sample of male veterans by Ouimette et al. (1997), 25.5% of those in the 12-step treatment condition were reported to be abstinent at the 1-year follow-up. Considering 2-year rates in the present sample, 47 individuals had continuously abstained during both years, corresponding to 19% of the baseline sample and 32% of the follow-up sample.

Though not addressed in any of the papers, remission rates should be noted here. Table 5 shows the status of the participants at the 1-year follow-up (full remission, partial remission, still dependent), by their dependence diagnoses at baseline. Altogether 132 (106+26) of 188 individuals (70.2%) were fully or partially remitted (*i.e.* improved) at the 1-year follow-up, while 56 (29.8%) were still dependent. Excluding the 14 participants who were not classified as dependent at baseline, and thus could not be considered “remitted” in the real sense, 119 of 174 individuals (68.4%) were completely or partially remitted (*i.e.* improved). These remission rates are comparable to those found in a NESARC subsample of 4422 prior-to past year alcohol dependent individuals identified in the general U.S. population, among which 75% were in full or partial remission, and 25% were still dependent, during the following year (Dawson et al., 2005). Among those in full remission in the present sample, 59 in the AD group, 6 in the DD group, 4 in the AD+DD group, and 7 in the No AD or DD group, were abstainers (not shown in table).

Table 5. One-year follow-up status by dependence diagnosis at baseline

Baseline status	Status at 1-year follow-up			n
	Full remission ^a	Partial remission ^b	Still dependent ^c	
Alcohol Dependence (AD)	79	24	43	146
Drug Dependence (DD)	8	0	6	14
AD + DD ^d	7	1	6	
AD + DD ^e	7	3	4	14
No AD or DD ^{d,f}	12	1	1	
No AD or DD ^{e,f}	14	0	0	14
Total n ^g	106	26	56	188
% of follow-up sample ^g	56.4	13.8	29.8	100

^a 0 dependence criteria are met. ^b 1-2 dependence criteria are met. ^c 3 or more dependence criteria are met. ^d Row entrances reflect AD. ^e Row entrances reflect DD. ^f 3 individuals met criteria for alcohol abuse. ^g Column summations are based on row entrances that reflect AD.

6.7 GENERAL METHODOLOGICAL CONSIDERATIONS

6.7.1 Design limitations

This project employed a single group design, which was chosen due to practical, ethical and cost-related concerns of the treatment provider. Though this certainly is an improvement compared to previous evaluations in Swedish Minnesota model settings, it precludes the attribution of outcomes to the treatment received. Prominent threats to internal validity, such as statistical regression to the mean and maturation, are likely to account for a non-negligible part of the pre- to post-treatment improvements. Several researchers have also noted that similar to other illnesses with a chronic and fluctuating course, treatment for alcoholism is usually sought in times of hardship and distress, and post-treatment improvements may partly be viewed as the natural course of the disorder (Room, 1980; Vaillant et al., 1983).

6.7.2 Correlation and causality

The use of prospective designs introduces the logical fallacy known as “post hoc ergo propter hoc” – “after this, therefore because of this”. Though temporal antecedence and covariation are crucial to infer causality, the real causal factor may still be a third variable which affects both the predictor and the outcome, or a confounding factor. Among the more plausible problems in Papers I-IV is the probable confounding role of internal motivation and external pressures on AA affiliation and aftercare. It is somewhat ironic that the only requirement for AA membership – a desire to stop drinking – is considered merely as nuisance in statistical analyses. Also, the relationships between drinking outcomes and satisfaction with treatment

respectively aftercare completion, at least partly reflect reversed causality. Similarly, it is theoretically possible that the higher problem levels in secondary domains found among problem drinkers in Paper III, were causes rather than consequences of problem drinking.

6.7.3 The validity of self-reports

The correspondence between patient's self-reported alcohol consumption and actual consumption is likely to vary as a function of respondent and interviewer characteristics, task complexity and assessment type (Babor et al., 1990). For example, if interviews are perceived as non-threatening, confidential, and the interviewer manages to establish rapport with the respondent, validity is enhanced. In follow-up assessments, information is more likely to be accurate when interviewers are not affiliated with the treatment setting under study, and blind to the treatments received by patients (Finney et al., 2003). The investigation of the correspondence between self-reported, biological and collateral information in Project MATCH data, corroborated previous research suggesting that research volunteers generally leave accurate self-reports on drinking (Babor et al., 2000). That the correspondence between clients' self-reports and collaterals were higher at treatment entry than at the 15-month follow-up (97.1% vs. 84.7%), suggests that response bias and social desirability factors are more at work at follow-up assessments. However, the majority of discrepancies at follow up were due to clients' over-reporting rather than under-reporting (11.6% vs. 3.7%).

The present study relied exclusively on participant's self-reports. The use of collateral informants was considered, but was abandoned because the possible gains were not expected to outweigh the associated costs (an opinion supported by the findings by Babor et al., 2000). Factors which hopefully increased the accuracy of the self-reported data were the non-demanding conditions for participation, the confidentiality assured, and that efforts and adjustments were made to make the respondents feel comfortable during the interview. The fact that some respondents were followed-up by personal interviews and some by telephone, may have introduced some variation in the follow-up data. Research has shown that in general, telephone interviews yield slightly lower alcohol and drug use estimates than personal interviews (Rehm, 1998), while a more recent study found no differences between the two modes with respect to abstinence rates or volume measures (Greenfield et al., 2000).

6.7.4 Generalizability of findings

The findings are limited to private Minnesota model treatment in Sweden. Given the abstinence goal, referring agents are probably more likely to send individuals with certain characteristics, *e.g.* those who are more motivated for abstinence, those who would benefit the most from such an outcome, or those who are considered valued co-workers by their employers. Such selection factors make generalizations to public care settings impossible,

and also highlight the need for randomized controlled trials of the model. Because Alfgruppen, unlike the majority of other private Minnesota model agencies in Sweden, has a clearly diverse patient profile, outcome rates are less likely to be inflated or deflated by extreme values on measures of social stability. Considering the identification of predictor variables, the selective attrition of drug users between baseline and the 1-year follow-up, suggests that some important outcome predictors might have gone undetected, and that results cannot be generalized to all individuals who enter Alfgruppen's treatment. Finally, it should again be noted that results from treatment research can not be used as basis for statements about problem drinkers in the general population, who usually recover at higher rates, and often without professional help.

7 CONCLUSIONS

Though improvements can not with certainty be attributed to treatment, the tentative conclusions from this thesis may be summarized as follows:

- Participants who continuously abstained during the 1st year after treatment were more often motivated for abstinence at intake, and engaged more in AA and/or NA after treatment, than those with non-dependent drinking.
- Participants with non-dependent drinking during the 1st year had a lower dependence severity at intake, than those with dependent drinking.
- Participants who experienced dependent drinking during the 1st year were far less likely to complete program aftercare, and reported lower levels of satisfaction with treatment, than both abstainers and non-dependent drinkers.
- Favorable 1st year drinking outcomes, and higher AA affiliation and satisfaction with treatment during the first year, increased the likelihood of abstinence in the 2nd year.
- Significant improvements were observed in family relations, psychiatric and legal life domains between the baseline assessment and the one-year follow-up. In the employment and medical domains, no mean change was observed. On the individual level, these changes were reflected as a statistically reliable improvement among 24.8% of those with baseline employment problems, 43.2% of those with medical problems, 47.7% among those with family problems, 62.5% among those with psychiatric problems, and 88.5% among those with legal problems.
- Problem levels in employment, family and psychiatric domains were significantly higher among dependent drinkers than among non-dependent drinkers and abstainers at the one-year follow-up.
- Women were more likely to engage in AA after treatment than men, as were those with pre-treatment AA experience, and abstinence as treatment goal.
- The 1-year abstinence rates of 31%, which are derived from intention-to-treat analyses and based on the full baseline sample, resemble the corresponding one-year rates of 34% and 37% derived from larger evaluations of Minnesota model treatment in the U. S. Consistent with previous research, abstinence rates declined with time; 19% reported continuous abstinence two year after treatment.
- Among the 174 participants in the one-year follow-up sample who had met criteria for substance dependence at baseline, 119 (68.4%) were in full or partial remission (*i.e.* improved) at the one-year assessment.

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10 SAMMANFATTNING

Minnesotamodellen är en gruppbaserad psykosocial intervention för substansberoende som baseras på Anonyma Alkoholisters principer och tolvstegsprogram. Modellen introducerades i Sverige under 1983-84, och används för närvarande som huvudsaklig arbetsmetod vid 25% av landets missbruksenheter. Denna avhandling beskriver resultat från en programutvärdering av Minnesotamodellsbehandling i privat regi, där de generella målen var att studera alkohol- och drog användning samt fungerande i viktiga livsområden efter behandling, och de faktorer som ökar respektive minskar chanserna till ett positivt utfall. Tvåhundra fyrtiofyra personer intervjuades under en av sina första dagar i behandling, och 188 (77.0%) respektive 148 (61%) följdes upp efter 1 och 2 år. **Artikel I** visade att alkoholberoendets svårighetsgrad och deltagarnas mål med behandling vid inskrivning, samt graden av AA engagemang, tillfredsställelse med behandlingen samt slutförande av eftervård, skiljde mellan de som var helnyktra, de som drack relativt problemfritt, och de med problemfyllt drickande under det första uppföljningsåret. **Artikel II** visade att graden av problemdrickande, tillfredsställelse med behandlingen samt AA engagemang under det första året predicerade helnykterhet under det efterföljande andra året. I **Artikel III** sågs statistiskt signifikanta förbättringar gällande familjerelationer, psykisk hälsa och lagliga problem vid 1-årsuppföljningen, medan problemnivåerna inom arbete och fysisk hälsa förblev oförändrade. De med problemfyllt drickande rapporterade mer problem med arbete och familjerelationer samt sämre psykisk hälsa, än de med problemfritt drickande och helnykterhet; inga sådana skillnader noterades mellan de två grupperna med positivt utfall. Slutligen visade **Artikel IV** att ett starkt AA engagemang efter behandling var mer vanligt bland kvinnor, bland de med tidigare AA erfarenhet, och bland dem som hade helnykterhet som mål vid inskrivning. Andelen helnyktra vid 1-årsuppföljningen var jämförbar med resultat från liknande men större utvärderingar av Minnesota modellen i ursprungslandet USA. Resultaten diskuteras med hänsyn till projektets metodologiska begränsningar, och tidigare forskning gällande prediktion av behandlingsutfall.

Nyckelord: Minnesota modellen, Anonyma Alkoholister, programutvärdering prediktorer för utfall, helnykterhet, Sverige, problemfritt drickande, privat sektor, tolvstegsbehandling.