TUULI PITKÄNEN

ALCOHOL DRINKING BEHAVIOR AND ITS DEVELOPMENTAL ANTECEDENTS

UNIVERSITY OF JYVÄSKYLÄ

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ABSTRACT

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The aim of the present study was to examine the development of and precursors to alcohol drinking behavior, considering the timing of antecedents (childhood, adolescence) and of outcomes (adolescence, young adulthood, early middle age) separately for females and males. The Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) extending from age 8 to 42 provided the data for Studies I, III, and IV, and the Mental Health of Young Adults (NAM) extending from age 17 to 22 provided the data for Study II. There were four main themes common to the four original publications (Studies I–IV): analysis of drinking behavior, methods of measuring drinking behavior, precursors of drinking behavior, and differences between the genders penetrating the three other themes. Several indicators of drinking behavior were used including the frequency of drinking, binge drinking, the alcoholism screening tests CAGE and Mm-MAST, and problems due to drinking. About half of the participants of both longitudinal studies had shown some signs of heavy drinking by young adulthood, and at early middle age, half of the JYLS participants acknowledged that the use of alcohol had caused problems for them in, for instance, human relationships and work. Continuity in drinking behavior was high, even though at the individual level variation was also considerable. The early age of onset and heavy drinking in adolescence were significant risk factors for later heavy drinking. The level of adult alcohol use and alcohol problems was significantly higher in men than in women. Significant childhood and adolescent risk factors to and resource factors for drinking behavior in young adulthood and early middle age were found. The precursors varied, however, across the indicators of drinking and across the genders. In sum, problems due to drinking were more predictable than other aspects of drinking behavior. Low child-centeredness in parenting, externalizing problem behaviors, low school orientation, maladjustment, substance use, and somatic symptoms in adolescence were associated with adult problem drinking in both genders. Additionally, maternal smoking and the daughters' internalizing symptoms were linked to adult problem drinking in females, whereas parental drinking, the sons' low compliance, and childhood externalizing problem behaviors, and social activity preceded adult problem drinking in males. The longitudinal results revealed a finding that was not found in the literature: problems due to drinking in males and females were more predictable in middle age than in young adulthood.

Keywords: alcohol, problem drinking, binge drinking, CAGE, Mm-MAST, frequency of drinking, onset age, psychological well-being, socioemotional behavior, school success, family background, longitudinal study

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CONTENTS

1 INTRODUCTION

1.1 Individual and cultural trends in drinking behavior

Adult drinking, even problem drinking, is common in Western countries. Drinking habits vary across cultures, cohorts, age groups, and gender. Individuals are apt to regard drinking behavior as a private matter, but the impact of problem drinking spreads far beyond the one who suffers from it, and the direct and indirect costs of problem drinking are remarkable.

Drinking behavior during the life-span

Adult drinking culture tends to be transmitted to the younger generation. Drinking alcohol characterizes a large proportion of early adolescents in Western countries despite legislation that limits the purchase of alcohol before late adolescence; the minimum age limit is 18 in Finland. According to the European School Survey Project on Alcohol and Other Drugs (ESPAD, Hibell et al., 2004), in which youthful drinking was compared in 35 European countries, the proportions of students that reported having been drunk at the age of 13 or younger vary substantially between countries. More than 30% of the students in six countries (Isle of Man, Russia, UK, Estonia, Denmark, and Finland) reported that they had experienced their first intoxication at the age of 13 or younger; in other countries the percentages were much lower.

Onset of drinking has been seen as part of adolescent development, and to be related to other transition-marking behaviors (Jessor & Jessor, 1977). Young peoples' experimentation with alcohol and tobacco has been seen as modeling adult behavior, attempting to achieve peer acceptance, and as an effort to overcome age-typical challenges in psychological growth. It has been assumed that adolescents "mature" out of abusive drinking patterns as the responsibilities of later adulthood supervene (Grant, Harford, & Grigson, 1988; Jessor, Donovan, & Costa, 1991; Marlatt et al., 1998; Silbereisen & Noack, 1988). However, some adolescents drink so much that it cannot be attributed to

experimentation any more. For example, in a Canadian study, the prevalence of two types of substance use disorders among 18 year-olds was 18% for alcohol abuse and 7% for dependence (Young, Corley, Stallings, Rhee, Crowley, & Hewitt, 2002).

Based on cross-national data from 27 longitudinal studies, Johnstone, Leino, Ager, Ferrer, and Fillmore (1996) concluded that the expectations for a "maturational hypothesis" were generally supported. Cultural variation is, however, likely. Many American studies have confirmed the maturational hypothesis. For example, Curran, Muthen, and Harford (1998) found that there were significant decreasing trajectories in alcohol use in a population study of 17 to 24 year olds over four years time, and Bartholow, Sher, and Krull (2003) found that shortly after leaving college, heavy drinking dropped markedly and remained low through approximately age 30. Schulenberg et al. (2001) also found that binge drinking (identified by 5 or more drinks in a row) escalated quickly for college students and declined as they left college; for non-college bound youth, binge drinking tended to reach its peak during high school and then decline thereafter. Although most individuals "mature-out" of their heavy drinking patterns by the end of the transition, others continue with high levels of alcohol consumption and increasing alcohol related problems (Schulenberg, O'Malley, Bachman, Wadsworth, & Johnston, 1996). Heavy drinkers have shown escalating trajectories of heavy use of alcohol from adolescence to adulthood (Chassin, Flora, & King, 2004).

The results of the Health Behaviour Survey among Finnish Adult Population (Helakorpi, Patja, Prättälä, Aro, & Uutela, 2003) have shown that the frequency of weekly drinking 6 or more portions in a row was most common among males at ages 25-34, and females at ages 15-24; the percentages for age groups 15-24, 25-34, 35-44, 45-54, 55-64 being, respectively, 22%, 27%, 23%, 23%, and 21% for males and 10%, 8%, 7%, 8%, 5%, and 7% for females. According to the Finnish Drinking Habit Surveys in 1968, 1976, 1984, 1992, and 2000 (Metso, Mustonen, Mäkelä, & Tuovinen, 2002), especially in the last two surveys intoxication consumption was most common among age groups 15-19 and 20-29, but the overall consumption of alcohol was about the same as among the middle aged (30-49). Gmel, Graham, Kuendig, and Kuntsche (2006) used three different quantity-frequency measures and compared volumes of drinking (in grams per day) for females and males combined in age groups (-29; 30-49; 50-) in ten countries. No differences were found between the Finnish and Argentinean age groups 16-29 and 30-49; in Sweden and Costa Rica the consumption of alcohol was higher in the age group 17-29 than in the older age groups; however, in Brazil, Mexico, Nigeria, Sri Lanka, Uganda, and the USA the volumes of drinking were higher at age group 30-49 than in the younger age group. In a British population-based prospective birth cohort study by Jefferis, Power, and Manor (2005) heavy drinking on a single occasion was common throughout adulthood and not confined to the early 20s; at age 42 years binge drinking was detected by approximately one in three men and one in seven women.

Concerning diagnosable alcohol dependency, a review of epidemiological research concerning the United States (Caetano & Cunradi, 2002) revealed that the prevalence of 12-month alcohol dependence was highest, about 9%, in the age group 18 to 29, and decreased to about 5% in the age group 30 to 39. The average level of alcohol dependence across age groups was 6% for males and 2% for females. The Finnish Health 2000 (Pirkola et al., 2005) study from age 30 to 74 revealed that the highest proportion of 12-month diagnosis of alcohol dependency was found among the youngest age group, 30 to 44 years: for males 8.4% and for females 2.7%. In the whole sample studied the percentages were 6.5% for males and 1.4% for females. Regarding the Finnish youth, broad-based diagnostic information on mental disorders, including alcohol dependency, is not yet available (Aalto-Setälä, 2002).

The study of age, period, and cohort effects on alcohol drinking is complicated, necessitating multiple comparable measures in samples drawn from the same population over a long period of time (Kerr, Greenfield, Bond, & Rehm, 2004). Cross-sectional and longitudinal studies assessing the association between age and drinking have produced inconsistent results (Eigenbrodt, Mosley, Hutchinson, Watson, Chambless, & Szklo, 2001). There is considerable variation between racial groups, genders, and countries in the associations between age and drinking (e.g., Eigenbrodt et al., 2001; Johnstone et al., 1996; Gmel et al., 2006; Fillmore, Hartka, Johnstone, Leino, Motoyoshi, & Temple, 1991). Differences in the indicators of drinking produce different results of the association between age and drinking, as well as differences in the groupings of age, or the use of age or gender as covariants. In many articles descriptive statistics on the basic variables are not presented.

There is a general tendency toward a reduction of heavy drinking as age increases. In middle-age, health related questions increase in importance for many people (Jussila & Pitkänen, 2002). In a large population-based, longitudinal study among US adults, Karlamanga, Zhou, Reuben, Greendale, and Moore (2006) have found an age and gender effect on the frequency and quantity of drinking, but no cohort effect. Individual heavy drinking tracked national per capita average alcohol consumption, and the likelihood of heavy drinking declined with an increasing age. The prevalence of heavy drinking varied considerably by demographic characteristics; a higher likelihood of being a heavy drinker included not being married, having less education, lower income, and smoking. Decrease in heavy drinking after middle age has also been documented in another American follow-up study (Eigenbrodt et al., 2001) and in a follow-up of British male doctors (Doll, Peto, Boreham, & Sutherland, 2005). However, in a cross-sectional Australian study, the percentage of consumers of hazardous levels of alcohol (more than 28 drinks/week for males, and 14 for females) was about the same in age groups 20-24, 40-44, and 60-64, but the percentage of moderate drinkers (14-27 and 7-13 drinks/week, respectively) increased with age (Rodgers, Windsor, Anstey, Dear, Jorm, & Christensen, 2005).

Changes in individual drinking behavior in both directions are very likely at all levels of consumption (e.g., Delucchi, Matzger, & Weisner, 2004; Kerr, Fillmore, & Bostrom, 2002), and subsequent changes tend to accumulate over time (Skog & Duckert, 1993). Even though there is the general tendency toward a reduction in problem drinking with age, it is difficult to predict an individual's propensity to misuse alcohol based on age; some individuals continue to drink excessively, and experience an to increase in alcohol related problems (O'Leary & Woodin, 2005). The fluctuation of an individual's drinking behavior is not only associated with age but also with health and illnesses, and various life style related factors such as region of residence, marital status, and work situation (Curran et al., 1998; Karlamanga et al., 2006; Pirkola, Poikolainen, & Lönnqvist, 2006), and divorce and number of children (Ahlström, 1987).

Generally, adult men drink more alcohol, their drinking is more often intoxication oriented, and it causes more problems than do women's drinking (e.g., Barnes, Welte, & Dintcheff, 1992; Merline, O'Malley, Schulenberg, Bachman, & Johnston, 2004). Gender differences in the age of onset of drinking have not been found in Finnish studies (Lintonen, Rimpelä, Ahlström, Rimpelä, & Vikat, 2000), nor in the American studies by Flory, Lynam, Milich, Leukefeld, and Clayton (2004), and Samson, Maxwell, and Doyle (1989). However, the drinking habits of the genders differ in the following years. Based on a meta-analysis of longitudinal studies Johnstone et al. (1996) show that gender-based variation in drinking concentrates on the early periods of the life-span, that is, on the establishment of differential levels of alcohol use in youth. Holmila and Raitasalo (2005) conclude in their review of the literature that gender differences in drinking behavior are considerable and found in all cultures studied so far. They argue that women and men have different needs, reasons and motivations in relation to drinking, and their drinking behaviors lead to different consequences, yet the reasons underlying the differences in drinking behavior remain largely unexplained.

Finnish drinking in a historical perspective

Alcohol drinking behavior within a given culture can change considerably depending on the official alcohol politics and public attitudes toward drinking. Finland is a good example. Finland has a long tradition of alcohol control legislation, including a period of total prohibition from 1919 to 1932. Finnish drinking habits have also changed significantly during the time-period of interest in the present study, from the sixties to 2001.

Until the 1960s the annual consumption per capita was low, under 2 litres 100% alcohol (Koski & Österberg, 1993). In 1969, the Finnish Alcohol Act was revised, resulting in a radical change in alcohol use restrictions. The State Alcohol Monopoly opened retail outlets in rural districts – they had previously existed only in towns and cities; it now became permissible for grocers to sell medium beer and cafés to serve it; and the minimum age was set at age 18 for beer and wine instead of the former minimum age of 21; and there occurred a

huge increase in the number of licensed premises (Simpura, 1987). The outcome of the new legislation was rapid growth in the country's alcohol consumption figures: the consumption doubled from 1968 to 1974, to 6.5 litres per capita measured in 100% alcohol (Heinonen, 2002). Nevertheless, the new Act was not solely responsible for the rise in consumption – the Finnish public had already begun to drink more several years earlier (Simpura, 1987).

In 1995, Finland joined the EU and was obliged to abolish all other alcohol monopolies except the retail sale (Karhu, 2002). The alcohol sector was still kept under strict control, and a new state authority was established for granting licenses and monitoring actors. In 1996, the level of consumption per capita in Finland (6.7 litres) was quite similar to the USA (6.6 litres), above Norway (3.9) and Sweden (4.9 litres) but below the mean level of most European countries (Hein, Virtanen, & Wahlfors, 2002). In the USA, alcohol consumption levels had declined since the early 1980's, and were expected to reach a minimum by the 21st century (Greenfield, Midanik, & Rogers, 2000). According to Hein et al. (2002), annual consumption of alcohol has remained at the same level during 1996-2000 in most European countries, but there has been a steady increase in the use of alcohol in Finland. In 2002, the registered consumption was 7.6 litres and the unregistered, including, for instance, imported and self-made products, was approximately 9.3 litres (Huttunen, 2003). In 2004, there were three major changes affecting alcohol consumption: the import quotas for travellers' duty free alcohol imports were abandoned; Estonia, where the price of spirits is much lower than in Finland, joined the EU; and the excise duties for alcohol products were lowered (Österberg, 2005). The registered consumption increased to 8.2 litres and the unregistered to 10.5 litres by the end of 2005 (Kuussaari, Österberg, & Wahlfors, 2006).

The conventional pattern of Finnish alcohol use is often said to have two chief distinguishing features: on the one hand, alcohol is regarded with an emphatic moral dichotomy; on the other, many Finns tend to drink solely in order to become intoxicated (Simpura & Partanen, 1987). Finnish drinking has been infrequent, separate from everyday life, and concentrated on weekends and national holidays. The cultural acceptance of drunkenness is widespread (Koski & Österberg, 1993; Mäkelä, Fonager, Hibell, Norlund, Sabroe, & Simpura, 2001). In the ESPAD comparison of 16-year olds, the 12 months prevalence of being drunk was substantially higher in Finland than the average (64% compared to 53%, respectively; Hibell et al., 2004). Teenagers follow adult drinking patterns with greater overall alcohol consumption in Southern Europe, but are more prone toward binge drinking in Northern Europe (Hibell et al., 2000).

Lintonen (2001) has studied the drinking patterns among Finnish fourteen year-olds from 1977 to 1999, and he concludes that even the patterns of 14-year-olds' drinking have shifted toward an intoxication orientation. Until 1989, drinking was as common among 14-year old girls and boys, but thereafter drinking became more common among girls than among boys. However, girls

seemed to develop a less intoxication-oriented style with age while intoxication-orientation increased with age among boys.

Finnish women seldom used alcohol in the late 1960's, but the discrepancy between men's and women's drinking frequencies narrowed during the following years; also the proportion of alcohol consumed by women increased from 12% in 1968 to one fourth of the total consumption in 2000 (Metso et al., 2002). As well, binge drinking has become more common especially among young women. By 2000, the prevalence of women abstainers had reduced markedly in all age groups between the ages of 14 and 69 (Hein et al., 2002).

1.2 Childhood and adolescent precursors to drinking behavior

The reasons for drinking are manifold, as is shown by the various psychological theories of drinking (Leonard & Blane, 1999). In the present study, a developmental perspective on drinking was adopted. Drinking habits unfold over time, from childhood through adolescence into adulthood, with considerable individual variation over time. In this process, possible antecedent and maintaining factors lie both in the individual and in the context. There are at least three types of antecedents that vary in their timing: 1) background factors involved in the family of origin which the person has little control over, 2) childhood factors before substance use initiation, and 3) adolescent factors when part of the age-group has already initiated substance use. The effects can be concurrent or contribute in the long run to the initiation of drinking, adolescent drinking, and/or adult drinking.

Family background

Parents' influences on the use of alcohol of their children include the impact of parental consumption of alcohol, family socio-economic background, family structure, and parenting behaviors and skills such as monitoring, parental behavior management, relationship quality, and norms, goals, and values. The study of parenting influences on their offsprings' drinking is complicated, because of the variety of definitions of parenthood (e.g., whether to consider biological parents and social parents or those living with the child) and because of the existence of several covariating and mediating effects, for example, the personality and behavior of the child (Hill & Yuan, 1999; Chassin et al., 2004).

Parental heavy drinking raises many problems in partnership and in relation to children. Higher parental substance use has been shown to be associated with heavier use of alcohol (e.g. Casswell, Pledger, & Pratap, 2002; Lieb, Merikangas, Höfler, Pfister, Isensee, & Wittchen, 2002; Pedersen & Skrondal, 1998) and smoking among their children (Barman, Pulkkinen, Kaprio, & Rose, 2004; Bricker, Peterson, Leroux, Andersen, Rajan, & Sarason, 2006; O'Callaghan, O'Callaghan, Najman, Williams, Bor, & Alati, 2006). Parental substance use disorder puts adolescents at significant risk of becoming

embedded in a cycle of drug use, associations with drug using peers, and poor family relations (Hoffmann & Su, 1998). The findings of Curran and Chassin (1996) suggest that both parents influence child development outcomes: the mother's parenting (monitoring of child behavior, consistency of discipline, and social support) did not buffer or protect against the negative effects of the father's alcoholism diagnosis.

The fact that children of alcoholics are more likely to have alcohol problems may be moderated by socioeconomic disadvantage (Whipple, Fitzgerald, & Zucker, 1995). There is evidence on the relationship between the accumulation of life course socioeconomic exposure and health outcomes in adulthood (e.g., Kristenson, Eriksen, Sluiter, Tarke, & Ursin, 2004; Lynch, Kaplan, & Salonen, 1997; Singh-Manoux, Ferrie, Chandola, & Marmot, 2004). It is known that there are differences in health behavior and substance use among people with different socioeconomic status groups (e.g., Kivimäki, Kinnunen, Pitkänen, Vahtera, Elovainio, & Pulkkinen, 2004). The risk for alcoholism is highest among men in manual occupations and the unemployed (Hemmingsson, 2004). Hemmingsson concludes that socioeconomic differences in male alcoholism can be attributed to life circumstances from childhood. Nevertheless, the relationship between socioeconomic status and substance use is not straightforward. For instance, Parker and Parker (1980) found a relationship between problem drinking and being from a lower socioeconomic class family; Margulies, Kessler, & Kandel (1977) found no relationship; and Martin and Pritchard (1991) found that white males from higher socioeconomic backgrounds tended to drink alcohol more frequently. Likewise, drinking among Finnish farmers is lower than among urban workers (Ahlström, 1987), and drinking among the offspring of single-parent families is higher than among mother–father families independent of socioeconomic status (Barrett & Turner, 2006).

Additional familial risk factors for heavier adolescent alcohol use include, for example, weaker family bonds (Bahr, Marcos, & Maughan, 1995), lower parental support (Barrera, Chassin, & Rogosch, 1993), greater family dysfunction, lower parental monitoring and problems in discipline practices (Clark, Neighbors, Lesnick, Lynch, & Donovan, 1998), interparental violence (Fergusson & Horwood, 1998), and childhood physical and sexual abuse (Bensley, van Eenwyk, & Simmons, 2000). Lack of nurturing and involved parenting, and a broken family increase the risk for antisocial behavior and later heavy alcohol use (e.g., Barrett & Turner, 2006; Hemmingsson, 2004; Power, Stewart, Hughes, & Arbona, 2005; Scaramella, Conger, Spoth & Simons, 2002). Hayes, Smart, Toumbourou, and Sanson, (2004) conclude in their review of literature on parenting influences on adolescent alcohol use that the relationship of parents and adolescents can have a global impact, and is likely not only to influence adolescent alcohol use, but will also influence parental behavior management and monitoring.

Maccoby (2000) adds genetic effects to this relationship. She argues on the basis of her review of environmental and genetic effects on children that genetic

predispositions and the parents' childrearing regimes are closely interwoven; parenting effects are real, though they often combine with genetic effects in influencing an outcome. Also, many factors other than parents' actions influence how children grow and develop.

Socioemotional behavior

Studies on the correlates and precursors of problem drinking have yielded findings on several personal and behavioral risk factors. For instance, Jessor and Jessor (1977) demonstrated that proneness to problem behavior was linked with alcohol-related problems. Adolescent drinking has been found to be related to under control (e.g., aggressiveness, impulsiveness, and lack of concentration; Andersson, Bergman, & Magnusson, 1989), and to various "problem" characteristics such as problem behavior, poor school performance, and various forms of delinquent and predelinquent behavior (Barnes & Welte, 1986; Donovan, Jessor, & Jessor, 1983). Antisocial behavior (e.g., conduct problems, aggressiveness, delinquency, and crime) in adolescence has been found to be a risk factor for later problem drinking (e.g., Grant, Stinson & Harford, 2001; Moffit, Caspi, Rutter, & Silva, 2001; Parker, Levin & Harford, 1996; Pulkkinen & Pitkänen, 1993; Warner & White, 2003).

Lynam, Leukefeld, & Clayton (2003) have examined the relation between antisocial behavior and substance abuse, because of the very high rates of co-occurrence across development. Does one of them cause the other or are they related because they share common antecedents or causes? They present a long list of potential common antecedents, including parenting style, neuropsychological deficits, school failure, peer and neighborhood factors, and personality, in which agreeableness and conscientiousness were the two most important protective domains. Highly antisocial individuals who misuse substances are likely to experience high degrees of negative affect and be very impulsive. According to the follow-up study from age 3 to 21 by Moffitt et al. (2001), young people develop antisocial behavior for two main reasons: the more common form of antisocial behavior, afflicting females as well as males, emerges in the context of social relationships; but the other form is a neurodevelopmental disorder, afflicting males, and its prevalence in the population is low. Zucker et al. (2006) point out that there are specific vulnerability indicators, like behavioral under control, low resiliency, and a diathesis for disruptive behavior, that all share a common thread involving deficits in the regulation of cognition, behavior, and emotion. These are individual difference characteristics that are non-specific to alcohol use.

Impulsivity is defined as a predisposition toward rapid, unplanned reactions to internal or external stimuli without considering the negative consequences of these reactions to the impulsive individual or to others (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). In their literature review, Moeller et al. (2001) point out that substance abuse is not inherently impulsive behavior; however, in response to stress or environmental cues, an individual can also use a substance in a rapid unplanned action without

considering the consequences. They conclude that there is a link between impulsivity and substance abuse, but the question of whether the higher level of impulsivity is a factor leading to or resulting from substance abuse has not been answered.

Emotions have physiological, behavioral, and subjective-experiential components, and individual differences in emotionality and impulse control contribute to differences in the quality of social behavior (Pulkkinen, 2006). Individual differences in emotions can be regarded both as dispositional differences related to temperament and socioemotional functioning, and as situationally specific reactions (Pulkkinen, 2004). Emotion regulation refers to the redirection, control, and modification of emotional arousal to enable an individual to function adaptively in emotionally arousing situations (Cicchetti, Ganiban, & Barnett, 1991). The term socioemotional refers to the integral role of emotions and emotion regulation in socialization (Pulkkinen, 2006). Individual differences in socioemotional behavior can be conceptualized in many terms, such as number of friends, aggressive and anxious behavior, prosocial and antisocial behavior, and under- or over-controlled behavior, or externalizing and internalizing problem behaviors (Pulkkinen, 2004).

From the beginning of the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), used in the present study, the framework for the study of individual differences in personality functioning has been a two-dimensional impulse control model developed by Pulkkinen (Pitkänen, 1969; Pulkkinen, 1995, 2006), later modified and relabelled as a model of emotional and behavioral regulation (Figure 1). The model consists of two orthogonal dimensions: expression vs. inhibition of behavior, and low vs. high self-control of emotions. "The combinations of the inhibitory and enhancing processes define different behavioral strategies. They are not categorical concepts or types, but ends of dimensions (Pulkkinen, 1995, p. 1662)". The model suggests two major types of behavior characterized by low self-control, that is, externalizing (A in Figure 1) and internalizing (D) expressions of dysfunction, and two major types of behavior characterized by high self-control, that is, spontaneous (B) and compliant (C) prosocial behavior.

Behavior problems often persist into adulthood (Kokko & Pulkkinen, 2005; Pulkkinen, Feldt, & Kokko, 2005; Moffitt et al., 2001). Low self-control and aggression have been shown with the JYLS data to be linked to several later outcomes such as long-term unemployment (Kokko & Pulkkinen, 2000), accumulation of risks in social functioning (Rönkä & Pulkkinen, 1995), criminal behavior (Hämäläinen & Pulkkinen, 1996), and the use of alcohol in adulthood (Pulkkinen & Pitkänen, 1993). Aggressiveness in early school age tends to lead to a cycle of maladjustment at school, indicated by low school motivation and success, rule breaking and punishments, and truancy, which is linked to the use of alcohol, low occupational alternatives, and long-term unemployment (Kokko & Pulkkinen, 2000). Results on continuity in socioemotional behavior and its developmental background, and relations to problem behavior and health, and

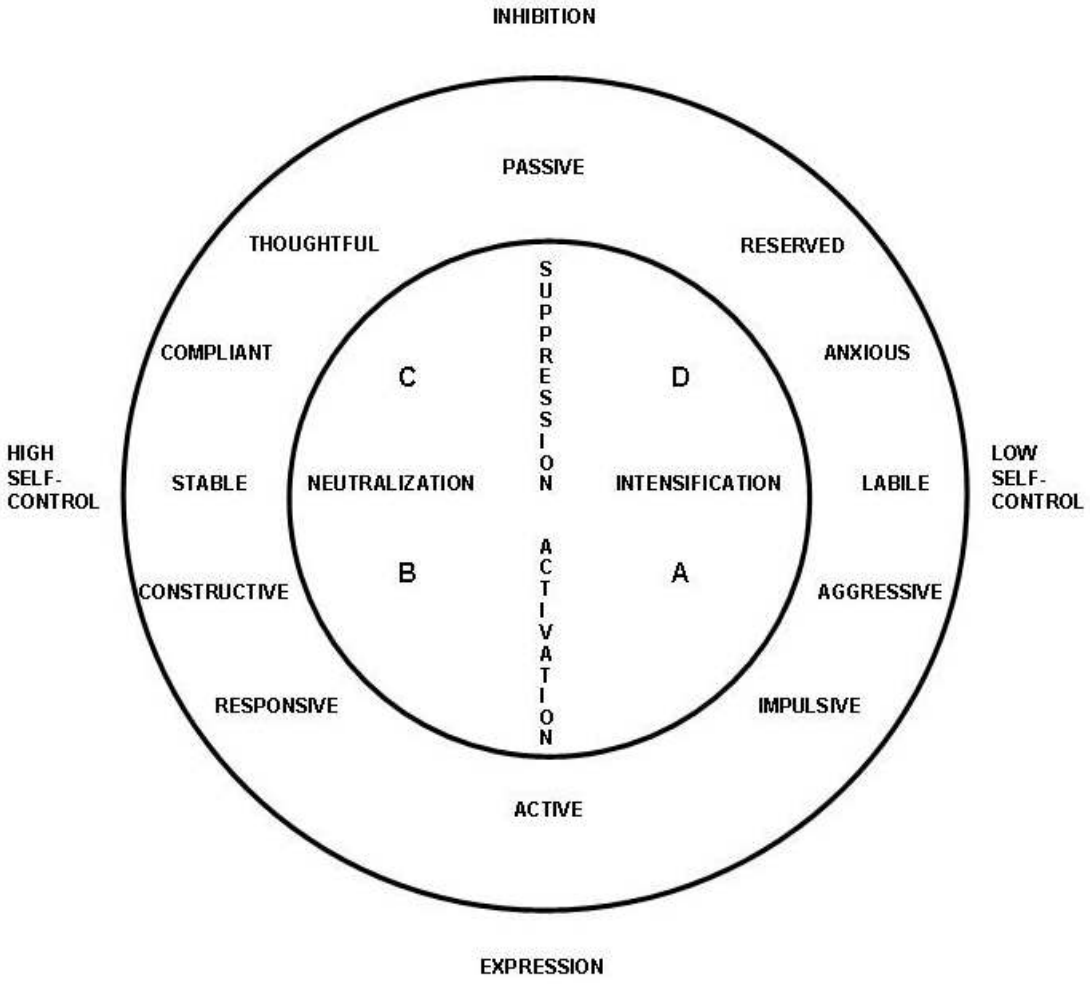

FIGURE 1 Model of emotional and behavioral regulation (Pulkkinen, 1995)

to positive development are presented in a recent book (Pulkkinen, Kaprio, & Rose, 2006).

The importance of regulatory skills and habits as a crucial factor influencing important developmental outcomes in adolescence has been found also by Wong and her colleagues (Zucker et al., 2006) in their study of child development from preschool age to adolescence. As children matured behavioral control increased, they became less impulsive and more controlled. However, resiliency remained stable over time; it is possible that individual differences in resiliency reflect a child's early temperament as well as the goodness of fit between the child's temperament and his or her environment. Children with slower rates of increase in behavioral control over time were more likely to drink by age 14. Low behavioral control predicted several alcohol and drug use outcomes. In contrast, low resiliency predicted early onset of alcohol use only. Although low behavioral control may initially get some adolescents into trouble, it is the presence or absence of resiliency that determines whether adolescents work through and grow beyond their difficulties.

There are consistent differences between females and males in externalizing and internalizing problems. Based on her literature review Pulkkinen (2004, p. 31) summarizes: "Activity and externalizing problems are risk factors for male development, whereas risk factors for female development also include passivity and internalizing problems." Passivity and anxiety tend to protect men from problem behaviors, whereas activity or assertiveness may be strengths in females that facilitate their career development compared to passivity (Pulkkinen, Ohranen, & Tolvanen, 1999). Activity in males involves higher risks for behavioral problems, and therefore, high self-control in boys is a more powerful predictor of career development than activity. Pulkkinen (2004) also notes that developmental paths differ between genders: "Developmental paths of men are more direct from externalizing problem behaviors in childhood to externalizing problem behaviors in adulthood than the paths of women: both girls' externalizing and internalizing problem behaviors tend to lead to internalizing problem behaviors in adulthood" (p. 31).

Concerning gender differences Gomberg (1993) concludes her literature review by stating that major antecedents to female problem drinking appear to be linked to difficulties in impulse control, depression, and the earlier appearance of other diagnostic syndromes such as eating disorders or phobia. Severe internalizing problems may include psychiatric disorders such as anxiety and depression, whereas externalizing problems may include conduct disorder and antisocial personality. Gender differences appear to exist both in the causal chain and in the comorbidity. Alcoholism is particularly likely to coexist with other diagnoses, and comorbidity has been reported to be more common in women than men (Brady, Grice, Dustan, & Randall, 1993; Cochrane, Goering, & Lancee, 1992; Helzer, Burnam, & McEvoy, 1991).

Drinking in adolescence

Contextual as well as individual characteristics are associated with health and risky behaviors in adolescents (Resnick et al., 1997). In addition to familial and personal risk factors described earlier, there are societal and cultural risk factors for adolescent alcohol abuse, and also factors concerning personal environments (e.g., Winter, 2004). These factors include laws and norms favorable toward substance use behavior, availability of substances, neighborhood disorganization, physiological factors, low degree of commitment to school, peer rejection, association with drug using peers, and attitudes favorable toward drug use as reviewed by Hawkins, Catalano, & Miller (1992).

There is a strong link between smoking and drinking, and as Pomerleau, Marks, Pomerleau, and Snedecor (2004) state, pleasurable early experiences with nicotine and alcohol are both associated with higher amount of alcohol consumed later. School misbehavior and low academic achievement contribute to increased cigarette use (Bryant, Schulenberg, Bachman, O'Malley, & Johnston, 2000), and the smoking of cigarettes during adolescence predicts increased problem behavior in young adulthood (Brook, Balka, Rosen, Brook, &

Adams, 2005). Smoking (Brook, Brook, Zhang, Cohen, & Whiteman, 2002; Riala, Hakko, Isohanni, Järvelin, & Räsänen, 2004) as well as low school orientation (Karlamanga et al., 2006; Muthen & Muthen, 2000; Riala, 2004) have been shown to be strong risk factors for later alcohol abuse. Early timing of pubertal maturity has been found to be related to higher levels of substance use, because early matures enter the risk period at an earlier point than late matures (Patton, McMorris, Toumbourou, Hemphill, Donath, & Catalano, 2006). Friends' problem behavior is a significant mediator between pubertal timing and heavy drinking (Wichstrom, 2001).

Early age of onset of alcohol drinking (Grant et al., 2001; Warner & White, 2003) and heavy drinking in adolescence (e.g., Ghodsian & Power, 1987; Harford, 1993; Pape and Hammer, 1996; Zucker et al., 2006) are risk factors for later problem drinking. Therefore, various preventive programs have been developed that target children of elementary school age, that is, before the initiation of substance use (e.g., Jackobson, Pitkänen, & Vilkko, 1998; "Preventing", 1997) and their parents (e.g., Tarkkanen, Pitkänen, & Jackobson, 1998). Public awareness of teenage drinking has also been aroused in Finland, for instance, through popularized reports (e.g., Pitkänen, Jackobson, Välimäki, Eklund, & Sulku, 1997; Pitkänen & Pulkkinen, 2003).

After the onset of substance use, the experiences of drinking begin to affect future use patterns. According to the longitudinal study by Schulenberg, Wadsworth, O'Malley, Bachman, and Johnston (1996), risk factors for concurrent binge drinking in late adolescence include, in addition to low school success and conventionality: drinking to get drunk, drinking to cope, expecting future use of alcohol, and being male; and higher levels of antisociality-alienation, and time spent with friends. For increased binge drinking by young adulthood, drinking to get drunk, expected future use, lower self-efficacy and conventionality, and male gender emerged as robust risk factors. Negative alcohol expectancies have been found to discourage drinking less in people with high rather than low levels of impulsivity (Finn, Bobova, Wehner, Fargo, & Rickert, 2005). According to a study by O'Hare and Sherrer (2005), students who drink excessively to cope with negative emotions are more likely than those who drink in social circumstances (i.e., convivial or intimate drinking) to suffer psychological and emotional disturbances in addition to negative social consequences. Nevertheless, whether drinking excessively during positive activities or when dealing with personal distress, young persons who do so, incur a significant risk for negative consequences.

Heavy use of alcohol has been extensively found to be related to low psychological well-being (e.g., Andreasson, Allebeck, Brandt, & Romelsjö, 1992; Cornel, Knibbe, Drop, Knottnerus, & van Zutphen, 1995; Rush & Brennan, 1990; Schuckit, 1994; Zucker, 1987). Even among adolescents, risky health behavior, including frequent drunkenness, has been found to be associated with major depressive episodes (Haarasilta, 2003). Also, in other studies alcohol use has been observed to be significantly associated with higher levels of psychiatric symptoms already among high school and college students (Casper, Belanoff, &

Offer, 1996; Kushner & Sher, 1993; Mezzich, Tarter, Kirisci, Clark, Buckstein, & Martin, 1993; Pullen, 1994; Shannon, James, & Gansneder, 1993). Weill and LeBourhis (1994) noted that the heaviest drinkers in young adulthood were generally dissatisfied with life, unconstrained, and pessimistic five years earlier.

Through early, middle, and late adolescence, a movement occurs away from the confinement of the family context and towards the roles that are available in the larger social environments. During adolescence, one experiences rapid physiological and psychological changes, and cognitive maturation; it is a time of the intensive readjustment to family, school, work, and social life, and of the preparation for adult roles (Marttunen & Rantanen, 2001). The transition out of high school and into early adulthood is associated with an increased well-being for most individuals, and clearly, continuity in well-being prevails across the transition. However, embedded within this transition are opportunities for deflections of existing developmental pathways: dysfunctional young adults can come from the ranks of seemingly well-functioning adolescents, and troubled adolescents can become exemplary young adults (Schulenberg, Bryant, & O'Malley, 2004).

1.3 Measures of drinking behavior

Consumption patterns consist of the frequency and quantity of drinking, and a variety of patterns may lead to negative consequences due to drinking and dependency. Although several different research methodologies have been developed for the study of problem drinking in the general population, there is no commonly accepted definition or gold standard measure (e.g., Heck & Williams, 1995; Kendler, Heath, Neale, Kessler, & Eaves, 1993; Sherbourne, Hays, Wells, Rogers, & Burnam, 1993). Cultural differences (Gmel et al., 2006) and differences in adolescent and adult drinking patterns (Bailey & Rachal, 1993; Bukstein, 1995; Day, 1995) create challenges for the measurement of drinking. Different definitions and terminology have contributed to differences in prevalence rates of problem drinking (Nyström, 1993), and may affect the conclusions drawn (Crawford, Plant, Kreitman, & Latcham, 1987).

Quantity and frequency

Many different types of measures have been employed in studying self-reported quantity and frequency of alcohol consumption. Frequency of consumption questions vary in time from the past 7 days to the past year. Alternatively, the researcher may simply ask the participants about their usual consumption frequency. To study the quantity consumed, questions are presented about the number of portions used, covering all types of alcoholic beverages or separately for each beverage, or about drinking to intoxication or about exceeding a specified amount of drinks, often 5 or more drinks in a row. Examples of portions that include about 12 grams of pure alcohol are often

given in the local cultural context; for instance, one portion equals one bottle (33 cl) of Finnish beer (4.5 % alc.), one glass of wine (12 cl ~ 12 % alc.), one glass of strong wine (8 cl ~21 % alc.) or one 4 cl portion of spirits. In addition to traditional interview and inventory methods, other methods such as Drinking diary (e.g., Smith, McCarthy, & Goldman, 1995), Time Line Follow Back (Greenbaum, del Boca, Darkes, Wang, & Goldman, 2005; Wood, Sobell, Sobell, Dornheim, & Agrawal, 2003), and biophysiological tests (Miller, Ornstein, Nietert, & Anton, 2004; Seppä, Pitkäjärvi, & Sillanaukee, 1999) have been used. Research findings have not been conclusive with regard to the best way to measure alcohol consumption (Gmel et al., 2006).

Frequency and quantity have special value in epidemiology, because the amount of consumed alcohol is related to dementia (Järvenpää, Rinne, Koskenvuo, Räihä, & Kaprio, 2005), and to mortality in alcohol augmentable causes (accident, violence, alcoholic psychosis, upper aerodigestive cancer, and liver disease; e.g., Doll et al., 2005). The risk for an accident is doubled if the amount of consumed alcohol exceeds 40 g or 3.5 portions (Anda, Williamson, & Remington, 1988). In epidemiological studies, the limit for male risky consumption has been set to 280 grams a week equalling 23.3 portions including 12 g of pure alcohol per week or 14 560 grams of pure alcohol per year (e.g., Doll et al., 2005; Rodgers et al., 2005; Seppä et al., 1999; Vahtera, Poikolainen, Kivimäki, Ala-Mursula, & Pentti, 2002). For females different limits have been proposed by different researchers, for example, 190 grams a week (9880 g/year; Sillanaukee, Kiianmaa, Roine, & Seppä, 1992), and 140 grams a week (7280 g/year; Rodgers et al., 2005).

The frequency of drinking, per se, is not a very informative measure, because a non-problem drinker who takes one drink every day gets a high score for the frequency of drinking, but the annual consumption is not high, 4 380 grams of 100% alcohol (1 portion x 12 g x 365 days). As well, a problem drinker who abstains from alcohol but once a year experiences an extended period of time (lets say 3 days) during which he repeatedly consumes alcohol to the point of intoxication while giving up his usual activities and obligations in order to drink, gets a low score for both the frequency of drinking and total consumption of 1260 g/year (35 portions x 12 g x 3 days). Neither is heavy episodic drinking revealed by asking about the frequency of intoxication or the frequency of drinking at least 5 portions in a row. Wood et al. (2003) found that the non-daily drinkers had higher dependence scores than daily drinkers, and that the primary difference between the two groups was in the domain of loss of behavior control. Many people who tend to lose control over their drinking respond by reducing their frequency of consumption. The importance of considering the pattern of drinking, in addition to the volume of consumption, has been noted also in epidemiological studies (Mäkelä, Paljärvi, & Poikolainen, 2005).

Alcoholism screening tests

People vary in their abilities and motivations to control their drinking, and not all persons who drink heavily, develop problems due to drinking or dependency on alcohol. Problem drinking has been probed with various questions concerning drinking habits, understanding of and feelings toward one's own drinking behavior, continuation of hazardous drinking behavior, and consequences due to drinking, such as accidents, drunken driving, arrests, fights, problems at work, and problems in relationships. For adolescents, questions relevant to their life-situation have been developed, for instance, skipping school, dropping out from school, fighting, or sleeping during school hours (Yeh & Chiang, 2005).

Alcoholism screening tests are sets of questions that are created for the rapid assessment of problem drinking patterns. There are life-time versions in which questions are presented in the form of "have you ever…" and time-limited versions in which questions are presented in the form of "have you during the last year…" or "have you during the last two months …" Alcoholism screening tests have been used for research purposes, but they have also been used as self-help tests, and to detect heavy drinkers in primary care. Early detection of heavy drinking in high-risk patients is important because brief interventions have proven successful (Montalto & Bean, 2003).

The CAGE Questionnaire developed by Ewing and Rouse (Ewing, 1984) is one of the most used screening instruments, followed by the Michigan Alcoholism Screening Test (MAST) or variations of the MAST, the Alcohol Use Disorders Identification Test (Audit) and variations of the Audit (Maisto & Saitz, 2003; Nyström, 1993; O'Connell et al., 2004). The CAGE includes four questions: (a) "Have you ever felt the need to Cut down on your drinking?"; (b) "Have you felt Annoyed by criticism of your drinking?"; (c) "Do you feel Guilty about your drinking?"; and (d) "Have you ever had a drink in the morning to get rid of a hangover (an Eye opener)?"

The Michigan Alcoholism Screening Test (MAST) developed by Selzer (1971) has several modifications. Mm-Mast, was based on the brief MAST (Pokorny, Miller, & Kaplan, 1972) that Kristenson and Trell (1982) adapted for use in Scandinavia (Malmö modification of the brief MAST; Mm-MAST), and which was first used in Finland by Seppä, Sillanaukee, and Koivula (1990). Mm-MAST probes personal attitudes and habits rather than symptoms. It consists of 9 items: "Have you ever been in the habit of taking a drink before going to a party?", "Have you ever been in the habit of taking a bottle of wine or corresponding amount of alcohol over a weekend?", "Has there ever been a period in your life when you have consumed daily a small amount of alcohol for the purpose of relaxing?", "Have you ever had to drink more alcohol than previously to obtain the same effects?", "Has it ever been difficult for you to drink less than your friends?", "Have you ever fallen asleep, after consuming a moderate amount of alcohol, without knowing how you got into bed?", "Have you ever had a bad conscience after drinking alcohol?", "Have you ever taken a 'hangover drink' or 'a hair of the dog'?", and "Have you ever tried to avoid

alcohol for certain periods of time, for instance one week?" This Scandinavian version has been used for, for example, screening binge drinking among patients in an emergency surgical ward (Forsberg, Halldin, Ekman, & Rönnberg, 2002); as a health survey of middle aged men (Seppä et al., 1999); the study of drinking behavior of Finnish university students (Nyström, 1993), and parental drinking behavior in the Finnish twin studies (Kaprio, 2006).

Sensitivity and specificity of these instruments have varied widely, depending on the prevalence of alcohol use disorders in the population being studied, the clinical characteristics of the population, and the type of drinking problem being detected (O'Connell et al., 2004). The CAGE questionnaire has been criticized for not being sufficient to detect consumption in excess, but asking questions about the quantity and frequency of drinking, has increased the number of problem drinkers detected (Adams, Barry, & Fleming, 1996; Seppä et al., 1999). The recommended cut-off points 1/2 for CAGE (Mayfield, McLeod, & Hall, 1974) and 2/9 for Mm-MAST (Kristensson & Trell, 1982) have been found to be low for Finns (Nyström, 1993; Seppä et al., 1990). This can be due to a low threshold of providing affirmative answers because of a prevailing high cultural acceptance for drunkenness, as documented in the study by Mäkelä et al. (2001) concerning the questions of intoxication.

In addition to CAGE, MAST, and Audit, there are a variety of short and long tests. Bradley, Boyd-Wickizer, Powell, and Burman (1998) described alcohol-screening questionnaires that contain 10 or fewer items developed by various researchers: T-ACE (tolerance, annoyed, cut down, eye-opener), TWEAK (tolerance, worried, eye openers, amnesia, cut down), NET (normal drinker, eye opener, tolerance), Trauma scale (accidents and injuries), and a 6-Item Quantity-Frequency Screen. O'Hare (2003) has developed an 8-item College Alcohol Problems Scale (CAPS) including personal (e.g., feeling sad) and social problems (unplanned sex, illegal activities). Nyström (1993) presents descriptions of following longer scales: a 90 item Alcohol Expectancy questionnaire (AEQ), a 35 item Self-Administered Alcoholism Screening Test (SAAST), the Spare Time Activities Questionnaire (STAQ), a 12 item the College Drinking Attitude Scale (SDAS), the SADQ Severity of Alcohol Dependence Questionnaire, and the EADS (Edinburgh Alcohol Dependence Scale). The Munich Alcoholism Test (MALT) has three diagnostically relevant subscales for drinking behavior, attitudes toward drinking, emotional and social impairment due to alcohol, and somatic complaints, whereas the Alcohol Dependence Scale (ADS) has four subscales (Loss of Behavior Control, Psychophysical Withdrawal, Psychoperceptual Withdrawal, and Obsessive Drinking Style).

Problem-based measures

A problem-based conceptual framework has been widely used in alcohol research (as in Alterman, Hall, Purtill, Searles, Halhon, & McLellan, 1990; Donovan et al., 1983; Hemmingsson, 2004; Hughes, Power, & Francis, 1992; Rambaldi, Gluud, Belli, Nielsen, Storgaard, & Moesgaard 1995; Wiesner & Windle, 2006). A problem-based framework provides for both an established

pattern of excessive alcohol use and an identification of the physical, social, or psychological problems related to drinking (Heck, 1991). Problem drinking measures involve several dimensions of symptoms with individuals not having to experience all of the symptoms to qualify for a diagnosis of dependence or abuse (Wood et al., 2003). Hemmingsson (2004), for example, has used in a Swedish longitudinal study a composite variable including at least one of the following factors for problem drinking: consumption of at least 250 grams 100% alcohol/week, having taken an eye-opener, to have been apprehended for drunkenness, or to have been drunk ”often”.

According to the Diagnostic and Statistical Manual of Mental Disorders (*DSM-IV-TR*; American Psychiatric Association, 2000), alcohol abuse generally refers to a maladaptive drinking pattern involving recurrent difficulties in one or more of the following areas: failure to fulfil major obligations (e.g., the demands of school, employment, or parenthood), alcohol use in physically hazardous situations (e.g., driving, or skiing), legal difficulties caused by drinking (e.g., arrests for drunken driving), and continued alcohol use without regard to the possible adverse social consequences (e.g., engaging in physical fights). Alcohol dependence is the most severe form of problem drinking. It is a psychobiological syndrome with often severe physical, psychological, and social sequelae (Saunders & Lee, 2000). A diagnosis of alcohol dependence precludes the diagnosis of alcohol abuse. Alcohol dependent individuals are responsible for about 50% of the social, legal, and interpersonal alcohol-related problems in society (Caetano & Cunradi, 2002). The criteria for alcohol dependence includes tolerance, withdrawal, impaired control over alcohol use (e.g., difficulty in cutting down, or drinking more than intended), narrowing of nondrinking activities, and the continued use of alcohol despite knowledge of associated adverse consequences.

DSM- and ICD-diagnosed alcohol abuse and dependency criteria have been applied to several studies; the International Statistical Classification of Diseases and Related Health Problems (ICD; World Health Organization, 1992) is a commonly used alternative to DSM. Different schedules based on diagnostic criteria have been used, for example, Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDASIS; Grant & Hasin, 1992), and Schedules for Clinical Assessment of Neuropsychiatry (SCAN; World Health Organization, 1994). Warner and White (2003) have constructed their own measure based on DSM-IV criteria, and Prescott and Kendler (1999) have adapted items from the Structured Clinical Interview for DSM-IIIR (SCID) and Semi-Structured Assessment for Genetics of Alcoholism (SSAGA). Traditionally, methods based on DSM and ICD-diagnosis use dichotomous classification of the individuals as having problems (i.e., alcoholic) or not having problems (i.e., nonalcoholic).

To study the drinking behavior of adolescents with the same indicators as adult drinking is problematic, because an awareness of and willingness to admit a drinking problem are presumed in many of the measures. Young people simply have not had the amount of drinking experience needed to

produce syndromes such as are probed in the CAGE questionnaire (O'Hare & Tran, 1997). Also the current diagnostic classifications and criteria for substance abuse and dependence are generally assumed to be too severe for adolescents and young adults (Bukstein, 1995; Martin, Langenbucher, Kaczynski, & Chung, 1996; Smith, Collins, Kreisberg, Volpicelli, & Alterman, 1987). For adolescents standardized versions of diagnostic interviews have been created, for example, C-SSAGA-A that has been used for 14-year old Finnish twins (Kaprio, 2006). C-SSAGA-A provides diagnoses and symptom counts of several psychiatric disorders, including alcohol abuse and dependence, given the very dynamic nature of alcohol use and risk-associated behaviors in mid-adolescence.

1.4 Aims of the present study

The aim of the present study was to examine development and precursors of alcohol drinking behavior considering the timing of the antecedents (childhood, adolescence) and of outcomes (adolescence, young adulthood, early middle age) of drinking separately for females and males. Two longitudinal studies, the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) extending from age 8 to 42 and the Mental Health of Young Adults (in Finnish Nuorten Aikuisten Mielenterveys, NAM) extending from age 17 to 22, provided the data. In addition to the study of the precursors of drinking behavior, there were three other themes common to the four original publications (Studies I–IV): analysis of drinking behavior, methods of measuring drinking behavior, and differences between the genders penetrating the other themes. Specific research objectives and hypotheses of Studies I-IV can be summarized as follows:

Study I (JYLS)

(1) What kinds of drinking behavior are found among female and male young adults?

It was assumed that there would be several components of drinking behavior, such as social and problem drinking, some of them being more characteristic of males than of females.

(2) Are there behavioral precursors in early school age and adolescence to young adult problem drinking?

It was expected that adult problem drinking would be associated with early indicators of a lack of adequate control of impulses and delinquent behavior. Adjustment to school was expected to be a resource factor against drinking problems.

(3) Are parental alcohol-related problems and socioeconomic status associated with their offsprings' use of alcohol in young adulthood?

Parental heavy drinking was assumed to be a risk factor for their offsprings' problem drinking. Because of the relative homogeneity of the Finnish population in terms of culture and incomes, socioeconomic status was not expected to be a significant contributor to problem drinking.

Study II (NAM)

(4) What is the predictive value of adolescent psychological well-being on the formation of adult drinking styles?

It was assumed that low psychological well-being in adolescence would be a risk factor for the adoption of a problem drinking style by young adulthood.

(5) What is the relationship between concurrent well-being and drinking style in young adulthood?

It was assumed that problem drinking in young adulthood would be associated with simultaneous lower states of psychological well-being.

(6) Are there gender differences in the relation between former and concurrent well-being to problem drinking?

It was expected that problem drinking is associated with lower former and concurrent psychological well-being more highly among females than males.

(7) Is it useful to categorize problem drinking based on several criteria?

It was expected that the categorization of problem drinking based on several clearly defined criteria would prove useful for the description of individual differences in drinking behavior, and for the study of antecedents and covariants of problem drinking.

Study III (JYLS)

(8) *Is the early age of onset of drinking a risk factor for female and male heavy alcohol use in early middle age?*

It was assumed that the early age at onset of drinking would be a risk factor for later heavy use of alcohol and problem drinking in both genders, and that the risk would be the higher the earlier the use of alcohol was initiated.

(9) What role do parental socioeconomic status, childhood socioemotional behavior, and school performance play in the precursors of the age of onset of drinking?

It was expected that low self-control and aggression assessed before the initiation of drinking would be associated with the early age of onset of drinking. It was expected that a risk group for early onset of drinking would be identified.

Study IV (JYLS)

(10) What is the contribution of family background and childhood and adolescent characteristics to the use of alcohol from late adolescence to young adulthood and early middle age?

It was expected that family background and individuals' problem behavior in childhood and early adolescence would be more highly related to drinking behavior in adolescence and young adulthood than in early middle age because of the shorter length of time.

(11) Is there continuity in drinking behavior from adolescence through young adulthood to early middle age?

It was assumed that continuity in drinking behavior would be more clearly evident during shorter successive time intervals.

(12) Are there differences between genders in the drinking behavior in adulthood and in the precursors of adult drinking behavior?

It was expected that male drinking in adulthood would be heavier than female drinking and that the precursors of drinking behavior would be partly different. In both genders, heavy drinking was expected to be related to problem behaviors, but in males more highly to externalizing problem behaviors, and in females more highly to internalizing problem behaviors corresponding to gender differences in these problem behaviors.

In addition, the use of alcohol of the JYLS and the NAM participants, assessed by different indicators of drinking, was compared in the present study for the analysis of the generalizability of the results. Also the assumption about the usefulness of the categorization of problem drinking (aim 7) was tested in the JYLS data.

2 METHOD

2.1 Participants and procedures

Jyväskylä Longitudinal Study of Personality and Social Development (JYLS)

The ongoing Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), conducted in Finland, provided the participants for Studies I, III, and IV. The JYLS was initiated by Lea Pulkkinen in 1968; the same individuals have been followed over thirty years, from childhood into early middle age (Table 1). Twelve complete school classes of second-grade pupils from both urban and suburban areas of the medium-sized town of Jyväskylä in Central Finland were randomly selected for the study (Pitkänen, 1969; Pulkkinen, 1982, 2006; Pulkkinen et al., 2005). The total number of pupils in these classes was 369 (173 girls and 196 boys) and there was no initial attrition. All of the participants were white ethnic Finns and most of them (93%) were born in 1959.

At ages 8 and 14, data were mainly collected from teachers and peers at school (Table 1). Subgroups of participants were interviewed at ages 14 and 20. At ages 27, 36, and 42, the participants completed a mailed Life-Situation Questionnaire (LSQ) and trained interviewers personally interviewed them. The LSQs and the interviews covered a wide range of content areas including questions on education, family background, social behavior, and substance use. During the interview sessions the participants completed several self-administered questionnaires, including alcoholism screening tests at ages 36 and 42. I was one of the interviewers in 1987 and 2001.

The participation rate of the JYLS has remained high over the years (Table 1). Sample attrition analyses showed that the participants at ages 36 (Sinkkonen & Pulkkinen, 1996) and 42 (Pulkkinen, Fyrstén, Kinnunen, Kinnunen, Pitkänen, & Kokko, 2003) were representative of the original sample. The JYLS sample was also found to be representative of the national age cohort born in 1959 (Pulkkinen et al., 2003; Sinkkonen & Pulkkinen, 1996). At age 42, the

participants represented the whole Finnish age cohort born in 1959 regarding, for example, marital status, number of children, and employment rate, as shown by the comparisons with the data derived from Statistics Finland (Pulkkinen et al., 2003). There were, however, more women among lower white-collar workers and fewer women among blue-collar workers in the sample than in the age cohort group. No difference existed in the higher white-collar workers and in any occupational category for men.

TABLE 1 Data waves, number of participants, and methods of JYLS used in the present Studies I, III, and IV

	Age	Participants	Methods
1968	8	196 boys	Peer nomination
		173 girls	Teacher rating
1974	14	189 boys (96.4%)	Peer nomination
		167 girls (96.5%)	Teacher-rating
			Teacher interview
		77 boys (39.3%)	Participant interview
		77 girls (44.5%)	Parental interview
1980	20	68 men (34.7%)	Participant interview
		67 women (38.7%)	
1986	26-27	171 men (87.2%)	Life-situation questionnaire
		155 women (89.6%)	Participant interview
1995	36	161 men (82.1%)	Life-situation questionnaire
		152 women (87.9%)	Participant interview + inventories
2001	42	151 men (77.0%)	Life-situation questionnaire
		134 women (77.5%)	Participant interview + inventories

In Study I, data at ages 8, 14, and 26-27 (called 27 hereafter) were used. Problem drinking data were available for 164 males and 147 females at age 27. Due to listwise exclusion of cases the number of participants varied according to the methods of data analysis used. In Study III, the age of onset of drinking was collected using all available data at all ages, and it was thus available for 356 participants, representing 96.5% of the entire original sample. Data on the use of alcohol at age 42 were gathered with similar methods as at age 36, and thus adult data at either age were available for 311 to 331 participants depending on the measure used. Attrition analyses showed that the mean age of onset of drinking for the 25 participants (10 women, 15 men) who were not reached at ages 36 or 42 did not differ from the mean age of the 331 participants who were reached in adulthood and for which at least some data on adult drinking were available.

The number of participants in Study IV was 347 (163 women and 184 men), representing 94.0% of the original sample (N = 369). They participated in the study in adulthood (between ages 27 and 42), and 88.8% of them (308 participants) participated at least twice. Two participants died before age 36 and were thus excluded. The number of participants varied in the measures used from 290 to 347 (83.6% to 100.0% of 347). The data were imputed using the

abundant information gathered during this longitudinal study. Information that was missing during the study was not missing completely at random according to Little's MCAR test, $\chi^2(92) = 156.6$, $p = .000$ (Roderick & Little, 1988). Attrition analyses showed that the 20 participants (10 women and 10 men) who did not participate in the follow-up at ages 27 to 42 had been less socially active at ages 8, $t(25.7) = 2.7$, $p = .012$ and 14, $t(25.5) = 6.0$, $p = .000$; more compliant at age 8, $t(363) = -2.1$, $p = .039$; and more anxious at age 14, $t(19.1) = -2.6$, $p = .018$; and smoked less at age 14, $t(25.4) = 5.0$, $p = .000$ than those participating in the follow-up.

Mental Health of Young Adults study (NAM)

A five-year follow-up of high-school students, the Mental Health of Young Adults study (NAM), conducted at the National Public Health Institute in Finland and directed by Kari Poikolainen and Jouko Lönnqvist provided the participants for Study II. It consisted of a baseline study at 1990 and a follow-up at 1995 (Table 2; Poikolainen, Aalto-Setälä, Marttunen, Tuulio-Henriksson, & Lönnqvist, 2000). The baseline study comprised 1518 adolescents attending five urban high schools in Helsinki (approx. 500 000 inhabitants) and five in Jyväskylä (approx. 70 000 inhabitants), located in southern and central Finland, and represented a cross section of urban environments and school entrance requirement levels (Poikolainen, Kanerva, & Lönnqvist, 1995).

TABLE 2 The data collection procedure of NAM used in the present Study II

BASELINE STUDY 1990	Questionnaire 1 1518 high-school students		
mean age 17 (range 15–19)	Returned questionnaire 1492 (98.3%) 668 boys, 824 girls Volunteered for follow-up 267 boys (40.4%) 442 girls (53.6%)		
		Dead *n*=1	Rejected due to missing data *n*=2
FOLLOW-UP STUDY 1995	Questionnaire 2 265 men 441 women		
mean age 22 (range 20–24)	Returned questionnaire 233 men (87.9%) 418 women (94.8%)		

During a regular classroom hour, adolescents were asked to complete a questionnaire that was administered by research assistants. The questionnaire included questions concerning family and educational background, and scales measuring various aspects of mental health, for instance, state and trait anxiety,

self-esteem, somatic symptoms, and defense styles. The students were free to refuse to answer, to respond anonymously, or to give their written consent to take part in the follow-up examination. In all, 1492 students completed the questionnaire. Of these, 785 (52.6%) responded anonymously and 707 (47.4%) volunteered for the future follow-up (Table 2).

The second data collection was carried out in 1995. A questionnaire was mailed to those 442 (62.6%) women and 264 (37.4%) men who had consented to participate in the follow-up study, and this resulted in a high response rate of 92%. The mean age of the respondents was 21.8 years. The questionnaire repeated scales measuring various aspects of mental health and it included items charting the subjects' life situation, educational and occupational career, physical health, and substance use behavior (Poikolainen, Aalto-Setälä, Pitkänen, Tuulio-Henriksson, & Lönnqvist, 1997). The diagnostic interview conducted for 245 participants in 1995 was not used in the present study. I took part in the 1995 data collections.

The participants in the follow-up were mainly born in 1974 (46%), 1973 (32%), or 1972 (18%). The mean age at the time of the baseline study was 16.8 (range 15-20, SD = 0.91). This sample was very homogenous, sharing similar ethnic, linguistic, educational, and social backgrounds. The parents of 53.5% of the participants were professionals, managers, administrators, or clerical employees. In larger cities in Finland, almost 60% of 16-year-olds enter upper secondary school, which prepares them for university studies, and the schooling is free. In the baseline study, no significant differences were found between the anonymous and non-anonymous respondents in family social class, school grade-point average, or in the well-being measures with the exception of some somatic symptoms. In both genders, anonymous respondents reported more somatic symptoms than those who identified themselves, t(df=807) = 2.66, p = .008 for females, t(df=650) = 2.66, p = .008 for men. However, the absolute differences in the symptom scores were not very large: the mean scores were 25.0 (SD = 0.23) for anonymous women, 24.2 (SD = 0.23) for identified women, 22.8 (0.29) for anonymous men, and 21.8 (0.23) for identified men.

Those who did not return the questionnaire in 1995 did not differ significantly from the respondents in the baseline examination. At the time of the follow-up in 1995, more women (72.5%) than men (53.7%) were students in universities or vocational colleges, $\chi^2(1) = 22.4$, $p < .001$, and 15.6% of the males were completing their military service. There was no gender difference in the percentages of the unemployed (15.1% of women and 17.2% of men) or the full-time employed (9.7% of women and 13.9% of men).

2.2 Measures

Use of alcohol

The NAM data on drinking behavior were collected with a mailed follow-up questionnaire at age 22, and the JYLS data on drinking with questionnaires and personal interviews at ages 14, 20, 27, 36, and 42. In the JYLS missing or conflicting information was completed or confirmed by utilizing parallel and retrospective data.

Measures and variables used in Studies I - IV

Variables concerning the age of onset of drinking were used in Studies II and III (Table 3). In Study II concerning the NAM data, two variables were used: the age of onset of regular use and first intoxication. This retrospective information was also used to get an approximation on the use of alcohol at the time of the baseline examination five years earlier. In Study III concerning JYLS data, one variable was used for the onset of drinking and the criterion was that the participant had been drunk or admitted using alcohol once in a while; mere tasting of alcohol was not considered to indicate onset. It was determined at ages 14, 20, 27, 36, and 42 using several questions such as, "Do you use alcohol?", "How often do you use alcohol?", "Have you been drunk?", and "At what age did you start using alcohol?", giving priority to data collected closest to the actual age of onset.

In Study I, 15 items concerning drinking behavior of the JYLS participants at age 27 were included in a factor analysis. This resulted in three factors: social, problem, and controlled drinking. Corresponding factor scores were used in data analysis. In addition, a three-point scale for problem drinking was constructed. The main criteria for the categorization of participants on that scale were arrests for alcohol abuse and the number of affirmative answers to the CAGE 4-item alcoholism screening test (Ewing, 1984), but all available information on the participants' problem drinking behavior in young adulthood was taken into account.

In Study II, four categories for current drinking behavior of the 22-year old NAM participants were formed using the combined scores of four indicators: consequences caused by drinking, the CAGE Questionnaire, annual use of alcohol, and frequency of intoxication. Participants were first classified into three groups for each indicator, and on the basis of them they were categorized into four groups (non-user, non-problem drinker, presumptive problem drinker, and problem drinker) using exact criteria.

In Study III, four indicators of the adult use of alcohol of the JYLS participants at age 42 were used: frequency of drinking, binge drinking, CAGE, and the 9-item alcoholism screening test Mm-MAST (Kristenson & Trell, 1982). In Study IV, a dichotomised variable of drinking or not drinking at age 14 was used. Heavy drinking between ages 15 and 20 was coded using data on arrests in local police records related to intoxicated behavior in public places, and data

on the frequency of drinking and intoxication collected at ages 20 to 42. For drinking in adulthood, four indicators that were available at both ages 27 and 42 were used; frequency of drinking, binge drinking, CAGE, and problems due to drinking.

TABLE 3 Variables for drinking behavior (x) and items for the consequences due to drinking (+) used in Studies I - IV

	NAM		JYLS	
	Study II	Study I	III	IV
Onset age	X		X	
Drinking at age 14				X
Heavy drinking by age 20				X
Frequency of being drunk	X	X		
Binge drinking (frequency of being drunk or 5 drinks or more in a row)			X	X
Annual use of alcohol (grams of ethanol)	X			
CAGE Questionnaire	X	X	X	X
Mm-MAST			X	
Annual frequency of drinking (sum)			X	X
1 bottle of beer or a glass of wine		X		
2-4 bottles of beer or half a bottle of wine		X		
5 bottles of beer or half a bottle of spirits		X		
Drinking for medication, for depression, when meeting friends, at dinner		X		
Preference for beer, wine, spirits		X		
Money spent on alcohol weekly		X		
Consequences due to drinking (sum)	X	X		X
- physical fight	+	+		+
- broken an engagement	+	+		
- had an accident	+	+		+
- damaged a friendship or an intimate relationship	+	+		+
- been involved in a (verbal) quarrel	+			+
- experienced episodic heavy drinking	+			+
- absence from work				+
- risk for the discontinuation of employment				+
- police contacts (arrests, drunken driving etc.)	+	X		+
- other	+	+		+

Comparison of the measures used in the two data sets

In 1995, a follow-up study was conducted in both data sets, the JYLS and the NAM, including similar questions concerning drinking behavior. The data sets represented two different cohorts: the JYLS participants were mainly born in 1959, and the NAM participants mainly in 1972-74. All JYLS participants were students in elementary schools of Jyväskylä in 1968, and by coincidence, 56.9% of the NAM participants were students in higher secondary schools of Jyväskylä in 1990. All NAM participants were higher secondary school students; 39.8% of the JYLS participants attended higher secondary school.

Table 4 presents the means of corresponding indicators of drinking behavior in the NAM and the JYLS, separately for females and males. In 1995, drinking to intoxication was more common among 22-year-old NAM females than among 36-year-old JYLS females, t(df = 253.1) = -6.0, p = .000 for the frequency of being drunk, and t(df = 294.3) = -8.3, p = .000 binge drinking. Moreover, the NAM females had experienced problems due to drinking more often than the JYLS females, t(df = 232.9) = -4.8, p = .000. The 22-year-old NAM males had lower CAGE scores than the 36-year-old JYLS males, t(df = 269.3) = -4.3, p = .000, but they reported being drunk more often than the JYLS males, t(df = 390) = -4.6, p = .000.

In Study I, a problem drinking categorization was used for the JYLS participants at age 27, where the main criteria were documented arrests for alcohol abuse and affirmative answers to the CAGE questionnaire. Other variables for drinking behavior that had high loadings on the factor for problem drinking were used for ascertaining the severity of drinking problems. For Study II (NAM), a categorization of problem drinking with clearly defined criteria was created based on four measures: annual consumption of alcohol, frequency of intoxication, CAGE, and number of problems due to drinking. In Study IV (JYLS), continuous variables were used to indicate problem drinking by ages 27 and 42, but heavy use of alcohol between ages 15 and 20 was categorized using data on arrests for alcohol abuse, and data on annual consumption and intoxication frequency collected at age 20 and retrospectively at ages 27-42. Table 5 presents the distributions of females and males into these categories.

It can be seen (Table 5; first three lines) for males that the proportion of non-problem drinkers was about the same in the NAM (age 22) and JYLS (ages 20 and 27), but there were more problem drinkers among JYLS males than among the NAM males, probably due to differences in the criteria used. For females, however, a smaller proportion in the NAM than in the JYLS were categorized as non-problem drinkers, the NAM females being categorized as presumptive problem drinkers more often than the JYLS females. The proportion of problem drinkers among the JYLS females decreased from late adolescence to young adulthood.

One of the aims of Study II (NAM) was to formulate exact criteria for problem drinking usable for different data sets such as the JYLS. For the present comparison of the measures, the Study II criteria were applied to the categorization of the JYLS participants at age 27 (recategorization) and at ages 36 and 42 (Table 5; three bottom lines). The measure used at age 27 in the JYLS slightly differed from the NAM measure, but at ages 36 and 42 the measures were the same in the JYLS and NAM studies. When the Study II criteria for problem drinking categorization were used for the JYLS participants at ages 27, 36, and 42, the distributions of the JYLS males did not differ at $p < .01$ level from the distribution of the NAM males at age 22. Nevertheless, significant differences in the distributions of the JYLS females compared to the NAM females at age 22 (in 1995) were found: age 27, $\chi^2(3) = 80.9$, $p < .001$; age 36 (in

TABLE 4 Indicators of drinking behavior in the two follow-up studies: means and standard deviations separately for females and males.

	NAM at age 22 in 1995			JYLS at age 27 in 1986			JYLS at age 36 in 1995			JYLS at age 42 in 2001		
	n	Mean	*SD*	*n*	Mean	*SD*	*n*	Mean	*SD*	*n*	Mean	*SD*
Females												
Frequency of drinking (0–365 times/year)	417	58.15	69.80	154	48.64[a]	71.11	149	72.95	88.09	132	78.39	81.86
Annual use of alcohol (grams)	417	2436.55	3590.61	154	1001.69[a]	1298.18	149	2150.82	3303.83	132	2652.91[a]	6320.12
Frequency of being drunk[b]	396	2.80	1.56	139	.68[a]	.80	149	1.37	1.52	132	1.15	1.53
Binge drinking (being drunk or at least 5 drinks in a row)[c]	417	2.27	1.23	154	1.42	1.16	150	1.55	1.28	132	1.49	1.36
Problems due to drinking (0–3 or more)	417	1.21	1.15	146	.13[a]	.47	128	.70	1.02	111	.56	.97
CAGE (0–8)[d]	417	1.08	1.36	142	.09[a]	.37	148	.98	1.41	129	1.27	1.76
Mm-Mast (0–9)							137	3.22	2.06	124	2.68	1.85
Onset age	386	15.93	1.76							165	15.58[a]	2.52
Males												
Frequency of drinking (0–365 times/year)	233	95.34	101.13	168	105.60[a]	117.59	156	113.41	111.78	147	133.24	118.48
Annual use of alcohol (grams)	233	5185.13	7792.91	168	3025.86[a]	3264.56	156	5600.00	7262.73	147	6867.67[a]	8625.25
Frequency of being drunk[b]	223	3.57	1.79	144	2.06[a]	1.77	159	2.69	1.97	147	2.35	1.87
Binge drinking (being drunk or at least 5 drinks in a row)[c]	233	2.78	1.35	169	2.67	1.33	160	2.60	1.45	147	2.51	1.45
Problems due to drinking (0–3 or more)	232	1.36	1.27	156	.75[a]	1.11	147	1.37	1.28	118	1.47	1.29
CAGE (0–8)[d]	231	1.25	1.45	149	1.03[a]	1.37	159	2.05	2.00	146	2.42	2.18
Mm-Mast (0–9)							146	4.86	2.55	130	4.78	2.36
Onset age	215	15.82	1.60							191	15.35[a]	2.28

Note. [a]The variable was slightly different from the one used in the NAM study described in Study II; exact descriptions of the JYLS variables are presented in Studies III and IV. [b]The scale varied from 0=not at all to 7=several times a week. [c]The scale varied from 0=not at all to 5=several times a week. [d]JYLS at age 27 (0-4).

TABLE 5 Drinking categories used for the NAM participants born 1973 and for the JYLS participants born 1959; and the JYLS participants grouped (JYLS 27-42) according to the criteria used in Study II.

		Females	%				Males	%			
		n	non-user	non-problem drinker	presumptive problem drinker	problem drinker	*n*	non-user	non-problem drinker	presumptive problem drinker	problem drinker
NAM	Drinking at age 22 (Study II)	418	6.9	39.9	43.5	9.6	233	4.7	39.9	37.3	18.0
JYLS	Drinking by age 20 (Study IV)[a]	155	4.5	59.4	17.4	18.7	181	4.4	38.1	23.8	33.7
JYLS	Drinking at age 27 (Study I)	147	2.0	79.6	17.0	1.4	164	3.0	38.4	27.4	31.1
JYLS	Drinking at age 27	163	1.8	81.0	16.6	0.6	177	2.8	39.0	48.0	9.6
JYLS	Drinking at age 36	150	3.3	62.7	30.7	3.3	166	4.2	33.1	47.6	14.9
JYLS	Drinking at age 42	133	2.3	63.9	29.3	4.5	158	5.1	31.6	48.1	12.0

Note. [a]Coded using prospective and retrospective data concerning ages 15 to 20.

TABLE 6 Number of times the JYLS participants were categorized into each of the drinking categories formed in Study II (NAM); $N = 127$ for females and $N = 136$ for males participating in the study at ages 27, 36, and 42.

	Females	%			Males	%		
	non-user	non-problem drinker	presumptive problem drinker	problem drinker	non-user	non-problem drinker	presumptive problem drinker	problem drinker
Categorized once	88	25	39	100	75	34	33	68
twice	12	19	50	0	16	24	31	26
three times	0	56	11	0	8	41	35	6
n^a	8	116	56	8	12	70	99	34

Note. [a]*n* refers to the number of participants who appeared in the category one, two, or three times across ages 27, 36, and 42. *n* exceeds *N*, because the same individual may appear in one, two, or three drinking categories.

1995), $\chi^2(3) = 24.8$, $p < .001$; and age 42, $\chi^2(3) = 24.6$, $p < .001$. There were more non-problem drinkers among the JYLS than the NAM females and more presumptive problem drinkers in the 22-year-old NAM than in the JYLS females.

The comparison of the categorization used in Study I for the JYLS participants at age 27 and their recategorization using the Study II criteria (Table 5; lines 3 and 4) revealed that the distributions for females did not differ significantly. For males, there were less problem drinkers when the Study II criteria were used than in the original categorization. Individual stability over time in the Study II drinking categories was highest among non-users and presumptive problem drinkers in both genders (Table 6). None of the JYLS females were categorized as a problem drinker even twice at ages 27, 36, and 42; one forth of the JYLS males were classified as problem drinkers twice and 6% three times. Five problem drinkers had died by age 42.

Family background

Socioeconomic status of the family of origin was used in all of the JYLS Studies. In Study I, it was coded using the sum of the main occupational status of the participant's mother and father, which was collected with the mailed questionnaire in 1986. In Studies III and IV the coding was based on the participants' father's occupation (or the mother's occupation, if she was a sole provider) in the school register in 1968.

Parental use of alcohol at the time when the child lived with the parents was used in two of the JYLS Studies. In Study I, it was categorized on the basis of the data collected at ages 14, 20, and 27. The heaviest use was coded and no distinction was made as to whether alcohol abuse existed in the father or mother or in a stepparent. However, the stepparent was included only if he/she lived with the child. Four categories were used: low consumption, heavy consumption but no reported problems, heavy consumption and mild problems, and severe problems due to drinking. Because of the non-linearity of the categories and the threshold effect found in Study I, parental use of alcohol was used as a dichotomized variable (low consumption vs. heavy consumption) in Study IV.

In Study IV two additional measures concerning family background were used: a dichotomized variable for maternal smoking and a composite score for child-centeredness in parenting. Child-centeredness was assessed at age 27 based on the participants' recollections of parenting practices and the home environment when they were 14 years old (Kokko & Pulkkinen, 2000).

Social behavior and school success

Data on socio-emotional behavior were collected within the model of emotional and behavioral regulation (Pitkänen, 1969; Pulkkinen, 1982, 1995, 2006; Pulkkinen et al., 2005) including measures for low self-control (aggression and

anxiety) and high self-control (constructiveness and compliance) as well as for social activity and passivity. In Study I, data collected with peer nominations and teacher ratings at ages 8 and 14, and with self-rating at age 27 were used. In Study III, peer nomination and teacher ratings at age 8 were utilized, and in Study IV, teacher ratings at ages 8 and 14. Teacher rated school success at age 8 was used in the JYLS studies I, III, and IV, and grade point average at age 14 in Studies I and IV. In Study I, a sum score for conduct problems at age 14, and in Study IV, truancy reported by teacher, smoking, and attainment to upper secondary education were also used as additional indicators of (mal)adjustment in adolescence. For adult maladjustment, criminality excluding alcohol-related offences was used in Study I.

Psychological well-being

In Study II concerning the NAM data, seven psychological well-being measures were used both in the baseline study (mean age 16.8) and in the follow-up (mean age 21.8): self-esteem (Rosenberg, 1965), trait anxiety (The State-Trait Anxiety Inventory by Spielberger, Gorsuch, & Lushene, 1970), somatic symptoms (Aro, 1981), immature/mature/neurotic defense styles (The Defense Style Questionnaire by Bond, Gardner, & Sigal, 1983), and eating concerns (questions concerning both anxiety about being overweight and binge eating for females, but only binge eating question for males). Also a measure of overall psychological well-being was calculated on the basis of standardized values of the seven well-being measures, separately for females and males, at baseline and at follow-up. Additionally, a 36-item version of the General Health Questionnaire (Goldberg, 1972) that measures change in well-being during the last month was used in the follow-up study.

2.3 Data analysis

Pearson correlation coefficients were used in all of the four studies to examine the interrelationships between the variables for females and males separately. Fisher's transformation of the correlation coefficient was used to illuminate gender differences in the correlations. In Studies II and IV, the *t*-test for independent samples was used to study the mean-level differences between genders, and the *t*-test for paired samples was used to study changes in drinking behavior and well-being over time. Differences between the behavioral characteristics (Study I) and drinking style categories (Study II) were studied using one-way ANOVA and Scheffe's test. Factor analysis (principal factor axis method) and a varimax rotation were used in Study I for the study of components of drinking behavior.

Multivariate analysis of variance was used in Study I for the analysis of interaction effects between the precursors and problem drinking. In Study II, differences in overall mean levels between drinking style categories (Grouping)

for each psychological well-being measure were determined with a series of 4 X 2 (Grouping X Time) repeated measure multivariate analyses of variance. In Study III, the main effects of the age of onset of drinking and gender, and their interaction on the four indicators of adult use of alcohol were studied by multivariate analysis of variance (MANOVA) with Wilks' lambda test. Also, the effects of the socioemotional behavior and the socioeconomic status of the family on the relationship of the age of onset of drinking and the indicators of adult alcohol use were studied by adding these factors as covariates into the MANOVA model.

Linear regression analysis was used in Studies I, III, and IV. In Study I, the stepwise method was used to select precursors of problem drinking. In Study III, the connections of childhood socioemotional behavior, school success, school class, and socioeconomic status of the family to the age of onset of drinking were studied primarily by regression analysis, but also covariance analysis, χ^2 –test, and exact test with the Monte Carlo method were used. In Study IV, the predictability of drinking behavior at different ages on the basis of family background and child and adolescent behavioral characteristics was studied using regression analysis. The variables were grouped into eight blocks. Linear regression analysis was first used to investigate the variation of each indicator of drinking behavior explained by each block of variables entered. As the second step, hierarchal linear regression analysis was used to study the change of R^2 for the blocks of variables entered. As the third step, stepwise regression analysis was used to select a smaller set of predictive variables for each indicator of drinking behavior.

In the overview of the risk and resource factors to drinking behavior, Pearson correlations, eta squares, and Cohen's f^2, were used as measures of effect size (Becker, 2006; Nummenmaa, 2005). All analyses were conducted using the SPSS statistical analysis software program.

3 OVERVIEW OF THE ORIGINAL STUDIES

3.1 Study I: Precursors to problem drinking in young adulthood

Pulkkinen, L. & Pitkänen, T. (1994). A prospective study on the precursors to problem drinking in young adulthood. *Journal of Studies on Alcohol*, 55, 578-587.

The ongoing Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) provided the participants (N = 369) for the present study. Data collected at ages 8, 14, and 27 were used to analyze individual differences, including gender differences, in young adult drinking behavior; behavioral precursors of adult problem drinking; and the effects of parental alcohol-related problems on their offsprings' use of alcohol. Three components of drinking habits were obtained at age 27: controlled, social, and problem drinking. Controlled drinking was more frequent among women than men. Both male drinking types (social and problem drinking) involved the consumption of alcohol in large quantities, but indicators of dependence on alcohol and problems caused by drinking were characteristic of problem drinking only. Moderate to severe problem drinking, as defined mainly by the CAGE Questionnaire and arrests for alcohol abuse, was obtained for 26% of the men and 1% of the women, and presumptive problem drinking was obtained for 23% of the men and 15% of the women.

Problem drinking at age 27 was directly accounted for by poor success in school, conduct problems, and low self-control at age 14. Variables at age 8 that contributed indirectly via adolescent behavior to adult problem drinking were high aggression and low prosociality for men, and high anxiety, low prosociality and poor school success for women. There were differences between females and males in the effect of social anxiety; in males, anxiety was a resource factor against frequent drinking; in females, it was a risk factor for problem drinking.

Parental drinking was related to male but not to female problem drinking. It had also a significant threshold effect on male offsprings' drinking: there was

less problem drinking among the male offspring if parental drinking was low, than if heavy consumption of alcohol, problem drinking, or alcoholism was observed in the parents. When parental drinking was associated with the son's conduct problems, the risk was highest. However, one-third of the sons of alcoholic parents had no problems with alcohol in young adulthood.

3.2 Study II: Problem drinking and psychological well-being

Pitkänen, T. Problem drinking and psychological well-being: a five-year follow-up study from adolescence to young adulthood. *Scandinavian Journal of Psychology*, 40, 197-207.

A five-year follow-up of high school students, the Mental Health of Young Adults study (NAM) conducted at the National Public Health Institute, provided the participants for this study. The psychological well-being of 651 Finnish adolescents (approximately age 17) was followed to young adulthood (age 22) and examined in terms of their alcohol drinking styles at age 22. The young adults were grouped into four categories delineating drinking style (non-users, non-problem drinkers, presumptive problem drinkers, and problem drinkers) using internationally accepted criteria. The groups were examined for evolved paths of psychological well-being. The psychological profile of the participants was comprised of seven variables: self-esteem, trait anxiety, somatic symptoms, eating concerns, and mature, neurotic, and immature defense styles.

The average annual alcohol consumption at age 22 was higher and intoxication more frequent in men than in women. Nevertheless, the CAGE scores did not differ between the genders. According to the retrospective data, there were no differences in the age of onset of alcohol use between the genders. The average age of onset of regular use (at least once a month) was 16.6 years, and the age of the first intoxication 16.1 years; the figures indicated that most adolescents had initiated the use of alcohol by the time of the baseline examination at about age 17.

In the baseline examination, female problem drinkers at age 22 differed significantly from their non-problem drinking counterparts in self-esteem, trait anxiety, somatic symptoms, eating concerns, and immature defense style, that is, in all psychological well-being measures except mature and neurotic defense styles. By the time of the second data collection in young adulthood, these differences had all increased. As well, differences between the female non-problem drinkers and presumptive problem drinkers had also increased. The level of overall psychological well-being of male problem drinkers was lower than that of non-problem drinkers already in adolescence. However, only the differences in somatic symptoms and immature defense style, as single measures, were statistically significant. By early adulthood, differences in the

use of an immature defense style had decreased, but new significant differences between problem drinkers and both non-problem and presumptive problem drinkers had emerged in binge eating, trait anxiety, and lack of mature defense style, indicating that well-being was lower among the problem drinkers. In addition, the difference in somatic symptoms had increased.

In conclusion, the present categorization of drinking into a compact measure that covers different aspects of problem drinking proved useful in the study of the relations between drinking and psychological well-being. Poor psychological well-being in adolescence emerged as a risk factor for later problem drinking in young adulthood for both females and males, and these differences became more pronounced during the transition to adulthood.

3.3 Study III: Age of onset of drinking and adult alcohol use

Pitkänen, T., Lyyra, A-L., & Pulkkinen, L. (2005). Age of onset of drinking and the use of alcohol in adulthood: a follow-up study from age 8-42 for females and males. *Addiction*, 100, 652-661.

The main aim was to study longitudinally the relation between the age of onset of drinking and several indicators of alcohol use in early middle age. Also the childhood precursors to early age of onset were studied. The Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) data on alcohol consumption and the age of onset of drinking gathered at ages 14, 20, 27, 36, and 42, and on behavioral data gathered at age 8 were utilized. The participants (155 women and 176 men) represented 90.4% of the original sample. Four indicators of the adult use of alcohol were used: frequency of drinking, binge drinking, CAGE, and Mm-MAST. Socio-emotional behavior at age 8 was assessed using teacher ratings and peer nominations.

Childhood socioemotional behavior, school success, and the socioeconomic status of the parents did not predict the age of onset of drinking in males. Low self-control and high aggressiveness were slight risk factors for females, especially if the girl's father was in a blue-collar occupation. The average age of onset of drinking was 15.5 years with no significant gender difference. However, the level of adult alcohol use and alcohol problems was significantly higher in men than in women.

Early onset of drinking was related to the four indicators of the use of alcohol in adulthood in both men and women. The effect of gender on adult alcohol use was highly significant, as was the effect of the age of onset of drinking, but their interaction was not significant. Thus the effect of the age of onset of drinking on adult alcohol use was similar for men and women. For both genders, a low age of onset of drinking was a significant risk factor for high consumption of alcohol and problem drinking in adulthood. Male and female participants who initiated drinking prior to age 14 scored higher in adult

alcohol use indicators than individuals who began drinking at age 18 or later (the legal age limit) and even higher than those who began drinking at age 16 to 17. For binge drinking, the higher risk also concerned the participants who started the use of alcohol at age 14 to 15 compared to those who initiated drinking at 16 or later.

3.4 Study IV: A developmental approach to drinking behavior

Pitkänen, T., Kokko, K., Lyyra, A-L., & Pulkkinen, L. (2006). *A developmental approach to problem drinking behavior in adulthood: a follow-up study from age 8 to age 42*. Manuscript submitted for publication.

The ongoing Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) provided the participants (163 females and 184 males) for this study. The main aim was to assess links from family background as well as child (age 8) and adolescent (age 14) socioemotional behavior, school performance, and maladjustment to heavy drinking by age 20 and to several indicators of adult alcohol use at ages 27 and 42, separately for females and males. Also the role of former drinking in the prediction of later drinking behavior was studied.

The results showed for both genders that problems due to drinking were more predictable than the frequency of drinking on the basis of home adversities and problem behaviors, and in males, also more predictable than binge drinking and high scores in the CAGE alcoholism screening test. In females, problems due to the use of alcohol, binge drinking, and CAGE were more similarly predicted by precursors than in males. Furthermore, problem drinking in males and females was more predictable in middle age than in young adulthood. Continuity in drinking behavior was high in adulthood. However, drinking in early adolescence was also a significant predictor of adult drinking, particularly in middle age.

In early adolescence, more than a third of the participants had initiated the use of alcohol and smoking. Poor school success, problems in social behavior and maladjustment in school were related to concurrent drinking, especially in females. Drinking in early adolescence was preceded by parental substance use and, in females, by low child-centeredness. For both genders, drinking at age 14 had independent power as a predictor of adult drinking behavior when familial and behavioral precursors were controlled.

The consumption of alcohol was higher in males than in females, and also the antecedents of drinking behavior were partly different between the genders. Low child-centeredness in parenting, adolescent externalizing problem behaviors, poor school success, and maladjustment predicted problem drinking for both genders. Additionally, maternal smoking and social passivity predicted female problem drinking, whereas parental drinking, social activity, low compliance, and externalizing problem behaviors in childhood predicted male

problem drinking. Both female and male binge drinking in middle age was preceded by smoking in adolescence, while low school success and maternal smoking were significant predictors to female binge drinking. No significant sets of precursors were found for the frequency of male drinking in middle age, but high frequency of female drinking was preceded by high social activity in childhood and smoking in adolescence.

Study IV was conducted in collaboration with members from five other longitudinal studies [the Michigan study of Adolescent Life Transitions (represented by Steve Peck), the Monitoring the Future study (represented by John Schulenberg), the Columbia County Longitudinal Study (represented by Eric Dubow), the Minnesota Longitudinal Study (represented by Andrew Collins), and the United Kingdom: the National Child Development Study (represented by Jennifer Maggs)] in the framework of the Center for the Analysis of Pathways from Childhood to Adulthood (CAPCA, 2006). The research team was united in using long-term longitudinal studies to try to understand how substance use and abuse unfold over time from childhood through adolescence and into adulthood. The present goal is to publish the six articles with a common introduction in a special issue of a journal.

4 DISCUSSION

The aim of the present study was to examine the development and precursors to alcohol drinking behavior considering the timing of the antecedents and outcomes of drinking in two longitudinal studies: in the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS) extending from age 8 to 42, and in the Mental Health of Young Adults (NAM) extending from age 17 to 22. There were four main themes in Studies I to IV: analysis of drinking behavior, methods of measuring drinking behavior, precursors of drinking behavior, and differences between the genders penetrating the three other themes.

4.1 Continuity of drinking behavior

About half of the participants of both longitudinal studies, the JYLS and the NAM, had shown some signs of heavy drinking, such as high annual consumption, frequent binge drinking, or negative consequences due to drinking by young adulthood: 36% of the JYLS females and 58% of males by age 20 (1980), and by 53% of the NAM females and 55% of males at about age 22, in 1995. At early middle age, one-third of the JYLS females and two-thirds of males acknowledged that the use of alcohol had caused problems for them in, for instance, human relationships and work. Continuity in drinking behavior was high, even though individual variation was also considerable. Drinking in early adolescence was a significant predictor of adult heavy drinking.

In Finland, the legal minimum age has been 18 since 1969. In spite of this, the majority of the JYLS and NAM participants used alcohol at age 16, which was the case also in other European countries in 2003 (Hibell et al., 2004). In accordance with the results of other studies (e.g., Lintonen et al., 2000; Flory et al., 2004; Samson et al., 1989), there were no differences between the genders in the age of onset of drinking either in the JYLS or in the NAM. The drinking habits of females and males began, however, to divert after the initiation, with males consuming more alcohol than females.

The frequency of being drunk was higher among the 22-year-old NAM participants than among the 36-year-old JYLS participants in 1995, but there were no differences in the annual consumption of alcohol. This was in accordance with the results of the Finnish Drinking Habit Surveys (Metso et al., 2002) showing that intoxication consumption is most common among the younger age groups, but the overall consumption of alcohol is about the same until middle age.

The maturational effect suggested by Grant et al. (1988) and Jessor et al. (1991) could not be strictly tested in the present study because of differences in the scales used in the JYLS at ages 20 and 27. However, the fact that while there were no differences in the distributions of males into problem drinking categories at ages 20 and 27, compared to a marked decrease in problem drinking that emerged among females suggested that maturation had taken place more often among females. Most women reported not using alcohol during pregnancy and breast-feeding and thus the decrease in drinking was at least partly due to their family responsibilities when the children were young. Being a mother has been found to have an especially strong decreasing effect on a woman's drinking habits when her children are under school age (Ahlström, 1987). Also, the results of Alati, Lawlor, Najman, Williams, Bor, & O'Callaghan (2005) indicate that there is variation in the meaning of alcohol consumption at different stages in the life of females. The proportion of presumptive and problem drinkers among JYLS females doubled towards early middle age. It is possible that females, including those who had used alcohol in early adolescence, control their drinking behavior in young adulthood due to pregnancy and child-care; but in early middle age, their drinking behavior correlates with adolescent drinking more highly.

The comparison of female drinking in the JYLS and NAM suggests a cohort difference: females in the younger generation used more alcohol and more heavily than females in the older generation. In a true cohort difference case one might expect that the NAM females would consume substantially more alcohol when they reach early middle age than the JYLS participants. It also should be noted, however, that females in the older generation increased their consumption of alcohol with age coinciding with the increase of the total consumption of alcohol in Finland towards the end of the 20th century and the corresponding increasing tolerance toward drinking that occurred during this time, particularly among females. However, future alcohol politics and attitudes toward drinking may affect the course of drinking behavior of the NAM females, even perhaps in the opposite direction.

In spite of the increase in female drinking towards the end of the century, women used less alcohol than men and their drinking was more often controlled. The proportion of the NAM and JYLS females in the problem drinking categories was much lower than that of males, even though the criteria for annual consumption were lower for females than for males.

The proportion of the JYLS male non-problem drinkers remained about the same from late adolescence to middle age; there was more variability in the

proportions of presumptive and problem drinkers, but this could be due to differences in the measures used. Stability in male drinking behavior until early middle age has been found, for example, by Karlamanga et al. (2006). For both genders, binge-drinking habits seemed to form before young adulthood and have continuity to early middle age as also found by Jefferis et al. (2005); however, the frequency of drinking and the amount of problems due to drinking increased significantly in adulthood.

At age 42, weekly drinking to intoxication — defined by reported drunkenness or by drinking five or more portions on one occasion — was admitted to by 22% of the JYLS males and 7% of the females, which was about the same as 15 years earlier, at age 27 (26% and 4%, respectively). Weekly drinking to intoxication was admitted to by 27% of the NAM males and 10% of females at age 22. These figures of the JYLS and the NAM correspond to those obtained in the Health Behavior Survey among the Finnish Adult Population (Helakorpi et al., 2003). In an American population study of 3473 adults, 18 years of age or older, the prevalence of binge drinking (5+ drinks) at least four times a month was much lower: 12% for males and 4% for females in the age group 18-34, and 6% and 1% in the age group 35-49 (Bensley et al., 2000).

Generally, continuity in drinking was highest between successive times of measurement and higher in adulthood than earlier, as was expected on the basis of the twin laws of longitudinal research proposed by Caspi and Roberts (1999), where stability increases with a decrease in the time interval between measurement points and with an increase in the age of the participants. Nevertheless, there were almost no differences in correlations between adolescent and middle age drinking depending on whether adolescent drinking was assessed as drinking onset by age 14 or heavy drinking by age 20. Drinking in early adolescence was significantly linked to female and male drinking behavior in early middle age, as also found by Jefferis et al. (2005). If information about the use of alcohol at age 27 was also included (besides age 14), the prediction of drinking behavior in early middle age improved significantly. Kerr et al. (2002) pointed out that the question of the stability of consumption is a key to the questions of mortality and diseases attributable to heavy consumption. Also, Fan et al. (2006) found that lifetime drinking patterns were significantly related to the prevalence of metabolic syndrome.

4.2 Indicators of drinking behavior

Three components of drinking habits, social, problem, and controlled drinking emerged in young adulthood as described in Study I. Social and problem drinking were typical of males. These involved the consumption of alcohol in large quantities, but indicators of dependence on alcohol and problems caused by drinking were characteristic of problem drinking only. For Study II, a categorization of problem drinking based on several clearly defined criteria was

created. In Studies III and IV, the relations between the frequency of drinking, binge drinking, alcoholism screening tests, and number of problems due to drinking were analyzed further. The results showed that different indicators had different functions and predictors. In the categorization of problem drinking it proved valuable to use several categories instead of a dichotomization.

Measuring quantity and frequency of drinking

Research on drinking behavior in the JYLS has been a long process. Since the inception of the study research methods have advanced and knowledge about drinking behavior has increased, and thus it would not have been meaningful to continue with the methods used in 1974, 1980 or 1987 in the later data waves. Quantity and frequency of drinking were asked at every data collection, but the scale became more precise and new options were added each time. This produced more exact responses but made age-to-age comparison more difficult. Also, the age of the participants set limits on the measures used: it was not meaningful to ask same questions about the use of alcohol and its consequences from 14-year-old and 42-year-old participants. For the comparison of the results between the JYLS and the NAM, it was fortunate that the measures were mainly the same in 1995.

In the NAM study, 5% of the participants reported that they had never used alcohol and 1% had quit drinking. In the JYLS study, all participants admitted using alcohol by age 30 according to the cumulative longitudinal data; however, at ages 36 and 42, about five percent of the participants – instead of zero – chose the option "never used alcohol" in the mailed questionnaire. Also Kerr et al. (2002) and Midanik and Greenfield (2003) have found inconsistencies in responses to drinking status questions. Instead of asking to skip the rest of the questions concerning drinking – if someone denies using alcohol – it might be wise to continue asking every participant all of the questions on the questionnaire. Inconsistencies are also a concern when studying the age of onset of drinking. The age of onset was generally recalled in early middle age to be two years older than the age that was reported closer to the actual onset in the JYLS. Bailey, Flewelling, and Rachal (1992) and Weinfurt and Bush (1996) have noted logical errors in the responses of adolescents even in 1-year time perspectives. It is possible that younger respondents understand the questions and evaluate the used amounts of alcohol in a different way than older respondents. Errors may emerge due to the fact that participants use their present adult consumption as a frame of reference.

The quantity-frequency table created for and used in the present studies seemed to function well. The measure was somewhat similar to the graduated frequency (GF) measure recommended by the World Health Organization (2000). The latter includes a series of questions probing the frequency of consuming different levels of quantities, as in the measure used in the present study, but starting with the frequency of consuming a large number of drinks and ending with the frequency of consuming lesser quantities. Gmel et al.

(2006) have criticized the use of the GF measure in cross-cultural studies, because the frequency figures may result in the overestimation of the frequency (the range of drinking occasions can exceed 365 days a year) and because the method is too complicated (many respondents reported only one single category, indicating no variation in drinking). The problems were mostly due to the administration of the GF in countries such as Uganda, Sri Lanka, and Costa Rica, where there was little experience with survey research in general, and where literacy is typically lower than in Western societies. However, as shown by the JYLS and the NAM as well as by Gmel et al. (2006), GF type measures function well in Finland. In each data collection wave, the sum of drinking occasions exceeding 365 was less than 5% of the JYLS and the NAM participants. It was possible that some participants had had repeated drinking occasions on some days; only a couple of the former heavy drinkers had clearly overestimated their former use as revealed by their responses to other questions. Also as noted by Greenfield (2000), if the participant meant the lowest category of each frequency interval, the calculations based on means may have caused the error. In the event that a participant had chosen only one frequency option, this was interpreted as a sign of low variation in their drinking behavior. The hypothesis of stability is also behind the widely used measure of beverage-specific habitual frequency of drinking (e.g., Vahtera et al., 2002).

The total annual consumption of alcohol was lower in the JYLS than could be estimated on the basis of the statistics on purchased alcohol per capita in Finland. The same discrepancy was found by Gmel et al. (2006) concerning at least both Finland and the USA, as well as by researchers who have compared sales to reported consumption (Embree & Whitehead, 1993; Göransson & Hanson, 1994). Personal interviews in the JYLS and the NAM complemented questionnaire data and confirmed the conception that responses to questionnaires were underestimations of consumption rather than overestimations. The underestimation is affected by the problem of recall and social desirability effect (Embree & Whitehead, 1993).

Alcohol use is not continuous throughout the calendar year but instead is influenced by external contingencies (e.g., school schedules, holidays) according to time line analyses conducted by Greenbaum et al. (2005). Alcohol consumption among Finnish people is traditionally linked to national holidays. Due to periodic peaks of heavy consumption of alcohol, it appeared better to ask for the quantity and frequency of drinking during the last year than asking it during the last month.

The question about the frequency of drinking to intoxication did not catch all heavy consumers of alcohol. For instance, some participants who in the quantity-frequency table reported that they drank over ten portions of alcohol in a row did not admit to having been drunk during the last year. In a comparison of four Nordic countries, Mäkelä et al. (2001) also found that the question of the frequency of subjectively defined intoxication yields a different result than that of exact amount of drinks. They suggest that intoxication is

subjectively defined and varies across countries depending on drinking habits, and the social acceptability of drunkenness.

In studies III and IV, binge drinking was defined by applying both the question about the frequency of intoxication and the internationally used criterion 5 or more drinks in a row (e.g., Hingson, Heeren, Jamanka, & Howland, 2000; Schulenberg, O'Malley et al., 1996; Wells, Graham, Speechley, & Koval, 2005). For Finnish adults, 5 drinks in a row is a low limit for binge drinking, particularly, among men who may consume even 20 drinks at one occasion and for whom binge drinking with the 5 drinks criterion was not highly predictable. However, from the epidemiological point of view concerning, for example, dementia (Järvenpää et al., 2005), this criterion is grounded also among adult Finnish men. Mäkelä et al. (2001) propose that subjective intoxication is likely to be a good measure in cases where drunkenness plays an important role (violence, accidents), whereas the more objective measures can be assumed to work better in situations when physiological harm is studied (e.g., heart disease). The combination of different questions as in the JYLS takes into account both aspects and thus may produce more reliable information about binge drinking than using only one question.

Measuring problem drinking

Heavy quantities or high frequency of drinking does not necessarily imply the presence of social consequences and other drinking-related problems (Salome, French, Matzger, & Weisner, 2005). Alcohol dependency can also be diagnosed in people with low frequency of binge drinking (Caetano & Cunradi, 2002). The emergence of problems due to drinking usually requires loss of control of drinking, or the loss of control over one's own behavior because of drinking.

Correlations between the indicators of drinking behavior were high, particularly, between the quantity and frequency measures, between binge drinking and alcoholism screening tests, and between alcoholism screening tests and problem drinking. Also Fan et al. (2006) found that lifetime drinking pattern measures were significantly intercorrelated, with some exceptions concerning the frequency of drinking. The intercorrelations were lower at age 27 than at age 42, which is in accord with the results of Smith et al. (1995) wherein the indicators produce different but partly overlapping pictures of the use of alcohol, and this is true especially among younger respondents who are less experienced with drinking and its consequences. As Jackson and Sher (2005) point out, it may be hazardous to generalize across alternate indices of alcohol involvement.

Problems due to drinking referred to direct and indirect consequences (accidents, days off from work, problems in relationships, violence, criminality etc.) assessed on the basis of the participants' reports and, in the JYLS, police records on drunken driving and alcohol-related arrests. Binge drinking is a risk factor for problem drinking (Heck, 1991; Jackson & Sher, 2005), as confirmed by the links between binge drinking at age 27 and problems due to drinking at age 42 in the JYLS. Problem drinking at age 42 correlated with binge drinking and

the scores of the alcoholism screening test, CAGE, concurrently (at age 42) and longitudinally, that is, from age 27 to age 42. This strongly suggests that heavy drinking in young adulthood precedes problem drinking in middle age.

Alcoholism screening tests have traditionally been used dichotomously. Smart, Adlaf, and Knoke (1991) used two or more affirmative answers to the CAGE questions in the US population study, resulting in 17% of males and 5% of females exceeding the limit. Among Finnish university students, the same cut-off point identified 28% of males and 16% of females (Nyström, 1993). In the JYLS, 32% of 27-year-old males exceeded the cut-off point, but only 3% of females. The latter figure is an underestimation, because the CAGE was administered during a personal interview, in case the interviewer estimated that the participant had had problems with alcohol. At ages 36 and 42, the CAGE was administered for everyone as a part of a larger questionnaire, resulting in higher variation in the CAGE scores.

Bradley et al. (1998) reviewed alcohol-screening questionnaires in women and found the CAGE questionnaire to lack sensitivity. As well, O'Hare and Tran (1997) reported the CAGE to be a poor tool, particularly for studying young women. Forsberg et al. (2002) found both Mm-MAST and CAGE insensitive to female binge drinking. In the present study, the two-point response scale (yes/no) was assessed to be too categorical, especially for women. Therefore, in the NAM and in the JYLS at ages 36 and 42, a three-point response scale (no, sometimes, often) was applied to CAGE. This resulted in a more normal distribution of participants and, consequently, in a more differentiated view on their drinking problems. Thus the three-point scale also facilitated the comparison between male and female drinking.

Alcoholism screening tests CAGE and Mm-MAST correlated highly (r = .67) at ages 36 and 42, and there were no differences between the genders in the correlations. Both tests were used as lifetime measures ("have you ever?"). In fact, the lifetime questions complicate the interpretation of results in follow-up studies: a high correlation between scores in successive measurements may result from the same heavy drinking period. Seppä et al. (1999) noticed that in the health screening of the same Finnish men at ages 40 and 45, self-reported consumption of alcohol had decreased and serum CDT value was smaller at age 45 compared to age 40, but the number of affirmative answers to the Mm-MAST had increased.

The consumption of alcohol in the study by Seppä et al. (1999) was at the same level as in the JYLS study, but there was a marked difference in the number of respondents that exceeded the cut-off point 3 $\geq$ in the Mm-MAST: the numbers were about 29% at age 40, and 36% at age 45 in the health screening and about 70% in the JYLS at age 42. It is possible that in a personal interview for research purposes people are willing to answer more honestly than in a health screen.

Alcoholism screening tests probe emotions such as guilt or having a bad conscience. Guilt is the condition attributed to a person (including oneself) upon some moral or legal transgression (Harré & Lamb, 1986). Guilt exists after

the violation of internalized principles, beliefs, or norms that are important to that person (Moscovici, 2005). Guilt is experienced if a person feels being personally responsible for an improper act, regardless of other people's knowledge of the violation (Kagan, 1984). The CAGE question concerning the "need to cut down" probes the person's self-perceptions of his or her drinking as a possible violation, and the question about whether one "has felt annoyed by criticism" includes the idea that another person has recognized the violation. The answers to all of these questions may differ according to the comprehension and experiences the person, his/her family, and peers have on hazardous drinking behavior.

In addition, personality factors or the level of moral development may affect the degree to which one is prone to provide affirmative answers to alcoholism screening questions. Abide, Richards, and Ramsay (2001) and Kuther and Higgins-D'Alessandro (2000) found that individuals who consider harmful substance use to be morally wrong will be less likely to use such substances than those who view harmful substance use as a personal choice. The behaviors defined as personal were not considered to be under the domain of morality and therefore engagement in the behavior was not related to moral reasoning (Kuther & Higgins-D'Alessandro, 2000). However, Abide et al. (2001) found some evidence that more mature moral reasoners display more consistency between their expressed beliefs about the morality of drug use and their reports of actual drug use than those whose moral reasoning was less mature.

Categorization of problem drinking

Information derived from several internationally recognized criteria was combined to measure problem drinking in Study II in order to cover many different types of hazardous drinking. The proportion of problem drinkers among the NAM participants was high: 9.6% of females and 18.0% of males. Aalto-Setälä, Marttunen, Tuulio-Henriksson, Poikolainen, & Lönnqvist (2001) reported, based on information from the semistructured clinical SCAN interview of the same 22-year old NAM participants that 2.5% of females and 3.7% of males had a current (one month prevalence) of DSM-IV diagnosed alcohol abuse or dependence. The difference in these results is understandable, because the criteria for DSM-diagnosis are stricter than for problem drinking, and because there is considerable variation in individual drinking behavior over time (e.g., Delucchi et al., 2004; Jefferis et al., 2005; Pirkola et al., 2006). The problem drinking measure was intended to cover at least the last twelve months; the lifetime version of CAGE and problems due to drinking covered an even a longer period.

It turned out that it was easier to differentiate non-problem drinkers from presumptive problem drinkers than presumptive problem drinkers from problem drinkers. Also Kerr et al. (2002) found that there appears to be important subgroups moving between abstention and light drinking, and between moderate and heavy drinking that can be identified only by multiple

measurements. They further argue that if a person has been identified as a heavy drinker more often than at one time point, it is likely that his/her consumption is above the average even when not categorized as a heavy drinker.

The replication of this categorization in another study was possible, as shown in Chapter 2.2, but not in a simple way. Several measures are needed and the categorization requires quite much calculation, as described in Study II. It was found in the JYLS that stability was high in the non-problem drinking category, but low in the problem-drinking category. Similar results were obtained by Mazas et al. (2006) during a 4-year follow-up period. Also, in other follow-up studies, changes in heavy drinking have been substantial, with drinkers reporting drinking cessation, remission, and progression (Delucchi et al., 2004; Eigenbrodt et al., 2001; Jackson, O'Neill, & Sher, 2006). According to the *DSM-IV-TR* (American Psychiatric Association, 2000), at some time in their lives, a substantial number (60% of males and 30% of females) of US adults have had one or more alcohol-related adverse life events; but fortunately, most individuals learn from these experiences and moderate their drinking.

Even though the cut-off point between problem drinkers and presumptive problem drinkers was a little ambiguous and moving in time, the categorization of the participants into four groups (non user, non problem drinker, presumptive problem drinker, problem drinker) was informative. Grouping an individual into the category for presumptive problem drinkers might be seen as a warning sign of his or her problem drinking. Also Jackson et al. (2006) and Wood et al. (2003) noted the importance of measuring problem drinking as a continuum rather than dichotomously.

Problem drinking is a multi-faceted phenomenon and there is considerable individual variation in it over time. The problem based approach covers different kinds of problems due to drinking including its consequences such as losing control over one's behavior and health risks resulting from the high annual consumption of alcohol and the pattern of heavy drinking. This approach may be particularly well suited to studies where one compact measure is needed, as for, for instance, an applied study such as Study II or a trajectory analysis with several measurement points. The idea of taking cut-off points from several criteria has been lately used in other studies (e.g., Delucchi et al., 2004; Hemmingsson, 2004; Seppä et al., 1999). The created problem drinking categorization was not used in Studies III and IV, because one aim of these studies was to analyze relationships between different indicators. As noted in the report of the International Center for Alcohol Policies (2004), an important paradigm shift has occurred in the alcohol field: how people drink is noticed to be at least as important as how much they drink.

4.3 Precursors to problem drinking

Problem drinking gives rise to high costs on the individual and the society (e.g., Mustonen & Simpura, 2006; Rehm, Taylor, & Patra, 2006). Consequently, for obtaining information for prevention, precursors to problematic drinking behavior were targets in Studies I to IV. Studies I and II showed that there were significant childhood and adolescent risk factors to and resource factors against problem drinking behavior in young adulthood (Tables 7 and 8). The precursors varied, however, across the indicators of drinking and across the genders. Study III revealed that the relation between the early onset of drinking and heavy drinking in early middle age was strong. In Study IV, the familial, childhood, and adolescent antecedents of several aspects of female and male drinking behavior in adolescence, young adulthood, and early middle age were analyzed. In sum, problem drinking was more predictable than other aspects of drinking behavior (Table 9). Low child-centeredness in parenting, externalizing problem behaviors, poor school success, maladjustment, drinking behavior, and somatic symptoms in adolescence were associated with adult problem drinking in both genders. Additionally, maternal smoking and the daughters' internalizing symptoms were linked to adult problem drinking in females, whereas parental drinking, the sons' low compliance, and childhood externalizing problem behaviors and social activity preceded adult problem drinking in males. The relationships of single predictors to later problem drinking were mostly small to moderate (Tables 7 and 8); the relationships were generally stronger when several risk factors emerged simultaneously (Table 9). The longitudinal results revealed a finding that was not found in the literature: problem drinking in males and females was more predictable in early middle age than in young adulthood.

Parental substance use and low child-centeredness

The effect of family background on adult problem drinking and the CAGE score were significant for both genders (Table 9). Low child-centeredness in parenting consisting of low quality of parental relationship, relationship with the father, maternal support, maternal supervision, and the use of physical punishment, was a risk factor for problem drinking in young adulthood and early middle age for JYLS females and males (Table 7). Parental heavy drinking was a higher risk factor to sons' than to daughters' high CAGE scores, binge drinking, and problems due to drinking, especially in young adulthood. Correspondingly, maternal smoking was a more important precursor to daughters' than to sons' binge drinking, high CAGE scores, and problem drinking, and this effect became stronger by time. The consistency of the findings over time and across indicators increases the importance of these longitudinal results.

Background factors (low socioeconomic status, parental drinking, maternal smoking, and low child-centered parenting) correlated with each

TABLE 7 Risk factors in females (F) and males (M) for heavy drinking by age 20, problem drinking at age 27 (as described in Studies I and IV), and problems due to drinking at age 42 in the JYLS, and problem drinking at age 22 in the NAM. A statistically significant relation is marked with s for small effect size (.10 < r < .24 or .02 < η^2 < .15), m for medium effect size (.24 < r < .37), l for large effect size (r > .37), and no relation with -. A blank space indicates that the measure in question was not available.

		JYLS						NAM	
Problem drinking at age		20		27		42		22	
Risk factors		F	M	F	M	F	M	F	M
Low child-centeredness in parenting		s	-	s	s	m	s		
Parental drinking		-	s	s[a]	m	-	m		
Maternal smoking		s	s	s	-	m	-		
Low socioeconomic status		-	-	-	s	s	-		
High social activity	at age 8	-	-	-	-	-	s		
Low social activity	at age 14	s	-	-	-	s	-		
Low self-control	at age 8	-	s	-	s[a]	-	s		
	at age 14	-	-	s	s	s	m		
	at age 27			s	s				
Aggressiveness	at age 8	-	s	-	s	-	s		
	at age 14	s	s	m	s	m	s		
	at age 27			-	m				
Anxiety	at age 8	s	-	s[a]	-s[b]	-	-		
	at age 14	-	-	s[a]	-s[b]	-	-		
	at age 17							s	-
	at age 22							s	s
	at age 27			-	s				
Truancy	at age 14	m	s	m	m	s	m		
Smoking	at age 14	m	m	m	s	m	m		
Conduct problems	at age 14			s	m				
Use of immature defenses	at age 17							s	-
	at age 22							s	s
Eating concerns (females) /binge eating (males)	at age 17							s	-
	at age 22							s	s
Crime (exc. alcohol-related)	by age 27			l	l				
Early onset of drinking		s	m	s	s	m	m	s	s
Heavy drinking by age 20				s	m	l	l		

Note. [a]The trend was the same in Study I and Study IV, but in one of the studies the results were not statistically significant. [b]Differences in the results due to variation in definitions of problem drinking: low anxiety was related to high frequency and quantity of drinking in males, but not necessarily to negative consequences due to drinking.

other, and with the drinking behavior of the offspring. This was in accordance with other studies showing that parental problem drinking is associated with reduced family functioning which is related to child outcomes (Keller, Cummings, & Davies, 2005); and that the combination of parenting problems with parental alcohol abuse increases the probability of the misuse and abuse of alcohol in offspring (Urberg, Goldstein, & Toro, 2005). Heavy drinking by and the

TABLE 8 Resource factors in females (F) and males (M) for non-problem drinking in late adolescence, young adulthood, and early middle age in JYLS, and young adulthood in NAM. A statistically significant relation is marked with s for small effect size (.10 < r < .24 or .02 < η^2 .15), m for medium effect size (.24 < r < .37), l for large effect size (r > .37), and no relation with -. A blank space indicates that the measure in question was not available.

		JYLS						NAM	
Problem drinking at age		20		27		42		22	
Resource factors	Gender:	F	M	F	M	F	M	F	M
Constructive behavior	at age 8	-	-	s	s[a]	s	-		
	at age 14	s	s	m	m	m	m		
	at age 27			s[b]	l				
Compliance	at age 8	-	s	-	s	-	s		
	at age 14	-	s	s	s	-	s		
School success	at age 8	-	-	s	s[b]	-	-		
	at age 14	m	s	m	m	m	m		
Educational attainment		s	s	s	s	s	m		
High self-esteem	at age 17							s	-
	at age 22							s	-
Use of mature defenses								-	s
No somatic symptoms	at age 17							s	s
	at age 22							s	s
Low GHQ score	at age 22							s	s

Note. [a]The trend was the same in Study I and Study IV, but in one of these studies the results were not statistically significant. [b]No relation to non-problem drinking, but related to controlled drinking in Study I.

low socio-economic status of parents have been found to be risk factors for their children's development, for example, shorter education and having a child by their early 20s (Pitkänen, 1990). Explanations for these connections can be searched for in environmental challenges and psychobiological mechanisms related to stress physiology (Kristenson et al., 2004) and in heritable factors (Dube, Anda, Felitti, Edwards, & Croft, 2002), because genetic factors are involved in drinking behavior (Dick, Barman, & Pitkänen, 2006), and even in memories from childhood family environment and parenting (Pedersen, Spotts, & Kato, 2005).

In the present study, there was a difference between the frequency of drinking and problem drinking in the indication of alcohol use. It was illuminated by the trends showing that higher frequency of drinking in young adulthood was not related to parental substance use, but rather to higher socioeconomic status of the family of origin, as also found by Blum, Beuhring, Shew, Bearinger, Sieving, & Resnick (2000) and Casswell et al. (2002). On the other hand, higher problem drinking was related to lower socioeconomic status, lower parental child-centeredness, and higher parental substance use. Concerning adolescents, Yeh and Chiang (2005) have found that paternal drinking was an important predictor of the frequency of drinking and getting drunk, but alcohol-related consequences were related to unsatisfactory family relationships. Also Pandina and Johnson (1989) found that adolescents with a

TABLE 9 Strength of groups of precursors to adult drinking behavior according to the regression analysis presented in Study IV. The R^2 of statistically significant relations are marked.

	Family background 4 variables	Age 8 social behavior 7 variables	Age 14 social behavior 7 variables	Age 14 (mal)-adaptation 3 variables	Total 1-4 21 variables
			Females		
Heavy drinking by 20	-	-	.11[S]	.11[S]	.20[m]
Age 27					
Problem drinking	.07[S]	-	.12[S]	.10[S]	-
Binge	-	-	-	.09[S]	-
CAGE	.06[S]	-	-	.06[S]	-
Frequency	-	-	-	.08[S]	-
Age 42					
Problem drinking	.12[S]	-	.16[m]	.09[S]	.23[m]
Binge	.13[S]	-	.16[m]	.20[m]	.34[l]
CAGE	.15[m]	.09[S]	.17[m]	.16[m]	.29[l]
Frequency	-	-	-	.07[S]	-
			Males		
Heavy drinking by 20	.05[S]	-	.15[m]	.09[S]	.25[m]
Age 27					
Problem drinking	.11[S]	-	.13[S]	.10[S]	.24[m]
Binge	-	-	.10[S]	.05[S]	-
CAGE	.08[S]	-	.10[S]	.05[S]	-
Frequency	-	-	.10[S]	-	-
Age 42					
Problem drinking	.12[S]	-	.20[m]	.17[m]	.31[l]
Binge	-	-	-	.12[S]	-
CAGE	.06[S]	-	-	.13[S]	-
Frequency	-	-	-	-	-

Note. [S]Small, [m]medium, and [l]large effect size.

family history of alcoholism were more likely than those without a family history of alcoholism to report experiencing problems or consequences related to drinking, but there were no differences in relation to several other drinking indicators.

Parental heavy drinking, including biological and stepparents, was a risk factor especially for sons' problem drinking in the JYLS. Problem drinking and alcoholism have been much more common among males than females in Finnish society, and thus the proportion of problem drinking fathers was greater than that of mothers in the combined measure of parental drinking. In other studies, paternal alcoholism has been found to be more strongly related to sons' than to daughters' substance use (e.g., Chassin, Curran, Hussong, & Colder, 1996).

A threshold effect concerning parental drinking was found in the present study: drinking at age 14 was less common and there was less problem drinking in adulthood if parental drinking was low than if either heavy consumption of alcohol, problem drinking, or alcoholism was observed in the parents. Heavy but not problematic parental drinking may cause positive attitudes and expectations towards drinking among their offspring; the effect of parental drinking may have been different when negative consequences were

experienced. Expectancies of drinking mediate the influence of family drinking history on persons' own drinking (Smith et al., 1987). According to Shell, Groppenbacher, Roosa, and Gensheimer (1992), children who reported concerns about parental drinking reported higher levels of psychological and behavioral problems independent of whether or not children had a problem-drinking parent. Orford and Velleman (1991) concluded that the environmental intergenerational transmission of problems of excessive substance use occurs via a variety of mechanisms that are likely to be of differential importance in different subgroups.

Mothers' smoking was significantly related to their daughters' problem drinking and binge drinking in early middle age. It is possible that the effect of maternal substance use and attitudes towards substance use are of more importance to their daughters than substance use of father or step-parents, and that maternal smoking is a powerful indicator of her personal attitudes and behavior. According to Nigg et al. (2006), even though parental alcoholism and antisociality had strong associations with eventual adolescent drinking problems, maternal alcoholism and antisociality were generally not contributory in the multivariate models possibly due to the strong assortment of alcoholism and antisociality found in alcoholic marriages.

Parental substance use was related to drinking at age 14 for both genders, but low child-centeredness was a risk factor only for females. Ensminger, Brown, and Kellam (1982) have found a relation between lower family bonding and female adolescent drinking; and according to the Finnish twin studies, the effect of reduced parental monitoring on drinking at age 14 was more salient for girls than for boys (Dick et al., 2006). Research on children has shown that parenting behaviors and parental characteristics can impact girls and boys differently (Block, Block, & Keyes, 1988; Prior, Smart, Sanson, & Oberklaid, 1993). Gender effects have not been presented in several studies concerning the familial precursors to drinking. However, the results of the present study suggest that it is important to study separately the familial precursors to drinking behavior for males and females.

Externalizing and internalizing problem behaviors

Slight relationships between social behavior in childhood and adolescence and adult drinking behavior were found, and these relations were somewhat different for females and males (Tables 7 and 8). The effect of social behavior at age 14 on adult drinking was stronger than that of age 8 (Table 9). The accumulation of problems in social behavior and adaptation by age 14 was a strong risk for later drinking problems in both genders.

Self-control proved to be an important dimension for discriminating risk factors and co-variants of drinking behavior: low self-control and its expression in problem behaviors were risk factors for problem drinking (Table 7), but high self-control, school orientation, and psychological well-being were resource factors for non-problem drinking (Table 8). The results of the present study fitted the model of emotional and behavioral regulation (Figure 1 in 1.2). There

were gender differences in the risk and resource factors in how the dimension of the expression and inhibition of behavior co-varied with the dimension of self-control, as also found in previous studies by Pulkkinen (summaries in Pulkkinen et al., 2005; Pulkkinen, 2006). Externalizing problem behaviors, for instance, aggressiveness and lability, from age 8 onwards were risk factors for male problem drinking, but its opposite in the model, compliance, was a resource factor. Correspondingly, internalizing problem behaviors from childhood onwards was a risk factor for female problem drinking, but its opposite in the model, constructiveness, was a resource factor. However, the difference between the genders in externalizing problem behaviors as antecedents of problem drinking was greater at age 8 than at age 14.

Externalizing problem behaviors assessed before drinking initiation was related to male problem drinking. Also Niemelä et al. (2006) have found that age 8 hyperactivity and conduct problems predicted frequent drunkenness in Finnish males at age 18. Other studies support the findings (Andersson et al., 1989; Barnes & Welte, 1986; Donovan et al., 1983) that indicators of weak control of a boy's behavior (aggression, conduct problems) are risk factors for problem drinking. Magnusson and Bergman (1990) point out that the patterns of behavioral problems are more important than single factors. The results of the studies by Jones (1968), van Kammen, Loeber, & Stouthammer-Loeber (1991), McCord and McCord (1960), and Robins and McEvoy (1990) have shown that conduct problems and lack of adequate controls over impulsivity, and especially over aggressive impulses, predict alcohol problems in men. Young et al. (1995) found with delinquent boys that substance use began very early and that conduct disorder symptoms usually preceded the substance use. For women, the findings are less consistent. Robins and McEvoy (1990, p. 202) state, however, that "girls with a history of conduct problems who start substance use early have as great a risk of later substance abuse as do boys with a similar history".

Adolescent aggressiveness and low self-control as well as other signs of externalizing problem behaviors (truancy, smoking, and conduct problems) at age 14, and criminality by age 27 were related to each other, and to concurrent and future problem drinking for both genders. Also in other studies, female and male externalizing problem behaviors in early adolescence have been found to be related to heavy use of alcohol at age 15 (Kumpulainen, 2000), both prospectively and concurrently (Hussong, Curran, & Chassin, 1998), and to problem drinking in adulthood (Steel, Forehand, Armistead, & Brody, 1995). Malone, Taylor, Marmorstein, McGue, and Iacono (2004) propose that alcohol involvement in adolescence can ensnare otherwise desisting youth in persistent antisocial behavior, and thus early involvement in substance use may increase externalizing problem behaviors.

There were differences between females and males in the relations of internalizing problem behaviors to drinking behavior that remained through adolescence. For females, childhood and adolescent high anxiety was a risk factor for problem drinking in late adolescence and adulthood. Low self-esteem,

somatic symptoms, eating concerns, high scores in the General Health Questionnaire (GHQ), and the use of immature defences correlated highly with anxiety, and they were both antecedents and co-variants of female problem drinking at age 22. The relationship between female heavy drinking and internalizing problems (anxiety and depression) has also been found in several other studies (e.g., Rohde, Lewinsohn, & Seeley, 1996; Alati et al., 2005). However, low anxiety was related to concurrent drinking at age 14 and to the high frequency of drinking in adulthood for JYLS females. The variability in the relations between anxiety and drinking indicators reflect the notion that frequency of drinking has different predictors than the measures of heavy drinking. The present results are in line with the results of Smith, Abbey, and Scott (1993) in that high monthly frequency of drinking was related to enjoyment of drinking, but high frequency of heavy drinking was related to drinking to cope.

For males, high anxiety was only related to concurrent problem drinking at ages 22 and 27. However, low anxiety in childhood and adolescence was related to the high frequency and quantity of drinking, and even to controlled drinking in late adolescence and young adulthood, but no more in early middle age. Also Niemelä et al. (2006) found that high scores in emotional problems at age 8 predicted the lower occurrence of drunkenness-oriented alcohol use among 18-year-old males. In addition, Andreasson et al. (1992) found increased odds ratios for both "never anxious" and "often anxious" high alcohol consumers in a study of Swedish conscripts, and Kaplow, Curran, Angold, and Costello (2001) found that generalized anxiety, but not separation anxiety, around age 10 were risk factors for initiating alcohol use by age 14 in both genders. The complex relation between anxiety and the drinking behavior should be studied further with pattern centered methods or trajectory analysis. It is likely that the relation between drinking and anxiety changes if drinking is heavy. Hussong et al. (1998) propose that it is possible that internalizing symptoms are a result and not a precursor of alcohol involvement, or that some types of internalizing symptoms may serve as precursors and others as consequences of alcohol involvement, or that the internalizing path creates developmental risk for only a subgroup of individuals. Consequently, there may be different types of alcoholics. Problem behavior prone orientation is of greater importance for alcoholism development at an early adult age than it is for alcohol abuse developed at a later age (Andersson et al., 1989; Weber, Graham, Hansen, Flay, & Johnson, 1989). A later onset of alcoholism may be more strongly related to intrapsychological characteristics (Hesselbrock, Hesselbrock, Babor, Stabenau, Meyer, & Weidenman, 1984; Gomberg, 1982).

High scores on somatic symptoms and GHQ were common among problem drinking males and females, and presumptive problem drinking females. However, somatic symptoms and a high GHQ score can be antecedents or consequences of heavy drinking, and thus the causality of the results of these relations should be interpreted with caution. O'Hare and Sherrer (2005) found that about one fifth or more of 18-year-old university

freshmen reported personal problems as a result of drinking. These included depression and anxiety symptoms, feeling bad about oneself, and problems with appetite or sleep as a result of their alcohol use.

Laukkanen, Shemeikka, Viinamäki, Pölkki, & Lehtonen (2001) have found that heavy drinking was associated with more severe psychosocial dysfunctioning among girls than boys at age 15. As in the JYLS, they found social activity to be related to boys' drinking. In girls, they also found concurrent adolescent heavy drinking to be associated with poor school success, absenteeism, behavior problems, difficulty in concentrating, problems with teachers, psychosomatic symptoms, and a negative social self-image. In the NAM study, female problem drinkers differed from the other groups in self-esteem at both ages, whereas no significant differences existed between male groups. Accordingly, Walitzer and Sher (1996) reported that in their prospective study of self-esteem and alcohol use disorders in early adulthood, low self-esteem played a particularly important etiological role in alcohol problems in women relative to men. The gender differences observed by Pandina and Schuele (1983) also suggest that the relationship between self-esteem and substance use may be different in male and female adolescent students. In addition, Stranges et al. (2006) found that intoxication and liquor consumption were associated with poorer self-perceived mental health in adult females, but poorer physical health in men.

Female problem drinkers had more eating concerns than other females, and this difference widened by young adulthood. It is widely known that there is a co-morbid association between alcoholism and eating disorders, especially bulimia nervosa, as noted in *DSM-IV* (American Psychiatric Association, 1994). Eating disorders are also often found to be predictive of substance abuse in women (e.g., Braun, Sunday, & Halmi, 1994; Higuchi, Suzuki, Yamada, Parrish, & Kono, 1993; Wiederman & Pryor, 1996). In a study of undergraduate women, Fischer, Anderson, and Smith (2004) found that high levels of trait urgency (a form of impulsivity indicating the tendency to act rashly when distressed) were positively associated with both eating and alcohol drinking problems. In the NAM males, binge eating in early adulthood was related only to concurrent problem drinking. Also in other studies, the association between alcoholism and eating disorders has been found to be dissimilar for females and males (Higuchi et al., 1993).

Different informants provide differentially relevant information as noted by Pagan, Kaprio, Pulkkinen, Viken, Rose, and Dick (2006). They found that peer but not parent or teacher reported high levels of emotional problems were related to a decreased risk of early initiation of substance use; but peer, teacher, and parent reports of behavioral problems were all significantly related to substance use initiation by age 14. Also in the JYLS, low anxiety assessed in childhood and adolescence by peers was less ambiguously related to male problem drinking than teacher rated anxiety. Griffith, Dubow, and Ippolito (2000) argue that peer nomination method provides a social perspective and

this method is especially suitable for classification purposes, if the aim is not in children's understanding about their own behavior.

Low child-centeredness and parental substance use were related to the accumulation of problem behaviors in adolescence for both genders, which in turn was related to heavy drinking in adulthood. Intergenerational transfer of psychosocial risk has been found in several longitudinal studies (Serbin & Karp, 2004). Interaction of a child's temperamental characteristics and child rearing in the development of problem drinking is obvious. For example, Barrera et al. (1993) have shown that low support from parents was related to adolescents' reports of substance use and externalizing problem behaviors, and Tarter, Blackson, Brigham, Moss, and Caprara (1995) that family discord in conjunction with boys' irritability was associated with substance use as a coping response by early adolescence.

Children of alcoholic (COA) parents are at high risk for psychopathology. Familial alcoholism has been found to raise the risk for alcohol use and dependence in part because children from alcoholic families had shown more signs of externalizing behavior (Hussong et al., 1998), were more impulsive and lower in agreeableness (Chassin et al., 2004); and even beginning at age 2, COA males have shown an increase of externalizing symptoms and females have shown both externalizing and internalizing symptoms (Furtado, Laucht, & Schmidt, 2006). Nigg et al. (2006) found that childhood externalizing problem behaviors (ADHD and conduct symptom) were related to alcohol-related problems in early adolescence, and executive response inhibition predicted the onset of alcohol use related problems independently of familial risk factors and of child externalizing symptoms. However, there was an apparent potentiation of this relation in high-risk (e.g., antisocial, alcoholic) families.

The level of psychological well-being of the entire sample increased in the NAM participants on all well-being measurements (trait-anxiety, self-esteem, somatization, eating concerns, and the use of mature, neurotic, and immature defenses) from adolescence to young adulthood reflecting normal development (e.g., Greene, Walker, Hickon, & Thompson, 1985; Kessler et al., 1994; Marschall, 1989). Males scored higher in the well-being measurements than females at both intervals. The same has also been found in other studies (e.g., Bolognini, Bettschart, Plancherel, & Rossier, 1989; Casper et al., 1996; Choquet & Menke, 1987; Hänninen & Aro, 1996; Rauste-von Wright & von Wright, 1981).

The results confirmed that constructive behavior, school success, and low somatization were resource factors against problem drinking for both genders (Table 8). The results were in accordance with previous findings that wanting to attend college, spending more time on homework, feeling that grades are important, and liking school are associated with lower levels of substance use (Bahr et al., 1995; Jessor et al., 1991; Jones & Heaven, 1998). Higher levels of school involvement, internal resources, and lower levels of problem behavior have been found to be related to positive expectations for future (Dubow, Arnett, Smith, & Ippolito, 2001).

Constructiveness in the present study means good interpersonal social skills and coping strategies. Poor social skills may cause poor adjustment to school-work that, in turn, may cause reluctance to continue studies after the obligatory school period, and unemployment (Kokko & Pulkkinen, 2000; Kokko, Pulkkinen, & Puustinen, 2000). Social alienation has been related to weekly drinking among 16-year old Finnish twins (Winter, 2004), and poor conflict-resolution skills and low work-status have accounted for excessive male drinking in the study by Frank, Jacobson, & Tuer (1990). In the present study, low constructiveness, low school success, and one's own and maternal smoking were robust risk factors for female binge drinking in early middle age. In contrast, in the study by Paschall and Lipton (2005) light-moderate (1-2 drinks per occasion and no recent heavy drinking) wine consumption in adulthood was related to a higher family social class, academic achievement, and good health habits that were established in childhood and adolescence. Also Koivusilta, Rimpelä, and Rimpelä (1999) have found that the probability of belonging to educational tracks with good social prospects in adulthood was high among adolescents with a positive health related lifestyle at the age of 16.

Early age of onset and heavy drinking in adolescence

Male and female JYLS participants who initiated drinking prior to age 14 had heavier alcohol consumption and scored higher on alcoholism screening tests in early middle age than individuals who began drinking at age 18 or later (the legal age limit) and even higher than those who began drinking at age 16 to 17. For binge drinking, the higher risk was also associated with the participants who started the use of alcohol at age 14 to 15 compared to those who initiated drinking at 16 or later. Drinking at age 14 had independent power as a predictor of adult problem drinking, when familial and behavioral precursors were controlled. As well, heavy drinking in late adolescence was a significant predictor of adult heavy drinking in both young adulthood and early middle age. The effect of adolescent drinking on adult alcohol use was the same for men and women. The results were similar among the NAM participants: the average age of onset was lowest among problem drinkers at age 22.

The results concerning early drinking as a risk for problem drinking were in accordance with studies in which follow-up data have been collected through adolescence (e.g., Hawkins, Graham, Maguin, Abbott, Hill, & Catalano, 1997; Pedersen & Skrondal, 1998) and to young adulthood (e.g., Casswell et al., 2002), and in which data on the age of onset of drinking has been collected retrospectively (e.g., Barnes et al., 1992; Fan et al., 2006; Presscott & Kendler, 1999). The highest risk for adult alcohol abuse has been found if drinking was initiated by age 14 (DeWit, Adlaf, Offord & Ogborne, 2000; Grant & Dawson, 1997; Hingson, Heeren, & Winter, 2006). Results of a 7-year follow-up (Hawkins et al., 1997) have shown that the age of onset of drinking is a powerful predictor of alcohol misuse, regardless of family history of alcoholism, status, ethnicity, gender, proactive parenting, school bonding, peer alcohol initiation, and perceived harmfulness of alcohol use. The early-onset group has been found to

be more dysfunctional also in terms of outcomes (internalizing disorders, antisocial personality disorder and substance use and dependency symptoms) in young adulthood, whereas the late-onset and non-user groups were better adjusted (Flory et al., 2004).

Parental drinking was related to the early age of onset of drinking in JYLS males, whereas maternal smoking and low child-centeredness were related to the early onset in females. However, socioemotional behavior and school success at age 8, assessed before the initiation of drinking, and father's occupational status, did not predict the age of onset of drinking or the use of alcohol at age 14 for males or females. The only exceptions were the significant relations of aggressiveness and low self-control at age 8 to the early age of onset of drinking in girls whose fathers were in blue-collar occupations. Drinking at age 14 was related to concurrent smoking for both genders, and for girls, to low self-control, low constructiveness, and low school orientation in adolescence.

Concerning parental influences, Seljamo et al. (2006) found that mother's and father's heavy drinking, and their early onset of drinking were important predictors of their children's problematic alcohol use at the age of 15. Hill, Shen, Lowers, and Locke (2000) propose that familial density of alcoholism is an important predictor of adolescent alcohol initiation and this effect can be partly due to neurobiological factors and temperament. Childhood extraversion has been found to be a mediator of the familial density effect on the early onset of drinking (Hill & Yuan, 1999). Kaplow, Curran, Dodge, and the Conduct Problems Prevention Research Group (2002) found that very early initiation of substance use (by age 12) was related both to parental substance abuse and lower levels of verbal reasoning and to kindergarten-age predictors such as higher levels of overactivity, more thought problems, more social problem solving skills deficits, and being male. The longitudinal results by Flory et al. (2004) have revealed that the onset of drinking in early adolescence was preceded by lower school performance, church involvement, and self-esteem, and higher sensation seeking and conduct disorder symptoms at age 10-11 compared to the onset of drinking at a later age or to non-using. The results of a Finnish twin study indicated that shared environmental factors (C) explain drinking at age 14 more highly than genetic factors (A): C explained 76 % of the variance of drinking for boys and girls, and A explained 18 % of girls' drinking and 0 % of boys drinking; the rest was explained by unique environmental factors (Dick et al., 2006). The factors connected with the beginning of the use of alcohol or a pattern of problem use are not necessarily the same as those characteristics that contribute to the maintenance of the alcohol use pattern or to the later build-up of a habitual problem involving alcohol abuse or dependency (Zucker & Gomberg, 1986). Once initiated, patterns of substance use among adolescents are under significant genetic influence (Rose, Dick, Viken, Pulkkinen, & Kaprio, 2001).

The combination of self-reported high frequency of drunkenness and appearance in governmental records because of alcohol abuse between the ages 15 to 17 have been found by Andersson and Magnusson (1988) to constitute a

serious indication of continuing alcohol abuse in Swedish males. Hingson et al. (2006) have found that the younger the age of onset the greater the likelihood of developing alcohol dependence within 10 years of drinking onset, and the stronger the subsequent association with chronic relapsing dependence. Also Spear presented in her literature reviews (2000; 2002) that the rate of progression to alcohol dependence was unusually rapid for adolescents, and once adolescents became addicted to alcohol, their rates of relapse were on the same level as by adults, despite the much shorter time of chronicity. She proposes that exposure to alcohol and other drugs during adolescence may alter critical ongoing processes of neural development occurring at that time, with long-term effects on neurobehavioral function that increase the propensity for later abuse.

Zeigler et al. (2005) have reviewed literature on the neurocognitive effects of alcohol on adolescents and college students, and they conclude that underage alcohol use is associated with brain damage and neurocognitive deficits, with implications for learning and intellectual development. Underage drinkers are susceptible to immediate consequences of alcohol use, including blackouts, hangovers, and alcohol poisoning, and are at elevated risk of neurodegeneration (particularly in regions of the brain responsible for learning and memory), impairments in functional brain activity, and the appearance of neurocognitive deficits. Binge drinking impairs study habits and erodes the development of transitional skills to adulthood. Alcohol is physically toxic to the body and particularly to the brain of a rapidly growing child.

It is known that maternal alcohol use during pregnancy contributes to a range of effects in exposed children, including hyperactivity and attention problems, learning and memory deficits, and problems with social and emotional development (Jacobson & Jacobson, 2002). According to Chen, Maier, Parnell, & West (2003) human and animal neuroanatomical studies have provided an experimental foundation for a better understanding of the behavioral impairments associated with heavy maternal drinking, and they summarize that one of the distinguishing features of prenatal alcohol exposure is impaired cognitive and behavioral functioning resulting from damage to the central nervous system. In rat studies, long-lasting changes have also been found in the functional brain activity of adult rats briefly exposed to high levels of ethanol during the periadolescent period (Slawecki, Betancourt, Cole, & Ehlers, 2001). Although the generalization of research findings from rats to human beings is not valid, one can assume on the basis of recent results that the use of alcohol in childhood and early adolescence when the body and brain are developing may have long-term effects.

The results on the relation between early age of onset of drinking and later problems with alcohol suggest that the use of alcohol in preadolescence or early adolescence should not only be regarded as experimentation or modelling adult behavior with an effort to overcome age-typical challenges in psychological growth, from which the adolescents mature out; early drinking may have long-standing consequences for developing body and mind. More than a third of the

JYLS participants had initiated the use of alcohol in 1974. It should be acknowledged, however, that the regular use of alcohol has become more common among Finnish 14-year-olds. About 20% of Finnish 14-year-olds used alcohol every month, and 5% drank to intoxication at least once a month in the era of the 1970s and 80s (Lintonen et al., 2000). In 2004, 38% of 14-year-olds used alcohol every month, and 18% drank to intoxication at least once a month (Rimpelä, 2004). Thus increasing problems with alcohol in adults can be expected to emerge in the future. Miller, Levy, Spicer, and Taylor (2006) studied the costs of the consequences of underage drinking in the US. In 2001, estimated losses resulting from $18 billion in alcohol consumed by underage drinkers included 368,000 quality-adjusted life years plus $20 billion in medical spending, property damage, work loss, and other resource costs. Put into perspective, the total cost to society of underage drinking translates to $3 per illegal drink.

4.4 Methodological evaluation

To understand alcohol abuse and its mechanisms and precursors, it is important to follow the same persons longitudinally. To gain understanding of the formation of alcohol drinking habits among different groups of individuals, first, the followed individuals should be randomly drawn from the population, and second, several indicators of drinking behavior at several time points should be used because of individual variation in the pattern and amount of drinking over time. Longitudinal research lays the foundation for predicting when, in whom, and under what conditions substance abuse is most likely to emerge, continue and decline (Sieber & Angst, 1990), and this information is important for health planning and prevention.

In the Jyväskylä Longitudinal Study of Personality and Social Development (JYLS), ninety percent of the participants have been followed from age 8 to ages 36 or 42. The study offered a unique opportunity to follow the development of drinking behavior and to study the precursors of problem drinking from childhood through adolescence and young adulthood to middle age. The strengths of the JYLS study were (1) the prospective design, (2) a random sample that included both males and females and represented socio-demographically the age cohort group, (3) a long follow-up time, (4) a high retention rate, and (5) the use of several indicators of adult alcohol use. The greatest limitation of the study concerned the slight variations in the indicators of drinking as discussed in chapter 4.2. The sample size could be criticized, but it is good to remember that the JYLS stands out as one of the pilots of longitudinal studies, and that the technical and financial possibilities of the 1960s and 1970s were quite limited. Resource demands needed for data collections on such a wide spectrum at several time points have been enormous

and difficult to realize. The JYLS study is distinctive among the longitudinal studies around the world.

The Mental Health of Young Adults study (NAM) illuminated drinking behavior in adolescence and young adulthood with an important aspect, that is, the relations of drinking behavior to psychological well-being. Furthermore, the comparison of the use of alcohol among the JYLS and NAM participants shed light on the generalizability of the findings. In the NAM study, the methodological strengths included relatively large sample size and the exact repetition of the psychological well-being measures. However, there were weaknesses in the representativeness of the sample and in the attrition rate (Aalto-Setälä, 2002). Unfortunately, no questions about the use of alcohol were presented in the baseline examination (at age 16 to 17), even though more than half of the participants had used alcohol by that time.

An additional strength of the present study was that similar measures of the use of alcohol were used in the JYLS and the NAM. Comparing two studies with original data produces more precise information than comparisons of published articles in which all the needed details cannot be described. The limitations and variations in the settings and results can be thoroughly analysed as done for example by Kokko, Bergman, and Pulkkinen (2003), and Dubow, Huesmann, Boxer, Pulkkinen, and Kokko (2006). The power of using several datasets is also featured in the principles employed by the Center for the Analysis of Pathways from Childhood to Adulthood (CAPCA, 2006) that provided the framework for Study IV. Despite the wide range of problems in carrying out the idea of using several datasets that have been collected for different purposes, this will certainly be a strengthening trend in future research.

The methodological solutions concerning missing data varied in Studies I to IV. In the end of the last century, listwise deletion of data was recommended resulting to the reduction of data in Study I. In Study III, missing data at age 42 on the four indicators of adult drinking was fulfilled with the person's own data at age 36, if that was available. In Study IV, imputations for missing data were computed, using the huge database of the participants' own behavior at different time points and collected by different methods (questionnaire, interview, health screen, criminal records). The effect of imputation was studied thoroughly and the results were compared to the results with the original data. Statistical imputation can be recommended to follow-up studies.

The group of non-users had a profile of its own, and it was important to separate non-users from moderate drinkers in Study II. The group of non-users, however, was too small for drawing reliable conclusions about the precursors of non-drinking and about the psychological well-being of abstainers. Separate analyses for ex-drinkers, ex-heavy drinkers, and never drinkers would have been needed (Fillmore, Kerr, Stockwell, Chikritzhs, & Bostrom, 2006).

A limitation of the present study was that various additional precursors such as peer drinking behavior, attitudes toward drinking, quality of social relationships, and various aspects of family background were not included in

the study. The number of precursors was, however, limited in the present study because of the requirements of statistical methods in regard to the number of variables in relation to sample size. Even so, the present study covers a wide spectrum of precursors and outcomes over a long time period.

Changes in Finnish alcohol policies during the study period complicate the interpretation of the results, especially regarding female drinking. Additionally, the increase in the use of alcohol due to changes in alcohol politics in 2004 makes the generalization of the results to later cohorts more difficult. Age and cohort effects are evident in Finland, but in the US, Eigenbrodt et al. (2001), Karlamanga et al. (2006), and Kerr et al. (2004) found an age effect on the frequency and quantity of drinking, but no cohort effect. Thus cultural factors can explain some differences in the results including, for example, the increase of consumption of alcohol among JYLS females, and the decrease among the US females towards middle age (Karlamanga et al., 2006). The comparisons between studies in long-term changes of alcohol consumption are difficult because of cultural differences, and even within one culture it is complex, for example, to ensure the comparability of measurements over time (Greenfield & Kerr, 2003).

4.5 Implications

The present study shed light on the complicated relations of family background and childhood and adolescent behavior to the formation of drinking behavior from adolescence to early middle age. Several risk factors for problem drinking were recognized with evident gender differences, but still a great deal of variation remains unexplained. Further research is needed for confirmation and replication of the results in other age cohorts and cultures. Hawkins et al. (1992) suggested that the most promising route to effective strategies for the prevention of alcohol problems is through a risk-focused approach that requires the identification of risk factors. The identification of a risk factor does not mean at the individual level that negative consequences would occur; there are many people at risk who do not become problem drinkers. An important task is, however, to disseminate research results on potential risk and resource factors to benefit work for prevention and intervention.

For future research

In many studies, gender differences have not been reported. However, as Zucker et al. (2006) point out, the drinking worlds for the two genders are different in many ways. Hommer (2003) concluded his review that many of the behavioral aspects of alcoholism progress more rapidly among women than among men. Also the physiological effects of alcohol differ: women are more vulnerable than men to many of the medical consequences of alcohol use. In the JYLS and NAM, the level of drinking was higher among males, and there were

differences in the antecedents and covariants of drinking between genders. Based on these results it is important to consider females and males separately.

The indicators of drinking have different antecedents and consequences. In alcohol research, it is extremely important to give exact operative definitions to the used indicators. It would be fruitful to study further the impact of consumption patterns, for example covariation of the dimensions in the used quantities and frequencies, on health and problem drinking. It is likely that frequent drinking of small quantities has profoundly different health and social consequences than infrequent or frequent binge drinking. The use of biophysical tests would validate the analysis of differences between the indicators. Cross-lagged and SEM analyses could provide more profound information of the relations between the indicators in the long run.

The emergence of risk factors and later alcohol problems is a dynamic, not necessarily stable process over time (Zucker et al., 2006). In addition to variable-centered approaches, individual-centered methods have been recommended for longitudinal studies (e.g., Magnusson, 1988; Schulenberg, Wadsworth et al., 1996). There is considerable inter- and intra-individual variation in problem drinking. Individual centered approaches might help to find subgroups such as late or early onset alcoholics (Andersson et al., 1989; Hesselbrock et al., 1984; Gomberg, 1982; Weber et al., 1989). According to Zucker, Davies, Kincaid, Fitzgerard, & Reider (1997), a life course framework is important for understanding variations in drinking behavior; they have used the age of onset, problems due to drinking, and the number of heavy drinking years to get a wider perspective on individual drinking. Schulenbergs group (Zucker et al., 2006) used trajectory analysis and pointed out that even though heavy drinking during late adolescence and early adulthood has been found to be related to later difficulties with alcohol, attempting to predict heavy drinking at one point in time has been less successful than if the course of heavy drinking across time has been considered.

Changes in individual drinking levels can be marked; drinking cessation and remission even among alcohol dependent individuals have been found to be common (Delucchi et al., 2004; Eigenbrodt et al. 2001; Jackson et al. 2006; Pirkola et al., 2006). Many heavy drinkers experience several short attempts to quit drinking. As recommended in *DSM-IV* (American Psychiatric Association, 1994) for sustained full remission from dependency, a one year control period of non-drinking was required in the JYLS to demonstrate the reliability of the participants' initiative to quit. It would be another significant study to investigate with a large number of participants the connection between the age of onset of drinking and the ability to quit heavy drinking, and reasons for quitting.

For implementation in preventive work

Adult heavy drinking was common among the participants of the present study, and many younger and older adults had experienced problems due to drinking. In other studies with the JYLS participants, heavy drinking in

adulthood has been found to be associated with other concurrent problems in social functioning, such as long-term unemployment (Kokko & Pulkkinen, 2000), health problems indicated by allostatic load (Kinnunen, 2005), the increased risk of accidents (Pulkkinen, 1995), and conflicted adaptation to environment (Pulkkinen et al., 2005). Furthermore, alcohol abuse exerts its influence on the next generation through modelling behavior and difficulties in parenting. Finnish maternity care reaches almost a hundred percent of pregnant women. Maternity care could be used more effectively for the identification and support of high-risk families with the aim of breaking the intergenerational cycle. The early detection of risks would be cost-effective.

Adapted behaviors at ages 8 and 14 were linked to fewer problems in adulthood due to drinking, but externalizing problem behaviors, poor school success, and maladjustment in adolescence predicted problem drinking for both genders, and additionally, low compliance, and childhood externalizing problem behaviors predicted male problem drinking. The predictive value of childhood and adolescent precursors was higher for problem drinking in early middle age than young adulthood, especially on women. Also, problem drinking in males and females was more predictable in middle age than in young adulthood. On the basis of the present results, adaptive behavior in school children should be encouraged and behavioral problems detected at an early stage. Unfortunately, there is a trend to reduce health care personnel in schools thus limiting the possibilities for the school to address children's problems.

Additionally, poor psychological well-being in late adolescence can be seen as a risk factor for later problem drinking in young adulthood for both females and males. Differences in well-being between problem drinkers and non-problem drinkers widened more among females than among males during the transition to young adulthood. Much more preventive attention should be paid to adolescent poor psychological well-being, especially among females. Early intervention is important for breaking the cycle of self-medication of psychological problems. Among the alcohol-dependent subjects, long-term comorbid psychiatric disorders predominately associate with the non-remitted state (Pirkola et al., 2006).

Continuity in drinking behavior was high and drinking in early adolescence was a significant predictor of adult drinking, particularly in middle age. Drinking in adolescence is a risk factor. Prescott and Kendler (1999) have claimed that delaying the age of onset of drinking would not prevent severe alcoholism, because so many other factors are involved. However, by delaying the age of onset, at least the hazardous health effects of and negative consequences due to heavy drinking in adolescence could be avoided. It is probable that a person has more modes of action and a greater ability to control her/his drinking habits in adulthood if drinking alcohol has not been a part of one's life-style in early adolescence. There is evidence that by employing effective alcohol-specific socialization processes, it is possible for parents to affect the behavior of adolescents. For example, van der Vorst, Engels, Meeus,

Dekovic, & van Leeuwe (2005) have found that imposing strict alcohol-specific rules seemed to prevent adolescents from starting to consume alcohol heavily and frequently; and this was the case also if the parents had confidence in the effectiveness of their alcohol-specific socialization. However, the frequency of communication about alcohol issues was positively associated with alcohol consumption by adolescents.

Individualistic values including achievement, stimulation, and hedonism have become more common in Finland in the 1980's (Helkama & Seppälä, 2004); hedonism is, however, ranked rather low in its importance by most Finns. It is possible that increasing individualism has been related to the increase in Finnish alcohol consumption. As proposed by Kuther and Higgins-D'Alessandro (2000) interventions designed to decrease risky behavior during adolescence might include discussions about why risky activities are moral decisions from society's point of view, thus attempting to get a change in perceptions of risky behaviors from matters of personal choice to matters of morality and values.

The drinking behavior of youth will not change, if change does not occur first among the adult population: the Finnish intoxication orientation is transmitted to children from adults. As proposed by Huttunen (2003), a change in general attitudes is needed to prevent an increase in problems caused by alcohol in the future. Achieving this result will require a joint effort by everyone, including parents, media, professionals, and politicians, and will necessitate a change in the present adult drinking culture.

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Tuuli Pitkänen

TIIVISTELMÄ

Alkoholin juomiskäyttäytyminen ja sen ennustaminen

Tutkimuksen tavoitteena oli selvittää alkoholin juomiskäyttäytymistä nuoruudesta keski-iän kynnykselle. Lisäksi tutkittiin kolmenlaisia juomiskäyttäytymisen ennusteita: lapsuuden perheeseen liittyviä tekijöitä, tutkittavan omaa käyttäytymistä alakouluiässä ennen alkoholin käytön aloittamista sekä käyttäytymistä ja hyvinvointia nuoruusiässä, jolloin osa ikäluokasta oli jo aloittanut päihteiden käytön. Alkoholin käyttö on monitahoinen ilmiö, joten juomiskäyttäytymisen tutkimiseen käytettiin useita menetelmiä, mm. käyttötiheyttä, humaltumisen tiheyttä, alkoholismin seulontatestejä (CAGE ja Mm-Mast) sekä alkoholin käytöstä aiheutuneiden ongelmien määrää. Juomiskäyttäytymisessä ja niiden ennusteissa oletettiin olevan sukupuolten välillä eroja, joten naisia ja miehiä tarkasteltiin erikseen.

Tutkimus perustui kahteen pitkittäistutkimusaineistoon. Jyväskylän yliopiston psykologian laitoksessa Lea Pulkkisen vuonna 1968 aloittamassa Lapsesta aikuiseksi -tutkimuksessa (JYLS) on seurattu 12 koululuokan oppilaita 8-vuotiaasta 42-vuotiaaksi ja heidän alkoholin käyttöään 14-vuotiaasta alkaen. Kansanterveyslaitoksen Mielenterveyden ja alkoholitutkimuksen osastossa Kari Poikolaisen ja Jouko Lönnqvistin vuodenvaihteessa 1990/91 aloittamassa Nuorten aikuisten mielenterveys tutkimuksessa (NAM) on seurattu lukiolaisten psyykkistä hyvinvointia viiden vuoden ajan. Lukion ensimmäisellä luokalla NAM-tutkimukseen osallistuneet olivat 15 – 20-vuotiaita (keski-ikä 16,8); seurantakyselyn aikaan he olivat keskimäärin 22-vuotiaita.

Tutkimusseloste pohjautuu neljään artikkeliin. Ensimmäisessä artikkelissa käsiteltiin nuorten aikuisten juomiskäyttäytymistä ja sen lapsuuden perheeseen sekä tutkittavan omaan sosioemotionaaliseen käyttäytymiseen liittyviä ennusteita. JYLS-tutkimukseen osallistujat olivat tuolloin 27-vuotiaita. Toisessa artikkelissa selvitettiin NAM-tutkimuksen aineiston avulla, miten psyykkinen hyvinvointi sekä lukioaikana että nuoressa aikuisuudessa olivat yhteydessä alkoholin käyttöön nuoressa aikuisiässä. Kolmannessa artikkelissa tarkasteltiin JYLS-tutkimuksen perusteella naisten ja miesten alkoholin käytön aloitusiän yhteyttä alkoholin käyttöön keski-iän kynnyksellä sekä selvitettiin lapsuusiän käyttäytymisen yhteyttä varhaiseen alkoholin käytön aloittamiseen. Neljännessä artikkelissa palattiin ensimmäisen artikkelin kysymyksiin JYLS-tutkimukseen osallistujien vartuttua 42-vuotiaiksi. Artikkelissa selvitettiin juomiskäyttäytymistä eri ikävaiheissa sekä sitä ennustavia lapsuuden perheeseen sekä tutkittavan omaan lapsuus- ja nuoruusiän käyttäytymiseen liittyviä tekijöitä. Neljäs artikkeli kytkeytyy käynnissä olevaan kansainväliseen yhteistyöhön, jossa analysoitiin alkoholinkäyttöä ja sen ennusteita kuuden pitkittäistutkimusaineiston pohjalta. Artikkeleita yhdistävässä selosteessa tutkimuksen keskeisiä tuloksia on pohdittu kansainvälisen alkoholikirjallisuuden valossa.

Aikuisten juomiskäyttäytymistä luonnehti kolme tyyliä: hallittu juominen, sosiaalinen juominen ja ongelmajuominen. Sekä sosiaaliseen että ongelmajuomiseen liittyivät suuret käyttömäärät, ja ne olivat tyypillisempiä miehille kuin naisille. Ongelmajuomiselle oli ominaista, että alkoholin käyttöä oli vaikea hallita tai siitä oli aiheutunut ikäviä seurauksia. Ongelmajuomisen välilliset ja välittömät kustannukset sekä yksilölle ja hänen lähipiirilleen että yhteiskunnalle ovat vuosittain huomattavat (mm. Mustonen & Simpura, 2006).

Suurella osalla tutkittavista oli viitteitä alkoholin ongelmakäytöstä myöhäisnuoruudessa tai nuoressa aikuisuudessa: 20 vuoden ikään mennessä (1980) 36 %:lla JYLS-tutkimuksen naisista ja 58 %:lla miehistä sekä keskimäärin 22 vuoden ikäisistä (v. 1995) NAM-tutkimuksen naisista 53 %:lla ja miehistä 55 %:lla oli ainakin joitakin viitteitä alkoholin ongelmakäytöstä, kun kriteereinä käytettiin vähintään viikoittaista humalajuomista, naisilla vähintään 7 kg:n ja miehillä 10 kg:n puhtaan alkoholin vuosikulutusta, myöntäviä vastauksia alkoholismin seulontatestiin ja/tai alkoholin käytöstä aiheutuneita hankaluuksia. JYLS-tutkimuksessa 27-vuotiaiden (v. 1986) ja 42-vuotiaiden (v. 2001) osalta vastaavat luvut olivat 20 % ja 34 % naisilla, 61 % ja 63 % miehillä. Kansainvälisesti esitetty käsitys nuoruusiän runsaan alkoholin käytön vähenemisestä kypsymisen myötä (mm. Jessor, Donovan & Costa, 1991; Johnstone, Leino, Ager, Ferrer & Fillmore, 1996; Marlat ym., 1998) ei JYLS-tutkimuksen perusteella näyttänyt toteutuvan suomalaisilla miehillä ja naisillakin vain väliaikaisesti. Myös Metso, Mustonen, Mäkelä ja Tuovinen (2002) ovat todenneet, että vaikka suomalaisilla humalajuominen keski-ikää kohti vähenee, niin käytetyn alkoholin määrä ei vähene.

Molemmissa tutkimuksissa nuoret olivat aloittaneet alkoholin käytön keskimäärin 15½-vuotiaana. Aloittamisella ei tässä tarkoiteta alkoholin maistamista vaan humaltumista tai säännöllisen käytön aloittamista. 37 % JYLS-tutkimuksen tytöistä ja pojista käytti alkoholia varhaisnuoruudessa eli 14-vuotiaana tai nuorempana. Tyttöjen ja poikien osalta ei ollut eroa alkoholin käytön aloittamisessa, mutta käyttötavat muotoutuivat erilaisiksi pian aloittamisen jälkeen. Sekä varhainen alkoholin käytön aloittaminen, erityisesti 14-vuotiaana tai nuorempana, että runsas juominen myöhäisnuoruudessa olivat yhteydessä sekä suurempaan humaltumistiheyteen että alkoholin ongelmakäyttöön aikuisiässä. Yhteydet olivat vahvoja riippumatta muista lapsuusperheeseen tai omaan käyttäytymiseen liittyvistä taustatekijöistä. Sekä varhaisen aloittamisen että nuoruusiän humalajuomisen yhteydet myöhempään alkoholin ongelmakäyttöön on todettu myös muissa tutkimuksissa (mm. Grant, Stinson & Harford, 2001; Warner & White, 2003; Zucker ym., 2006), ja niitä on selitetty mm. tapojen kehittymisellä (Andersson & Magnusson, 1988) sekä alkoholin haitallisilla vaikutuksilla nuoren kehittyvälle keholle, erityisesti aivoille ja hermostolle (Spear, 2002; Zeigler ym., 2005).

Alkoholin käyttäminen varhaisnuoruudessa ja runsas juominen myöhäisnuoruudessa olivat yhteydessä äidin tupakoimiseen ja pojilla myös vanhempien runsaaseen alkoholin käyttöön ja tytöillä heikkoon perheen ilmapiiriin. Se, käyttikö alkoholia 14-vuotiaana, ei ollut juuri yhteydessä lapsen omaan sosiaa-

liseen käyttäytymiseen 8-vuotiaana, mutta pojilla 8-vuotiaan mukautuvuus ja vähäinen aggressiivisuus sekä vahvempi itsehallinta olivat yhteydessä vähäisempään nuoruusiän alkoholin käyttöön. 14-vuotiaana alkoholia käyttävät nuoret tupakoivat muita useammin, ja tyttöjen alkoholin käytöllä oli yhteyttä myös samanaikaiseen heikompaan itsehallintaan, vähäisempään rakentavaan käyttäytymiseen, luvattomiin poissaoloihin koulusta ja heikompaan koulumenestykseen. Nuoruusiän runsas juominen oli sekä tytöillä että pojilla yhteydessä 14-vuotiaan aggressiivisuuteen, päihteiden käyttöön ja vähäisempään koulusuuntautuneisuuteen. Pojilla mukautuvuus myös 14-vuotiaana oli yhteydessä vähäisempään alkoholin käyttöön, tytöillä puolestaan sosiaalinen aktiivisuus. JYLS-tutkimuksen osanottajat käyttivät 14-vuotiaana (v. 1974) harvemmin alkoholia kuin kouluterveystutkimuksen tulosten perusteella nykynuoret (Rimpelä, 2004).

Alkoholin käytön tiheys eli se, kuinka monena päivänä vuodessa käyttää alkoholia, ei ole sellaisenaan hyvä juomiskäyttäytymisen mittari. Käyttötiheys korreloi voimakkaasti humalajuomisen tiheyden kanssa, mutta heikommin ongelmakäytön indikaattorien kanssa. Monet, joilla on vaikeuksia alkoholin käyttönsä hallitsemisessa, kontrolloivat käyttökertojensa määrää. Aikuisiän alkoholin käyttötiheys oli heikosti ennustettavissa. Lieviä yhteyksiä tiheään alkoholin käyttöön oli lähinnä suuremmalla sosiaalisella aktiivisuudella, vähäisellä ahdistuneisuudella, lapsuuden perheen korkeammalla sosioekonomisella asemalla ja omalla aiemmalla päihteiden käytöllä, siten että nuoruusiän runsas juominen oli yhteydessä nuorten aikuisten suurempaan alkoholin käyttötiheyteen, mutta alkoholin käyttö 14-vuotiaana keski-iän käyttötiheyteen. Varhaisnuoruudessa tupakoineet naiset käyttivät alkoholia aikuisuudessa useammin kuin muut.

Humalajuomisen tiheys määriteltiin sen perusteella, kuinka usein tutkittava kertoi olevansa kunnolla humalassa tai juovansa vähintään 5 annosta. Viiden annoksen rajaa on käytetty monissa tutkimuksissa (mm. Hingson, Heeren, Jamanka & Howland, 2000; Schulenberg, O'Malley, Bachman, Wadsworth & Johnston, 1996; Wells, Graham, Speechley & Koval, 2005), ja se on sairastavuuden kannalta todettu merkitseväksi (mm. Järvenpää, Rinne, Koskenvuo, Räihä & Kaprio, 2005). NAM-tutkimuksen naisista humaltui 22-vuotiaana viikoittain 10 % ja miehistä 27 %. JYLS-tutkimuksen naisista humaltui 27-vuotiaana viikoittain 4 % naisista ja miehistä 26 %, 42-vuotiaana naisista 7 % ja miehistä 22 %. Nämä luvut ovat kansainvälisiin tutkimuksiin verrattuina korkeita (mm. Bensley, Eenwyk & Simmons, 2000), mutta vastaavat Helakorven, Patjan, Prättälän, Aron ja Uutelan (2003) tuloksia suomalaisten aikuisten terveyskäyttäytymisestä. Luvut kuvastavat sitä, että humaltuminen on suomalaisessa kulttuurissa hyväksyttyä (Mäkelä, Fonager, Hibell, Norlund, Sabroe & Simpura, 2001).

Naisten humalajuomisen tiheys keski-iän kynnyksellä oli ennustettavampaa kuin heidän humalajuomisensa nuoressa aikuisiässä sekä ennustettavampaa kuin miesten humalajuominen. Sekä 27- että 42-vuotiaiden naisten humalajuominen oli yhteydessä äidin tupakoimiseen sekä tytön omaan tupakointiin, vähäiseen rakentavaan käyttäytymiseen, luvattomiin poissaoloihin koulusta ja aggressiivisuuteen 14-vuotiaana sekä nuoruusiän runsaaseen alkoholin käyt-

töön. 42-vuotiaiden naisten humalajuominen oli lisäksi yhteydessä heikkoon koulumenestykseen 8- ja 14-vuotiaana sekä vanhempien alkoholin käyttöön ja heikkoon lapsuuden perheen ilmapiiriin. Miesten humaltumista 27-vuotiaana ennusti heikko koulusuuntautuneisuus ja runsas juominen nuoruusiässä, kun taas humaltumista 42-vuotiaana ennustivat lähinnä vanhempien alkoholin käyttö sekä nuoren varhainen alkoholin käytön aloittaminen, tupakoiminen ja runsas juominen nuoruusiässä.

Tutkimuksessa käytettiin kahta alkoholismin seulontatestiä. CAGE-testi sisältää neljä kysymystä: halun vähentää juomista, krapularyypyn ottamisen, harmistumisen saadusta kritiikistä ja syyllisyyden kokemukset. Mm-MAST-testi sisältää yhdeksän kysymystä, esimerkiksi ”Onko sinulla koskaan ollut vaikeuksia juoda vähemmän kuin ystäväsi?” ja ”Onko sinulla koskaan ollut tapana ottaa lasillinen alkoholia ennen juhliin lähtöä?” Testien keskinäinen korrelaatio oli suuri ja ne olivat kiinteästi yhteydessä myös sekä humalajuomiseen että alkoholin käytöstä aiheutuneisiin ongelmiin. Miehillä korkeat CAGE-pisteet 27- ja 42-vuotiaana olivat yhteydessä vanhempien runsaaseen alkoholin käyttöön sekä pojan heikkoon koulumenestykseen ja luvattomiin poissaoloihin koulusta varhaisnuoruudessa. Lisäksi tupakointi ja alkoholin käyttö 14-vuotiaana sekä runsas juominen nuoruusiässä olivat yhteydessä korkeisiin CAGE-pisteisiin 42-vuotiaana sekä naisilla että miehillä. Korkeat CAGE-pisteet 42-vuotiaana olivat naisten osalta ennustettavissa yhtä hyvin ja samoilla oman käyttäytymisen ja lapsuuden perheen tekijöillä kuin humaltumisen useuskin, mutta lisäksi ennustearvoa oli nuoruusiän aggressiivisuudella ja heikolla itsehallinnalla sekä lapsuuden perheen matalalla sosioekonomisella asemalla.

Alkoholin käytöstä aiheutuneilla hankaluuksilla tarkoitettiin mm. tappeluita, onnettomuuksia, ongelmia ystävyys- tai parisuhteissa, poissaoloja töistä, työsuhteen vaarantamista, juopumuspidätyksiä ja rattijuopumuksia. 42-vuotiaista JYLS-tutkimuksen naisista 18 % ja miehistä 48 % oli kokenut enemmän kuin yhden hankaluuden alkoholin käyttönsä takia, mutta peräti 61 % 22-vuotiaista NAM-tutkimuksen naisista sekä miehistä. JYLS-tutkittavien osalta vertailua aiempiin ikävaiheisiin hankaloitti se, että mittari oli tutkimuksen aikana hieman muuttunut.

Alkoholin käytöstä aiheutuneet hankaluudet keski-iän kynnyksellä olivat voimakkaammin yhteydessä lapsuus- ja nuoruusiän käyttäytymiseen sekä lapsuuden perheeseen liittyviin riski-tekijöihin kuin hankaluudet nuoressa aikuisuudessa. Alkoholin käytöstä aiheutuneet hankaluudet sekä 27- että 42-vuotiailla olivat JYLS-tutkimuksen miehillä yhteydessä vanhempien alkoholin käyttöön, lapsuuden perheen heikkoon ilmapiiriin ja matalampaan sosioekonomiseen asemaan sekä lisäksi pojan aggressiivisuuteen, heikkoon itsehallintaan ja vähäisempään mukautuvuuteen 8-vuotiaana. Myös varhaisnuoruusiän vähäinen rakentava käyttäytyminen, vähäinen mukautuvuus, aggressiivisuus, heikko itsehallinta, heikko koulumenestys, luvaton poissaolo koulusta ja päihteiden käyttö olivat enemmän yhteydessä alkoholin käytöstä aiheutuneisiin ongelmiin kuin pelkkään humaltumisen tiheyteen; yhteydet olivat erityisen voimakkaita alkoholista aiheutuneisiin ongelmiin 42-vuotiaana. Naisten osalta alkoholin

käytöstä aiheutuneiden hankaluuksien ja humalajuomisen ennusteet olivat suurelta osin samoja. Kuitenkin sosioemotionaaliset ja sopeutumisongelmat 14 -vuotiaana erottelivat voimakkaammin alkoholin käytöstä aiheutuvia ongelmia kuin humalakäyttöä tai korkeita CAGE-pisteitä 27-vuotiaana. 42-vuotiaiden naisten humaltumisen, korkeiden CAGE-pisteiden ja alkoholin ongelmakäytön ennusteista keskeisimpiä olivat äidin tupakointi, heikko lapsuuden perheen ilmapiiri, tytön vähäinen rakentava käyttäytyminen sekä nuoruusiän aggressiivisuus, heikko itsehallinta, heikko koulumenestys, luvaton poissaolo koulusta sekä tupakoiminen ja alkoholin käyttö.

NAM-tutkimuksen naisten ja miesten psyykkistä hyvinvointia tarkasteltiin suhteessa heidän ongelmajuomiseensa nuoressa aikuisuudessa. Alkoholin käyttömäärän, humalajuomisen, CAGE-pisteiden ja alkoholin käytöstä aiheutuneiden ongelmien perusteella muodostettiin neljä ryhmä: absolutistit, kohtuukäyttäjät, mahdolliset ongelmajuojat ja ongelmajuojat. Nuoressa aikuisuudessa alkoholia ongelmallisesti käyttävien psyykkinen hyvinvointi oli lukioiässä ollut heikompaa kuin muilla nuorilla, ja erot alkoholin käyttöryhmien välillä kasvoivat kohti nuorta aikuisuutta. Naispuolisilla ongelmajuojilla oli lukioiässä muita heikompi itsetunto, enemmän ahdistuneisuutta, somaattista oirehtimista ja syömishäiriöitä sekä epäkypsempiä minän puolustusmekanismeja, ja erot suurenivat sekä kohtuukäyttäjien ja ongelmajuojien että kohtuukäyttäjien ja niiden välillä, joilla oli joitakin viitteitä ongelmajuomisesta 22-vuotiaana. Miespuolisten ongelmakäyttäjien minän puolustusmekanismit olivat olleet epäkypsempiä lukioiässä, ja heillä oli enemmän somaattisia oireita kuin muilla. Koska alkoholin käytöstä ei kysytty lukioaikana, on mahdollista, että lukioiän somaattiset oireet olivat yhteydessä samanaikaiseen alkoholin käyttöön. Miehillä erot alkoholiryhmien välillä suurenivat nuorta aikuisuutta kohti siten, että ongelmajuojat poikkesivat nuoressa aikuisuudessa sekä kohtuukäyttäjistä että mahdollisista ongelmajuojista runsaampien somaattisten oireiden, ruoan ahmimisen, ahdistuneisuuden ja kypsien minän puolustuskeinojen vähäisyyden suhteen.

Alkoholin ongelmakäytön ennusteena itsehallinta osoittautui tärkeäksi ulottuvuudeksi sekä naisilla että miehillä, kuten oli Pulkkisen (1995, 2006) sosioemotionaalisen mallin ja ongelmakäyttäytymiseen liittyvän kirjallisuuden perusteella oletettavissa (mm. Lynam, Leukefeld & Clayton, 2003; Moffit, Caspi, Rutter & Silva, 2001; Parker, Levin & Harford, 1996). Ulospäin suuntautuva heikko itsehallinta (mm. aggressiivisuus) oli 8-vuotiaasta alkaen riskitekijä poikien myöhemmälle ongelmajuomiselle, mutta vahvaa itsehallintaa osoittava vetäytyvä käyttäytyminen (mm. mukautuvuus ja harkitsevaisuus) oli yhteydessä hallitumpiin juomatapoihin. Sitä vastoin tytöillä sisäänpäin suuntautunut heikko tunteiden hallinta (mm. ahdistuneisuus) oli riskitekijä, kun taas sen vastakohtaa edustavat rakentava käyttäytyminen ja sosiaalinen aktiivisuus olivat yhteydessä hallitumpiin juomatapoihin. Ulospäin suuntautuvan ongelmakäyttäytymisen osalta eroa oli sukupuolten välillä kuitenkin vain lapsuudessa; varhaisen nuoruusiän aggressiivisuus ja koulusopeutumattomuus olivat myöhempien alkoholiongelmien riskitekijöitä myös naisille.

Alkoholin käyttö on Suomessa tutkimuksen aikana lisääntynyt huomattavasti, ja siihen ovat vaikuttaneet muutokset sekä alkoholipolitiikassa että asenteissa. Alkoholin saatavuus on lisääntynyt ja hinta laskenut. Perinteisestä kontrollipolitiikasta on siirrytty kohti yksilön vastuuta oman alkoholin käyttönsä hallinnasta. Laissa määriteltyä 18 vuoden alkoholin käytön alaikärajaa ei kunnioiteta; lapsille ostetaan ja myydään alkoholia, mitä osoittaa hyvin se, että suomalaisista nuorista yli 30 % oli ottanut ensihumalan ennen 14 vuoden ikää, mikä on eurooppalaisittain poikkeuksellisen suuri luku (Hibell ym., 2004). Suhtautuminen erityisesti naisten juomiseen on tullut hyväksyvämmäksi, mikä näkyi sekä JYLS- ja NAM-ikäluokkien välisenä erona että JYLS-tutkimuksen naisten keski-ikää kohti lisääntyneenä alkoholinkäyttönä. JYLS- ja NAM-tutkimusten naisten alkoholin käytön vertailu ei ollut ongelmatonta, mutta vaikuttaa siltä, että NAM-tutkimuksen naisten juominen oli runsaampaa kuin JYLS-tutkimuksen naisten alkoholin käyttö samanikäisenä. Naisten alkoholiongelmien määrä tulee kasvamaan tulevaisuudessa runsaasti, mikäli NAM-tutkimusta edustavan ikäluokan naisten juominen lisääntyy keski-ikää kohti samalla tavalla kuin JYLS-tutkimuksen naisten. On kuitenkin mahdollista, että asenneilmapiirissä tulee tapahtumaan uusia muutoksia, jotka vaikuttavat vaikkapa hillitsevästi naisten juomiseen. Huolimatta siitä, että naisten juominen on lisääntynyt, ongelmajuominen on edelleen erityisesti miesten ongelma.

Tutkimuksen perusteella on siis olemassa lapsuuden perheeseen sekä ihmisen omaan lapsuuden ja nuoruusiän käyttäytymiseen ja hyvinvointiin liittyviä alkoholin ongelmakäytön riskitekijöitä. Vaikka nämä tekijät selittävät vain osan myöhemmästä alkoholin ongelmakäytöstä ja vaikka yksilötasolla ennustaminen on vaikeaa, niin kuitenkin sekä riski- että suojaavien tekijöiden tunnistaminen on ennalta ehkäisevän työn kannalta tärkeää. Korjaavan työn ohella tulisi entistä enemmän panostaa riskiperheiden auttamiseen lapsen ollessa neuvola- ja kouluiässä. Päihteiden käytön aloittamisen siirtäminen mahdollisimman myöhäiseksi vähentäisi sekä niitä huomattavia haittoja, joita alaikäisten päihteiden käytöstä syntyy, että mitä todennäköisimmin myöhempää päihdeongelmaisten määrää. Päihdekulttuurin muutos on mahdollinen, mutta seuraavan sukupolven käyttäytyminen ei muutu itsestään. Myös aikuisilta tarvitaan tahtoa sekä oman käyttäytymisen ja asenteiden uudelleen arvioimista.

REFERENCES

Aalto-Setälä, T. (2002). *Depressive disorders among young adults*. Helsinki: National Public Health Institute, No. A 22.

Aalto-Setälä, T., Marttunen, M., Tuulio-Henriksson, A., Poikolainen, K., & Lönnqvist, J. (2001). One-month prevalence of depression and other DSM-IV disorders among young adults. *Psychological Medicine, 31*, 791-801.

Abide, M.M., Richards, H.C., & Ramsay, S.G. (2001). Moral reasoning and consistency of belief and behavior: decisions about substance abuse. *Journal of Drug Education, 31*, 367-384.

Adams, W.L., Barry, K.L., & Fleming, M.F. (1996). Screening for problem drinking in older primary care patients. *JAMA, 276*, 1964-1967.

Ahlström, S. (1987). Women's use of alcohol. In J. Simpura (Ed.), *Finnish drinking habits. Results from interview surveys held in 1968, 1976 and 1984* (pp. 109-134). (The Finnish Foundation for Alcohol Studies, No. 35). Jyväskylä: Gummerus.

Alati, R., Lawlor, D.A., Najman, J.M., Williams, G.M., Bor, W., & O'Callaghan, M. (2005). Is there really a 'J-shaped' curve in the association between alcohol consumption and symptoms of depression and anxiety? Findings from the Mater-University Study of Pregnancy and its outcomes. *Addiction*, *100*, 643-651.

Alterman, A.I., Hall, J.G., Purtill, J.J., Searles, J.S., Holahan, J.M., & McLellan, A.T. (1990). Heavy drinking and its correlates in young men. *Addictive behaviors, 15*, 95-103.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

Anda, R.F., Wialliamson, D.F., & Remington, P.L. (1988). Alcohol and fatal injuries among US adults. *JAMA, 260*, 2529-2532.

Andersson, T., Bergman, L.R., & Magnusson, D. (1989). Patterns of adjustment problems and alcohol abuse in early adulthood: A prospective longitudinal study. *Development and Psychopathology, 1,* 119-131.

Andersson, T., & Magnusson, D. (1988). Drinking habits and alcohol abuse among young men: a prospective longitudinal study. *Journal of Studies on Alcohol, 49*, 245-252.

Andreasson, S., Allebeck, P., Brandt, L., & Romelsjö, A. (1992). Antecedents and covariates of high alcohol consumption in young men. *Alcoholism: Clinical and Experimental Research, 16,* 708-713.

Aro, S. (1981). Stress, morbidity, and health-related behaviour. *Scandinavian Journal of Social Medicine, 25(*Suppl.*)*, 1-130.

Bahr, S.J., Marcos A.C., & Maughan, S.L. (1995). Family, educational and peer influences on the alcohol use of female and male adolescents. *Journal of Studies on Alcohol, 56*, 457-469.

Bailey, S.L., Flewelling, R.L., & Rachal, J.V. (1992). The characterization of inconsistencies in self-reports of alcohol and marijuana use in a Longitudinal Study of Adolescents. *Journal of Studies on Alcohol*, *53,* 636-647.

Bailey, S.L., & Rachal, J.V. (1993). Dimensions of adolescent problem drinking. *Journal of Studies on Alcohol, 54*, 555-565.

Barman, S., Pulkkinen, L., Kaprio, J., & Rose, R.J. (2004). Inattentiveness, parental smoking, and adolescent smoking initiation. *Addiction, 99,* 1049-1061.

Barnes, G.M., & Welte, J.W. (1986). Patterns and predictors of alcohol use among 7-12th grade students in New York State. *Journal of Studies on Alcohol, 47*, 53-62.

Barnes, G.M., Welte, J.W., & Dintcheff, B. (1992). Alcohol misuse among college students and other young adults: Findings from a general population study in New York State. *The International Journal of the Addictions*, *27,* 917-934.

Barrera M., Jr., Chassin L., & Rogosch, F. (1993). Effects of social support and conflict on adolescent children of alcoholic and nonalcoholic fathers. *Journal of Personality and Social Psychology*, *64*, 602-612.

Barrett, A.E., & Turner, R.J., (2006). Family structure and substance use problems in adolescence and early adulthood: remaining explanations for the relationship. *Addiction, 101*, 109-120.

Bartholow, B.D., Sher, K.J., & Krull, J.L. (2003). Changes in heavy drinking over the third decade of life as a function of collegiate fraternity and sorority involvement: a prospective, multilevel analysis. *Health Psychology, 22*, 616-626.

Bensley, L.S., van Eenwyk, J. & Simmons, K.W. (2000). Self-reported childhood sexual and physical abuse and adult HIV-risk behaviors and heavy drinking. *American Journal of Preventive Medicine, 18*, 151-158.

Becker, L.A. (2006). Effect size. http://web.uccs.edu/lbecker/Psy590/es.htm

Block, J., Block, J.H., & Keyes, S. (1988). Longitudinally foretelling drug usage in adolescence: early childhood personality and environmental precursors. *Child development, 59*, 336-355.

Blum, R.W., Beuhring, F., Shew, M.L. Bearinger, L.H., Sieving, R.E., & Resnick, M.D. (2000). The effects of race/ethnicity, income, and family structure on adolescent risk behaviors. *American Journal of Public Health, 90*, 1879-1884.

Bolognini, M., Bettschart, B., Plancherel, B., & Rossier, L. (1989). From the child to the young adult: sex differences in the antecedents of psychological problems. A retrospective study over ten years. *Social Psychiatry & Psychiatric Epidemiology, 24*, 179-186.

Bond, M., Gardner, S.T., & Sigal, J.J. (1983). Empirical study of self-rated defense styles. *Archives of General Psychiatry, 40*, 333-338.

Bradley, K.A., Boyd-Wickizer, J., Powell, S.H., & Burman, M.L. (1998). Alcohol screening questionnaires in women: A critical review. *JAMA*, *280*, 166-171.

Brady, K.T., Grice, D.E., Dustan, L., & Randall, C. (1993). Gender differences in substance use disorders. *American Journal of Psychiatry, 150,* 1707-1711.

Braun, D.L., Sunday, S.R., & Halmi, K.A. (1994). Psychiatric comorbidity in patients with eating disorders. *Psychological Medicine, 24*, 859-867.

Bricker, J.B., Peterson A.V., Jr., Leroux, B.G., Andersen, M.R., Rajan, K.B., & Sarason, I.G. (2006). Prospective prediction of children's smoking transitions: role of parents' and older siblings' smoking. *Addiction, 101*, 128-136.

Brook, D.W., Brook, J.S., Zhang, C., Cohen, P., & Whiteman, M. (2002). Drug use and the risk of major depressive disorder, alcohol dependence, and substance use disorders. *Archives of General Psychiatry*, *59*, 1039-1044.

Brook, J.S., Balka, E.B., Rosen, Z., Brook, D.W., & Adams, R. (2005). Tobacco use in adolescence: longitudinal links to later problem behavior among African American and Puerto Rican urban young adults. *The Journal of Genetic Psychology, 166*, 133-151.

Bryant, A.L., Schulenberg, J., Bachman, J.G., O'Malley, P.M., & Johnston, L.D. (2000). Understanding the links among school misbehavior, academic achievement, and cigarette use: A national panel study of adolescents. *Prevention Science, 1*, 71-87.

Bukstein, O.G. (1995). Influences on the risk and course of substance use and abuse in adolescents. *Current Opinion in Psychiatry*, *8*, 218-221.

Caetano, R. & Cunradi, C. (2002). Alcohol dependence: a public health perspective. *Addiction*, 97, 633-645.

CAPCA (2006). Center for the Analysis of Pathways from Childhood to Adulthood. http://rcgd.isr.umich.edu/capca/

Casper, R.C., Belanoff, J., & Offer, D. (1996). Gender differences, but no racial group differences, in self-reported psychiatric symptoms in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 500-508.

Caspi, A. & Roberts, B.W. (1999). Personality continuity and change across the life course. In Pervin, L.A. & John, O.P. (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 300-326). New York: Guilford Press.

Casswell, S., Pledger, M. & Pratap, S. (2002). Trajectories of Drinking from 18 to 26 years: Identification and prediction. *Addiction*, 97, 1427-1437.

Chassin, L., Curran, P.J., Hussong, A., & Colder, D.R. (1996). The relation of parent alcoholism to adolescent substance use: a longitudinal follow-up study. *Journal of Abnormal Psychology, 105*, 70-80.

Chassin, L., Flora, D.B., & King, K.M. (2004). Trajectories of alcohol and drug use and dependence from adolescence to adulthood: the effects of familial alcoholism and personality. *Journal of Abnormal Psychology, 113*, 483-498.

Chen, W-J.A., Maier, S.E., Parnell, S.E., & West, J.R. (2003). Alcohol and the developing brain: Neuroanatomical studies. *Alcohol Research & Health, 27*, 174-180.

Choquet, M., & Menke, H. (1987). Development of self-perceived risk behaviour and psychosomatic symptoms in adolescents: a longitudinal approach. *Journal of Adolescence*, *10*, 291-308.

Cicchetti, D., Ganiban, J., & Barnett, D. (1991). Contributions from the study of high-risk populations to understanding the development of emotion regulation. In J. Garber & K.A. Dodge (Eds.), *The development of emotion regulation and dysregulation* (pp. 15-48). (Cambridge studies in social and emotional development). New York: Cambridge University Press.

Clark, D.B., Neighbors, B.D., Lesnick, L.A., Lynch, K.G., & Donovan, J.E. (1998). Family functioning and adolescent alcohol use disorder. *Journal of Family Psychology, 12*, 81-92.

Cochrane, J.J., Goering, P., & Lancee, W. (1992). Gender differences in the manifestations of problem drinking in a community sample. *Journal of Substance Abuse*, *4*, 247-254.

Cornel, M., Knibbe, R.A., Drop, M.J., Knottnerus, J.A., & van Zutphen, W.M. (1995). The medical profile of unidentified problem drinkers in general practice: test of an hypothesis. *Alcohol & Alcoholism*, *30*, 651-659.

Crawford, A., Plant, M.A., Kreitman, N., & Latcham, R.W. (1987). Unemployment and drinking behaviour: Some data from a general population survey of alcohol use. *British Journal of Addiction, 82,* 1007-1016.

Curran, P.J., & Chassin, L. (1996). A longitudinal study of parenting as a protective factor for children of alcoholics. *Journal of Studies on Alcohol, 57*, 305-313.

Curran, P.J., Muthen, B.O., and Harford, T.C. (1998). The influence of changes in marital status on developmental trajectories of alcohol use in young adults. *Journal of Studies on Alcohol*, *59*, 647-658.

Day, N.L. (1995). Epidemiology of Alcohol Use, Abuse, and Dependence. In M.T. Tsuang, M. Tohen, & G.E.P. Zahner (Eds.), *Textbook in psychiatric epidemiology* (pp. 345-360). New York: Wiley-Liss.

Delucchi, K.L., Matzger, H., & Weisner, C. (2004). Dependent and problem drinking over 5 years: a latent class growth analysis. *Drug and Alcohol Dependence, 74*, 235-244.

DeWit, D.J., Adlaf, E.M., Offord, D.R., & Ogborne, A.C. (2000). Age of first alcohol use: a risk factor for the development of alcohol disorders. *American Journal of Psychiatry, 157*, 745-750.

Dick, D.M., Barman, S., & Pitkänen, T. (2006). Genetic and environmental influences on the initiation and continuation of smoking and drinking. In Pulkkinen, L., Kaprio, J., & Rose. R.J. (Eds.), *Socioemotional Development and Health from Adolescence to Adulthood* (pp. 126-145). New York: Cambridge University Press.

Doll, R., Peto, R., Boreham, J., & Sutherland, I. (2005). Mortality in relation to alcohol consumption: a prospective study among male British doctors. *International Journal of Epidemiology, 34*, 199-204.

Donovan, J.E., Jessor, R., & Jessor, L. (1983). Problem drinking in adolescence and young adulthood: a follow-up study. *Journal of Studies on Alcohol*, *44*, 109-137.

Dube, S.R., Anda, R.F., Felitti, V.J., Edwards, V.J. & Croft, J.B. (2002). Adverse childhood experiences and personal alcohol abuse as an adult. *Addictive Behaviors*, 27, 713-725.

Dubow, E., Arnett, M., Smith, K., & Ippolito, M.F. (2001). Predictors of future expectations of inner-city children: a 9-month prospective study. *Journal of Early Adolescence, 21*, 5-28.

Dubow, E.F., Huesmann, L.R., Boxer, P., Pulkkinen, L., & Kokko K. (2006). Middle childhood and adolescent contextual and personal predictors of adult educational and occupational outcomes: A mediational model in two countries. *Developmental Psychology*, *42*, 937-949.

Eigenbrodt, M.L., Mosley, T.H., Hutchinson, R.G., Watson, R.L., Chambless, L.E., & Szklo, M. (2001). Alcohol consumption with age: A Cross-sectional and Longitudinal Study of the Atherosclerosis Risk in Communities (ARIC) Study, 1987-1995. *American Journal of Epidemiology, 153*, 1102-11.

Embree, B.G. & Whitehead, P.C. (1993). Validity and reliability of self-reported drinking behavior: dealing with the problem of response bias. *Journal of Studies on Alcohol, 54*, 334-344.

Ensminger, M.E., Brown, C.H., & Kellam, S.G. (1982). Sex differences in antecedents of substance use among adolescents. *Journal of Social Issues, 38*, 25-42.

Ewing, J.A. (1984). Detecting alcoholism: The CAGE Questionnaire. *JAMA*, *252*, 1905-1907.

Fan, A.Z., Russell, M., Dorn, J., Freudenheim, J.L., Nochajski, T., Hoey, K., & Trevisn, M. (2006). Lifetime alcohol drinking pattern is related to the prevalence of metabolic syndrome. The Werstern New York Health Study (WNYHS). *European Journal of Epidemiology*, *21*, 129-138.

Fergusson, D.M. & Horwood, L.J. (1998). Early conduct problems and later life opportunities. *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 1097-1108.

Fillmore, K.M., Hartka, E., Johnstone, B.M., Leino, V., Motoyoshi, M., & Temple, M.T. (1991). The collaborative alcohol-related longitudinal project: A meta-analysis of life course variation in drinking. *British Journal of Addiction, 86*, 1221-1268.

Fillmore, K.M., Kerr, W.C., Stockwell, T., Chikritzhs, T., & Bostrom, A. (2006). Moderate alcohol use and reduced mortality risk: Systematic error in prospective studies. *Addiction Research and Theory, 14*, 101-132.

Finn, R.R., Bobova, L., Wehner, E., Fargo, S., & Rickert, M.E. (2005). Alcohol expectancies, conduct disorder and early-onset alcoholism: negative alcohol expectancies are associated with less drinking in non-impulsive versus impulsive subjects. *Addiction*, *100*, 953-962.

Fischer, S., Anderson, K.G., & Smith, G.T. (2004). Coping with distress by eating or drinking: role of trait urgency and expectancies. *Psychology of Addictive Behaviors, 18,* 269-274.

Flory, K., Lynam, D., Milich, R., Leukefeld, C., & Clayton, R. (2004). Early adolescent through young adult alcohol and marijuana use trajectories: Early predictors, young adult outcomes, and predictive utility. *Development and Psychopathology, 16,* 193-213.

Forsberg, L., Halldin, J., Ekman, S., & Rönnberg, S. (2002). Screening of binge drinking among patients on an emergency surgical ward. *Alcohol*, 27, 77-82.

Frank, S.J., Jacobson, S., & Tuer, M. (1990). Psychological predictors of young adults' drinking behaviors. *Journal of Personality and Social Psychology, 59*, 770-780.

Furtado, E.F., Laucht, M., & Schmidt, M.H. (2006). Gender-related pathways for behavior problems in the offspring of alcoholic fathers. *Brazilian Journal of Medical and Biological Research, 39*, 659-669.

Ghodsian, M. & Power, C. (1987). Alcohol consumption between the ages of 16 and 23 in Britain: A longitudinal study. *British Journal of Addiction, 82*, 175-180.

Gmel, G., Graham, K., Kuendig, H., & Kuntsche, S. (2006). Measuring alcohol consumption - should the 'graduated frequency' approach become the norm in survey research? *Addiction, 101*, 16-30.

Goldberg, D.P. (1972). *The detection of psychiatric illness by questionnaire*. Institute of Psychiatry, Madsley, Monographs. London: Oxford University Press.

Gomberg, E.S.L. (1982). The young male alcoholic: A pilot study. *Journal of Studies on Alcohol, 43*, 683-701.

Gomberg, E.S.L. (1993). Gender issues. *Recent Developments in Alcoholism*, *11*, 95-107.

Grant, B.F., & Dawson, D.A. (1997). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse*, *9*, 103-110.

Grant, B.F., Harford, T.C., & Grigson, M.B. (1988). Stability of alcohol consumption among youth: a national longitudinal study. *Journal of Studies on Alcohol*, *49*, 253-260.

Grant, B.F., & Hasin, D.S. (1992). *The Alcohol Use Disorder and Associated Disabilities Interview Schedule.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Grant, B.F., Stinson, F.S., & Harford, T.C. (2001). Age at onset of alcohol use and DSM-IV alcohol abuse and dependence: a 12-year follow-up. *Journal of Substance Abuse*, *13,* 493-504.

Greenbaum, P.E., del Boca, F.K., Darkes, J., Wang, C-P., & Goldman, M.S. (2005). Variation in the drinking trajectories of freshmen college students. *Journal of Consulting and Clinical Psychology, 73*, 229-238.

Greene, J.W., Walker, L.S., Hickson, G., & Thompson, J. (1985). Stressful life events and somatic complaints in adolescents. *Pediatrics*, *75*, 19-22.

Greenfield, T.K. (2000). Ways of measuring drinking patterns and the difference they make: experience with graduated frequencies. *Journal of Substance Abuse*, *12*, 33-49.

Greenfield, T.K., & Kerr, W.C. (2003). Tracking alcohol consumption over time. *Alcohol Research & Health*, *27*, 30-38.

Greenfield, T.K., Midanik, L.T., & Rogers, J.D. (2000). A 10-year national trend study of alcohol consumption, 1984-1995: Is the period of declining drinking over? *American Journal of Public Health, 90*, 47-52.

Griffith, M.A., Dubow E.F., & Ippolito, M.F. (2000). "Developmental and Cross-Situational Differences in Adolescents' Coping Strategies." *Journal of Youth and Adolescence 29*, 183-204.

Göransson, M., & Hanson, B.S. (1994). How much can data on days with heavy drinking decrease the underestimation of true alcohol consumption? *Journal of Studies on Alcohol, 55*, 695-700.

Haarasilta, L. (2003). Major depressive episode in adolescents and young adults: A nationwide epidemiological survey among 15-24-year-olds. Helsinki: National Public Health Institute, A14.

Harford, T.C. (1993). Stability and prevalence of drinking among young adults. *Addiction*, *88*, 273-277.

Harré, R., & Lamb, R. (Eds.). (1986). *The dictionary of personality and social psychology*. Oxford: Blackwell.

Hawkins, J.D., Catalano, R.F., & Miller, J.Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychological Bulletin*, *112*, 64-105.

Hawkins, J.D., Graham, J.W., Maguin, E., Abbott, R., Hill, K.G. and Catalano, R.F. (1997). Exploring the effects of age of alcohol use initiation and psychosocial risk factors on subsequent alcohol misuse. *Journal of Studies on Alcohol*, *58*, 280-290.

Hayes, L., Smart, D., Toumbourou, J.W., & Sanson, A. (2004). *Parenting influences on adolescent alcohol use.* Melbourne: Australian Institute of Family Studies for the Australian Government, Department of Health and Ageing, 10.

Heck, E. J. (1991). Developing a screening questionnaire for problem drinking in college students. *College Health, 39*, 227-231.

Heck, E. J., & Williams, M. D. (1995). Using the CAGE to screen for drinking-related problems in college students. *Journal of Studies on Alcohol, 56*, 282-286.

Hein, R., Virtanen, A., & Wahlfors, L. (2002). *Yearbook of Alcohol and Drug Statistics 2002.* (Stakes: Official Statistics of Finland; Social Security, 3.) Saarijärvi: Gummerus.

Heinonen, J. (2002). Myrskyjä vesilasissa. [Storms in a liquor glass. In Finnish.] In J. Heinonen, (Ed.), *Turmiolan Tommi. Mietteitä alkoholi- ja huume-tutkimuksesta* (pp. 38-49). Keuruu: Otava.

Helakorpi, S., Patja, K., Prättälä, R., Aro, A.R., & Uutela, A. (2003). *Suomalaisen aikuisväestön terveyskäyttäytyminen ja terveys, kevät 2003.* [Health behaviour and health among Finnish adult population, spring 2003]. Helsinki: National Public Health Insititute, B17.

Helkama K., & Seppälä, T. (2004). Arvojen muutos Suomessa 1980-luvulta 2000-luvulle. [Changes in Finnish values from 1980 to 2000. In Finnish.] In Helkama K., Seppälä, T., Alasuutari, P., Kantola, A., Tainio, R., Tiihonen, S., Ilmonen, K., Wilenius, M., Luostarinen, H., Uskali, T., & Lehtinen, E. (Eds.) *Artikkelikokoelma tutkimushankkeesta sosiaaliset innovaatiot, yhteis-kunnan uudistumiskyky ja taloudellinen menestys* (pp. 1-32*).* Helsinki: Sitra. http://www.sitra.fi/fi/Julkaisut/sarjat/Muutjulkaisut/muut_julkaisut.htm

Helzer, J.E., Burnam, A., & McEvoy, L.T. (1991). Alcohol abuse and dependence. In L.N. Robins, & D.A. Regier (Eds.), *Psychiatric disorders in America: The epidemiologic catchment area study* (pp. 81-115). New York: Free Press.

Hemmingsson, T. (2004). The relative importance of childhood experience and adult social circumstances for the development of alcohol abuse and dependence in adulthood. In P. Rosenqvist, J. Blomqvist, A. Koski-Jännes, & L. Öjesjö (Eds.), *Addiction and lifecourse* (pp. 71-83). Nordiska nämnden för alkohol- och drogforskning (NAD) publication, 44.

Hesselbrock, M.N., Hesselbrock, V.M., Babor, T.F., Stabenau, J.R., Meyer, R.E., & Weidenman, M. (1984). Antisocial behavior, psychopathology and problem drinking in the natural history of alcoholism. In D.W. Goodwin, K.T. vanDusen, & A.S. Mednick (Eds.), *Longitudinal research in alcoholism* (pp. 197-214). Boston: Kluwer-Nijhoff.

Hibell, B., Andersson, B., Ahlström, S., Balakireva, O., Bjarnason, T., Kokkevi, A., & Morgan, M. (2000). *The 1999 ESPAD report: Alcohol and other drug use among students in 30 European countries*. (The Swedish Council for Information on Alcohol and Other Drugs and the Pompidou Group at the Council of Europe). Stockholm: Modin.

Hibell, B., Andersson, B., Bjarnason, T., Ahlström, S., Balakireva, O., Kokkevi, A., & Morgan. M. (2004). *The ESPAD Report 2003. Alcohol and other drug use among students in 35 European countries*. (The Swedish Council for Information on Alcohol and Other Drugs and the Pompidou Group at the Council of Europe). Stockholm, Sweden: Modin.

Higuchi, S., Suzuki, K., Yamada, K., Parrish, K., & Kono, H. (1993). Alcoholics with eating disorders: Prevalence and clinical course. A study from Japan. *British Journal of Psychiatry*, *162*, 403-406.

Hill, S.Y., Shen, S., Lowers, L., & Locke, J. (2000). Factors predicting the onset of adolescent drinking in families at high risk for developing alcoholism. *Biological Psychiatry, 48*, 265-275.

Hill, S.Y., & Yuan, H. (1999). Familial density of alcoholism and onset of adolescent drinking. *Journal of Studies on Alcohol, 60*, 7-17.

Hingson, R.W., Heeren, T., Jamanka, A., & Howland, J. (2000). Age of drinking onset and unintentional injury involvement after drinking. *JAMA*, *284,* 1527-1533.

Hingson, R.W., Heeren, T., & Winter, M.R., (2006). Age at drinking onset and alcohol dependence. *Archives of pediatrics & adolescent medicine, 160,* 739-746.

Hoffmann, J.P., & Su, S. (1998). Parental substance use disorder, mediating variables and adolescent drug use: a non-recursive model. *Addiction, 93*, 1351-64.

Holmila, M., & Raitasalo, K. (2005). Gender differences in drinking: why do they still exist? *Addiction, 100*, 1763-1769.

Hommer, D.W. (2003). Male and female sensitivity to alcohol-induced brain damage. *Alcohol Research & Health, 27*, 181-185.

Hughes, S.O., Power, T.G., & Francis, D.J. (1992). Defining patterns of drinking in adolescence: a cluster analytic approach. *Journal of Studies on Alcohol*, *53*, 40-47.

Hussong, A.M., Curran, P.J., & Chassin, L. (1998). Pathways of risk for accelerated heavy alcohol use among adolescent children of alcoholic parents. *Journal of Abnormal Child Psychology, 26*, 453-466.

Huttunen, J. (2003). Alkoholipolitiikan vuosi 2002 – pilvet tummuvat taivaalla. [Alcohol policy in Finland in 2002.] In J. Heinonen, H. Alho, J. Lindeman, K. Raitasalo, & R. Roine (Eds.), *Tommi 2003. Alkoholi- ja huumetutkimuksen vuosikirja - Yearbook of Finnish alcohol and drug research* (pp. 6-11). Keuruu: Otava.

Hämäläinen, M., & Pulkkinen, L. (1996). Problem behavior as a precursor of male criminality. *Development and Psychopathology, 8*, 443-455.

Hänninen, V., & Aro, H. (1996). Sex differences in coping and depression among young adults. *Social Science and Medicine*, *43*, 1453-1460.

International Center for Alcohol Policies (2004). Drinking patterns: from theory to practice. Washington, DC: ICAP reports, 15. http://www.icap.org/portals/0/download /all_pdfs/ICAP_Reports_English/report15.pdf

Jackson, K.M., O'Neill, S.E., & Sher, K.J. (2006). Characterizing alcohol dependence: Transitions during young and middle adulthood. *Experimental and Clinical Psychopharmacology, 14*, 228-244.

Jackson, K.M., & Sher, K.J. (2005). Similarities and differences of longitudinal phenotypes across alternate indices of alcohol involvement: A methodologic comparison of trajectory approaches. *Psychology of Addictive Behaviors, 19*, 339-351.

Jacobson, J.L., & Jacobson, S.W. (2002). Effects of prenatal alcohol exposure on child development. *Alcohol Research & Health, 26*, 282-287.

Jakobson, M., Pitkänen, T., & Vilkko, L. (1998). *Selvästi hauskinta. Tukioppilaan koulutusaineisto ala-asteen päihdetunteja varten*. [Peer tutors' material for teaching substance-free living for elementary grades. In Finnish]. Helsinki: Mannerheimin Lastensuojeluliitto.

Jefferis, B.J.M.H., Power, C., & Manor, O. (2005). Adolescent drinking level and adult binge drinking in a national birth cohort. *Addiction*, *100,* 543-549.

Jessor, R., Donovan, J.E., & Costa, F.M. (1991). *Beyond adolescence: Problem behavior and young adult development.* New York: Cambridge University Press.

Jessor R., & Jessor, S.L. (1977). Adolescent development and the onset of drinking: A longitudinal study. *Journal of Studies on Alcohol, 36*, 27-51.

Johnstone, B.M., Leino, E.V., Ager, C.R., Ferrer, H., & Fillmore K.M. (1996). Determinants of life-course variation in the frequency of alcohol consumption: Meta-analysis of studies from the collaborative alcohol-related longitudinal project. *Journal of Studies on Alcohol, 57*, 494-506.

Jones, M.C. (1968). Personality correlates and antecedents of drinking patterns in adult males. *Journal of Consulting and Clinical Psychology, 32*, 2-12.

Jones, S.P., & Heaven, P.C.L. (1998). Psychosocial correlates of adolescent drug-taking behaviour. *Journal of Adolescence, 21*, 127-134.

Jussila, K., & Pitkänen, T. (2002) Ikääntyvien työntekijöiden elämänmotivaatio. [Personal goals of middle age workers. In Finnish.] In K. Salmela-Aro, & J-E. Nurmi (Eds.), *Mikä meitä liikuttaa. Modernin motivaatiopsykologian perusteet* (pp. 145-156). Jyväskylä: PS-kustannus.

Järvenpää, T., Rinne, J. O., Koskenvuo, M., Räihä, I., & Kaprio, J. (2005). Binge drinking in midlife and dementia risk. *Epidemiology, 16*, 766-771.

Kagan, J. (1984). *The nature of the child*. New York: Basic Books.

Kaplow, J.B., Curran, P.J., Angold, A., & Costello, E.J. (2001). The prospective relation between dimensions of anxiety and the initiation of adolescent alcohol use. *Journal of Clinical Child Psychology, 30*, 316-326.

Kaplow, J.B., Curran, P.J., Dodge, K.A., & The Conduct Problems Prevention Research Group (2002). Child, parent, and peer predictors of early-onset substance use: a multisite longitudinal study. *Journal of Abnormal Child Psychology, 30*, 199-216.

Kaprio, J. (2006). Social behaviors and health in twins: The FinnTwin Studies. In L. Pulkkinen, J. Kaprio, & R.J. Rose (Eds.), *Socioemotional development and health from adolescence to adulthood* (pp. 76-90). New York: Cambridge University Press.

Karhu, P. (2002). Alkoholihallinnosta. [About alcohol administration. In Finnish.] In Heinonen, J. (Ed.), *Turmiolan Tommi. Mietteitä alkoholi- ja huumetutkimuksesta* (pp. 26-37). Keuruu: Otava.

Karlamangla, A., Zhou, K., Reuben, D., Greendale, G., & Moore, A. (2006). Longitudinal trajectories of heavy drinking in adults in the United States of America. *Addiction, 101,* 91-99.

Keller, P.S., Cummings, E.M., & Davies, P.T. (2005). The role of marital discord and parenting in relations between parental problem drinking and child adjustment. *Journal of Child Psychology and Psychiatry, 46*, 943-951.

Kendler, K.S., Heath, A.C., Neale, M.C., Kessler, R.C. & Eaves, L.J. (1993). Alcoholism and major depression in women. A twin study of the causes of comorbidity. *Archives of General Psychiatry. 50*, 690-698.

Kerr, W.C., Fillmore, K.M., & Bostrom, A. (2002). Stability of alcohol consumption over time: Evidence from three longitudinal surveys from the United States. *Journal of Studies on Alcohol, 63*, 325-333.

Kerr, W.C., Greenfield, T.K., Bond, J., Ye, Y., & Rehm, J. (2004). Age, period and cohort influences on beer, wine and spirits consumption trends in the US National Alcohol Surveys. *Addiction*, 99, 1111-1120.

Kessler, R.C., NcGonagle, K.A., Zhao, S., Nelson, C.B., Hughes, M., Eshleman, S., Wittchen, H.-U., & Kendler, K.S. (1994). Lifetime and 12-month prevalence of DSM-III-R: psychiatric disorders in the United States. Results from the national comorbidity survey. *Archives of General Psychiatry*, *51*, 8-19.

Kinnunen, M-L. (2005). *Allostatic load in relation to psychosocial stressors and health.* (Jyväskylä Studies in Education, Psychology and Social Research, No. 275). Jyväskylä, Finland: University of Jyväskylä.

Kivimäki, M., Kinnunen, M-L., Pitkänen, T., Vahtera, J., Elovainio, M., & Pulkkinen, L. (2004). Contribution of early and adult factors to socioeconomic variation in blood pressure: Thirty-four-year follow-up study of school children. *Psychosomatic Medicine, 66,* 184-189.

Koivusilta, L.K., Rimpelä, A.H., & Rimpelä, M.K. (1999). Health-related lifestyle in adolescence – origin of social class differences in health? *Health Education Research, 14*, 339-355.

Kokko, K., Bergman, L., & Pulkkinen, L. (2000). Selection into long-term unemployment in Finnish and Swedish longitudinal samples. *International Journal of Behavioral Development, 27,* 134-144.

Kokko, K., & Pulkkinen, L. (2000). Aggression in childhood and long-term unemployment in adulthood: A cycle of maladaptation and some protective factors. *Developmental Psychology*, *36,* 463-472.

Kokko, K., & Pulkkinen, L. (2005). Stability of aggressive behavior from childhood to middle age in women and men. *Aggressive Behavior, 31*, 485-497.

Kokko, K., Pulkkinen, L., & Puustinen, M. (2000). Selection into long-term unemployment and its psychological consequences. *International Journal of Behavioral Development, 24*, 310-320.

Koski, H., & Österberg, E. (1993). From large projects to case consultation – interaction of alcohol research and policy in Finland. *Addiction*, *88*(Suppl.), 143-150.

Kristenson, H., & Trell, E. (1982) Indicators of alcohol consumption: Comparisons between a questionnaire (Mm-MAST), interviews and gamma-glutamyl transferase (GGT) in a health survey of middle-aged males. *British Journal of Addiction*, *77*, 297-304.

Kristenson, M., Eriksen, H.R., Sluiter, J.K., Starke, D., & Ursin, H. (2004). Psychobiological mechanisms of socioeconomic differences in health. *Social Science & Medicine, 58*, 1511-1522.

Kumpulainen, K. (2000). Psychiatric symptoms and deviance in early adolescence predict heavy alcohol use 3 years later. *Addiction, 95*, 1847-1857.

Kushner, M.G., & Sher, K.J. (1993). Comorbidity of alcohol and anxiety disorders among college students: effects of gender and family history of alcoholism. *Addictive Behaviors*, *18*, 543-552.

Kuther, T.L., & Higgins-D'Alleassandro, A. (2000). Bridging the gap between moral reasoning and adolescent engagement in risky behavior. *Journal of Adolescence, 23*, 409-422.

Kuussaari, K., Österberg, E., & Wahlfors, L. (2006). *Alkoholijuomien kulutus 2005.* [Consumption of alcoholic beverages in 2005. In Finnish.] Helsinki: Stakes. www.stakes.fi/FI/tilastot/Aiheittain/Paihteet/alkoholijuomienkulutus2005luelisaa

Laukkanen, E.R., Shemeikka, S.L., Viinamäki, H.T., Pölkki, P.L., & Lehtonen, J.O. (2001). Heavy drinking is associated with more severe psychosocial dysfunction among girls than boys in Finland. *Journal of Adolescent Health, 28*, 270-277.

Leonard, K.E., & Blane, H.T. (Eds.). (1999). *Psychological theories of drinking and alcoholism*. New York: Guilford Press.

Lieb, R., Merikangas, K.R., Höfler, M., Pfister, H., Isensee, B., & Wittchen, H.U. (2002). Parental alcohol use disorders and alcohol use and disorders in offspring: a community study. *Psychological Medicine, 32*, 63-78.

Lintonen, T. (2001). *Drinking patterns among Finnish fourteen year-olds from 1977 to 1999.* (Acta Universitatis Tamperensis, No. 832). Tampere, Finland: Tampere University Press.

Lintonen, T., Rimpelä, M., Ahlström, S., Rimpelä, A., & Vikat, A. (2000). Trends in drinking habits among Finnish adolescents from 1977 to 1999. *Addiction, 95*, 1255-1263.

Lynam, D.R., Leukefeld, C., & Clayton, R.R. (2003). The contribution of personality to the overlap between antisocial behavior and substance use/misuse. *Aggressive Behavior, 29*, 316-331.

Lynch, J.W., Kaplan, G.A., & Salonen, J.T. (1997). Why do poor people behave poorly? Variation in adult health behaviours and psychosocial characteristics by stages of the socioeconomic lifecourse. *Social Science and Medicine*, *44*, 809-819.

Maccoby, E.E. (2000). Parenting and its effects on children: on reading and misreading behavior genetics. *Annual Review of Psychology, 51*, 1-27.

McCord, W., & McCord, J. (1960). *Origins of alcoholism*. Stanford, California: Stanford University Press.

Magnusson, D. (1988). Individual development from an interactional perspective: a longitudinal study. Hillsdale: Lawrence Erlbaum Associates.

Magnusson, D., & Bergman, L.R. (1990). A pattern approach to the study of pathways from childhood to adulthood. In L. N. Robins & M. Rutter

(Eds.), *Straight and devious pathways from childhood to adulthood* (pp. 101-115). Cambridge: Cambridge University Press.

Maisto, S.A., & Saitz, R. (2003). Alcohol use disorders: screening and diagnosis. *The American Journal on Addictions, 12*(Suppl. 1), 12-25.

Malone, S.M., Taylor, J., Marmorstein, N.R., McGue, M., & Iacono, W.G. (2004). Genetic and environmental influences on antisocial behavior and alcohol dependence from adolescence to adulthood. *Development and Psychopathology, 16*, 943-966.

Marlatt, G.A., Baer, J.S., Kivlahan, D.R., Dimeff, L.A., Larimer, M.E., Quiqley, L.A., Somers, J.M., & Williams, E. (1998). Screening and brief intervention for high-risk college student drinkers: results from a 2-year follow-up assessment. *Journal of Consulting and Clinical Psychology, 66*, 604-615.

Marqulies, R.Z., Kessler, R., & Kandel, D.B. (1977). A longitudinal study of onset of drinking among high-school students. *Journal of Studies on Alcohol*, *38*, 897-912.

Marschall, P. (1989). Self-report and stability of physical symptoms by adolescents. *Adolescence*, *24*, 209-216.

Martin, C.S., Langenbucher, J.W., Kaczynski, N.A., & Chung, T. (1996). Staging in the onset of DSM-IV alcohol symptoms in adolescents: survival/hazard analyses. *Journal of Studies on Alcohol*, *57,* 549-558.

Martin, M.J., & Pritchard, M.E. (1991). Factors associated with alcohol use in later adolescence. *Journal of Studies on Alcohol, 52*, 5-9.

Marttunen, M., & Rantanen, P. (2001). Nuorisopsykiatria. [Youth psychiatry. In Finnish.] In J. Lönnqvist, M. Heikkinen, M. Henriksson, M. Marttunen, & T. Partonen (Eds.), *Psykiatria* (pp. 518-556). Hämeenlinna: Duodecim Karisto.

Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: Validation of a new alcoholism screening test. *American Journal of Psychiatry*, *131,* 1121-1123.

Mazaz, C.A., Cofta-Woerpel, L., Daza, P., Fouladi, R.T., Vidrine, J.I., Cinciripini, P.M., Gritz, E.R., & Wetter, D.W. (2006). At-risk drinking in employed men and women. *Annals of Behavioral Medicine*, *31*, 279-287.

Merline, A.C., O'Malley, P.M., Schulenberg, J.E., Bachman, J.G., & Johnston, L.D. (2004). Substance use among adults 35 years of age: prevalence, adulthood predictors, and impact of adolescent substance use. *American Journal of Public Health, 94,* 96-102.

Metso, L., Mustonen, H., Mäkelä, P., & Tuovinen, E.L. (2002). Suomalaisten juomatavat vuonna 2000. [Finnish drinking habits in 2000. In Finnish.] Helsinki: Stakes, 3.

Mezzich, A., Tarter, R., Kirisci, L., Clark, D., Buckstein, O., & Martin, C. (1993). Subtypes of early age onset alcoholism. *Alcoholism: Clinical and Experimental Research*, *17*, 767-770.

Midanik, L.T., & Greenfield, T.K. (2003). Defining 'current drinkers' in national surveys: Results of the 2000 National Alcohol Survey. *Addiction*, *98*, 517-522.

Miller, P.M., Ornstein, S.M., Nietert, P.J., & Anton, R.F. (2004). Self-report and biomarker alcohol screening by primary care physicians: the need to translate research into guidelines and practice. *Alcohol & Alcoholism, 39*, 325-328.

Miller, T.R., Levy, D.T., Spicer, R.S., & Taylor, D.M. (2006). Societal costs of underage drinking. *Journal of Studies on Alcohol, 67, 519-528*.

Moeller, F.G., Barratt, E.S., Dougherty, D.M., Schmitz, J.M., & Swann, A.C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry, 158*, 1783-1793.

Moffit, T.E., Caspi, A., Rutter, M., & Silva, P.A. (2001). Sex differences in antisocial behaviour: Conduct disorder, delinquency, and violence in the Dunedin Longitudinal Study. Cambridge, UK: Cambridge University Press.

Montalto, N.J. & Bean, P. (2003). Use of contemporary biomarkers in the detection of chronic alcohol use. *Medical Science Monitor, 9,* 285-290.

Moscovici, S. (2005). Häpeän ja syyllisyyden etiikka. [Ethics of shame and guilt. In Finnish.] In A-M. Pirttilä-Backman, M. Ahokas, L. Myyry, & S. Lähteenoja (Eds.), *Arvot, moraali ja yhteiskunta. Sosiaalipsykologisia näkökulmia yhteiskunnan muutokseen* (pp. 197-215). Helsinki: Gaudeamus.

Mustonen, H., & Simpura, J. (2006). Alcohol use. In S. Koskinen, A. Aromaa, J. Huttunen, & J. Teperi, *Health in Finland* (pp. 42-44). Helsinki: National Public Health Institute, National Research and Development Centre for Welfare and Health, and Ministry of Social Affairs and Health.

Muthen, B.O., & Muthen, L.K. (2000). The development of heavy drinking and alcohol-related problems from ages 18 to 37 in a U. S. national sample. *Journal of Studies on Alcohol*, *61*, 290-300.

Mäkelä, P., Fonager, K., Hibell, B., Norlund, S., Sabroe, S., & Simpura, J. (2001). Episodic heavy drinking in four Nordic countries: A comparative survey. *Addiction, 96,* 1575-1588.

Mäkelä, P., Paljärvi, T., & Poikolainen, K. (2005). Heavy and nonheavy drinking occasions, all-cause and cardiovascular mortality and hospitalizations: A follow-up study in a population with a low consumption level. *Journal of Studies on Alcohol, 66*, 722-728.

Niemelä, S., Sourander, A., Poikolainen, K., Helenius, H., Sillanmäki, L., Parkkola, K., Piha, J., Kumpulainen, K., Almqvist, F., & Moilanen, I. (2006). Childhood predictors of drunkenness in late adolescence among males: a 10-year population-based follow-up study. *Addiction, 101*, 512-521.

Nigg, J.T., Wong, M.M., Martel, M.M., Jester, J.M., Puttler, L.I., Glass, J.M., Adams, K.M., Fitzgerald, H.E., & Zucker, R. (2006). Poor response inhibition as a predictor of problem drinking and illicit drug use in adolescents at risk for alcoholism and other substance use disorders. *Journal of American Academy of Child and Adolescent Psychiatry, 45*, 1-8.

Nummenmaa, L. (2005). Efektikoko psykologisessa tutkimuksessa. [Effect size in psychological science. In Finnish.] *Psykologia, 5-6*, 559-567.

Nyström, M. (1993). Alcohol use, drinking patterns and indicators of heavy drinking in Finnish university students. Helsinki: Yliopistopaino.

O'Callaghan, F.V., O'Callaghan, M., Najman, J.M., Williams, G.M., Bor, W., & Alati, R. (2006). Prediction of adolescent smoking from family and social risk factors at 5 years, and maternal smoking in pregnancy and at 5 and 14 years. *Addiction, 101*, 282-290.

O'Connell, H., Chin, A-V., Hamilton, F., Cunningham, C., Walsh, J.B., Coakley, D., & Lawlor, B.A. (2004). A systematic review of the utility of self-report alcohol screening instruments in the elderly. *International Journal of Geriatric Psychiatry, 19*, 1074-1086.

O'Hare, T. (2003). Comparing the AUDIT and 3 drinking indices as predictors of personal and social drinking problems in freshman first offenders. *Journal of Alcohol & Drug Education*, *49*, 37-61

O'Hare, T., & Sherrer, M.V. (2005). Assessment of youthful problem drinkers: validating the Drinking Context Scale (DCS-9) with freshman firs offenders. *Research on Social Work Practice, 15*, 110-117.

O'Hare, T., & Tran, T.V. (1997). Predicting problem drinking in college students: gender differences and the CAGE questionnaire. *Addictive Behaviors, 22*, 13-21.

O'Leary, K.D., & Woodin, E.M. (2005). Partner aggression and problem drinking across the lifespan: How much do they decline? *Clinical Psychology Review, 25*, 877-894.

Orford, J., & Velleman, R. (1991). The environmental intergenerational transmission of alcohol problems: A comparison of two hypotheses. *British Journal of Medical Psychology, 64*, 189-200.

Pagan, J.L., Kaprio, J., Pulkkinen, L., Viken, R., Rose, R.J., & Dick, D. (2006). Predicting adolescent substance use from parent, peer, and teacher reports. Manuscript submitted for publication.

Pandina, R.J., & Johnson, V. (1989). Familial drinking history as a predictor of alcohol and drug consumption among adolescent children. *Journal of Studies on Alcohol, 50*, 245-253.

Pandina, R.J., & Schuele, J.A. (1983). Psychosocial correlates of alcohol and drug use of adolescent students and adolescents in treatment. *Journal of Studies on Alcohol*, *44*, 950-973.

Pape, H., & Hammer, T. (1996). How does young people's alcohol consumption change during the transition to early adulthood? A longitudinal study of changes at aggregate and individual level. *Addiction*, *91*, 1345.

Parker, D.A., Levin, B.M., & Harford, T.C. (1996). Effects of early drinking and an antisocial orientation on the alcohol use of young Russians. *Alcoholism: Clinical and Experimental Research, 20*: 1179-1183.

Parker, D.A., & Parker, E.S. (1980). Status and status inconsistency of parents on alcohol consumption of teenage children. *The International Journal of the Addictions, 15,* 1233-1239.

Paschall, M., & Lipton, R.I. (2005). Wine preference and related health determinants in a U.S. national sample of young adults. *Drug and Alcohol Dependence, 78*, 339-344.

Patton, G.C., McMorris, B.J., Toumbourou, J.W., Hemphill, S.A., Donath, S., & Catalano, R.F. (2006). Puberty and the onset of substance use and abuse. *Pediatrics, 114*, 300-306.

Pedersen, N.L., Spotts, E.L., & Kato, K. (2005). Genetic influences on midlife functioning. In S. Willis & M. Martin (Eds.), *Middle Adulthood: A lifespan perspective* (pp. 65-98). Thousand Oaks, CA: Sage.

Pedersen, W., & Skrondal, A. (1998). Alcohol consumption debut: Predictors and consequences. *Journal of Studies on Alcohol*, *59*, 32-42.

Pirkola, S., Isometsä, E., Suvisaari, J., Aro, H,. Joukamaa, M., Poikolainen, K., Koskinen, S., Aromaa, A., & Lönnqvist, J. (2005). DSM-IV mood-, anxiety and alcohol use disorders and their comorbidity in the Finnish general population: results from the Health 2000 Study. *Social Psychiatry and Psychiatric Epidemiology, 40,* 1-10.

Pirkola, S.P., Poikolainen, K., & Lönnqvist, J.K. (2006). Currently active and remitted alcohol dependence in a nationwide adult general population – results from the Finnish Health 2000 Study. *Alcohol & Alcoholism, 41,* 315-320.

Pitkänen, L. (1969). *A descriptive model of aggression and nonaggression with applications to children's behaviour*. (Jyväskylä Studies in Education, Psychology and Social Research, No. 19). Jyväskylä, Finland: University of Jyväskylä.

Pitkänen, T. (1990). Alkoholiperheiden lasten kehityksen seuranta kouluikäisistä nuoriksi aikuisiksi. [Children of alcoholic parents: development from school age to young adulthood. In Finnish.] Unpublished master's thesis, Department of Social Psychology, University of Helsinki, Finland.

Pitkänen, T., Jackobson, M., Välimäki, A-L., Eklund, S., & Sulku, S. (1997). "Lapsijuopot" totta tänään. Mitä teemme? [Children as drunks – a reality today. What to do? In Finnish.] Helsinki, Finland: Mannerheimin Lastensuojeluliiton Kuuma linja, 3.

Pitkänen, T., & Pulkkinen, L. (2003). Onko alkoholin käytön alaikäraja tuulesta temmattu? [Is the minimum age for alcohol use relevant? In Finnish.] In J. Heinonen, H. Alho, J. Lindeman, K. Raitasalo, & R. Roine (Eds.), *Tommi 2003. Alkoholi- ja huumetutkimuksen vuosikirja - Yearbook of Finnish alcohol and drug research* (pp. 12-30). Keuruu: Otava.

Poikolainen, K., Aalto-Setälä, T., Marttunen, M., Tuulio-Henriksson, A., & Lönnqvist, J. (2000). Predictors of somatic symptoms: a 5-year follow-up of adolescents. *Archives of Disease in Childhood, 83*, 388-392.

Poikolainen, K., Aalto-Setälä, T., Pitkänen, T., Tuulio-Henriksson, A., & Lönnqvist, J. (1997). Nuorten aikuisten psyykkiset oireet ja niihin liittyvät tekijät. [Young adults' psychological well-being and its covariants. In Finnish.] Helsinki: National Public Health Institute, A2.

Poikolainen, K., Kanerva, R., & Lönnqvist, J. (1995). Life events and other risk factors for somatic symptoms in adolescence. *Pediatrics*, *96*, 59-63.

Pokorny, A.D., Miller, B.A., & Kaplan, H.B. (1972). The brief MAST: A shortened version of the Michigan alcoholism screening test. *American Journal of Psychiatry*, *129*, 342-345.

Pomerleau, C.S., Marks, J.L., Pomerleau, O.F., & Snedecor, S.M. (2004). Relationship between early experiences with tobacco and early experiences with alcohol. *Addictive Behaviors*, 29, 1245-1251.

Power, T.G., Stewart, C.D., Hughes, S.O., & Arbona, C. (2005). Predicting patterns of adolescent alcohol use: a longitudinal study. *Journal of Studies on Alcohol, 66*, 74-81.

Prescott, C.A., & Kendler, K.S. (1999). Age at first drink and risk for alcoholism: A noncausal association. *Alcoholism: Clinical and Experimental Research*, *34*, 101-107.

Preventing drug use among children and adolescents: a research based guide (1997). US National Institute on Drug Abuse. NIH Publication No. 97-4212.

Prior, M, Smart, D., Sanson, A, & Oberklaid, F. (1993). Sex differences in psychological adjustment from infancy to 8 years. *Journal of the American Academy of Child and Adolescent Psychiatry, 32,* 291-304.

Pulkkinen, L. (1982). Self-control and continuity from childhood to late adolescence. In B.P. Baltes, & O.G. Brim, Jr. (Eds.), *Life-span development and behaviour* (Vol. 4, pp. 63-105). Orlando, FL: Academic Press.

Pulkkinen, L. (1995). Behavioral precursors to accidents and resulting physical impairment. *Child Development, 66*, 1660-1679.

Pulkkinen, L. (2004). Socioemotional behavior in childhood as a precursor to delinquency and adaptation: Gender differences. *Revista Portuguesa de Pedagogica, 38*, 11-48.

Pulkkinen, L. (2006). The Jyväskylä Longitudinal Study of Personality and Social Development (JYLS). In L. Pulkkinen, J. Kaprio, & R.J. Rose (Eds.), *Socioemotional development and health from adolescence to adulthood* (pp. 29-55). New York: Cambridge University Press.

Pulkkinen, L., Feldt, T., & Kokko, K. (2005). Personality in young adulthood and functioning in middle age. In S. Willis & M. Martin (Eds.), *Middle Adulthood: A lifespan perspective* (pp. 99-141). Thousand Oaks, CA: Sage.

Pulkkinen, L., Fyrstén, S., Kinnunen, U., Kinnunen, M-L., Pitkänen, T., & Kokko, K. (2003). *40+ Erään ikäluokan selviytymistarina.* [40+ A successful transition to middle adulthood in a cohort of Finns]. Jyväskylä, Finland: Reports from the Department of Psychology, University of Jyväskylä, 349.

Pulkkinen, L., Kaprio, J., & Rose, R.J. (Eds.). (2006). *Socioemotional development and health from adolescence to adulthood.* New York: Cambridge University Press.

Pulkkinen, L., Ohranen, M., & Tolvanen, A. (1999). Personality antecedents of career orientation and stability among women compared to men. *Journal of Vocational Behavior, 54,* 37-58.

Pulkkinen, L., & Pitkänen, T. (1993). Continuities in aggressive behavior from childhood to adulthood. *Aggressive Behavior*, *19*, 249-263.

Pullen, L.M. (1994). The relationships among alcohol abuse in college students and selected psychological/demographic variables. *Journal of Alcohol and Drug Education*, *40,* 36-50.

Rambaldi, A., Gluud, C., Belli, A., Nielsen, S.D., Storgaard, H., & Moesgaard, F. (1995). Prevalence of alcohol problems among adult somatic in-patients in Naples. *Alcohol & Alcoholism*, *30*, 441-448.

Rauste-von Wright, M., & von Wright, J. (1981). A longitudinal study of psychosomatic symptoms in healthy 11-18 year old girls and boys. *Journal of Psychosomatic Research*, *25*, 525-534.

Rehm, J., Taylor, B., & Patra, J. (2006). Volume of alcohol consumption, patterns of drinking and burden of disease in the European region 2002. *Addiction, 101*, 1086-1095.

Resnick, M.D., Bearman, P.S., Blum, R.W., Bauman, K.E., Harris, K.M., Jones, J., Tabor, J., Beuhring, T., Sieving, R.E., Shew, M., Ireland, M., Bearinger, L.H., & Udry, J.R. (1997). Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA, 278*, 823-832.

Riala, K. (2004). Adolescent predictors of adult social and psychiatric adversities. A prospective follow-up study of the Northern Finland 1966 Birth Cohort. Oulu, Finland: University of Oulu.

Riala, K., Hakko, H., Isohanni, M., Järvelin, M-R., & Räsänen, P. (2004). Teenage smoking and substance use as predictors of severe alcohol problems in late adolescence and in young adulthood. *Journal of Adolescent Health, 35*, 245-254.

Rimpelä, M. (2004). Kouluterveystutkimuksen 2004 valtakunnalliset tulokset. [The results of the national school health survey in 2004. In Finnish.] http://www.stakes.fi/kouluterveys/taulukot/2004/paihteet04.htm

Robins, L.N., & McEvoy, L. (1990). Conduct problems as predictors of substance abuse. In L. N. Robins, & M. Rutter (Eds.), *Straight and devious pathways from childhood to adulthood* (pp. 182-204). New York: Cambridge University Press.

Roderick J.A., & Little R.J.A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*, 1198-1202.

Rodgers, B., Windsor, T.D., Anstey, K.J., Dear, K.B.G., Jorm, A.F., & Christensen, H. (2005). Non-linear relationship between cognitive function and alcohol consumption in young, middle-aged and older adults: the PATH Through Life Project. *Addiction, 100*, 1280-1290.

Rohde, P., Lewinsohn, P.M., & Seeley, J.R. (1996). Psychiatric comorbidity with problematic alcohol use in high school students. *Journal of the American Academy of Child and Adolescent Psychiatry*, *35*, 101-109.

Rose, R.J., Dick, D.M., Viken, R.J., Pulkkinen, L. & Kaprio, J. (2001). Drinking or abstaining at age 14? A genetic epidemiological study. *Alcoholism: Clinical and Experimental Research, 25,* 1594-1604.

Rosenberg, M. (1965). *Society and the adolescent self-image.* New Jersey: Princeton University Press.

Rush, B., & Brennan, M. (1990). Is the health profile of problem drinkers different from that of other patients? *The Journal of Family Practice, 31,* 42-46.

Rönkä, A., & Pulkkinen, L. (1995). Accumulation of problems in social functioning in young adulthood: A developmental approach. Jour*nal of Personality and Social Psychology*, *69*, 381-391.

Salome, H.J., French, M.T., Matzger, H., & Weisner, C. (2005). Alcohol consumption, risk of injury, and high-cost medical care. *The Journal of Behavioral Health Services & Research, 32*, 368-380.

Samson, H.H., Maxwell, C.O., & Doyle, T.F. (1989). The relation of initial alcohol experiences to current alcohol consumption in a college population. *Journal of Studies on Alcohol, 50*, 254-260.

Saunders, J.B., & Lee, N.K. (2000). Hazardous alcohol use: its delineation as a subthreshold disorder, and approaches to its diagnosis and management. *Comprehensive Psychiatry, 41*(Suppl. 1), 95-103.

Scaramella, L.V., Conger, R.D., Spoth, R., & Simons, R.L. (2002). Evaluation of a social contextual model of delinquency: a cross-study replication. *Child Development, 73*, 175-195.

Schuckit, M.A. (1994). Alcohol and depression: a clinical perspective. *Acta Psychiatrica Scandinavica, 377*(Suppl.), 28-32.

Schulenberg, J.E., Bryant, A.L., & O'Malley, P.M. (2004). Taking hold of some kind of life: How developmental tasks relate to trajectories of well-being during the transition to adulthood. *Development and Psychopathology, 16,* 1119-1140.

Schulenberg, J., Maggs, J.L., Long, S.W., Sher, K.J., Gotham, H.J., Baer, J.S., Kivlahan, D.R., Marlatt, G.A., & Zucker, R.A. (2001). The problem of college drinking: Insights from a developmental perspective. *Alcoholism Clinical and Experimental Research, 25*, 473-477.

Schulenberg, J., O'Malley, P.M., Bachman, J.G., Wadsworth, K.N., & Johnston, L.D. (1996). Getting drunk and growing up: Trajectories of frequent binge drinking during the transition to young adulthood. *Journal of Studies on Alcohol, 57*, 289-304.

Schulenberg, J., Wadsworth, K.N., O'Malley, P.M., Bachman, J.G., & Johnston, L.D. (1996). Adolescent risk factors for binge drinking during the transition to young adulthood: Variable- and pattern-centered approaches to change. *Developmental Psychology, 32*, 659-674.

Seljamo, S., Aromaa, M., Koivusilta, L., Rautava, P., Sourander, A., Helenius, H., & Sillanpää, M. (2006). Alcohol use in families: a 15-year prospective follow-up study. *Addiction, 101*, 984- 992.

Selzer, M.L. (1971). The Michigan Alcoholism Screening Test: The quest for a new diagnostic instrument. *American Journal of Psychiatry, 127,* 1653-1658.

Seppä, K., Pitkäjärvi, T., & Sillanaukee, P. (1999). Alcohol consumption profile by time in middle-aged men: a longitudinal study based on three different diagnostic instruments. *Alcohol & Alcoholism, 34*, 65-70.

Seppä, K., Sillanaukee, P., & Koivula, T. (1990). The efficiency of a questionnaire in detecting heavy drinkers. *British Journal of Addiction*, *85*, 1639-1645.

Serbin, L.A., & Karp, J. (2004). The intergenerational transfer of psychosocial risk: Mediators of vulnerability and resilience. *Annual Review of Psychology, 55*, 333-63.

Shannon, D.M., James, F.R., & Gansneder, B.M. (1993). The identification of adolescent substance misuse using school-reported factors. *The High School Journal*, *76*, 118-128.

Shell, R.M., Groppenbacher, N., Roosa, M.W., & Gensheimer, L.K. (1992). Interpreting children's reports of concern about parental drinking: indicators of risk status? *American Journal of Community Psychology*, *20*, 463-489.

Sherbourne, C.D., Hays, R.D., Wells, K.B., Rogers, W., & Burnam, A. (1993). Prevalence of comorbid alcohol disorder and consumption in medically ill and depressed patients. *Archives of Family Medicine, 2,* 1142-1150.

Sieber, M.F., & Angst, J. (1990). Alcohol, tobacco and cannabis: 12-year longitudinal associations with antecedent social context and personality. *Drug and Alcohol Dependence*, *25*, 281-292.

Silbereisen, R., & Noack, P. (1988). On the constructive role of problem behavior in adolescence. In N. Bolger, A. Caspi, G. Downey, & M. Moorehouse (Eds.), *Persons in context: developmental processes* (pp. 152-180). New York: Cambridge University Press.

Sillanaukee, P., Kiianmaa, K., Roine, R., & Seppä, K. (1992). Alkoholin suurkulutuksen kriteerit. [The criteria for heavy drinking. In Finnish.] *Suomen Lääkärilehti*, *47*, 2919-2921.

Simpura, J. (1987). About the Drinking Habits Surveys and their history. In J. Simpura (Ed.*), Finnish drinking habits: results from interview surveys held in 1968, 1976 and 1984* (pp. 11-16). Jyväskylä: Gummerus.

Simpura, J., & Partanen, J. (1987). Drinking habits in a changing society. In J. Simpura (Ed.*), Finnish drinking habits: results from interview surveys held in 1968, 1976 and 1984* (pp. 210-222). Jyväskylä: Gummerus.

Singh-Manoux, A., Ferrie, J.E., Chandola, T., & Marmot, M. (2004). Socioeconomic trajectories across the life course and health outcomes in midlife: Evidence for the accumulation hypothesis? *International Journal of Epidemiology, 33*: 1072-1079.

Sinkkonen, M., & Pulkkinen, L. (1996). *Elämänrakenne parhaassa aikuisiässä [*Life structure in the best years of adulthood. In Finnish.] Jyväskylän yliopiston psykologian laitoksen julkaisuja, 333.

Skog, O-J., & Duckert, F. (1993). The development of alcoholics' and heavy drinkers' consumption: a longitudinal study. *Journal of Studies on Alcohol, 54*, 178-188.

Slawecki, C.J., Betancourt, M., Cole, M., & Ehlers, C.L. (2001). Periadolescent alcohol exposure has lasting effects on adult neurophysiological function in rats. *Developmental Brain Research, 128*, 63-72.

Smart, R.G., Adlaf, E.M., & Knoke, D. (1991). Use of the CAGE scale in a population survey of drinking. *Journal of Studies on Alcohol, 52*, 593-596.

Smith, M.J., Abbey, A., & Scott, R.O. (1993). Reasons for drinking alcohol: Their relationship to psychosocial variables and alcohol consumption. *The International Journal of the Addiction, 28*, 881-908.

Smith, D.S., Collins, M., Kreisberg, J.P., Volpicelli, J.R., & Alterman, A.I. (1987). Screening for problem drinking in college freshmen. *College Health*, *36*, 89-94.

Smith, G.T., McCarthy, D.M., & Goldman, M.S. (1995). Self-reported drinking and alcohol-related problems among early adolescents: dimensionality and validity over 24 months. *Journal of Studies on Alcohol*, *56*, 383-394.

Spear, L.P. (2000). The adolescent brain and age-related behavioral manifestations. *Neuroscience and Biobehavioral Reviews, 24*, 417-463.

Spear, L.P. (2002). Alcohol's effects on adolescents. *Alcohol Research & Health, 26,* 287-291.

Spielberger, C.D., Gorsuch, R.L., & Lushene, R.E. (1970). *STAI manual for the state-trait anxiety inventory.* Palo Alto: Consulting Psychologists Press.

Steele, R.G., Forehand, R., Armistead, L. & Brody, G. (1995). Predicting alcohol and drug use in early adulthood: the role of internalizing and externalizing behavior problems in early adolescence. *American Journal of Orthopsychiatry, 65*, 380-388.

Stranges, S., Notaro, J., Freudenheim, J.L., Calgero, R.M., Muti, P., Farinaro, E., Russell, M., Nochajski, T.H., & Trevisan, M. (2006). Alcohol drinking pattern and subjective health in a population-based study. *Addiction, 101*, 1265-1276.

Tarkkanen, T., Pitkänen, T., & Jacobson, M. (1998). Täysi kymppi! Kouluikäisten lasten vanhemmille tarkoitettu viiden kerran vanhempainryhmäohjelma. [Substance-free living for elementary grades – material for parental meetings. In Finnish.] Helsinki, Finland: Mannerheimin Lastensuojeluliitto.

Tarter, R.E., Blackson, T., Brigham, J., Moss, H., & Caprara, G.V. (1995). The association between childhood irritability and liability to substance use in early adolescence: a 2-year follow-up study of boys at risk for substance abuse. *Drug and Alcohol Dependence, 39*, 253-261.

Urberg, K., Goldstein, M.S., & Toro, P.A. (2005). Supportive relationships as a moderator of the effects of parent and peer drinking on adolescent drinking. *Journal of Research on Adolescence, 15*, 1-19.

Vahtera, J., Poikolainen, K., Kivimäki, M., Ala-Mursula, L., & Pentti, J. (2002). Alcohol intake and sickness absence: a curvilinear relation. *American Journal of Epidemiology, 156*, 969-976.

van der Vorst, H., Engels, R.C.M.E., Meeus, W., Dekovic, M., & van Leeuwe J. (2005). The role of alcohol-specific socialization in adolescents' drinking behavior. *Addiction, 100*, 1464-1476.

van Kammen, W.B., Loeber, R., & Stouthammer-Loeber, M. (1991). Substance use and its relationship to conduct problems and delinquency in young boys. *Journal of Youth and Adolescence, 20*, 399-413.

Walitzer, K.S., & Sher, K.J. (1996). A prospective study of self-esteem and alcohol use disorders in early adulthood: evidence for gender differences. *Alcoholism: Clinical and Experimental Research, 20*, 1118-1124.

Warner, L.A., & White, H.R. (2003). Longitudinal effects of age at onset and first drinking situations on problem drinking. *Substance Use & Misuse*, *38*, 1983-2016.

Weber, M.D., Graham, J.W., Hansen, W.B., Flay, B.R., & Johnson, C.A. (1989). Evidence for two paths of alcohol use onset in adolescents. *Addictive Behaviors, 14*, 399-408.

Weill, J., & Le Bourhis, B. (1994). Factors predictive of alcohol consumption in a representative sample of French male teenagers: a five-year prospective study. *Drug and Alcohol Dependence, 35*, 45-50.

Weinfurt, K.P., & Bush, P.J. (1996). Contradictory subject response in longitudinal research. *Journal of Studies on Alcohol, 57*, 273-282.

Wells, S., Graham, K., Speechley, M., & Koval, J. J. (2005). Drinking patterns, drinking contexts and alcohol-related aggression among late adolescent and young adult drinkers. *Addiction, 100*, 933-944.

Whipple, E.E., Fitzgerald, H.E., & Zucker, R.A. (1995). Parent-child interactions in alcoholic and nonalcoholic families. *The American Journal of Orthopsychiatry, 65,* 153-159.

Wichström, L. (2001). The impact of pubertal timing on adolescents' alcohol use. *Journal of Research on Adolescence, 11*, 131-150.

Wiederman, M.W., & Pryor, T. (1996). Substance use among women with eating disorders. *International Journal of Eating Disorders, 20,* 163-168.

Wiesner, M., & Windle, M. (2006). Young adult substance use and depression as a consequence of delinquency trajectories during middle adolescence. *Journal of Research on Adolescence, 16*, 239-264.

Winter, T. (2004). *Nuorten raittius ja siihen vaikuttavat tekijät.* [Abstention among Finnish youth and its covariants. In Finnish]. Helsinki: Yliopistopaino.

Wood, L.D., Sobell, L.C., Sobell, M.B., Dornheim, L., & Agrawal, S. (2003). Nondaily drinkers score higher on the Alcohol Dependence Scale than daily drinkers. *Addictive Behaviors, 28*, 347-352.

World Health Organization (1992). The ICD-classification of mental and behavioral disorders. Clinical descriptions and diagnostic guidelines. Geneva, Switzerland: Author.

World Health Organization (1994). *The Schedules for Clinical Assessment in Neuropsychiatry (SCAN).* Version 2.0. Geneva, Switzerland: Author.

World Health Organization (2000). *International Guide for Monitoring Alcohol Consumption and Related Harm*. Geneva: WHO Department of Mental

Health and Substance Dependence, Noncommunicable Diseases and Mental Health Cluster.
http://whqlibdoc.who.int/hq/2000/WHO_MSD_MSB_00.4.pdf

Yeh, M-Y., & Chiang, I-C. (2005). Comparison of the predictors of alcohol use and misuse among Han and aboriginal students in Taiwan. *Addictive Behaviors, 30*, 989-1000.

Young, S.E., Corley, R.P., Stallings, M.C., Rhee, S.H., Crowley, T.J., & Hewitt, J.K. (2002). Substance use, abuse and dependence in adolescence: prevalence, symptom profiles and correlates. *Drug and Alcohol Dependence, 68*, 309-322.

Young, S.E., Mikulich, S.K., Goodwin, M.B., Hardy, J., Martin, C.L., Zoccolillo, M.S., & Crowley, T.J. (1995). Treated delinquent boys' substance use: onset, pattern, relationship to conduct and mood disorders. *Drug and Alcohol Dependence, 37*, 149-162.

Zeigler, D.W., Wang, C.C., Yoast, R.A., Dickinson, B.D., McCaffree, M.A., Robinowitz, C.B., & Sterling, M.L. (2005). The neurocognitive effects of alcohol on adolescents and college students. *Preventive Medicine, 40*: 21-32.

Zucker, R.A. (1987). The four alcoholisms: a developmental account of the etiologic process. In P.C. Rivers (Ed.), *Nebraska Symposium on Motiavation: Alcohol and Addictive Behaviors* (pp. 27-83*).* Lincoln: University of Nebraska Press.

Zucker, R.A., & Gomberg, E.S.L. (1986). Etiology of alcoholism reconsidered: The base for a biopsychosocial process. *American Psychologist, 41*, 783-793.

Zucker, R.A., Davies, W.H., Kincaid, S.B., Fitzgerard, H.E., & Reider, E.E (1997). Conceptualizing and scaling the developmental structure of behavior disorder: The lifetime Alcohol Problems Score as an example. *Development and Psychopathology, 9*, 453-471.

Zucker, R.A., Wong, M.M., Clark, D.B., Leonard, K.E., Schulenberg, J.E., Cornelius, J.R., Fitzgerald, H.E., Homish, G.G., Merline, A., Nigg, J.T., O'Malley, P.M., & Puttler, L.I. (2006). Predicting risky drinking outcomes longitudinally: What kind of advance notice can we get? *Alcoholism: Clinical and Experimental Research, 30,* 243-252.

Österberg, E. (2005). Alkoholin kulutuksen kasvu vuonna 2004. [The growth in alcohol consumption in Finland in 2004. In Finnish.] In K. Raitasalo, H. Alho, J. Lindeman, R. Roine, & C. Tigerstedt (Eds.), *Tommi 2005. Alkoholi- ja huumetutkimuksen vuosikirja - Yearbook of Finnish alcohol and drug research* (pp. 7-18). Hämeenlinna: Finnish Society for Alcohol and Drug Research.