The association of attention deficit hyperactivity disorder, substance use and the motivation to consume alcohol and nicotine in young Austrian males.

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Submitted by

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A. Theoretical framework

1. Abstract (English)
The consumption of alcohol, nicotine and other substances is common among adolescents and young adults and poses a serious health risk. The abuse of different substances often occurs together with other mental disorders and the causes are very complex. One disorder that is increasingly discussed to be linked to the abuse of psychoactive substances is attention deficit hyperactivity disorder (ADHD). Substance abuse seems to be highly prevalent in adolescents and adults with ADHD, conversely there is also a growing number of studies that report a high prevalence of ADHD in patients treated for abuse or dependence of alcohol, nicotine or illicit drugs.

**Aim:** The aim of the present study was to investigate the association between the symptomatology of attention deficit hyperactivity disorder and substance use in a large representative sample of 18-year-old males in Austria. Another focus of this study was to assess the role of attention deficit hyperactivity disorder in the motivation to consume alcohol or nicotine and its association with psychosocial factors.

**Method:** All young men from 11 selected Austrian districts liable to enlistment to the Military Service in 2010 were included in the study, 3280 could be enrolled.

**Screening instruments:** The 25-item Wender Utah Rating Scale (Ward, Wender, & Reimherr, 1993) was used for assessing childhood symptoms of attention deficit hyperactivity disorder, and the ADHD checklist based on DSM IV was used for current symptomatology. The CAGE questionnaire (Ewing, 1984) was used to test for alcohol misuse and dependence and the Heavy Smoking Index (HSI) (Heatherton, Kozlowski, Frecker, Rickert, & Robinson, 1989) to test for the severity of nicotine dependence.

**Findings:** The number of ADHD symptoms was positively related to the CAGE score, the severity of nicotine dependence as well as to the use of illicit drugs. ADHD symptomatology was also associated with different drinking and smoking motives. Individuals with higher rates of ADHD symptoms seemed to increasingly use alcohol and nicotine to deal with difficult situation and negative feelings, to reduce stress and tension as well as to relax.
Conclusion: Our findings underline the increased vulnerability of 18-year old males with elevated symptom severity of ADHD for smoking, drinking and illicit drug use. Our data also show the necessity of special prevention and treatment programmes for a subgroup of addicted patients defined by developmental disorders such as ADHD.

Abstract (German)
Methode: Alle jungen Männer aus 11 ausgesuchten Bezirken in Österreich, die im Jahr 2010 stellungspflichtig waren, wurden befragt, 3280 davon konnten eingeschlossen werden.

Schlussfolgerung: Unsere Ergebnisse unterstreichen die erhöhte Vulnerabilität 18-jähriger Männer mit erhöhter ADHS Symptomatik in Bezug auf Rauchen, Trinken und den Konsum illegaler Drogen. Unsere Daten zeigen auch die Notwendigkeit spezifischer Präventions- und Behandlungsstrategien für eine Untergruppe von Suchtpatienten, definiert durch eine Entwicklungsstörung wie ADHS.
2. Introduction
The consumption of alcohol, nicotine and illegal drugs is one of the major health risks in adolescents and young adults. Substance abuse and addiction is related to a number of severe consequences. Besides the risk of developing dependence, alcohol, nicotine and other psychoactive substances account for increased morbidity (Chung, Wang, Yu, & Yang, 2007; Feinstein, Richter, & Foster, 2012; Tsalapati et al., 2014; van Amsterdam, Pennings, Brunt, & van den Brink, 2013), premature death (Neubauer et al., 2006; Rehm et al., 2007), and more hospital admissions (Tsalapati u. a., 2014).

The list of related consequences also includes academic difficulties (King, Meehan, Trim, & Chassin, 2006; Latvala et al., 2014; Sekulic, Ostojic, Ostojic, Hajdarevic, & Ostojic, 2012), involvement with the justice system (Carney, Myers, Louw, Lombard, & Flisher, 2013; Helstrom, Bryan, Hutchison, Riggs, & Blechman, 2004; Hunter, Miles, Pedersen, Ewing, & D’Amico, 2014), occupational and social problems (World Health Organization, 2004) and problems within families or relationships. Parental substance abuse is furthermore associated with an increased risk of addiction problems in the offspring (Arria, Mericle, Meyers, & Winters, 2012; Jennison & Johnson, 2001; Johnson & Leff, 1999; Newlin, Miles, van den Bree, Gupman, & Pickens, 2000).

Additional to the severe consequences for the individual, substance use disorders pose a considerable burden to the health care systems worldwide (Degenhardt et al., 2013; Inocencio, Carroll, Read, & Holdford, 2013; Laramée et al., 2013; Rehm et al., 2009; Varney & Guest, 2002; Vossius et al., 2013).

Adolescence is a time period where individuals tend to engage in new experiences and are more prone to risky behaviour including the use of various psychoactive substances. But only a small group of those experiencing with drugs is developing abuse or dependence. The challenging question for research remains the reason why. Genetic factors seem to play an important role, but psychosocial factors are also involved in the aetiology of addiction. The mechanism of an underlying vulnerability and the interplay of neurobiological and environmental factors are not fully understood yet, and further research is needed to develop prevention and treatment strategies. Addiction is a chronic disease that usually starts in adolescence or early adulthood and is related to negative impact on the
development of the brain (Baler & Volkow, 2011; Volkow & Baler, 2014; Volkow & Li, 2005; Volkow, 2005) and numerous other negative consequences. Hence identifying risk factors to optimize prevention programs and develop focused and need orientated early intervention and treatment strategies must be a major public health concern.

One comorbid disorder that has often been linked to the abuse of psychoactive substances is attention deficit hyperactivity disorder (ADHD). ADHD seems to be one particular risk factor in developing addiction. Research literature on ADHD is steadily increasing over the last decades, and many studies performed in adolescents and adults with ADHD found a higher risk of substance abuse (Biederman et al., 1995; Groenman et al., 2013; Milberger et al., 1997; Wilens et al., 2011; Wilson & Levin, 2005). Biedermann et al. found a life time risk of 52% for SUD in adults with ADHD compared to 27% in controls. (Biederman et al., 1995).

Conversely, high rates of ADHD have been found in patients with substance use disorders (Fond et al., 2013, 2014; Kaye et al., 2013; Ohlmeier et al., 2007, 2008; Schubiner et al., 2000; Shrier et al. 2003; van de Glind et al., 2013). The estimated prevalence rates showed a wide variety. In a meta-analysis an overall rate of 23,1% (CI:19,4 - 27,2%) of patients with substance use disorder was found to have comorbid ADHD (van Emmerik-van Oortmerssen et al., 2012).

But there are also studies where the relationship between substance use and ADHD was unclear. Some authors found that the association is merely mediated by comorbid conduct disorder (Armstrong & Jane, 2002; Biederman et al., 1997; Lynskey & Hall, 2001).

Despite the fact that comorbid disorders may to some extent mediate or contribute to the relationship of ADHD and substance abuse, evidence is growing that the co-occurrence of ADHD and SUD poses a particularly disabling condition with increased risk of psychosocial problems, criminal behaviour and a negative impact on the course of both disorders (Bihlar Muld et al. 2013; Ginsberg et al. 2010; Gudjonsson et al. 2014).

Due to the high prevalence and the profound consequences of both conditions in adolescence and adults, the association of SUD and ADHD must be a concern of both research fields. The frequent co-occurrence led to a growing number of studies investigating possible common underlying biological vulnerabilities (Arcos-
Despite growing research on the connection and consequences of ADHD and the abuse of alcohol, nicotine and other drugs, many adolescents and adults with addiction problems and co-existing ADHD remain unrecognized (Asherson et al., 2012; Barkley & Brown, 2008; Levin, 2007) and are therefore not receiving appropriate treatment targeting the impairment resulting from their ADHD symptomatology. Especially those individuals who present with an increased number of ADHD symptoms and related consequences but do not meet the diagnostic criteria of DSM IV or ICD 10 may be undertreated (Ameringer & Leventhal, 2013; Cho et al., 2009; Hong et al., 2013; Malmberg et al., 2011).

In order to address this issue some authors started to draw increased attention to subthreshold diagnosis or to support a dimensional structure of ADHD symptomatology questioning the categorical approach of diagnostic classifications (Balázs & Keresztény, 2014; Faraone et al, 2009; Faraone et al., 2006; Frazier et al. 2007; Haslam et al., 2006; Lubke et al., 2007; Marcus & Barry, 2011; Marcus et al., 2012).

Due to the diagnostic insufficiency of screening instruments to assess a diagnosis of ADHD and following the idea that ADHD consists on a continuum of symptom severity rather than being a categorical condition, we decided to assess the number of present ADHD symptoms using the 25-item WURS and the ADHD checklist according to DSM IV as screening instruments for analysing the relation of ADHD and substance use, as well as the motives that lead to consumption.

3. Aim of the study
The aim of the present study was to examine the association of symptoms of attention deficit hyperactivity disorder and the consumption of alcohol, nicotine and other psychoactive substances in a representative sample of 18-year-old males. Based on the assumption that ADHD symptoms may lead to different reasons for alcohol or nicotine consumption, we looked for different drinking- and smoking motives in relation to ADHD symptoms.
Additionally we assessed the interplay between severity of ADHD symptomatology and different psychological factors.

Due to the large representative sample we can also provide information regarding the prevalence of substance use in relation to symptoms of attention deficit hyperactivity disorder in 18-year-old Austrian males. To our knowledge no data on ADHD prevalence rate and stimulant treatment in Austria are currently available.

4. Substances

Alcohol abuse and nicotine dependence often occur conjointly and are associated to an increased likelihood of illicit drug use. Higher levels of alcohol use were found to be related to increased likelihood of smoking and marijuana use (Leatherdale & Ahmed, 2010), and smoking was linked to more problematic alcohol use and higher rates of illicit drugs (Kapusta et al., 2006, 2007; Lai et al. 2000; Ramo, et al., 2012). Although no causal effect has been examined those findings support the gateway theory of drug use (Fergusson et al., 2006).

In the addiction field two competing theories are trying to explain the co-occurrence of multiple substance use. The gateway theory of drug use assumes that individuals start with consuming alcohol or nicotine (tobacco), then progress to the use of cannabis (marijuana) which subsequently leads to the use of "harder" drugs (e.g. opiates, cocaine, metamphetamines). Presuming that there exists a hierarchical structure of substances and a progression from one to the other, that leaves alcohol and nicotine as the "gateway drugs". Whereas the other theory, the common liability (common trunk) model takes into account the complex interplay of neurobiological, psychosocial, behavioural factors and comorbidity that emerges in the individual as a common addiction risk (Tarter et al., 2006; van Leeuwen et al., 2011; Vanyukov et al., 2012). Criticism regarding the gateway model as being too simplistic has arisen and research mostly supports the common liability model (Agrawal et al., 2007; Agrawal et al., 2004; Kirisci et al., 2013; Tarter et al., 2006).

The assumption that there is a common underlying vulnerability that accounts for the predisposition of developing an addiction problem prompted us to investigate the association of ADHD and the consumption of different substances. ADHD symptomatology may be one important mediating factor.
4.1. Diagnostic criteria


The DSM 5 has recently replaced the DSM IV (American Psychiatric Association, American Psychiatric Association, & Task Force on DSM-IV, 2000), which is the diagnostic system commonly referred to in the references used in the present report.

The two classification systems correspond closely (Hasin et al., 2006). While in the DSM IV three or more of 7 symptoms (including craving, tolerance, withdrawal, neglect of other activities and continued use despite knowledge about the harmful consequences) must have been present at any time during the last 12 month to meet the diagnosis of dependence, the ICD 10 requires three or more out of 6 similar symptoms that have been present during the same period. Different criteria for abuse are available for both systems (American Psychiatric Association et al., 2000; World Health Organization, 1992).

The changes in the DSM 5 may reflect tendencies to support the dimensional approach of diagnosing disorders instead of categorizing (Compton et al., 2009; Helzer et al., 2007; Helzer et al., 2006; Martin et al., 2008). In the fifth edition the distinction between abuse and dependence of a substance has been removed. Instead of two different diagnoses there is now one referred to as "substance use disorder" measuring different severity degrees on a continuum from mild to severe (American Psychiatric Association et al., 2013).

Common definitions of disorders on the basis of diagnostic criteria are important tools and should be agreed on throughout the research community, as otherwise comparison of findings is complicated or inadmissible. But it can be discussed if current used diagnostic classification systems are sufficient to meet the heterogenity of disorders and if they have relevant implications for specific prevention and treatment approaches. Especially the latter induced many
researchers to turn to different options and investigated the usefulness of subgroups and typologies, especially for alcohol (Barbor et al., 1992, Cloninger et al., 1981, Leggio et al., 2009; Lesch & Walter, 1996; Pombo & Lesch, 2009; Schlaff et al., 2011), nicotine (Etter, 2005; Heatherton et al., 1991; Heatherton et al., 1989; Lesch & Walter, 1996) and opiates (Salem et al., 2014).

4.2. Prevalence rates

Prevalence rates found regarding use, abuse and dependence of alcohol, nicotine and other substances vary across the literature and comparisons should be made with care. Differences in methodology, sample selection and diagnostic or screening measures lead to varieties in findings (Hublet et al., 2006; Kraus et al., 2003).

In a literature search that was restricted to studies on alcohol use disorders based on DSM IIIR, DSM IV and ICD 10 across Europe estimates for 12-months prevalence rates for dependence was 6.1% for males and 1.1% for females (Rehm et al., 2005). Smoking prevalence among European Countries in 2002 varied from 5.5% to 20.0% among boys and 8.9% to 24.7% in girls. Comparing these data with findings from 1990 and 1998 the estimates for boys in the Nordic countries showed a decline and were found to be stable in Hungary and Austria, no decline but an increase for girls were found in Hungary (Hublet et al., 2006).

In a review of eleven population-based surveys of adults (≥18 year olds) and two of young adults (18–30 year olds) to estimate lifetime and current prevalence of nicotine dependence 25% of adults in the USA and Germany presented with lifetime dependence, 15% were currently dependent. Rates in Asian men corresponded with these findings, but less than 5% of Asian women had been dependent (Hughes, et al., 2006).

In a study investigating substance use in 18 year old Austrian males (n = 1902) 7,6% had a positive urine test for illicit drugs. Cannabis with 5,1% was the most prevalent drug found in the urine samples followed by opiates with 2,7% (Kapusta et al., 2006).

About 52% of all young males in this study reported to be smokers. 85% of them showed low nicotine dependence, 16% of all smokers had a HSI score of ≥ 4 indicating strong nicotine dependence. 15% of the sample had a CAGE score of
≥1 and 3.2% had a score of ≥2 indicating alcohol dependence (Kapusta et al., 2006).

In 2010 Wittchen et al. conducted systematic literature reviews and reanalyses of existing data sets from national surveys and expert consultations from all European Union Member States as well as Switzerland, Norway and Iceland on estimated rates of a broad range of mental and neurological disorders. The overall rate for suffering from any mental disorder per year found was 38.2%. Alcohol and drug dependence accounted for 4% (Wittchen et al., 2011).

5. ADHD
Attention-deficit-hyperactivity disorder (ADHD) is the most common diagnosis in children and adolescents, indicating different degrees of inattentiveness, distractibility, impulsivity, and often hyperactivity that is inappropriate for the developmental stage of the child, in many cases leading to emotional, cognitive and behavioural problems of those affected.

The disorder was long time considered to be a childhood condition only. It was thought that somehow ADHD recedes with age. This myth persisted for many years until during the last decades attention-deficit-hyperactivity disorder in adults received increasing attention in medical research and was becoming recognized in the international literature (Biederman et al., 2010; Wender et al., 2001; Wilens & Dodson, 2004).

ADHD remains a very controversial topic. While some people argue that way too many children are labelled with a diagnosis that does not exist as such, being a cultural construct (Timimi & Taylor, 2004), being invented by the media, teachers, parents and pharmaceutical companies (Saul, 2014; Schrag & Divosky, 1975) concern is raised by some clinicians and researchers that ADHD is still not recognised in all affected children, what leads to withholding treatment that could reduce the risk for problems related to that disorder (Asherson et al., 2012; Barkley & Brown, 2008; Levin, 2007).

The perspectives on attention-deficit-hyperactivity-disorder in the literature range from questioning the medical and neuropsychological approach, pointing out the problem of overdiagnosis (Bruchmüller et al, 2012) and medicalization of children
who show behavioural problems with the intent to control deviant behaviour (Breggin & Scruggs, 2001; Conrad, 2006) to ADHD being a serious limiting neuropsychological condition resulting in a rapidly growing research literature on genetic aspects, neurobiological factors, executive functioning and comorbidity of the disorder (Barkley, 1997; Barkley, 2010; Spencer et al., 2013; Spencer et al., 2007; Surman et al., 2013).

Independent to different views on ADHD, there is a substantial body of literature that reports the negative impact of increased ADHD symptomatology on many life domains. ADHD showed to result in impaired academic achievement (Barbaresi, et al., 2007; DuPaul, et al., 2009; Loe & Feldman, 2007; Polderman et al., 2010; Washbrook et al., 2013; Wu & Gau, 2013), increased odds of having problems with the justice system (Belcher, 2014; Bernat et al., 2012; Buitelaar & Ferdinand, 2013; Herrenkohl, Lee, & Hawkins, 2012; von Polier, Vloet, & Herpertz-Dahlmann, 2012; Zhou et al., 2012), increased risk of accidents and injuries (Chou et al. 2014; Kang et al., 2013; Lange et al., 2014) and was found to lead to problems within families or relationships (Gau, 2007; Hechtman, 1996; Humphreys et al., 2013; Normand et al., 2013) and social problems (Blachno et al., 2013; Mrug et al., 2012; Mueller, Fuermaier, Koerts, & Tucha, 2012).

Besides the limiting consequences on affected individuals, the negative impact on school outcomes, employment prospects and social problems, ADHD also put an economic burden on the national social and welfare systems (Le et al., 2013; Zarkin et al., 2008). Treatment and higher numbers of hospital admissions result in increased healthcare costs (Holden et al., 2013).

5.1. A brief history of ADHD

Tracking down the historical roots of the disorder currently known as attention deficit hyperactivity disorder (ADHD) one finds literature dating back until 1775. A chapter found in a book written by Melchior Adam Weikard, a German physician, seems to be the first currently known description of a condition that reminds of attention deficit hyperactivity disorder (Barkley & Peters, 2012).

For a long time the Scottish physician Alexander Crichton was known as the first who described a condition including all essential symptoms of the inattentive type
of ADHD according to DSM IV. Already in his 1798 published work "An Inquiry into the Nature and Origin of Mental Derangement" that was reprinted in 2008 (Crichton, 2008), he described observations of clinical cases of mental restlessness and "the incapacity of attending with a necessary degree of constancy to any one object" mentioning the early onset of the disorder that diminishes with age (Lange et al., 2010; Palmer & Finger, 2001). Despite these early references it very often is the character of "Fidgety Phil" by Heinrich Hoffmann, a German physician who created a collection of illustrated stories, first published in 1845 in the book "Struwelpeter" (Hoffmann, 2011) that is mentioned when referred to historical literature of ADHD. The little boy Phillip who is described in one of the stories, shows clear signs of inattentiveness and restlessness. In this story collection one can also find another description of a boy showing signs of inattention that in the end leads to an accident where the boy falls in the river. These stories are often seen as an early description of children suffering from a condition now diagnosed as ADHD (Lange et al., 2010; Thome & Jacobs, 2004). Fidgety Phil (in German: "Zappelphilip") also serves as an allegory for ADHD in the literature (Hüther & Bonney, 2013).

In 1902 Sir George Frederic Still, a British pediatrician, published the Goustonian lectures, describing children who had problems with moral control, attention, high emotionality, but with no general intellectual impairment or physical disease. His lectures are seen as the beginning of a scientific discourse and the first medical notion of attention deficit disorder (Barkley, 2006; Lange et al., 2010; Still, 2006). Most of the children described showed symptoms of the disease before the age of 7, and he also reported about an uneven distribution among boys and girls, boys being 3 times more likely to be affected (Lange et al., 2010).

Thirty years later Kramer and Pollnow, 2 German Physicians reported about a "hyperkinetic disease" in children, describing symptoms of marked motor restlessness during the day but no sleeping problems or agitation during night time, distractability and difficulties to concentrate. Kramer and Pollnow also could observe that if these children were engaged in activities of their own interest they could stay focused for hours. They reported about an early onset of the disorder and a subsequent recovery, especially regarding motor restlessness over the years (Lange et al., 2010). Summarized it can be said that the description of the
"hyperkinetic disease of infancy" closely fits the current diagnosis of ADHD (DSM IV) or Hyperkinetic disorder (ICD 10) and is deemed to be the first concept of ADHD.

In 1937 when Charles Bradley was doing neurological examinations of children at the Emma Pendleton Bradley Home at Rhode Island, a home for children diagnosed with behavioural disorders, attempting to treat headache, he discovered that children presenting with symptoms of hyperactivity, reduced attention span, impulsiveness and behavioural problems did benefit from treatment with benzedrine. This unexpected effect of stimulant treatment, calming down hyperactive children, was the beginning of pharmacological treatment of ADHD (Lange et al., 2010; Strohl, 2011).

Although the discovery of Bradley became quite influential in later years, for the following 25 years his finding remained largely ignored.

In the following years research concentrated on the concept that the coexistence of hyperactivity and behavioural problems may be due to minimal brain damage. Following criticism that this concept was too speculative and too general, different labels such as "hyperactivity", "learning disability" and "dyslexia" developed to meet this definition problem (Barkley, 2005; Lange et al., 2010).

In 1968 a disorder called "hyperkinetic reaction of childhood" was first mentioned in the second edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM). This diagnosis was followed by "attention deficit disorder (ADD)" in the DSM III were the diagnosis was expanded allowing a diagnosis without the presence of hyperactivity focusing on the impairment of attention. ADD could be diagnosed with hyperactivity (ADD/H) and without hyperactivity (ADD/WO) (Barkley, 2005).

In the revision of the third edition of the DSM, the DSM III-R, the term ADHD was first used as the official name for the disorder described. The name remained the same in the DSM IV and the text revised DSM IV-TR which both define 3 subtypes of the disorder: the primarily inattentive type, the primarily hyperactive/impulsive type and the combined type (American Psychiatric Association et al., 2013).
The DSM IV has already been replaced by its newer version, the DSM 5, published in 2013, the name remained unchanged but there has been an update of the definition of ADHD. (American Psychiatric Association et al., 2013)

5.2. Diagnosis of ADHD
Despite all the research done in ADHD, the diagnosis of the disorder remains challenging in children but even more in adults. ADHD is not diagnosed by the cause of the disorder but by its behavioural symptoms. Although during the last decades research on laboratory based diagnostic methods has increased rapidly (Cubillo et al., 2010; Dey, Rao, & Shah, 2012; di Michele et al., 2005; Dougherty et al., 1999; Emond, Joyal, & Poissant, 2009; Smith et al. 2006) no clear biological measure has been found so far and the diagnosis remains symptom based.

There is no single measurement, no biological marker, no brain imaging method that showed sufficient data in diagnosing ADHD. The diagnostic process of ADHD needs a thorough clinical assessment by a specialist to rule out other potential problems or medical conditions that may cause similar symptoms. Parents or teachers information are also a valuable contribution to gain insight. Different instruments and checklists are available to assess behavioural problems, associated disabilities and to determine whether a child meets the diagnostic criteria of the disorder. Three different diagnostic classifications are currently in use for diagnostic purposes.

The DSM criteria for ADHD, as well as the ICD criteria for this condition, were developed to describe symptoms present in children affected by the disorder. Because the symptoms of ADHD may differ in adults from those in children, especially those of hyperactive behaviour, other criteria more specific for adults may be helpful to confirm a diagnosis in grown ups.

The development of the Wender Utah Criteria in the 1970s described by Wender and colleagues (Wender, 1995) were an approach to meet the special challenges of diagnosing adults with ADH.

The differences between the classification systems are resulting in different prevalence rates depending on the diagnostic classification system used in the studies.
The classification system to which this report refers to is the DSM IV-TR which was the version in use when the data have been collected (American Psychiatric Association et al., 2000).

5.2.1. Diagnostic criteria according to DSM IV  
The DSM-IV distinguishes between three subtypes of ADHD:  
1. Combined Type: if both Criteria A1 and A2 are met for the past 6 months  
2. Predominantly Inattentive Type: if Criterion A1 is met but Criterion A2 is not met for the past 6 months  
3. Predominantly Hyperactive-Impulsive Type: if Criterion A2 is met but Criterion A1 is not met for the past 6 months

A1 - *Inattention*:  
six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:  
- often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities  
- often has difficulty sustaining attention in tasks or play activities  
- often does not seem to listen when spoken to directly  
- often does not follow through on instructions and fails to finish school work, chores, or duties in the workplace (not due to oppositional behaviour or failure to understand instructions)  
- often has difficulty organizing tasks and activities  
- often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)  
- often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)  
- is often easily distracted by extraneous stimuli  
- is often forgetful in daily activities
A2 - Hyperactivity/Impulsivity:
six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity:
- often fidgets with hands or feet or squirms in seat
- often leaves seat in classroom or in other situations in which remaining seated is expected
- often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
- often has difficulty playing or engaging in leisure activities quietly
- is often "on the go" or often acts as if "driven by a motor"
- often talks excessively

Impulsivity:
- often blurts out answers before questions have been completed
- often has difficulty awaiting turn
- often interrupts or intrudes on others (e.g., butts into conversations or games)

Additionally to A1 and/or A2, the following criteria have to be met:
B) Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.
C) Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).
D) There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.
E) The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorders, or a Personality Disorder).

5.2.2. Diagnostic Criteria according to DSM 5
(Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (American Psychiatric Association et al., 2013))
In the fifth edition of the Diagnostic and Statistical Manual no fundamental changes have been made. The name ADHD remained unchanged, as well as the 18 criteria and the presence of the two categories inattention and hyperactivity/impulsivity. But the system of predominant subtypes (the predominantly inattentive, the predominantly impulsive hyperactive and the combined type) are no longer seen as subtypes, they are seen as different presentation of the disorder instead. The age of onset for the criteria has been changed from being present before the age of 7 to being present before the age of 12. Some descriptions of symptoms were added to show how they might present in the different age groups. Another change is that in the DSM 5 the threshold for adults has been lowered. Individuals older than 17 years only need to meet 5 symptoms instead of 6 in either of the categories (Epstein & Loren, 2013; Sibley et al. 2013).

5.2.3. Diagnostic criteria according to ICD-10
Another widely used diagnostic tool for clinical, epidemiological and quality purposes is the International Classification of Mental and Behavioural Disorders. It is currently in use in the 10th edition which will be replaced by the ICD-11 in 2017. The International Classification of Mental and Behavioural Disorders (ICD-10) is a classification system developed by the World Health Organization (WHO) (World Health Organization, 1992).

The ICD-10 refers to attention-deficit-hyperactivity disorder as hyperkinetic disorder. The code in the classification system is F90 "Hyperkinetic disorders". Similar to the DSM IV, symptoms of hyperkinetic disorder (HKD) must arise in early childhood, before the age of 6.

Different to the DSM IV the ICD-10 diagnosis requires evidence in both categories, attention deficit and hyperactivity/impulsivity. The symptoms must be present in multiple settings (for example: at home, at school, in a medical or treatment setting) in different situations, must be excessive compared with the norm for a child the same age und must be persisting over time.
The ICD-10 describes hyperkinetic disorder as:

"A group of disorders characterized by an early onset (usually in the first five years of life), lack of persistence in activities that require cognitive involvement, and a tendency to move from one activity to another without completing any one, together with disorganized, ill-regulated, and excessive activity. Several other abnormalities may be associated. Hyperkinetic children are often reckless and impulsive, prone to accidents, and find themselves in disciplinary trouble because of unthinking breaches of rules rather than deliberate defiance. Their relationships with adults are often socially disinhibited, with a lack of normal caution and reserve. They are unpopular with other children and may become isolated. Impairment of cognitive functions is common, and specific delays in motor and language development are disproportionately frequent. Secondary complications include dissocial behaviour and low self-esteem." (see ICD-10, chapter V, Behavioural and emotional disorders with onset usually occurring in childhood and adolescence (F90) (World Health Organization, 1992)

Excluded from the diagnosis are the following disorders:
- F 90.1 hyperkinetic conduct disorder (if associated with conduct disorder)
- F 90.8 other hyperkinetic disorders
- F 90.9 hyperkinetic disorder, unspecified (also called hyperkinetic syndrome)

Due to its narrower criteria, the diagnosis of hyperkinetktic disorder (HKD) only being met when symptoms of inattention and symptoms of hyperactivity/impulsivity are presented, the ICD-10 describes a subgroup of the more widely used diagnosis according to DSM IV.

For research purposes the age of onset is < 7, but there must be evidence in all three categories, attention deficit (6 symptoms required), hyperactivity (3 symptoms required) and impulsivity (1 symptom required) (Cameron & Hill, 1996).
5.2.4. Diagnostic criteria according to the Wender - Utah - Criteria
The Wender Utah Criteria have been described by Paul Wender (Wender, 1995) and are the first diagnostic criteria developed for adult patients with attention deficit hyperactivity disorder. These criteria also require a childhood onset of the disorder before the age of 7 and symptoms of hyperactivity and poor concentration present in adulthood. But what discriminates the Wender Utah Criteria from other classifications systems are symptoms that address the emotional aspects of the disorder (Wender, 1995).

Two out of the following five symptoms must be present in the adult patient:

- affective lability
- hot temper
- inability to complete tasks and disorganization
- stress intolerance
- impulsivity

Although the Wender Utah Criteria have been especially developed for assessing adult ADHD, they only include patients with evidence of both, inattention and hyperactivity. Therefore the predominantly inattentive type (according to DSM IV) is missed out. And it must be noted that using alternative classification systems bares the risk that comparison with other studies may be limited in validity.

5.2.5. Categorical versus dimensional approach
In the recent years a scientific debate started questioning the categorical approach to diagnose disorders (Brown & Barlow, 2005; First, 2010; Hudziak et al., 2007; Kecmanovic, 2012; Krueger & Piasecki, 2002; Narrow & Kuhl, 2011; Ruscio et al., 2011). In ADHD this is an especially important topic due to the controversies concerning the diagnosis, possible overdiagnosis and stimulant treatment. A growing number of research yielded around the question if ADHD would be better understood as a condition presenting with symptoms of inattention, hyperactivity and impulsivity existing on a continuum of severity, instead of categories where the condition is either present or not (Beauchaine, 2003; Faraone et al., 2009; Faraone et al., 2006; Frazier et al., 2007; Lewinsohn et al. 2004; Marcus et al,
2012; Swanson, Wigal, & Lakes, 2009). Authors scrutinised if the current conceptualization is sufficient for identifying individuals of different age groups who are experiencing problems and impairments due to ADHD symptomatology, and what level of symptom severity warrants treatment and medication (Marcus & Barry, 2011; Marcus et al., 2012). Furthermore findings from research on the dimensional structure should lead to considerations if the treatment should not be decided on the ground of the level of impairment and the individuals need for treatment, instead of diagnostic categories (Haslam et al., 2006).

Balázs and Keresztény conducted a systematic review on subtreshold attention deficit hyperactivity in children and adolescents (Balázs & Keresztény, 2014). Out of 669 studies 18 could be included. Taking into account that the studies differed largely in sample selection, measures and definitions, the prevalence rates showed a wide variety in a range from 0.8 - 23%. Looking into the rates of comorbidity half of the studies found a significant association with at least one comorbid disorder, some studies did not even find large differences in the comorbidity rate between full and subtreshold diagnosis of ADHD (Balázs & Keresztény, 2014). Subtreshold ADHD was found to be a risk factor for several other disorders, including conduct disorders, mood disorder, alcohol dependence and smoking (Cho et al., 2009; Hong et al., 2013; Lewinsohn et al., 2004; Malmberg et al., 2011).

Overall researchers found a negative impact of subtreshold ADHD on different life domains, functional impairments and lower quality of life (Balázs & Keresztény, 2014).

All these findings consistently supported the dimensional structure of ADHD and no clear boundary could be made between clinical and subclinical symptoms of ADHD. Further research is needed and could help to add information about the relevance of those findings and possible implications for treatment and prevention programmes.

5.3. Prevalence of ADHD

When searching the literature it must be considered that besides the DSM IV other classification systems exist, using different diagnostic criteria. This has an impact on the prevalence rates found in different studies. Although there is a strong
correlation and overlap between children identified as having ADHD by DSM IV and ICD-10, the DSM IV describes a broader group of children than the ICD 10 (Dalibor Karlović, 2002; Sørensen et al., 2005; Tripp et al., 1999), varying rates of ADHD in different samples may be explained by different methodologies or different diagnostic criteria used in the studies (Faraone et al., 2003; Polanczyk et al., 2007). Most of the studies found in the medical database refer to the diagnostic criteria of DSM IV. Prevalence rates in different studies using ICD-10 criteria were much lower than in those using DSM IV criteria for diagnostic purposes.

Comparing the prevalence rates among a British childhood population using different diagnostic criteria, 6-7% of children met the criteria according to DSM III, 3-5% met the criteria for DSM III-R or DSM IV and only 0,5 - 1% of the children could be diagnosed according to ICD 10 (Cameron & Hill, 1996).

Polanczyk et al. did the first comprehensive systematic literature review on the prevalence rates of ADHD or hyperkinetic disorder (HD) across all continents. Altogether 102 studies comprising 171 756 subjects were included in the review. All subjects were 18 years or younger. The diagnostic criteria used in the studies were DSM (III; III-R, or IV) and ICD (9 or 10). Out of all studies, 32 were carried out in North America, 32 in Europe, the remaining 38 studies were distributed among Asia, South America, Oceania, Middle East and Africa. The pooled overall prevalence found for children and adolescents was 5,29% (Polanczyk et al., 2007). There was a wide variety across different samples and different studies, largely explained by methodological differences. The geographical location did not show to play a major role and no significant difference was found between North America and Europe. Gender seemed to have a major impact on the estimate rate, followed by the age group (Polanczyk et al., 2007).

In 2012 another meta-analytic review was published, including 86 studies investigating children and adolescents (n = 163 688) and 11 samples of adults (n = 14 112) with ADHD. All studies were based on the diagnostic criteria of DSM IV (Willcutt, 2012).

Like in previous reviews the geographic location did not show significant differences in the estimate rates, whereas gender and age group did significantly influence the prevalence rates found. The highest rates (11,4%) were found in the
group of 6 -12 year olds (the rate between males and females was 2.3:1). Among adults the prevalence rate was 5%. The gender difference between males and females declined with age (1.6 :1) (Willcutt, 2012).

In 2014 Polanczyk et al. updated the two previous systematic reviews (Polanczyk et al., 2007; Willcutt, 2012) and investigated if there had been an increase of prevalence estimates over the last three decades. They included 135 studies published between 1985 and 2012 in their meta-regression analysis. Although there had been concern that the prevalence rates of ADHD are increasing, this study could not support those data. After controlling for study methods no increase in the estimate rates from 1985 - 2012 was found (Polanczyk, et al., 2014).

There are no data available for Austria. To our knowledge our study is the first carried out in Austria investigating a representative sample of 18 year old males.

5.4. From childhood ADHD to adult ADHD
In the past ADHD was known as a childhood disorder that fades with age, leaving adult patients with ADHD symptoms out of the research focus. Starting in the 1970s a growing body of literature changed the perception of ADHD from being a childhood condition only to a disorder that affects all age groups (Weiss & Hechtman, 1993; Wender et al., 2001). Subsequently to these findings the DSM III defined the residual type of ADD, a type which disappeared in the DSM IV. In the fifth version of the DSM some criteria were modified, to be more applicable for adult patients (American Psychiatric Association et al., 2013).

Follow-up studies could show that ADHD symptoms persist into adulthood (Biederman et al., 2000; Biederman et al., 2010; Teicher, et al., 2012; Wilens & Dodson, 2004). Within a meta analysis of follow up studies Faraone et al. found that up to 65% of children diagnosed with ADHD still showed increased ADHD symptomatology as adults, but only 15% presented with full persisting ADHD diagnosis at the age of 25 (Faraone, Biederman, & Mick, 2006). The rates were very much depending on the definition and the diagnostic criteria. Kessler et al. reported much higher rates of persisting ADHD into adulthood. About half of those
individuals who retrospectively reported childhood ADHD in a clinical interview did still meet full ADHD diagnosis as adults (Kessler et al., 2010).

ADHD does not initially appear during adulthood. Even if not diagnosed in childhood, adult ADHD patients with persisting symptoms must also report about a history of symptoms and impairments during their early age. While the disorder persist in many cases the manifestation of symptoms in adulthood may be different and change over time. While children, especially boys, present with more symptoms of hyperactivity and impulsivity, which may decline with age (Biederman et al., 2000; Kessler et al., 2010), the most impairing symptoms found in adults are inattentiveness and problems with executive functions (such as working memory, task avoidance, impaired self-regulation) (Barkley & Murphy, 2010; Kamradt et al., 2014) and a high rate of comorbidity (Jacob et al., 2007; Marks et al., 2001; Newton-Howes, 2004).

Compared to attention deficit hyperactivity disorder in childhood the literature on prevalence rates in adults is few. To assess the cross-national prevalence of adult ADHD, Fayyad et al. did a survey in 10 countries from America, Europe and the Middle East. The estimated prevalence rate of DSM IV adult ADHD in the total sample was 3,4% (range 1,2–7,3%) (Fayyad et al., 2007). In other studies the reported prevalence rates of adult ADHD were between 4 and 4,4% (Estévez et al., 2014; Kessler et al., 2006; Polanczyk & Rohde, 2007).

5.5. ADHD and Comorbidity

Throughout the literature ADHD is associated with significant rates of comorbid disorders and high levels of impairment across the life span. The rates of comorbidity range from 52% (Jensen & Steinhausen, 2014), 66,2% (Piñeiro-Dieguez et al., 2014) to 87% (McGough et al., 2005) in adults and up to 96,3% in children and adolescents (Yüce et al., 2013).

The list of comorbid disorders investigated and found to be associated with ADHD includes mood disorders, anxiety disorders, bipolar disorder, personality disorders (Di Trani et al., 2014; McGough et al., 2005; Piñeiro-Dieguez et al., 2014; Soendergaard et al., 2014; Tamam, Karakus, & Ozpoyraz, 2008; Wingo &
Ghaemi, 2007; Yüce et al., 2013), disorders of the autistic spectrum, conduct disorder, oppositional defiant disorder, disruptive behaviour disorders and learning disabilities (Jensen & Steinhausen, 2014; Ronald et al., 2014; Sizoo, van der Gaag, & van den Brink, 2014; Willcutt, et al., 1999).

In a Danish sample of 14,825 children and adolescents (age 4–17) with a diagnosis of ADHD, 52% were found to have at least one comorbid psychiatric disorder. The most frequent comorbid disorders were conduct disorder (16.5%), specific developmental disorders of language, learning and motor development (15.4%), autism spectrum disorders (12.4%), and intellectual disability (7.9%) (Jensen & Steinhausen, 2014).

Bipolar disorder seems to be closely related to adult ADHD. In a systematic review up to 47% of ADHD patients had co-existing bipolar disorder and 21% of patients with bipolar disorder also met the criteria for ADHD (Wingo & Ghaemi, 2007).

In a clinical sample of 155 patients with ADHD referred to a specialized ADHD unit, 57% of the patients presented with comorbid disorders. Higher rates of comorbidity were found in patients older than 25. Men were more likely to present with substance abuse disorder whereas women were more affected by personality disorders (Soendergaard et al., 2014).

How relevant it is to assess ADHD in relation to comorbid disorders showed an investigation carried out by Balász et al. (2014). They investigated 211 treatment naive children and adolescents with a full diagnosis of ADHD according to DSM IV and 105 who met subthreshold diagnosis regarding suicidality risk. They found an association of ADHD symptoms and an increased risk of suicidality, which was fully mediated by different types of comorbid disorders depending on age. In children younger than 12 higher suicidality was mediated by symptoms of anxiety disorders, and in the older age group the association of ADHD and higher suicidality was mediated by symptoms of depressive disorders, dysthymia and symptoms of substance abuse or dependence (Balazs et al., 2014).
5.6. ADHD and substances use disorder

Substance use disorder was one comorbid disorder found to be closely related to ADHD in many studies (Breyer et al., 2014; De Alwis et al., 2014; Kalbag & Levin, 2005; Kaye et al., 2013; Malone et al. 2010; Molina & Pelham, 2003; Piñeiro-Dieuguez et al., 2014; Pomerleau et al., 1995; Wilens & Biederman, 2006) and that is of special interest regarding the presented report.

The pooled overall prevalence rate for ADHD found in a systematic literature review was 5.3% for children and adolescents and 4.4% for adults (Polanczyk et al., 2007). In a sample of substance abusing adults ADHD was found in 11 - 35% of subjects (Kalbag & Levin, 2005).

In an international study (including Australia, Belgium, France, the Netherlands, Hungary, Norway, Spain, Sweden, Switzerland and the USA) the prevalence rates of adult ADHD in treatment seeking patients with SUD according to DSM IV ranged between 5.4 - 31.3%. The lowest rate was found in Hungary, the highest in Norway. The rates according to DSM 5 were slightly higher (7.6 - 32.6%) (van de Glind et al., 2014).

ADHD symptomatology increased the risk for cigarette smoking and substance abuse disorders and was associated with greater severity and chronicity of the disorders (Wilens & Biederman, 2006). Similar results were found in other studies (Fuemmele et al., 2007; Gudjonsson et al., 2012; Kollins et al., 2005; Milberger et al., 1997; Rodriguez & Span, 2008; Sullivan & Rudnik-Levin, 2001; Wilens & Biederman, 2006).

Conduct disorder was found to be an important mediator between ADHD and substance use disorder (Glass & Flory, 2012; Milberger et al. 1997; Wilens, 2007).

Milberger et al. followed a group of 237 boys aged 6 - 17 into adolescence or young adulthood. They found that ADHD was a significant predictor of smoking and early initiation of smoking, results remained stable even controlling for other psychiatric comorbidity (Milberger et al., 1997).
In a sample of adult ADHD patients \((n = 367)\), 39.2\% presented with comorbid substance use disorder (Piñeiro-Dieguez et al., 2014). Conversely, 21\% of alcohol dependent patients met DSM IV criteria of adult ADHD (Wodarz et al., 2004).

In another German sample 20.9\% - 23.1\% (depending on the diagnostic criteria) of the alcohol-dependent patients showed evidence of childhood ADHD. In the group of substance-addicted patients the rates were 50.8\% - 54.1\% (Ohlmeier et al., 2008). Among 269 regular users of illicit drugs 45\% screened positive for adult ADHD (Kaye et al., 2013).

All those findings underline the increased vulnerability of adolescents and adults with ADHD symptoms for smoking and alcohol as well as illicit drug use, possibly as a means of self-medication, and emphasize a need for early identification and treatment to reduce the negative impact on the course of the substance use disorder and other negative outcomes.

Even if there is a vast literature on the comorbidity of ADHD and SUD, further research investigating the common underlying and mediating factors and the ways how these disorders interact and influence each other is needed for specialized treatment programmes.

### 5.7. ADHD and psychosocial factors

Different psychosocial factors have been discussed in relation to ADHD and the aetiology of ADHD.

#### 5.7.1. Initiation of drinking

ADHD has been identified as a risk factor for early onset alcohol dependence and was related to more severe alcohol problems (Johnson et al., 2000; Sartor et al., 2007; Sibley et al., 2014; Sringeri et al., 2008). Sringeri et al. could show that 63.3\% of early onset alcohol dependent patients had been diagnosed with childhood ADHD and 56.7\% had been diagnosed with adult ADHD, compared to 25 \% and 17.9\% of late onset alcoholics (Sringeri et al., 2008).

Compared with controls, adolescents with ADHD were more likely to initiate alcohol and smoking at early age (Sibley et al., 2014).
5.7.2. Maternal smoking
Different psychosocial and other risk factors have been investigated regarding their role in the aetiology of ADHD. One factor that has been discussed in that matter by different authors is maternal smoking (Altink et al., 2009; Hellström-Lindahl et al., 2001; Kollins et al., 2009; Langley et al., 2012; Laucht & Schmidt, 2004; Linnet et al., 2005; Nomura et al., 2010; Obel et al., 2009; Thakur et al., 2013).

In a Danish study smoking during pregnancy was related to a nearly three folded risk for ADHD in the offspring (Linnet et al., 2005).

It still remains unclear if the relationship is causal or if confounding factors and genetic predisposition are responsible for the association. Measuring nicotine and cotinine concentrations in placental tissue, Luck et al. found indications that the fetus is exposed to higher nicotine concentrations than the mother (Luck et al., 1985). Nicotine exposure during pregnancy may pose a disturbance in the functional role of nicotinic receptors during the development of the brain (Hellström-Lindahl et al., 2001).

5.7.3. Life satisfaction
A high level of life satisfaction can serve as a protective factor even in children at risk for various problems. ADHD symptoms were found to be negatively related to self-reported life satisfaction (Gudjonsson et al., 2009; Miranda-Casas et al., 2011; Ogg et al., 2014). Additionally, behavioural problems can contribute to the negative relationship of satisfaction with life and childhood ADHD as perceived by the children as well as their parents (Miranda-Casas et al., 2011).

ADHD is increasing the risk for affected individuals to be confronted with stigma, prejudices, and discrimination, this as a consequence can lead to more dissatisfaction with life (Mueller et al., 2012). The best predictor for decreased satisfaction with life among boys was poor social functioning, whereas in girls poor emotional control showed to have a stronger impact (Gudjonsson et al., 2009).
5.7.4. Socioeconomic status

Different studies could show the negative association of ADHD and the socioeconomic status (SES) of affected individual and families (Huss et al., 2008; Larsson et al., 2014; Russell et al., 2014).

In a British cohort, children with ADHD were found to have an increased risk to come from families below the poverty line (Russell et al., 2014). Huss et al. found that the prevalence rate of ADHD was significantly associated with the familial socioeconomic status. In low SES families the prevalence rate was 6.4%, in medium SES families 5% and 3.2% had a high socioeconomic background (Huss et al., 2008).

In a meta-analytic review of 11 studies (n = 14112) individuals from low socioeconomic background had a 1.5 - 4 times higher risk to be diagnosed with ADHD than individuals from families with high socioeconomic status (Willcutt, 2012). Contradictory, Fayyad et al. found higher prevalence rates of ADHD in high income countries (Fayyad et al., 2007).

Up to now there is no clear answer to the question if this relationship is causal and if poor socioeconomic environment is a contributing factor in the aetiology of ADHD or if an ADHD symptomatology puts additional strain on family resources, leading to more familial problems effecting the financial situation (e.g. divorces, lone parenthood). Russell et al. hypothesised that a child with ADHD might lead to an increased rate of marital breakdown and single parent families, but the findings did not support this hypothesis (Russell et al., 2014).

5.7.5. School education

In many studies childhood ADHD has been associated with poor academic achievement, underperforming, increased grade retention, higher school drop out rates, impaired executive functioning and learning disabilities (Biederman et al., 2004; Chiang & Gau, 2014; Galéra et al., 2009; Loe & Feldman, 2007; Pastor & Reuben, 2008; Washbroo et al., 2013; Wu & Gau, 2013).

Most of these studies have been carried out in children. To fill that gap, Fredriksen et al. investigated ADHD symptoms and their relation to educational deficits and work disability in a clinical sample of untreated adult patients with ADHD. 38 % of
all patients reported reading or arithmetic skill problems in primary school. Males were more likely than women (39% versus 20%) to have been referred to educational psychology services. ADHD symptoms were negatively related to duration of education and patients with ADHD had a higher rate of dropout from high school. Higher age and comorbidity were significantly associated with higher likelihood of being out of work last year. 58% of women and 41% of men were in disability or rehabilitation pension (Fredriksen et al., 2014).

6. Motivation to consume

Why do people drink and smoke? The reasons for drinking alcohol or smoking are individually different and may be mediated by different factors. Drinking and smoking is mostly initiated during adolescence and motivational factors play a central role for the initiation and the abuse of alcohol or nicotine. To reduce the risk of developing dependence and to prevent related negative consequences it is very important to understand the reasons and motives why young people engage in drinking alcohol and smoking the first place. The motivation to drink and to smoke should be considered for prevention as well as for specialized treatment programs as that could positively affect the success rate of such programmes.

6.1. Drinking Motives

Social motives were found to be closely related to the alcohol consumption of peers (Abbey et al., 1993) and social reasons and coping motives showed to play a more important role in alcohol abuse among older adolescents than in early adolescence (Bradizza et al., 1999). Németh et al. investigated drinking motives in college students in Hungary and Spain (Németh et al., 2011). The two countries are known to be quite different in regard to drinking culture. In both student samples enhancement motives were associated with drinking frequency and drunkenness, while coping motives were associated with alcohol-related problems (Németh et al., 2011). Similar results were found for adolescents from Switzerland, Canada, and the United States. Enhancement as well as coping motives were related to the use of alcohol and to risky drinking, but coping was also related to alcohol-related problems (Kuntsche, Stewart, & Cooper, 2008). The relation of coping motives and alcohol has also be
confirmed by other authors (Grant, Stewart, O’Connor, Blackwell, & Conrod, 2007; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007).

Using the four-dimensional structure of the Drinking Motive Questionnaire (DMQ-R-SF) (Kuntsche & Kuntsche, 2009) to investigate drinking motives, frequency of alcohol use and sensation seeking, social motives, enhancement motives and coping motives were positively related to sensation seeking and frequency of alcohol use, while conformity motives were negatively related to frequency of drinking as well as to sensation seeking (Mazzardis et al., 2010).

Merril and Read based on their investigation of enhancement and coping motivations in association with different alcohol related problem domains, suggest that the different problems related to either drinking to cope with negative affect or to enhance positive affect should be considered for intervention. Students who reported drinking to cope with negative emotions showed more problems especially in regard to risky behaviour, poor self-care and academic or occupational problems (Merrill & Read, 2010).

6.2. Smoking Motives

Asked about their self-perceived motives for smoking, 51% of all participants (n = 2133) reported that they smoke out of enjoyment. Stress relief as their motivational drive for smoking was reported by 47%. Weight control and stress relief were more often reported by women while men, especially older men, liked being a smoker and enjoyed smoking more often than women. Socializing and stress relief showed to be more prominent among younger smokers. Stronger nicotine dependence was associated with a greater number of reported smoking motives (Fidler & West, 2009). It can be assumed that those who like being a smoker and enjoy smoking will be less motivated to stop. The level of nicotine dependence was found to be positively related with negative reinforcement motives (Mathew et al., 2014).

In an investigation on smokers with ADHD in relation to controls, those with ADHD reported more often to smoke because of automaticity, cue exposure, loss of control, for cognitive enhancement and to reduce negative emotions compared to controls. Social motives yielded higher scores in the group of smokers without ADHD (Mitchell et al., 2014).
B. Methods

1. Introduction
In Austria the recruitment process for the National Service is mandatory. Due to conscription all young Austrian men turning 18 have to undergo a pre-military evaluation of their mental and physical health status to determine their eligibility to perform either in the Military Service or alternatively in the Civil Service. This mandatory physical and psychological examination, taking place annually, assessing all young men who turn 18 in the same year, enabled us to investigate an unselective sample of young males independent of background, social status or education. Thus we could collect representative data regarding the prevalence of alcohol, nicotine and illicit drug use, ADHD symptomatology and psychosocial factors such as life satisfaction, family history of drinking and smoking, socioeconomic factors as well as onset, patterns and motivations for substance use in 3280 young men from 11 districts of two different regions in Austria.

For the present study we have chosen two Austrian provinces. Lower Austria, which is the largest province of Austria located in the eastern part of the country, and Tirol being located in the west of Austria. Out of these two provinces we investigated 7 (out of 21) districts from the eastern province and 4 (out of 9) districts from the western province.
The districts chosen were Zwettl, Lilienfeld, Waidhofen/Thaya, St. Poelten City, St.Poelten Vicinity, Moedling, and Vienna Vicinity from Lower Austria and Innsbruck, Kitzbuehel, Reutte and Imst from Tirol. Districts were chosen to give a representative sample taking into account urban and rural regions, agricultural and industrial regions, as well as lower income and higher income regions.
Our sample of 18-year-old males enables as to compare our data concerning the prevalence of substance use with those from a previous study investigating the same 7 districts from Lower Austria (Kapusta et al., 2006, 2007) and a study investigating 1380 college students using the same measures for substance use in 2009 (Unseld et al., 2012). By adding 4 districts from Tirol we can also compare the data from the eastern part of Austria with those from the western part.
2. Data collection

2.1. Sample

All young males born in 1992 from the 11 selected districts in Lower Austria and Tirol, liable to enlistment to the Military Service, were included in the study. Data have been collected between January 2010 and December 2010 at two of a total of six recruitment centres for military service in Austria. The 18-year-olds were called up for examination in groups of 30 up to 60 persons a day, the examination date was appointed by place of residence. 22 (1.70%) out of 1297 young men from the selected districts in Tirol and 38 (1.86%) out of 2043 in Lower Austria declined to participate in the study. In total, 60 persons (out of 3340) refused participation. That results in a response rate of 98.20%. The total number of enrolled subjects was 3280. The outstanding response rate may partly be explained by the setting. The examination they had to undergo was obligatory, they were called for the recruiting process by the Military service and therefore the setting in which our investigation was implemented was clearly hierarchically structured giving definite instructions that had to be followed. Although it was pointed out that the study is not related to the Austrian Armed Forces in any way and participation is voluntary with no consequences whatsoever resulting from refusal, this may have had an impact.

2.2. Procedure

Before starting our data collection in the two centres, ethical approval was obtained from the Ethics Committee of the Medical University of Vienna as well as the Ethics Committee of the Austrian Armed Forces. The assessment was conducted personally by the author during the first day of the two days mandatory examination, independently from the recruitment process. Prior to the check-up of the Austria Armed Forces, starting at 9 am in the morning, the 18 year old males gathered in the lecture hall, were informed by the author about the ongoing study and those from the selected districts were subsequently asked to complete an eight-sided paper-and-pencil questionnaire which was then distributed to all participating conscripts. The whole session took about 30 to 45 minutes. All data collection was done additionally to the standard procedure and it was outlined that the investigation is independent from the Draft Board of the National Service, refusal does not lead to any negative consequences or have any
impact on their National Service and that all data will be handled strictly confidential being used for research purposes only. In order to increase the accuracy of the self-reports the conscripts were informed by the author about the aim of the study and were assured that participation is voluntary and anonymous. Following the introduction all participants signed an informed consent.

After completing the screening instruments, the conscripts were instructed about the process of the medical and psychological assessment by an officer of the Austrian Armed Forces.

Within the following standard procedure of the medical examination, parameters such as height, weight, body mass index (BMI) and others were measured, blood samples including markers such as γ-glutamyltransferase (GGT), mean corpuscular volume (MCV), Alanin-Aminotransferase (ALAT, ALT), former known as Glutamat-Pyruvat-Transaminase (GPT), Aspartat-Aminotransferase (AST or ASAT), former known as Glutamat-Oxalacetat-Transaminase (GOT), which can serve as alcohol markers, were taken from each conscript. Additionally to the self-report questionnaire we also measured carbon monoxide (CO) levels in exhaled air using a smokerlyser (EC50 Smokerlyser; Bedfont Instruments; Kent, UK) to test for nicotine use and collected urine samples, independent to the routine of the National Service, for objective measure of recent use of illicit drugs. The samples are being analyzed at the Clinical Institute of the Medical and Chemical Laboratory Diagnostics in Vienna.

The biological markers assessed within the present study are not part of this thesis, but the parameters will be available for evaluation in further studies as well as for comparison with the data of the survey conducted in 2002 (Kapusta et al., 2006, 2007).

All additional measures, as well as the use of data from the standard medical examination within the recruitment process, were approved by the Ethics Committees of both Boards and were included in the informed consent signed by all participants.
3. Research Questions
The aim of the study was to investigate the impact of ADHD symptomatology on the substance use of 18 year old men and to assess the role ADHD plays in the motivation to consume alcohol or nicotine among this sample. This aim was summarized in two hypotheses.

Hypothesis 1
A significant association between the severity of ADHD symptoms and the use of alcohol, nicotine and illicit drugs can be found.

Hypothesis 2
A significant association between ADHD symptoms and different motivations to consume alcohol and nicotine can be found.

4. Questionnaires and other data collection
All questionnaires used in this study have been administered in their German version. Besides the validated measures for assessing attention deficit hyperactivity disorder (ADHD), alcohol and nicotine we used single item questions to investigate the consumption of other psychoactive substances, the motivation to consume alcohol and nicotine, as well as psychosocial factors. The original eight-sided paper-and-pencil questionnaire (in German Language) used in the study can be found in the appendix.

Our sample consists of 18 year old men, an age group in the transmission from adolescents to young adulthood. This makes interpreting and comparing the data with other adult samples more challenging as scales are either developed for children or adults.
Taking that into account and considering the fact that we used a different rating for ADHD symptoms according to DSM IV than in different validated versions of instruments based on the DSM IV criteria, we decided to use only the WURS score for further analyses in the present report.

The WURS is a widely used instrument for assessing childhood ADHD symptoms in adults and has proved to be a valid measure for screening in young adults (Fossati et al., 2001; Rossini & O'Connor, 1995; Wierzbicki, 2005).

Although it is very clear that screening instruments can not serve as diagnostic instruments alone, not many studies evaluating the prevalence of ADHD are referring to that problem. In this study screening instruments have been used to assess the severity of ADHD symptomatology without categorizing participants as having ADHD or not. There are studies indicating that symptoms of ADHD or subthreshold ADHD are related to impairments, high rates of comorbidity and more severe rates of smoking (Balázs & Keresztény, 2014; Heffner, Johnson, Blom, & Anthenelli, 2010; Hong et al., 2013).

By focusing on the continuum of symptoms of attention deficit hyperactivity disorder to investigate the association between ADHD and the consumption of alcohol, nicotine and other substances, it is possible to examine increased risk in those who do not meet full diagnostic criteria and would be missed out by categorising.

4.1. WURS

The diagnosis of adult attention-deficit/hyperactivity disorder (ADHD) remains difficult because it requires the retrospective assessment of self-reported ADHD symptoms during childhood. Several rating scales have been developed to identify adults with ADHD. In the present study the 25-item Wender Utah Rating Scale (WURS) (Ward et al., 1993) has been used to assess childhood ADHD symptoms. The scale is retroactively measuring the severity of childhood ADHD symptoms by using a 5 - point Likert scale. All items are rated from 0 (not at all) to 4 (very much). The total maximum score is 100.
The Wender Utah Rating Scale (WURS) was developed by its name giver Wender and his colleagues, based on the Utah criteria for attention deficit disorder in adults. It is a self-report questionnaire to identify childhood ADHD symptoms in adults with normative data available across sex and age (Stein et al., 1995; Wierzbicki, 2005).

The scale originally consisted of 61 items focusing on inattention, hyperactivity, and impulsivity together with emotional dysregulation as well as conduct problems. Ward et al. developed a 25 item version that can be administered for screening more easily. The individuals rate the severity of the ADHD symptoms they experienced when they were children using a 5-point Likert scale. All items are rated from 0 (not at all) to 4 (very much). A total score of ≥ 36 indicates possible ADHD.

Further in the report if the Wender Utah Rating Scale (WURS) is mentioned, it refers to the 25 item version of the scale.

The WURS has been found to be a reliable and well validated tool in the retrospective assessment of experienced ADHD symptoms in childhood. and showed good internal consistency and retest reliability (Stein et al., 1995; Ward et al., 1993; Wierzbicki, 2005).

As psychometric properties of retrospective self-report rating scales may vary between different age groups, it shall be mentioned that the WURS was also validated in college students and undergraduates of both sex (Fossati et al., 2001; Weyandt, 1995; Rossini & O’Connor, 1995; Wierzbicki, 2005).

In an Italian sample of 759 undergraduate students the WURS showed good internal consistency reliability (Cronbach alpha = 0.888) and good retest reliabilities. (after 1-week, r = 0.981, after 2-month, r = 0.924) (Fossati et al., 2001).

Rösler, Retz - Junginger and colleagues did a statistical analysis of the German version of the 61 items WURS. This analysis led to the development of the WURS-k, another short version of the original WURS. The instrument consists of 25 items. 21 remained from the original scale and 4 control questions have been
added. Rating is done by using a 5-point Likert scale (Retz-Junginger et al., 2002).

In 2003 the authors presented a validation of this questionnaire. ROC analyses indicated a sensitivity of 85% and specificity of 76% at a cut-off score of 30 points. The test also showed excellent internal consistency (alpha = 0.91) (Retz-Junginger et al., 2003).

In 2010 Caci et al. presented a study where the psychometric properties of both short versions of the WURS have been investigated (Caci et al., 2010).

Although the WURS-k showed to be a well performing instrument, the 25 item version of the WURS by Ward et al. (1993) was used for the present study as this allows better comparison of the data with the international research literature on adult ADHD.

4.2. ADHD checklist according to DSM IV

Besides the assessment of retrospective self-reported childhood symptoms of ADHD it is also necessary to investigate current persisting ADHD symptomatology.

For the assessment of current symptoms of ADHD we used the ADHD checklist for adults based on DSM IV (American Psychiatric Association, American Psychiatric Association, & Task Force on DSM-IV, 2000).

This checklist consists of 18 items. 9 items are referring to inattention, 6 items to hyperactivity and 3 items assess symptoms of impulsiveness.

For testing positive for ADHD a person must present 6 or more symptoms of inattention and 6 or more symptoms of hyperactivity and impulsivity. The symptoms must have persisted for at least six months prior to investigation to meet the criteria for adult ADHD.

For our investigation we used the rating of a 3-point Likert scale, rating from 0 (does not apply), 1 (applies partly) up to 2 (applies fully). That gives a maximum score of 36.
4.3. CAGE

A large number of screening instruments for alcohol problems have been developed and tested over the years. Among those the CAGE questionnaire is one of the most widely used screening tools for the detection of alcohol abuse and dependence. It consists of 4 simple "yes" or "no" questions that have proved useful in helping to diagnose alcoholism. Each question is scored 0 or 1 summing up for a total possible score ranging from 0 to 4 points. The questions focus on cutting down, annoyance by criticism, guilty feeling, and eye-openers (Ewing, 1984; O'Brien, 2008). The Name "CAGE" is an acronym of these 4 items and shall help clinicians to remember the 4 questions.

Although other instruments have been developed subsequently, some being more precise and providing more information on drinking pattern, quantity, frequency and consequences (Aertgeerts et al, 2000; Saunders et al., 1993) the CAGE questionnaire remains widespread as a screening instrument for alcohol among different populations. There is good evidence that the CAGE questionnaire is an effective, efficient and easy to use questionnaire for detecting alcohol abuse or dependence in a clinical setting (Aertgeerts et al., 1995).

It showed high test-retest reliability (0.80 - 0.95), and adequate correlations (0.48 - 0.70) with other screening instruments in medical, surgical and psychiatric inpatients and out-patients (average sensitivity 0.71, specificity 0.90), but showed lower performance in females and college students (Dhalla & Kopec, 2007).

The recommended cut-off score for detecting alcohol dependence is $> \text{or } = 2$ (Fiellin et al., 2000; King, 1986; Mayfield, McLeod, & Hall, 1974; Skogen, Overland, Knudsen, & Mykletun, 2011). We followed this recommendation for our investigation.

There is some indication that a cut-off score of $\geq 1$ may be more appropriate for women, as the traditional cut-off score missed a high percentage of women with alcohol dependence (Bradley et al., 1998).

A different cut-off may also be necessary for samples of adolescents. Knight et al. investigated the validity of brief alcohol screening tests in a sample of 14 to 18
year old patients undergoing routine healthcare and compared the criterion validity of the different instruments among adolescents. The optimal cut-offs associated with problematic alcohol use in that age group found by the researchers were among others a score of 2 or higher for the Alcohol Use Disorders Identification Test (AUDIT) and ≥ 1 for the CAGE. Overall the CAGE did not perform well in that age group compared to other screening instruments and was not recommended by the authors for the use in adolescents (Knight, et al., 2003).

Summarising, the test accuracy of the CAGE but also of other instruments may vary according to the difference of samples and settings. In a systematic review the CAGE questionnaire showed to be the best performance tool for identifying patients with alcohol abuse or dependence. Few studies have been performed using multiple tests for alcohol screening, so there is no possibility to directly compare the CAGE with other tests under the same conditions in the same population groups (Fiellin et al., 2000).

4.4. Heavy Smoking Index (HSI)
Different self-report measures of nicotine dependence are used to test for smoking. The Fagerström Tolerance Questionnaire (FTQ) was one of the first and after revision resulted in the Fagerström Test for Nicotine Dependence (FTND), a widely used six items questionnaire (Heatherton et al., 1991). The HSI is a shorter measurement consisting only of two items from the FTND. These items assess “the number of cigarettes per day” and 'time to the first cigarette of the day (Heatherton et al., 1989).

In the present study smoking was assessed using the Heavy Smoking Index (HSI). This brief screening instrument was found to be a valid alternative to the Fagerström Test for Nicotine Dependence (FTND) showing good sensitivity as well as specificity, even outperforming the longer FTND among male alcohol and drug dependents in the study of Burling and Burling (2003). De Leon et al. were investigating different short measures of nicotine dependence in a sample of 1642 smokers from the US and Spain. In that study the HSI performed with a sensitivity of 94% and a specificity 88% (de Leon et al., 2003).

Among female smokers with light nicotine dependence the FTND may nevertheless be the more suitable option (Pérez-Ríos et al., 2009).
Due to its shortness the HSI is an appropriate instrument, especially for epidemiological surveys. The questionnaire consists of item 1 and 4 of the Fagerström Test for Nicotine Dependence with a total score ranging from 0 - 6. A cut-off of > or = 4 in the HSI for identifying high nicotine dependence showed good sensitivity and specificity across different population groups (Chabrol et al., 2005; de Leon et al., 2003; Diaz et al., 2005; Kozlowski et al., 1994; Lim et al., 2012). Scores below 4 indicate low nicotine dependence.

An additional reason for choosing the Heavy Smoking Index (HSI) as a screening instrument for smoking and the CAGE questionnaire for drinking in the present investigation was the fact that it allows us to compare the findings of the present study with a study done in a sample of college students in residential student homes in Vienna (Unseld et al., 2012) and those from a survey conducted in 2002, screening for alcohol, nicotine and illicit drug use in young adult males from exactly the same districts of the eastern region of Austria (Kapusta et al., 2006, 2007). Investigating representative samples of the same age group in the same region using the same questionnaires (CAGE and HIS) provides comparable data for further investigations.

4.5. Other drugs
ADHD is linked to an increased risk of substance use disorder (SUD) (Breyer, Lee, Winters, August, & Realmuto, 2014; Groenman et al., 2013; Milberger et al., 1997; Schubiner, 2005; Zulauf, et al, 2014) and patients presenting with SUD often show higher rates of childhood ADHD or persisting ADHD symptoms up to adulthood (Ohlmeier et al., 2007; Schubiner et al., 2000; Schubiner, 2005).

Hence, besides alcohol and nicotine, we also collected data for different illicit drugs (THC, Benzodiazepines, Cocaine, Opiates, Ecstasy and other drugs). For each of the drugs we assessed, we asked if it has ever been consumed and if so, if it was only once, frequently or regularly.
4.6. Motives for consuming alcohol or nicotine
Motives to drink alcohol or to smoke were investigated separately. We used 9 different items to assess different categories of motives. Coping, relaxation, reward, enhancement and social triggers.
The options given were: "does not apply at all", "does partially apply" and "applies fully".

4.7. Psychosocial factors
The term "psychosocial" has been widely used in social and medical literature and its meaning might sometimes seem unclear. "Psychosocial" is defined as "of or pertaining to the interaction between social and psychological factors" (Dictionary.com Unabridged, 2014).

In the present report the term "psychosocial factors" refers to a list of determinants that have been thought to be associated with ADHD and to have a possible impact.

Parental alcohol consumption
Data about parents alcohol consumption were collected separately for mothers and fathers. The options were drinking occasionally, drinking regularly, not drinking at all. We also assessed if parents had been drinking in the past, as it might have an effect if the parents had been drinking during the participants childhood.

Parental alcohol problems
Parental alcohol problems were investigated by two single item questions.
In the literature different ways to assess parental drinking problems can be found. The Children of Alcoholics Test (CAST) is one screening instrument that can be found in the literature. It consists of 30 items, was developed by Jones in 1983 and is a valid screening instrument to identify children of alcoholics (Sheridan, 1995). Other studies could show that single item questions can be a valid but less time consuming possibility to identify parental alcohol problems (Berkowitz & Perkins, 1988; Claydon, 1987; Crews & Sher, 1992).
For this data collection we decided to use a combination of two single item questions, asking if during childhood the participant has ever thought that a parent had a drinking problem, or if he ever worried about a parents drinking. Both question discriminated between mother and father and gave "yes" or "no" options.

**Parental smoking**
Data about parental smoking were assessed exactly the way we did for parental drinking. Data were collected separately for mothers and fathers and options were as follows: occasionally smoking, regularly smoking, non-smoker. We also assesses if the parents had been smoking in the past, as it might have an effect if the parents had been smoking during the participants childhood.

**Maternal smoking during pregnancy**
Maternal smoking has been linked to childhood ADHD in various studies and was found to be a significant risk factor for attention-deficit/hyperactivity disorder (Langley et al., 2012; Laucht & Schmidt, 2004; Linnet et al., 2005; Nomura et al., 2010; Obel et al., 2009). These findings prompted us to assess if the mother was smoking while being pregnant with the participant. Taking into account that it might be difficult for some young men to answer that question we offered a third option "no judgement possible" additional to the "yes" or "no" options.

**Craving for sweets**
Eating disorder and obesity have been found to be associated in numerous reports and children with ADHD showed to be at increased risk for being overweight (Cortese et al., 2008; Erhart et al., 2012; Stulz et al., 2013; Yang et al., 2013). In the present sample we investigated the possible association of the severity of ADHD symptoms and craving for sweets.
The single item question used was: "Sometimes I have an irresistible craving for food, especially sweets." The options were "yes" and "no"
Life satisfaction
Current life satisfaction was measured on a scale from 1 - 10. The range was from 1 (not at all satisfied) to 10 (fully satisfied).

Friends
We wanted to assess the social involvement and if participants tend to mix with peers, befriend easily, enjoy a lot of acquaintances, withdraw from others or suffer from lonesomeness. We offered 4 statements regarding social activities and social life. They had to choose between one of the following options. "I have many friends and acquaintances", "I have a few good friends", "I barely have friends and I am often quite lonesome" and "I am rather a loner and like being on my own".

Socioeconomic status
Data about the socioeconomic status was collected by asking about the social situation of the family. 4 options were given, ranging from "very good" to "not sufficient".

Highest education level
We also asked the young males about their highest current education level, asking which type of school the participant had attended and if he completed all grades and graduated.

5. Statistical methods
Data analysis was conducted using IBM SPSS Statistics 21.0. Questionnaires with incomplete or contradictory answers were excluded from statistical analysis. All tests were considered significant at the level of $p < 0.01$. The total number of subjects included in the study was $n = 3280$. For each item we excluded those with missing data. That results in different numbers of investigated subjects, depending on the item. The total number for each item or analyses is stated in the report.
The tests used for analysing our data were the Spearman´s rho correlation and the Kruskal- Wallis Test for non-parametric testing. The graphical representation of the variability of our data are shown using error bars.
6. Results

6.1. Description of the sample

All 3280 male participants of the study were born in 1992. Thus the participants were, depending on their exact date of birth, either 18 years old or became 18 within the year of the data collection.

<table>
<thead>
<tr>
<th>Province</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Austria</td>
<td>2005</td>
<td>61,1</td>
</tr>
<tr>
<td>Tirol</td>
<td>1275</td>
<td>38,9</td>
</tr>
<tr>
<td>Total</td>
<td>3280</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Table 1: Distribution of participants by state

In total 2005 participants came from Lower Austria, the largest Austrian state in the eastern part of Austria whereas 1275 came from the state Tirol in the eastern region. The distribution is shown in Table 1.

Due to the fact that only eighteen-year-old men have to undergo an obligatory health examination to test their ability to perform in the National Service, all enrolled subjects volunteering to participate were males.

7. ADHD (n = 3227)

Out of the total sample 3227 answered the question if they have ever been treated for ADHD. 86 (2.7%) stated that they have been treated for ADHD. 53 participants did not answer this question.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>86</td>
<td>2.6</td>
</tr>
<tr>
<td>no</td>
<td>3141</td>
<td>95.8</td>
</tr>
<tr>
<td>total</td>
<td>3227</td>
<td>98.4</td>
</tr>
<tr>
<td>missing</td>
<td>53</td>
<td>1.6</td>
</tr>
<tr>
<td>total</td>
<td>3280</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2: Treated for ADHD
Out of 2657 males 40 (1,5%) reported that they have received pharmacological treatment, 2617 (79,8%) did not receive any medication for ADHD and 623 did not provide information. That results in 46,5% of those diagnosed and treated for ADHD in their childhood who received pharmacological treatment for their condition as shown in table 3.

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>no</td>
<td>2617</td>
<td>79,8</td>
<td>98,5</td>
</tr>
<tr>
<td>yes</td>
<td>40</td>
<td>1,2</td>
<td>1,5</td>
</tr>
<tr>
<td>total</td>
<td>2657</td>
<td>81,0</td>
<td>100,0</td>
</tr>
<tr>
<td>missing</td>
<td>623</td>
<td>19,0</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>3280</td>
<td>100,0</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: received pharmacological treatment for ADHD
7.1. WURS (n = 2813)
The results of our sample showed a mean of 17,05 (median = 14), the standard deviation was 13,177. 467 participants did not provide answers to all items of the measurement. If an item was missing the questionnaire was excluded from analyses. Only those participants were included who completed all of the 25 items.

The minimum score was 0, the maximum score was 88 out of possible 100. Out of 2813 participants 285 (10,1%) had a score above the cut-off of >36. The distribution of the score is shown in figure 1.

![figure 1: distribution of WURS score](image)
7.2. ADHD Checklist according to DSM IV (n = 3164)

The ADHD checklist is based on the diagnostic criteria of the DSM IV and consists of 18 items assessing current ADHD symptoms.

The mean score in our sample was 6.94 (median 6), the standard deviation was 5.264. Out of 3280 young men 116 did not complete the questionnaire. Minimum score was 0, maximum score out of possible 36 was 34. Symptom score was distributed as shown in figure 2.

![ADHD symptoms according to DSM IV](image)

Figure 2: current ADHD symptoms according to DSM IV
7.3. WURS and ADHD checklist (n = 2737)
Comparing the results of both ADHD screening instruments, the WURS and the ADHD checklist, we found a strong association ($r = 0.648$) as shown in figure 3.

For the following report and all analyses symptoms of ADHD were evaluated by using the 25 item version of this scale. (Ward et al., 1993).

8. Substances
8.1. Alcohol (n = 3190)
2917 (91.4%) young men reported to drink alcohol. 66 (2.1%) stated that they drink alcohol on a daily basis. 606 (19%) reported to be drinking several times a week, 1204 (37.7%) once a week, 1041 (32.6%) are consuming alcohol less often
than once a week and 273 (8,6%) reported that they do not drink alcohol at all (n = 3190). Out of all participants 90 males (2,7%) did not answer this question.

8.1.1. Age first time drinking (n = 3032)
Asked for the age of their first alcohol consumption 71 (2,3%) of the 18 year olds reported they were younger than 8 years old. 76 (2,5%) were younger than 10, 302 (10%) drank alcohol for their first time when they were between 10 and 12 years old, 1247 (41,1%) were between 13 and 14, 1059 (34,9%) between 15 and 16 years and 277 participants (9,1%) consumed alcohol first time at the age between 17 and 18. No data could be obtained from 248 subjects.

8.1.2. Regular drinking (n = 3008)
14 young men (0,5%) started regular drinking before they reached the age of 12. Out of 3008 participants 111 (3,7%) started to drink on a regular basis when they were between 12 and 14 years, 639 (21,2%) between the age of 15 and 16 and 1121 (37,3%) were between 17 and 18 when they started to drink regularly. The same percentage (37,7%) reported that they have never drank on a regular basis up to now. 272 young men did not answer the question.

8.1.3. Most of friends drink (n = 3163)
1794 participants (56,7%) answered the question if most of their friends drink alcohol with yes, whereas 1369 (43,3%) declared that this does not apply to their friends.

8.1.4. CAGE (n = 2977)
The CAGE questionnaire consists of 4 items. A cut-off of > or = 2 indicates alcohol dependence. In our sample 1318 (44,3%) had a score of 0. As only 2917 males reported to drink alcohol, it can be assumed that this number also includes some of those 8,6% subjects who did report that they never drink alcohol at all. 1083 (36,4%) had a score of 1, 415 (13,9%) had a score of 2, and 142 (4,8%) reached a score of 3, while 19 young men (0,6% ) showed the full score of  4.
The scored ranged between 0 and 4, our sample showed a mean score of 0,8, standard deviation was 0,89.
Distribution of the CAGE score is shown in figure 4.

![CAGE score distribution](image)

In total 576 (19.3%) individuals of our sample met the cut-off score of 2 or higher, indicating an alcohol problem.

### 8.2. Nicotine (n = 3239)

Out of all participants 1421 (43.9%) reported to be smokers and 1818 (56.1%) to be non-smokers. 41 participants did not answer this question.

#### 8.2.1. smoke more frequently during the first hours (n = 1411)

Out of the 1421 smokers only 110 (7.8%) reported to smoke more frequently during the first hours of the day, while 10 participants who reported to be smokers did not respond to that item.

#### 8.2.2. most of friends smoke (n = 3256)

Independently from their own smoking behavior 2089 (64.2%) participants reported that the majority of their friends are smokers whereas only 1167 (35.8%) are surrounded by more non-smoking than smoking friends.
8.2.3. HSI (n = 1393)

Out of all 1421 self-reported smokers, 1393 filled out the 2 questions of the HSI, 18 did not answer this 2 questions.

The distribution is shown in figure 5.

Out of the 1393 smokers, 23.4% scored 0, 18.2% presented with a score of 1, followed by 18.6% with 2, 22.8% with a score of 3, 11.7% with 4, 3.8% with 5 and 1.4% of all smokers had the full score of 6. Summing up the subjects with a score above the cut-off of 4, 236 (16.9%) presented with a score that indicates high nicotine dependence. Low nicotine dependence was found in 1157 (83.1%) of all smokers. The range of score was 0 - 6, mean in our sample was 2 (SD = 1.55).

figure 5: Heavy Smoking Index score
8.3. Other drugs

We assessed experiences with illicit drugs, asking if the subjects ever consumed one of the following drugs: Cannabis (THC), Benzodiazepines, Cocaine, Opiates, Ecstasy, or other illicit drugs.

The response options for each substance were: (0) never, (1) once, (2) several times (3) regularly.

Out of all participants 618 (19%) young males reported that they have tried Cannabis at least once in their life, 35 young men (1,1%) reported regular Cannabis consumption.

Benzodiazepine use without prescription at least once in the lifetime has been reported by 66 participants (2,1%). Cocaine has been at least tried once by 83 (2,6%) individuals, whereas only 22 (0,8%) consumed opiates. Ecstasy has been consumed at least once by 63 (2,0%) individuals.

Asked about the consumption of other illicit drugs 58 males (1,8%) reported that they have tried unspecified psychoactive substances at least once in their life.

The full list of self-reported drug consumption is shown in table 4.

<table>
<thead>
<tr>
<th>drug</th>
<th>never</th>
<th>once</th>
<th>frequently</th>
<th>regularly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis (THC) (n = 3249)</td>
<td>81,0</td>
<td>10,4</td>
<td>7,6</td>
<td>1,1</td>
</tr>
<tr>
<td>Benzodiazepines (n = 3213)</td>
<td>97,9</td>
<td>1,1</td>
<td>0,7</td>
<td>0,3</td>
</tr>
<tr>
<td>Cocaine (n = 3218)</td>
<td>97,4</td>
<td>1,7</td>
<td>0,7</td>
<td>0,2</td>
</tr>
<tr>
<td>Opiates (n = 3209)</td>
<td>99,3</td>
<td>0,4</td>
<td>0,2</td>
<td>0,2</td>
</tr>
<tr>
<td>Ecstasy, Amphetamines (n = 3213)</td>
<td>98,0</td>
<td>1,2</td>
<td>0,6</td>
<td>0,2</td>
</tr>
<tr>
<td>Other drugs (n = 3156)</td>
<td>98,2</td>
<td>0,9</td>
<td>0,6</td>
<td>0,3</td>
</tr>
</tbody>
</table>

Table 4: Illicit drug use (in %)
8.4. Overall substance consumption

For a better overview of the overall substance use a table was prepared. Each substance was rated positive or negative. Negative for alcohol and nicotine is referring to no alcohol problem or to low nicotine dependence.

Alcohol was rated positive when a cut-off of 2 or more was met (CAGE ≥ 2).

Nicotine was rated positive when the cut-off of 4 or more was met (HSI ≥ 4). Negative in regard to nicotine in the table below represents no or low nicotine dependence, positive represents those who suffer from high nicotine dependence.

Illicit drugs have been classified as positive when they had been used more than once. The option "once" was rated as negative to avoid including those who once tried a substance experimentally but never consumed again.

In this regard consumption of all positive drug use, including alcohol, nicotine and all illicit drugs is presented in table 5.

<table>
<thead>
<tr>
<th>Substance</th>
<th>negative</th>
<th>positive/more than once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol (CAGE neg. vs. pos.,) (n = 2977)</td>
<td>80,7</td>
<td>19,3</td>
</tr>
<tr>
<td>Nicotine (low vs. high dependence) (n = 1393)</td>
<td>83,0</td>
<td>16,9</td>
</tr>
<tr>
<td>Cannabis (THC) (n = 3249)</td>
<td>91,4</td>
<td>8,7</td>
</tr>
<tr>
<td>Benzodiazepines (n = 3213)</td>
<td>99,0</td>
<td>1,0</td>
</tr>
<tr>
<td>Cocaine (n = 3218)</td>
<td>99,1</td>
<td>0,9</td>
</tr>
<tr>
<td>Opiates (n = 3209)</td>
<td>99,7</td>
<td>0,4</td>
</tr>
<tr>
<td>Ecstasy, Amphetamines (n = 3213)</td>
<td>99,2</td>
<td>0,8</td>
</tr>
<tr>
<td>Other drugs (n = 3156)</td>
<td>99,1</td>
<td>0,9</td>
</tr>
</tbody>
</table>

Table 5: Overall consumption of all substances (in %)
9. Motives for consumption

The motivation for consuming alcohol and smoking differed between the substances. The options for answering these questions was "does not apply", "does partly apply" and "does fully apply".

9.1. Motives for drinking

3190 subjects responded to the question how often alcohol is consumed, 273 declared not to drink alcohol at all (see 6.3.1). Different drinking motives were reported by 3013 young men. Asked for their reason to drink the young adult men answered according to the 9 different options as shown in table 6.

1393 (46%) reported the taste of alcohol to be a motivation for their drinking, 1250 (41,5%) were drinking alcohol to improve their mood and 781 (26%) reported to drink because it is common among their friends. Coping with stress and overcoming uncertainties did score relatively low in our sample. The distribution of all drinking motives is presented in table 6.

<table>
<thead>
<tr>
<th>Motive</th>
<th>applies not</th>
<th>applies partly</th>
<th>fully applies</th>
</tr>
</thead>
<tbody>
<tr>
<td>taste (n = 3013)</td>
<td>6,7</td>
<td>47,1</td>
<td>46,2</td>
</tr>
<tr>
<td>makes difficult situations easier (n = 3001)</td>
<td>67,7</td>
<td>26,3</td>
<td>6,0</td>
</tr>
<tr>
<td>overcome uncertainties, feel at ease (n = 3001)</td>
<td>43,0</td>
<td>43,5</td>
<td>13,5</td>
</tr>
<tr>
<td>to deal with stress (n = 3006)</td>
<td>71,3</td>
<td>22,5</td>
<td>6,2</td>
</tr>
<tr>
<td>to relax, to calm down (n = 3001)</td>
<td>60,5</td>
<td>30,6</td>
<td>9,0</td>
</tr>
<tr>
<td>improves mood (n = 3013)</td>
<td>15,3</td>
<td>43,2</td>
<td>41,5</td>
</tr>
<tr>
<td>common among friends (n = 3008)</td>
<td>30,6</td>
<td>43,4</td>
<td>26,0</td>
</tr>
<tr>
<td>reward (n = 3004)</td>
<td>66,7</td>
<td>23,0</td>
<td>10,3</td>
</tr>
<tr>
<td>boredom (n = 3005)</td>
<td>88,4</td>
<td>11,6</td>
<td>4,0</td>
</tr>
</tbody>
</table>

Table 6: motivation to drink alcohol (in %)
9.2. Motives for smoking
Although only 1421 participants reported to be smokers, 1425 replied to the question of smoking motives. (see 6.3.2) This discrepancy in numbers may be explained by missing data for assessing nicotine use.

In contrast to alcohol use, smoking was used more for relaxation, to calm down and to cope with stress, and only 140 (9.9%) participants replied that they use nicotine to improve their mood. Taste was also a high scoring item with 583 (41%) participants. Smoking was more used to deal with the feeling of being bored than alcohol. 327 (23%) are using nicotine versus 120 (4%) who are using alcohol when they are feeling bored.

The distribution of smoking motivation was as presented in table 7.

<table>
<thead>
<tr>
<th>Motive</th>
<th>applies not</th>
<th>applies partly</th>
<th>fully applies</th>
</tr>
</thead>
<tbody>
<tr>
<td>taste (n = 1423)</td>
<td>13,8</td>
<td>45,3</td>
<td>41,0</td>
</tr>
<tr>
<td>makes difficult situations easier (n = 1420)</td>
<td>47,5</td>
<td>32,5</td>
<td>20</td>
</tr>
<tr>
<td>overcome uncertainties, feel at ease (n = 1415)</td>
<td>60,6</td>
<td>24,9</td>
<td>14,6</td>
</tr>
<tr>
<td>to deal with stress (n = 1423)</td>
<td>22,2</td>
<td>39,5</td>
<td>38,3</td>
</tr>
<tr>
<td>to relax, to calm down (n = 1422)</td>
<td>16,6</td>
<td>42,1</td>
<td>41,4</td>
</tr>
<tr>
<td>improves mood (n = 1415)</td>
<td>62,0</td>
<td>28,1</td>
<td>9,9</td>
</tr>
<tr>
<td>common among friends (n = 1425)</td>
<td>39,5</td>
<td>35,9</td>
<td>24,4</td>
</tr>
<tr>
<td>reward (n = 1417)</td>
<td>62,7</td>
<td>22,2</td>
<td>15,2</td>
</tr>
<tr>
<td>boredom (n = 1422)</td>
<td>45,2</td>
<td>31,8</td>
<td>23,0</td>
</tr>
</tbody>
</table>

Table 7: motivation to smoke (in %)
10. Psychosocial factors

10.1. parental alcohol (n = 3173 for fathers / n = 3200 for mothers)

Out of 3173 young men 722 (22%) reported that their father is not drinking alcohol, compared to 1338 (41,8%) mothers.

Former drinking was reported for fathers by 188 (5,9%) and for mothers by 90 (2,8%) young males.

1986 (62,6%) reported occasional drinking of their father and 1684 (52,6%) occasional drinking of their mother. Regular drinking was found in 277 (8,7%) fathers and 90 (2,8%) mothers of the participants.

10.2. parental alcohol problem (both single item questions)

Parental alcohol problems were assessed by two single items question. The answers did distinguish between the father and the mother. A third option was given if the problem applied to both parents.

"Did you ever worry about a parents drinking?" was answered positive for the father by 122 (3,8%) and for the mother by 48 (1,5%) of the participants. 22 (0,7%) worried about the drinking of both parents. (n = 3208)

"During your childhood, have you ever thought that one of your parents had a drinking problem?" 134 (4,1%) thought that their father has an alcohol problem, compared to 31 (1%) mothers. Only 6 (0,2%) thought that both parents had an alcohol problem. (n = 3241)

10.3. parental smoking (n = 3163 for fathers / n = 3205 for mothers)

Smoking habits in the parents did not show to differ a lot. Only in the rate of non-smokers a gender difference could be found.

1073 (33,9 %) of fathers and 1448 (45,2%) of the mothers were non-smokers.

925 (29,2 %) of fathers and 662 (20,7%) of mothers were former smokers. Current regular smoking was found in 825 (26,1 %) fathers and 771 (24,1%) mothers. 340 (10,7%) fathers and 324 (10,1%) mothers were reported to smoke occasionally. This numbers show that no real gender difference could be found in regular and occasional parental smoking. The number of non-smokers was higher for mothers (45,2% vs. 33,9%).
10.4. Maternal smoking during pregnancy (n = 3254)

In our sample maternal smoking was reported by 120 participants (3.7%). 2693 (82.8%) reported that their mother was not smoking during pregnancy, while 441 (13.6%) could not answer this question.

10.5. Craving for sweets (n = 3262)

Out of 3262 18-year-olds 1302 (39%) reported craving for sweets. 18 participants did not provide information on this item.

10.6. Life satisfaction (n = 3264)

We assessed the current life satisfaction using a scale from 1 to 10. 1 equals being completely unsatisfied and 10 equals being utterly satisfied. 747 (22.9%) stated to be utterly satisfied with their current life and 15 (0.5%) to be completely unsatisfied. The mean was 8.32, median was 9. (Standard deviation = 1.614). 16 subjects did not reply to that question.

The distribution of the item “life satisfaction” is shown in figure 5.

![Life satisfaction](image)
10.7. Many friends vs. loner (n = 3243)
2375 (73,2%) reported to have many good friends and companions and 762 (23,5%) had only a few but good friends. 75 (2,3%) declared they are more of a loner and enjoying being for themselves whereas 31 (1%) stated that they do not have friends and feel alone most of the time.

10.8. Socioeconomic status (n = 3237)
1062 (32,8%) rated the socioeconomic situation of their family as "very good". 1436 (44,4%) reported the situation as "good" 680 (21%) as sufficient. 59 (1,8%) classified themselves as living in insufficient socioeconomic conditions.

10.9. Highest school education (n = 3136)
We assessed the highest school education level attained by the participants. Austria offers different types of school for this age group. Grammar school takes 4 years and whereas vocational schools for higher education (BHS) takes 5 years. This has to be taking into account when interpreting the data about graduation. For many attending this school type it would have not been possible to finish by now, due to age.
3,6% of the participants had already finished school education and taken their school leaving examinations (A-level, Matura), 1389 (44,3%) were still attending school and 805 (25,7%) had finished one year polytechnic course. Secondary modern school was finished by 750 (23,9%) and 46 (1,5%) attended secondary modern school but failed to graduate. 32 (1%) of the 18 year old males had attended a special needs school.
11. Main findings

11.1. Hypothesis 1

"A significant association between the severity of ADHD symptoms and the use of alcohol, nicotine and illicit drugs can be found."

11.1.1. WURS and CAGE (n = 2548)

As shown in figure 6 a significant association between the WURS score and the scores of the CAGE questionnaire was found in our sample. N was distributed as follows: Cage score of 0 (n = 1154), 1 (917), 2 (n = 347), 3 (n = 114), 4 (n = 16). The higher the WURS score the higher an individual scored in the CAGE questionnaire. The correlation coefficient was $r = 0.186 \ (p < 0.01)$. The distribution of means is shown in figure 6.

![figure 6: WURS and CAGE](image-url)
11.1.2. WURS and HSI  \( (n = 1161) \)
Checking for a possible link between the number of positive ADHD symptoms and the scores in the Heavy Smoking Index we found a similar picture. WURS score and HSI score showed a significant association \( (r = 0.117, \ p < 0.01) \).

N was distributed as follows: HSI score of 0 \( (n = 279) \), 1 \( (n = 221) \), 2 \( (n = 213) \), 3 \( (n = 259) \), 4 \( (n = 128) \), 5 \( (n = 45) \), 6 \( (n = 16) \).
A score of \( > \) or \( = \) 4 in the HSI is indicating high nicotine dependence. Nearly all young men who where presenting with the highest HSI score of 6 \( (n = 16) \) showed a WURS score of \( > \) or \( = \) 36, indicating a possible ADHD diagnosis. The results are shown in figure 7.

![figure 7: WURS and HSI](image-url)
11.1.3. WURS and all other drugs

Analysing the use of drugs in correlation to ADHD symptomatology we found a significant relationship for all investigated drugs. The strongest link between WURS score and substance was found with Cannabis. Cannabis has also been the most often used drug in our sample. 19% of all participants reported that they have tried Cannabis at least once in their life. The lowest relation was found between ADHD symptoms and the use of ecstasy. But it must be noted that numbers among drug users were small, especially for regular drug use. The correlation coefficient for all drugs is shown in table 8.

<table>
<thead>
<tr>
<th>Drugs</th>
<th>r</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis (THC)</td>
<td>0.208**</td>
<td>2787</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>0.112**</td>
<td>2763</td>
</tr>
<tr>
<td>Cocaine</td>
<td>0.112**</td>
<td>2765</td>
</tr>
<tr>
<td>Opiates</td>
<td>0.078**</td>
<td>2760</td>
</tr>
<tr>
<td>Ecstasy/Amphetamines</td>
<td>0.095**</td>
<td>2762</td>
</tr>
<tr>
<td>Other drugs</td>
<td>0.088**</td>
<td>2717</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)

table 8: correlation between WURS score and the use of drugs

The strongest association was found between 18-year-olds who never consumed a substance and those who reported the use of the drug. If we pool all those individuals who took a substance once, more than once or regularly and compare them with those who never consumed the substance, the association is increasing. No large difference was found between those who reported to have used a drug once, more than once or regularly.

The means for Cannabis, which showed the strongest link with the WURS score are presented in figure 8.

N among the groups was as follows. "never" (n = 2268), "once" (n = 290), "more than once" (n = 198) and "regularly (n = 31).
figure 8: WURS and Cannabis

Summing up the results for all substances, the data of our study did support the first hypothesis. A significant association was found between the severity degree of ADHD symptoms and the use of alcohol, nicotine and other drugs.

11.2. Hypothesis 2
"A significant association between ADHD symptoms and different motivations to consume alcohol and nicotine can be found."

11.2.1. WURS and drinking motives
As shown in table 9, the relationship between the WURS score and motivation to consume alcohol was significant for all motives but "drinking for taste". The strongest correlation was found between the WURS score and the motivation "to overcome uncertainties" and "feel at ease". This was followed by the motivation "to make difficult situations easier" and "relaxation". All of these motives describe coping with negative emotions or help to deal with difficult situations. A less strong relationship was found for improving mood, reward or social triggered motivation.
<table>
<thead>
<tr>
<th>Motive</th>
<th>r</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>taste</td>
<td>0.025</td>
<td>2577</td>
</tr>
<tr>
<td>makes difficult situations easier</td>
<td>0.216**</td>
<td>2566</td>
</tr>
<tr>
<td>overcome uncertainties, feel at ease</td>
<td>0.233**</td>
<td>2568</td>
</tr>
<tr>
<td>to deal with stress</td>
<td>0.196**</td>
<td>2572</td>
</tr>
<tr>
<td>to relax, to calm down</td>
<td>0.205**</td>
<td>2566</td>
</tr>
<tr>
<td>improves mood</td>
<td>0.188**</td>
<td>2577</td>
</tr>
<tr>
<td>common among friends</td>
<td>0.158**</td>
<td>2573</td>
</tr>
<tr>
<td>reward</td>
<td>0.121**</td>
<td>2570</td>
</tr>
<tr>
<td>boredom</td>
<td>0.172**</td>
<td>2571</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)

table 9: correlation between WURS score and motivation to drink alcohol
11.2.2. WURS and smoking motives

Regarding the motivation to smoke we found the same effect. Eight motives showed to be significant correlated with the severity degree of the WURS. Only "taste" showed no correlation with the number of ADHD symptoms at all. The strongest correlation was found between coping motives "relaxation" and "dealing with stress" and WURS score. Feeling bored as a motive to consume was more strongly linked to ADHD symptoms for smoking than drinking alcohol.

<table>
<thead>
<tr>
<th>Motive</th>
<th>r</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>taste</td>
<td>0.32</td>
<td>1187</td>
</tr>
<tr>
<td>makes difficult situations easier</td>
<td>0.236**</td>
<td>1183</td>
</tr>
<tr>
<td>overcome uncertainties, feel at ease</td>
<td>0.211**</td>
<td>1178</td>
</tr>
<tr>
<td>to deal with stress</td>
<td>0.269**</td>
<td>1184</td>
</tr>
<tr>
<td>to relax, to calm down</td>
<td>0.270**</td>
<td>1184</td>
</tr>
<tr>
<td>improves mood</td>
<td>0.174**</td>
<td>1179</td>
</tr>
<tr>
<td>common among friends</td>
<td>0.155**</td>
<td>1188</td>
</tr>
<tr>
<td>reward (n = 1417)</td>
<td>0.179**</td>
<td>1181</td>
</tr>
<tr>
<td>boredom</td>
<td>0.263**</td>
<td>1186</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)

table 10: correlation between WURS score and motivation to smoke

Controlling for the second hypothesis we found that almost all motives showed a significant correlation between the severity degree of the WURS score and the motives to consume alcohol or nicotine. Drinking or smoking because of the taste was not linked to ADHD symptoms.

Looking at the different motives we found that such motives that deal with difficult situation or negative feelings showed the strongest relation. In comparison to the coping motives, "improving ones mood", "seeking reward" or "using the substance because it is common among peers" seemed to play a less important role in association between substance use and ADHD symptomatology.

Thus it can be said that our results support the second hypothesis. Increased scores in the WURS were significantly linked to 8 out of 9 motives. Individuals with
higher ADHD score showed stronger relation with different drinking and smoking motives.

12. Other findings
Besides the main results we also looked for associations between ADHD symptoms and different psychosocial factors. In our sample the WURS score showed a significant correlation with most of the factors examined.

12.1. Initiation of drinking
As shown in figure 9, increasing ADHD symptoms were clearly linked to younger age of first alcohol consumption as shown in figure 8. Those young men who presented with a low score on the WURS started drinking between 15-16 or 17-18 years. The younger they started to drink, the higher they scored on the WURS ($r = 0.157$, $p < 0.01$). A higher score on the WURS was also an indicator for an earlier starting age of regular drinking ($r = 0.069$, $p < 0.01$). Included in figure 10 are also those who never started drinking on a regular basis.

![figure 9: WURS and age of first drinking (n = 2594)](image-url)
figure 10: WURS and starting age of regular drinking (n = 2576)
12.2. WURS and maternal smoking (n = 2794)

Using the Kruskal - Wallis Test we found a significant relation between maternal smoking during pregnancy and the number of presented ADHD symptoms in the WURS. As shown in figure 11 those who stated that their mother was smoking during their pregnancy showed significant more symptoms of ADHD (z = 46.067, p < 0.01). There was also a group of participants who could not answer this question.

figure 11: WURS and mother smoking during pregnancy
12.3. WURS and life satisfaction (n = 2803)

Asked about how satisfied the young males felt with their life, those with a low score on the WURS were significantly more satisfied with their life. \( r = 0.335, p < 0.01 \) Participants who stated that they are not at all satisfied with their life (n = 9) showed the highest WURS scores with a mean of 51.22 (SD = 13.98). The maximum score of the WURS is 100. The distribution among our sample is shown in figure 12.

![figure 12: WURS and life satisfaction](image)
12.4. Socioeconomic status (n = 2785)
The number of ADHD symptoms also showed a significant relationship with the reported social situation of the family (r = 0.181, p < 0.01). Those who rated the social situation of their family as "very good" presented with lower WURS scores. The lower the young males rated the social situation the higher they scored on the WURS. See figure 13.

figure 13: WURS and social situation
12.5. School education (n = 2701)

As presented in figure 14 the only psychological factor examined which did not show to be related to the severity of ADHD symptoms was the educational level of the 18 year old males. As shown in figure 14, school education was not linked to the WURS score in our sample (r = -0.023, p < 0.01). The attended school type was not depending on the WURS score, nor was graduation.

figure 14: WURS and highest school education
13. Discussion
The current study addresses the relationship between symptoms of ADHD and the consumption of alcohol, nicotine and other psychoactive substances, as well as the motives for consumption in a sample of 3280 18-year-old males from 11 different districts in Austria.

To our knowledge no data for ADHD prevalence in Austria are available so far. Within our study we could present the first representative data on ADHD in young Austrian men. It must be noted that for our investigation we measured the number of ADHD symptoms according to the 25 item Wender Utah Rating Scale (Ward et al., 1993) instead of using the categorical approach of diagnosing ADHD according to DSM IV or ICD 10.

Taking that into account and considering the fact that we used a different rating for ADHD symptoms according to DSM IV than in different validated versions of instruments based on the DSM IV criteria, we decided to use only the WURS score for further analyses.

The WURS is a widely used instrument for assessing childhood ADHD symptoms in adults and has proved to be a valid measure for screening in young adults (Fossati et al., 2001; Rossini & O’Connor, 1995; Wierzbicki, 2005).

Controlling for the number of participants who would meet the screening criteria for ADHD based on the WURS, 285 out of 2813 (10,1%) met the cut off score. The prevalence rate according to these results would therefore be 10,1% .

2,7% of our sample reported that they have been treated for ADHD in the past, 46% of whom (1,5% of all participants) received pharmacological treatment.

Assuming that the prevalence rate in a population is higher than the percentage of those being treated for a condition, and taking into account the variations of prevalence rates in different studies worldwide, all showing a significant gender difference, our data correspond well with the international literature.

In a German study every 10th boy between 11 and 17 years was found to be diagnosed with ADHD, in comparison to every 43rd girl of that age group (Huss et al., 2008)
In 2007 Polanczyk et al. who did a systematic review on ADHD prevalence worldwide, found a pooled overall prevalence rate of 5.3% worldwide (Polanczyk et al., 2007). While no significant difference was found between the rates in North America and Europe there was a significant difference in gender and age. The pooled prevalence from 44 studies showed a prevalence around 10% for males.

Out of all investigated males 91.4% drank alcohol, 2.1% of whom reported to drink alcohol on a daily basis. 43.9% of all participants were smokers. 19.3% young men presented with a CAGE score indicating alcohol dependence and 16.9% of our sample presented with high nicotine dependence.

Regarding the number of young males who presented with alcohol abuse or dependence, our data did correspond with the findings of other authors.

In a Chilean sample 34.3% of the 17 - 27 year old male medical students met a CAGE score of 2 or more (Latorres & Huidobro, 2012) and in a Greek sample of 660 training conscripts 16.4% scored 2 or higher in the CAGE (Moussas et al., 2006).

Mueller et al. investigated alcohol consumption among Swiss male conscripts between the age of 18 and 22 years (n = 27,241) and found that 26% reported regular or daily drinking (Mueller et al., 2009). In a representative Austrian survey, the rate of problem drinkers among 15 - 19 year old males was 17% (Uhl et al., 2008). It must be noted that the data of the last two studies are not based on the CAGE score.

Comparing our data with a sample of students of residential homes in Vienna (n = 1380), the number of individuals presenting with a CAGE score of 2 or higher was lower in our sample. 19.3% versus 21.8% (Skala et al., 2012; Unseld et al., 2012). This difference in the number of individuals presenting with alcohol problems may be due to different age groups. While all participants in the present study were 18 years old, the age range in the students sample was 18 - 25.

When we compared our results for alcohol use with a sample from 2002, investigating the same age group in the same districts in Lower Austria, we found a surprising increase of 18-year old males with alcohol problems. Whereas 19.3% individuals of our sample (n = 2917) met the cut-off score of 2 or more, only 3.2%
of participants (n = 1902) in the study of Kapusta et al. met this CAGE score (Kapusta et al., 2006).

This strong rise of the number of 18 year old males presenting with alcohol problems may partly be explained by methodical differences between the two studies. In 2002 the CAGE questionnaire was included in the routine interview from the Austrian Armed Forces. For the present study the assessment of all questionnaires was conducted by the author personally, independently from the recruitment process and anonymous, which may have had an influence on the self-reports.

But further explanations for this large increase of alcohol problems among 18 year old males are still missing. Analysing only the data from the same districts of Lower Austria included in the study of 2002, not taking into account individuals from the western part of Austria, we still found 18,9% (342 out of 1809) who met the Cage score off 2 or more compared to the 3,2% from the previous investigation.

Comparing our findings for smoking with data from previous Austrian studies, we found similar results. Out of 1393 smokers, 16,9% presented with a HSI score indicating high nicotine dependence. 83,1% of the smokers showed low nicotine dependence. In 2002 Kapusta et al. found 15,97% of smokers (n = 962) to be strongly dependent on nicotine, whereas 84,93% showed low nicotine dependence. The rate of non-smokers was higher in our study population (56,1% versus 48%) (Kapusta et al., 2006).

Our data are also in line with those from the representative Austrian survey carried out in 2008, where 16% of 15 - 19 year old males were classified as heavy smokers, smoking more than 20 cigarettes per day (Uhl et al., 2008).

Self reported rates of illicit drug use in our sample were surprisingly low. Cannabis was found to be the most frequently used illicit drug in our sample. 10,4% reported to have tried cannabis once in their life, 7,4% reported to have used cannabis more than once and 1,1% reported regular use. In the student sample investigated in 2009, the results have been 14,5% (once), 17,9% (more than once) and 2,3% (regularly). Comparing our results with those from Unseld et al., 19% of the 18 year old males compared to 34,7% of the students reported to
have used cannabis at least once in their life (Unseld et al., 2012). The rates were also much lower than in the students sample from 2009. The consumption of the different drugs, "at least once in their life" in comparison of our sample and the student sample was as follows: 2,1% vs. 3,8% for benzodiazepines, 2,6% vs. 4% for cocaine, 0,8% vs. 2,3% for opiates, 2% vs. 4,3% for ecstasy and 1,8 vs. 3,2 for other drugs. The difference may partly be explained by the different age groups (18 years vs. 18-25 years) but may also be due to different response rates (98,20% in the present study compared to 46% in 2009). Another difference between the two samples is that in our sample we investigated only men while in the other study 59,7% of the participants were females (Unseld et al., 2012).

In the representative Austrian survey from 2008 the 15-19 year olds presented with a lifetime prevalence of 21,2% for cannabis, 9,2 % for benzodiazepines, 3,4% for cocaine, 1% for opiates and 4,4% for ecstasy. These numbers include both sexes (Uhl et al., 2008).

Testing the association between symptoms of ADHD and the consumption of different psychoactive substances, our data supported both our hypotheses. We found that a higher number of self-reported ADHD symptoms were associated with increased rates of alcohol, nicotine and drug use and abuse. The strongest correlation was found for cannabis ($r = 0,208$, $p < 0.01$) followed by alcohol. ($r = 0,186$, $p < 0.01$). A higher score of ADHD symptoms on the WURS was also associated with higher scores on the Heavy smoking Index (HSI) ($r = 0,117$, $p < 0.01$). All young males who were strongly nicotine dependent, presenting with the highest HSI score had a WURS score above the cut-off level of ≥ 36. The use of benzodiazepines and cocaine was also associated with an increasing WURS score ($r = 0,112$, $p < 0.01$). A milder but still significant relation was found between ADHD symptoms and the use of opiates, amphetamines, ecstasy and other drugs.

Thus our results match with findings from the research literature. Heffner et al. investigated alcohol dependent patients who did not meet the full diagnostic criteria of ADHD. They could show that even without a full diagnosis a higher number of ADHD symptoms was associated with an increased risk for ever smoking and nicotine dependence (Heffner et al., 2010).
Another study could show a relation between ADHD and alcohol, nicotine and illicit drug use, independently if the categorical or the dimensional approach to ADHD was used (Gudjonsson et al., 2012).

In a prospective study of nicotine and substance dependencies Lambert et al. found that at the age of 17, 46% of young adults with ADHD reported daily smoking, compared to 24% of those without ADHD. Lifetime nicotine dependence was found to be 40% of those with ADHD compared to 19% in controls (Lambert & Hartsough, 1998). Millberger et al. investigated children and young adults (aged 9 - 22) with and without ADHD for nicotine dependence. Out of the 237 participants 19% of those with ADHD were found to be smokers, compared to 10% of the control group (Milberger et al., 1997).

The co-occurrence of attention-deficit hyperactivity disorder and psychoactive substance use disorder has been investigated in previous studies. Biedermann et al. found a twofold increased risk for SUD in subjects with ADHD compared to controls. Alcohol abusing patients with ADHD were also more likely to develop alcohol dependence and comorbid SUD (Biedermann et al., 1998). Analysing the results of the National Comorbidity Survey Replication Kessler et al. found that adults with ADHD are at greater risk for any substance abuse disorder or dependence than those without ADHD (Kessler et al., 2006).

In a ten year follow-up study, Wilens et al. found ADHD being a significant risk factor for any substance use disorder and smoking in adolescents and adults (Wilens et al., 2011).

Although a number of further studies support findings about an association between ADHD and psychoactive substance use disorder (PSUD), (De Alwis et al., 2014; Faraone et al., 2007; Gudjonsson et al., 2012; Kaye, Darke, & Torok, 2013; Lambert & Hartsough, 1998; van de Glind et al., 2013) the nature of this relation remains unclear.

That prompted us to look for different motives that led to the consumption of alcohol or nicotine. We tested 9 different motives, including taste, coping motives, enhancement motives, peer influence and boredom.

8 out of these 9 drinking and smoking motives showed to be related to symptoms of ADHD. Relation was strongest for coping motives. Participants who scored
higher on the WURS were more likely to use alcohol to deal with difficult situations, feel at ease or relax. Reward, mood or peer group were found to be of less importance. No relation was found between ADHD symptoms and taste. Similar results were found for alcohol and nicotine. The only differentiation we found was for boredom. Boredom as a reason for consumption showed stronger association for ADHD scores and smoking than alcohol. Our findings indicate that individuals with higher ADHD scores are more likely to use alcohol and smoking for coping purposes than those with low ADHD scores.

The number of ADHD symptoms was also positively related to the age of first drinking ($r = 0.157$, $p < 0.01$) and the age the young men started to drink alcohol regularly ($r = 0.069$). These findings are of importance as early onset alcohol dependence has been shown to be related to more severe alcohol related problems (Johnson et al., 2000; Sringeri et al., 2008).

13.1. Other findings
Because ADHD has been linked to a variety of risk factors and psychosocial factors, we also looked for associations between ADHD symptoms and different psychosocial factors.

**Initiation of drinking**
ADHD has been identified as a risk factor for early onset and more severe alcohol dependence by different authors (Johnson et al., 2000; Sartor et al., 2007; Sibley et al., 2014; Sringeri et al., 2008).

Sibley et al. (2014) could show that adolescents with ADHD were more likely than controls to initiate alcohol and smoking at early age (Sibley et al., 2014).

In our sample we also found that the number of ADHD symptoms was clearly linked to younger age of first alcohol consumption and to earlier regular drinking. Those young men who presented with a high score on the WURS started drinking earlier than those who had a low WURS score and also reported drinking on a regular basis at earlier age.

**Maternal smoking**
Prenatal exposure to nicotine has been found to increase the risk of ADHD in offspring across literature (Altink et al., 2009; Laucht & Schmidt, 2004; Nomura,
Marks, & Halperin, 2010; Thakur et al., 2013). In a Danish study smoking during pregnancy posed a nearly three folded risk to give birth to suffering from ADHD (Linnet et al., 2005).

In the presented study participants were asked about maternal smoking during pregnancy and data from 85,8% of all participants could be obtained. 13,4% could not provide information about their mothers smoking behaviour during the pregnancy and 0,8% did not answer the question. Maternal smoking in our sample was also linked to higher rates of ADHD symptoms \( z = 46,067, p < 0.01 \) and our results support previous findings. The mean WURS score of those who reported maternal smoking was 23,82 (SD = 17,66) and 16,15 (SD = 12,44) in those whose mother did not smoke.

**Life satisfaction**
ADHD has also been found to have a negative impact on life satisfaction (Gudjonsson et al., 2009; Miranda-Casas et al., 2011; Ogg et al., 2014). As low levels of life satisfaction may contribute to negative outcomes of ADHD patients in various domains we assessed the satisfaction of life in our study population. We found a significant correlation between WURS score and the ratings of life satisfaction \( r = 0,335, p < 0.01 \). Especially those young males stated not to be satisfied at all with their lives showed a high number of ADHD symptoms. The mean in this group was of 51,22 (SD = 13,98).

**Socioeconomic status**
Higher scores on the WURS were significantly related to a lower rating of the social situation. \( r =0,181, p < 0.01 \) The lower participants rated the social situation the higher they scored on the WURS. This data are concordant with findings from other studies (Huss et al., 2008; Larsson et al., 2014; Russell et al., 2014). ADHD has been discussed to be a heritable condition (Faraone et al., 2005; Franke et al., 2012; Russell et al., 2014; Swanson et al., 2007). This link may be an effect of parental ADHD that can affect income and productivity losses (Doshi et al., 2012) and have a negative impact an academic achievement or personal careers.
School education
Although there are numerous studies that could show the negative effect of ADHD on academic achievement, executive functioning and learning disabilities (Biederman et al., 2004; Chiang & Gau, 2014; Galéra et al., 2009; Loe & Feldman, 2007; Pastor & Reuben, 2008; Washbrook et al., 2013; Wu & Gau, 2013), surprisingly ADHD symptoms were not found to be related to school education in our study population ($r = -0.023$, $p < 0.01$). These results may be partly explained by the fact that the school system in Austria offers different options to 14 year old adolescents after attending either 4 years of high school or 4 years of secondary modern school who target a high school diploma. They can either stay in Grammar school and finish the 8 years education, or they can attend a vocational high school were the can focus on professional qualifications. Those participants who decided for the second option could not yet finish their school education (grammar school without graduation) due to age. 44.3% of all participants can be found in this group. No information has been obtained regarding repetition of grades, academic achievement or school attainment.

13.2. Limitation of the study
Several limitations should be noted when reviewing this study. The first and most obvious one is that in the present study only male participants have been enrolled and no data on young females have been collected. Taking into account that there are no Austrian epidemiological data on ADHD available, neither in children nor in adults, this is especially unfortunate.
Second, it must be underlined that for the present study participants have not been diagnosed with ADHD. We assessed the severity of ADHD symptoms on a continuum. A diagnosis of ADHD cannot be done by using screening instruments only. It always requires a thorough clinical assessment by trained professional and further information, which was not possible in the present investigation. Furthermore assessing adult ADHD requires a retrospective self-reported symptoms present in the subjects childhood. Hence data may lack accuracy due to memory gaps. Despite this challenge the Wender Utah Rating Scale appears to be a useful method of assessing childhood symptoms in adults, including young adults (Fossati et al., 2001; Weyandt, 1995; Rossini & O’Connor, 1995; Wierzbicki, 2005).
Third, using the CAGE questionnaire or the Heavy Smoking Index (HSI) for screening purposes in a population based sample the diagnostic value may be questioned. The CAGE questionnaire showed to be a useful tool of good validity for detecting alcohol abuse or dependence in different inpatient and outpatient groups, but may be limited as a screening test for less severe drinking, women, people younger than 18 and ethnic minorities (Dhalla & Kopec, 2007; Fiellin et al., 2000). The Heavy Smoking Index (HSI) was found to be an appropriate measures for high nicotine dependent smokers but shows poorer results in light smokers (Etter, Duc, & Perneger, 1999; Pérez-Ríos et al., 2009).

Considering that our data on alcohol, nicotine and substance use are based on self-report questionnaires the selected instruments may have a limiting effect on our findings. Although the CAGE and the HSI have been chosen on grounds (e.g.: time restriction and the possibility to compare data with previous studies) further investigations done in similar samples should consider the limitation of such instruments in that age group or in subjects with lower nicotine dependence and less severe drinking.

Fourth, investigating 18 year old males, an age group in the transition from adolescents to young adulthood may add to the limitation of brief screening measures and makes interpreting and comparing the data with other adult samples more challenging as scales are either developed for children or adults.

Fifth, the motives for drinking and smoking have been assessed without the use of a validated questionnaire, hence our data do not allow direct comparison with the international research literature.

And sixth, all our data rely on self report screening instruments. Although we have collected biological markers for alcohol, CO measures for nicotine and urine samples for the use of psychoactive substance, these data have not been taking into account for this report out of various reasons. For further analyses these data should be included to enhance the validity of data.
14. Conclusion

Our findings underline the increased vulnerability of adolescents with elevated symptom severity of ADHD for smoking, drinking and illicit drug use. Alcohol and nicotine in this group seemed to be increasingly used as a coping strategy to reduce stress and tension, to deal with negative emotions and difficult situations and to relax.

Considering the prevalence of ADHD and the high rates of alcohol or nicotine abuse among adolescents and young adults, our data highlight the importance of early identification, prevention and treatment programs for affected children and adolescents to reduce the risk of developing substance dependence. Children and adolescents who suffer from an underlying developmental disorder such as ADHD form a special subgroup in the field of addiction that needs to be further investigated in the future.

The current investigation was one of the first to consider the relation between ADHD symptomatology and the motivation to drink and smoke.

Our findings indicate that future prevention and intervention programme for this risk group should more strongly focus on coping strategies in conjunction with motives to drink or smoke.

Further research is still required to enhance the understanding for the complex association of ADHD symptoms and substance use disorders, two of the major health problems in youth. The co-occurrence and relation does not only add to the impairment and health problems but also to the economic burden related with both disorders.
15. References


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16. Appendix

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### 16.2. Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD</td>
<td>Attention deficit hyperactivity disorder</td>
</tr>
<tr>
<td>ADD</td>
<td>Attention deficit disorder</td>
</tr>
<tr>
<td>ADD/H</td>
<td>Attention deficit disorder with hyperactivity</td>
</tr>
<tr>
<td>ADD/WO</td>
<td>Attention deficit disorder without hyperactivity</td>
</tr>
<tr>
<td>AUDIT</td>
<td>The Alcohol Use Disorders Identification Test</td>
</tr>
<tr>
<td>CAGE</td>
<td>The CAGE questionnaire is an internationally used assessment instrument for identifying problems with alcohol.</td>
</tr>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
</tr>
<tr>
<td>DMQ-R-SF</td>
<td>Drinking Motive Questionnaire</td>
</tr>
<tr>
<td>GGT</td>
<td>γ-glutamyltransferase Alanin-Aminotransferase</td>
</tr>
<tr>
<td>GOT</td>
<td>Glutamat-Oxalacetat-Transaminase</td>
</tr>
<tr>
<td>GPT</td>
<td>Glutamat-Pyruvat-Transaminase</td>
</tr>
<tr>
<td>FTND</td>
<td>Fagerstrom Test for Nicotine Dependence</td>
</tr>
<tr>
<td>HKD/HD</td>
<td>Hyperkinetic disorder</td>
</tr>
<tr>
<td>HSI</td>
<td>Heavy Smoking Index</td>
</tr>
<tr>
<td>MCV</td>
<td>Mean corpuscular volume</td>
</tr>
<tr>
<td>PSUD</td>
<td>Psychoactive substance use disorder</td>
</tr>
<tr>
<td>SES</td>
<td>Socioeconomic Status</td>
</tr>
<tr>
<td>SUD</td>
<td>Substance Use disorder</td>
</tr>
<tr>
<td>THC</td>
<td>Tetrahydrocannabinol</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WURS</td>
<td>Wender Utah Rating Scale</td>
</tr>
</tbody>
</table>
16.3. Questionnaires:

1. Im Folgenden möchten wir Sie bitten zu beantworten, welche der folgenden Aussagen die meiste Zeit in Ihrem Leben zutreffend waren. Bitte kreuzen Sie rechts jeweils die zutreffende Zahl an. Kreuzen sie an, was am ehesten zutrifft!

Verwenden Sie dabei bitte folgende Skala:

<table>
<thead>
<tr>
<th></th>
<th>Man sagt mir, dass ich unfähig sei, die positive Seite von Dingen zu erkennen.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ich denke, dass sich Dinge oft zum Schlechtesten wenden.</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3</td>
<td>Ich habe mir immer Vorwürfe gemacht wegen Dingen, die Andere für unwesentlich hielten.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ich gehörte zu jenen Menschen, die alles in Zweifel ziehen.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>Man sagt mir, dass ich oft die Dinge pessimistisch sehe und damit frühere glückliche Zeiten vergesse.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Solange ich mich erinnern kann, bin ich immer jemand gewesen, der sich zu viele Sorgen macht.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Viele Leute haben mir gesagt, ich solle mir nicht so viele Sorgen machen.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>8</td>
<td>Ich habe plötzlich Wechsel in Stimmung und Antrieb.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Ich beginne oft Sachen und verliere dann das Interesse daran, bevor ich fertig bin.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Meine Stimmung wechselt häufig ohne jeden Grund.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Ich schalte ständig um zwischen lebhaft und träge.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Ich schwanke dazwischen hin und her, allzu selbstvertrauend und dann wieder selbstunsicher zu sein.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Ich bin der Typ Mensch, der zur gleichen Zeit traurig und glücklich sein kann.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Ich habe großes Selbstvertrauen.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ich bekomme oft viele gute Ideen.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Ich kann viele Aufgaben erledigen und werde nicht mal müde dabei.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ich habe ein Talent zum Reden und bin dabei überzeugend und begeisternd.

Ich liebe es, neue Projekte in Angriff zu nehmen, auch wenn sie riskant sind.

Wenn ich mich einmal entschieden habe, etwas auszuführen, kann mich nichts aufhalten.

Ich habe Fähigkeiten und Sachverstand auf vielen Gebieten.

Wenn ich mit jemandem nicht einverstanden bin, kann ich in ein hitziges Streitgespräch geraten.

Ich bin eine reizbare Person.

Wenn man mir in die Quere kommt, könnte ich in Kampflust geraten.

Wenn ich zornig bin, schnauze ich Leute an.

Mein beißender Humor hat mir schon Unannehmlichkeiten bereitet.

Ich kann so wütend werden, dass ich jemanden verletzen könnte.

Ich bin dafür bekannt, viel zu fluchen.

Ich habe oft Magenverstimmungen.

Wenn ich nervös bin, kann ich auch mal Durchfall haben.

Wenn ich nervös bin, ist mir oft übel.

Wenn ich nervös bin, muss ich häufiger zur Toilette.

Wenn jemand verspätet nach Hause kommt, habe ich Angst, dass er einen Unfall gehabt haben könnte.

Ich bekomme schnell Kopfschmerzen, wenn ich gestresst bin.

Plötzlich Geräusche erschrecken mich leicht.

### 2.1. Trinken Sie Alkohol?
- täglich,
- mehrmals pro Woche,
- 1x pro Woche,
- seltener,
- ich trinke überhaupt keinen Alkohol => bitte weiter mit Frage 2.7
2.2. Im Durchschnitt trinke ich (bitte setzen Sie die Zahl ein)
durchschnittlich ____  halbe Bier pro Woche und/oder
durchschnittlich ____  Achtel Wein (oder Spritzer) pro Woche und/oder
durchschnittlich ____  Stamperl Schnaps oder andere harte Getränke

2.3. Wie alt waren Sie als Sie das erste Mal Alkohol getrunken haben?

- jünger als 8
- jünger als 10
- 10 – 12
- 12 - 14

2.4. Wie alt waren Sie als sie begonnen haben regelmäßig (mehrmals pro Woche) Alkohol zu trinken?

- jünger als 12
- 12 – 14
- 14 - 16
- habe noch nie regelmäßig Alkohol getrunken

2.5. Ich trinke Alkohol, weil …

<table>
<thead>
<tr>
<th>Grund</th>
<th>trifft überhaupt nicht zu</th>
<th>trifft teilweise zu</th>
<th>trifft voll zu</th>
</tr>
</thead>
<tbody>
<tr>
<td>er mir schmeckt</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>es schwierige Situationen erleichtert</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>es über Unsicherheiten hinweghilft, man lockerer wird</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>es hilft mit Stress umzugehen</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>es mir hilft zu entspannen, mich beruhigt</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>es die Stimmung verbessert</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>es im Freundeskreis üblich ist</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>als Belohnung</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>aus Langeweile</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

2.6.

<table>
<thead>
<tr>
<th>Frage</th>
<th>ja</th>
<th>nein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haben Sie jemals daran gedacht, weniger zu trinken?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haben Sie jemals bei anderen Menschen Anstoß erregt, weil Sie nach deren Meinung zu viel trinken?</td>
<td>□ ja</td>
<td>□ nein</td>
</tr>
<tr>
<td>Haben Sie sich jemals wegen Ihres Trinkens schuldig gefühlt?</td>
<td>□ ja</td>
<td>□ nein</td>
</tr>
<tr>
<td>Haben Sie jemals morgens als erstes Alkohol getrunken, um sich nervlich zu stabilisieren oder einen Kater loszuwerden?</td>
<td>□ ja</td>
<td>□ nein</td>
</tr>
</tbody>
</table>
2.7. Die Mehrheit meiner Freunde trinkt regelmäßig (mehrmals pro Woche) Alkohol
☐ stimmt ☐ stimmt nicht

2.8. Trinken Ihre Eltern Alkohol?
☐ Vater trinkt gelegentlich ☐ Mutter trinkt gelegentlich
☐ Vater trinkt regelmäßig ☐ Mutter trinkt regelmäßig
☐ Vater trinkt keinen Alkohol ☐ Mutter trinkt keinen Alkohol
☐ hat früher Alkohol getrunken ☐ hat früher Alkohol getrunken

2.9. Während Ihrer Kindheit, dachten Sie da jemals daran, dass einer oder beide Elternteile ein Alkoholproblem hat/haben?
☐ ja - Vater ☐ ja - Mutter ☐ nein

2.10. War das Trinken eines oder beider Elternteile jemals ein Problem für Sie?
☐ ja - Vater ☐ ja - Mutter ☐ nein

3.1 Rauchen Sie?
☐ ja ☐ nein => dann weiter mit Frage 3.6.

3.2. Wie viele Zigaretten rauchen Sie im Durchschnitt täglich?
☐ bis 10 ☐ bis 21-30
☐ bis 11-20 ☐ bis 31 und mehr

3.3. Wann nach dem Aufstehen rauchen Sie die erste Zigarette?
☐ innerhalb 5 Min. ☐ 31 – 60 Min.
☐ 6 – 30 Min. ☐ nach 60 Min.

3.4. Rauchen Sie am Morgen im Allgemeinen mehr als am Rest des Tages?
☐ ja ☐ nein

3.5. Ich rauche, weil ...

<table>
<thead>
<tr>
<th>Ich rauche, weil ...</th>
<th>trifft überhaupt nicht zu</th>
<th>trifft teilweise zu</th>
<th>trifft voll zu</th>
</tr>
</thead>
<tbody>
<tr>
<td>es mir schmeckt</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>es schwierige Situationen erleichtert</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>es über Unsicherheiten hinweghilft, man lockerer wird</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>es hilft mit Stress umzugehen</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>es mir hilft zu entspannen, mich beruhigt</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>es die Stimmung verbessert</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>es im Freundeskreis üblich ist</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>als Belohnung</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>aus Langeweile</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
3.6. Rauchen ihre Eltern?
- Vater raucht gelegentlich
- Vater raucht regelmäßig
- Vater hat nie geraucht
- Vater hat früher geraucht
- Mutter raucht gelegentlich
- Mutter raucht regelmäßig
- Mutter hat nie geraucht
- Mutter hat früher geraucht

3.7. Hat ihre Mutter während der (Ihrer) Schwangerschaft geraucht?
- ja
- nein
- weiß nicht

- stimmt
- stimmt nicht

4.1 Haben Sie schon einmal Drogen konsumiert?

<table>
<thead>
<tr>
<th>Drogen</th>
<th>einmal</th>
<th>mehrmals</th>
<th>regelmäßig</th>
<th>nie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis (THC)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beruhigungstabletten/Benzodiazepine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kokain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opiate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecstasy, Amphetamine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andere, welche:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.1. Manchmal habe ich unwiderstehliches Verlangen nach Nahrungsmitteln (Heißhunger), vor allem auf Süßes.
- ja
- nein

5.2. Ich bin aktiv in einem Verein tätig? (Mehrfachantworten möglich)
- nein
- ja
  Wenn ja, in welchem:
  - Sportverein
  - Musikverein
  - Feuerwehr
  - Landjugend
  - andere _______________________

5.3. Auf einer Skala von 1 -10, wie zufrieden sind sie derzeit mit ihrem Leben.

1 = gar nicht zufrieden  10 = vollkommen zufrieden
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
5.4. Ich habe schon einmal ernsthaft über Selbstmord nachgedacht
- innerhalb des letzten Jahres
- innerhalb des letzten Monats
- noch nie

5.5. Welche Aussage trifft am ehesten auf Sie zu?
- Ich habe viele Freunde und Bekannte.
- Ich habe ein paar gute Freunde.
- Ich habe kaum Freunde und bin oft ziemlich einsam.
- Ich bin eher ein Einzelgänger und bin gerne alleine.

5.6. Ich sitze in meiner Freizeit (privat) durchschnittlich pro Tag
- 0-1 Stunde
- 1-3 Stunden
- 3-5 Stunden
- 5-8 Stunden
- über 8 Stunden vor dem Computer

5.7. Ich hatte schon mal Probleme bzw. Ärger mit der Polizei
- ja - im Zusammenhang mit Alkohol oder Drogen bzw. unter dem Einfluss von Alkohol oder Drogen
- ja - unabhängig von Alkohol und Drogen
- nein

5.8. Wie schätzen Sie insgesamt die finanzielle/soziale Situation Ihrer Familie ein?
- sehr gut
- ausreichend
- gut
- nicht ausreichend

5.9. Meine bisherige höchste Schulausbildung ist
- Sonderschule
- Hauptschule ohne Abschluss
- Hauptschule mit Abschluss
- Polytechnischer Lehrgang
- AHS oder BHS abgebrochen, kein Abschluss
- Matura

5.10. Derzeit bin ich
- in Schulausbildung
- mache eine Lehre
- berufstätig
- auf Arbeitssuche

☐ ja  ☐ nein

6.2. Wenn ja, haben Sie auch Medikamente bekommen?

☐ nein  ☐ ja  Welche? ________________________

6.3. Bitte kreuzen Sie die Zahl an, welche am besten Ihr Verhalten in den letzten 6 Monaten beschreibt.

0 = trifft nicht zu, 1 = trifft teilweise zu, 2 = trifft zu

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ich beachte häufig Einzelheiten nicht oder mache Flüchtigkeitsfehler bei der Arbeit.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Ich zapple häufig mit Händen oder Füßen oder rutsche auf dem Stuhl herum.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Ich habe oft Schwierigkeiten, längere Zeit die Aufmerksamkeit bei Aufgaben aufrecht zu erhalten.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Ich stehe in Situationen, in denen Sitzenbleiben erwartet wird, häufig auf.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Ich höre häufig nicht zu, wenn andere mich ansprechen.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Ich fühle mich oft unruhig.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Ich führe häufig Anweisungen anderer nicht vollständig durch und kann Arbeiten nicht zu Ende bringen.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Ich habe häufig Schwierigkeiten, mich mit Freizeitaktivitäten ruhig zu beschäftigen.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>Ich habe häufig Schwierigkeiten, Aufgaben und Aktivitäten zu organisieren.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Ich bin häufig auf Achse oder fühle mich, wie durch einen Motor angetrieben.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Ich vermeide häufig Aufgaben oder habe eine Abneigung gegen Aufgaben, die länger dauernde geistige Anstrengungen erfordern.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Ich rede häufig übermäßig viel.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>Ich verliere häufig Gegenstände, die für Aufgaben oder Aktivitäten benötigt werden.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Ich platze häufig mit der Antwort heraus, bevor die Frage zu Ende gestellt wird.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Ich lasse mich durch äußere Reize leicht ablenken.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Ich kann nur schwer warten, bis ich an der Reihe bin.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Ich bin bei Alltagsaktivitäten häufig vergesslich.</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>Ich unterbreche oder störe andere häufig.</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
6.4. Bitte rechts die am ehesten zutreffende Antwort ankreuzen!

0 = nicht, 1 = gering, 2 = mäßig, 3 = deutlich, 4 = stark ausgeprägt

**Als Kind im Alter von 6-10 Jahren war ich oder hatte ich......**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Konzentrationsprobleme, leicht ablenkbar</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>ängstlich, besorgt</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>nervös, zappelig</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>unaufmerksam, verträumt</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>rasch wütend, aufbrausend</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Wutanfälle, Gefühlsausbrüche</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>geringes Durchhaltevermögen (Abbrechen von Tätigkeiten vor deren Beendigung)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>hartnäckig, willensstark</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>oft traurig, depressiv, unglücklich</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>ungehorsam, rebellisch, aufsässig</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>geringes Selbstwertgefühl, niedrige Selbsteinschätzung</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>12</td>
<td>leicht zu irritieren</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>13</td>
<td>starke Stimmungsschwankungen</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>häufig ärgerlich</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>15</td>
<td>impulsiv (handeln ohne nachzudenken)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>Tendenz zur Unreife</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>17</td>
<td>häufige Schuldgefühle</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>Verlust der Selbsteinschätzung</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>Neigung zu unvernünftigen Handlungen</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>Probleme mit anderen Kindern (keine langen Freundschaften, schlechtes Auskommen mit anderen Kindern)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>21</td>
<td>Unfähigkeit Dinge vom Standpunkt des anderen zu betrachten</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22</td>
<td>Probleme mit Autoritäten (Ärger in der Schule mit Lehrern, Vorladungen beim Schuldirektor)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>23</td>
<td>insgesamt mäßiger Schüler mit langsamen Lerntempo</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>24</td>
<td>Probleme mit Zahlen und Rechnen</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>25</td>
<td>meine Möglichkeiten nicht ausgeschöpft</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Curriculum Vitae:

Mag.a Anita J. Riegler
date of birth: 29.08.1968

**Educational background**

**Graduation**

Bundesoberstufenrealgymnasiums (BORG) St. Pölten 1986

Diploma for group and individual coaching, 2005

Diploma for Counselling, 2006

Pedagogics/Psychology/Medicine (combination of subjects) University of Vienna 2008

Propaedeutic studies in Psychotherapy (Österreichischer Arbeitskreis für Gruppentherapie und Gruppendynamik, ÖAGG) 2013

Doctoral Program of Applied Medical Science N790, since 2011

Medical University of Vienna

Advanced studies in Psychotherapy (Gesellschaft für Logotherapie und Existenzanalyse Österreich) since 2013
Professional experiences

Research at the Royal Edinburgh Hospital, Scotland (Alcohol Problems Clinic) and the Royal Free Hospital London, UK

Research at the Nervenklinik Würzburg, Germany

Research assistant at the Medical University Vienna, Department of Psychiatry (research group of Univ.Prof. Dr. Otto M. Lesch)

Working with inmates (group sessions and aftercare for inmates with alcohol problems) Justizanstalt Mittersteig; Vienna

July 1999 - date  
Administration of the ESBRA Central Office (European Society for Biomedical Research on Alcoholism) (www.esbra.com)

Working in a halfway house for homeless women with psychological problems, psychiatric disorders and/or addiction. Caritas Vienna

Work experience in Saudi Arabia

Feb. 2013 - Feb 2014  
Research assistant at the Medical University Vienna, Department of Psychiatry
Publications in peer reviewed journals


Other publications


