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Master thesis

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Predictors of outpatient psychotherapy utilization among autistic adults

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Preliminary remark

In this master thesis, the following literature will be considered in order to find an autistic-preferred language and avoid potentially offensive terms:

Monk, R., Whitehouse, A. J. O. & Waddington, H. (2022). "The use of language in autism research." Trends in Neuroscience, 45(11), 791-793. https://doi.org/10.1016/j.tins.2022.08.009

While efforts have been made to align with the given literature recommendations, it is to note that certain terms, particularly those that are essential to explaining the clinical picture or are rooted in official manuals, remain unchanged. This decision was made to ensure precision and adherence to established terminology in specific contexts.

Abstract

Background: The diagnosis of Autism Spectrum Disorder (ASD) refers to a pervasive neurodevelopmental difference and is mostly accompanied by a range of co-occurring mental health challenges such as anxiety and depression. These can significantly reduce the quality of life of those affected or even lead to suicidality if remaining untreated. For the management of co-occurring mental health conditions psychotherapeutic interventions is recommended. However, autistic individual do seek lesser outpatient psychotherapy than the general population. In addition, the accessibility of healthcare services for autistic people decreases as they reach adulthood. Within this context, the aim of the study is to examine the factors that explain variance in the utilization of outpatient psychotherapy among autistic adults.

Methods: Data for this master thesis is based on the “BarrierfreeASD” project, which is carried out by the Department of Medical Psychology at the University Medical Center Hamburg-Eppendorf (UKE). The cross-sectional data set includes N = 246 autistic adults, living in Germany. For this purpose, predictor variables have been identified within the framework of Anderson's "Behavioral Model of Health Services Utilization". Predictors included are gender, employment status, income, educational background, age, relationship status, psychological co-occurring, physical co-occurring, support need in social interaction and support need in behavioral flexibility, were statistically analyzed using binary logistic regression. The aim of this analysis was to identify associations within a 6-month period of outpatient psychotherapy utilization.

Results: Among the ten independent variables included in the logistic regression model, two contributed significantly in explaining the variance in utilization of outpatient psychotherapy among autistic adults. One predisposing characteristic, educational background ($p < .035$), and one need factor, psychological co-occurring condition ($p < .001$), showed statistical significance. Regarding the variable psychological co-occurring, the result is highly significant ($p < .001$). This means that for each additional psychological co-occurring, the odds of receiving psychotherapy increase by a factor of 1.738 (95%-CI [1.401, 2.156]). It was also found for the variable, educational background, that autistic adults with a university entrance certificate were significantly more likely to receive outpatient psychotherapy, with the odds ratio increasing by a factor of 2.023 (95%-CI [1.052, 3.892]) compared to those without a certificate.

Keywords: Autism spectrum disorder, Adults, Andersen behavioral model, Outpatient Psychotherapy

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Abbreviation

ABA	Applied Behaviour Analysis
ADHD	Attention deficit hyperactivity disorder
ASD	Autism Spectrum Disorder
AWMF	Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften
BASS	BarrierfreeASD (German title: *BarrierefreiASS*)
CBT	Cognitive-behavioral therapy
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
DSM-5	Diagnostic and Statistical Manual of Mental Disorders 5th Version
EU GDPR	European General Data Protection Regulation
ICD	International Classification of Diseases
ID	Intellectual Disability
IQ	Intelligence quotient
MCAR	Missing completely at Random
MI	Multiple imputation
NICE	National Institute for Health and Clinical Excellence
SD	Standard Deviation
Sig.	Significance
SPSS	Statistical Package for the Social Sciences
TEACCH	Treatment and Education of Autistic and Communication Handicapped Children
OR	Odds ratio
UKE	University Medical Center Hamburg-Eppendorf
WHO	World Health Organization

1 Introduction

The diagnosis of Autism Spectrum Disorder (ASD) refers to a pervasive neurodevelopmental difference. Over the past 20 years, awareness of autism has increased enormously (Lord et al., 2022), and the estimated global prevalence is around 1% (Talantseva et al., 2023), whereas the prevalence in Germany is 0.38% (Roy & Starte 2023). Rates have risen steadily over time, influenced by factors such as increased social awareness and evolving diagnostic criteria (Mazurek et al., 2023; Zeidan et al., 2022). For instance, the representation of autism in the media is being raised and increasingly being featured in books, films and documentaries. However, the portrayal of autistic individuals as exceptionally talented and skilled is often stereotypical (Riedel et al., 2020), offering a narrow perspective of autism that only encompasses a small segment of the spectrum. This one-dimensional portrayal of autism in society may lead to a perception of the diagnosis as less stigmatizing compared to other psychiatric diagnoses (Jensen et al., 2016).

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), autism is characterized by two main characteristics: Persistent challenges in social communication (e.g., difficulties in responding to social-emotional cues) and the occurrence of restricted, repetitive sensorimotor behaviors', for instance consistent use of objects (World Health Organization (WHO), (2019). The proportion of adults who are formally diagnosed with autism after attending an "autism clinic" is considerably lower than for children. One reason for this may be that people with the most obvious manifestations of autism have already been diagnosed in childhood (Lord et al., 2018). Additionally, autistic people without intellectual disabilities (ID) are able to learn social rules to a certain level and are therefore often not diagnosed until adulthood (Lipinski et al., 2019). For autistic adults, the in the DSM-5 stated main characteristics of autism can significantly interfere with daily life such as the integration in the work force (Holwerda et al, 2012). Moreover, the experiences of isolation, strained relationships, and challenges in articulating thoughts and emotions can further contribute to the development of co-occurring conditions (Lipinski et al. 2019). In particular, anxiety and depression disorders are the most frequent co-occurring mental health issues among autistic adults (Mazurek et al., 2023). Along with a high level of mental health problems, autistic people have a significantly increased risk of suicidality (suicidal thoughts, suicide plans, suicide attempts and death by suicide) compared to non-autistic people (Newell et al., 2023). Consequently, the challenges faced in managing daily life and social interactions can have a substantial impact on the mental health of autistic individuals, often resulting in

lower mental health-related quality of life (HRQoL) (Lipinski et al. 2019; Brice et al. 2021; Weir et al. 2022).

Despite the increasing demand for psychotherapy (Lipinski et al., 2019) and advances in understanding autism, services tailored specifically for autistic adults still fall behind those provided for children (Howlin, 2021; Schweizer et al., 2024). It is surprising that a considerable proportion of autistic individuals still do not access necessary healthcare services. As reported by Lipinski et al. (2019), only 22% of adults diagnosed with autism (without ID) received psychotherapy, a figure significantly lower than control groups comprising non-autistic individuals with depression. This discrepancy is also contrary to recommendations from current guidelines, such as those from the United Kingdom (UK) National Institute for Health and Clinical Excellence (NICE) or the S3-Guideline from Germany, which emphasize the use of psychosocial interventions in the treatment of co-occurring mental health conditions (NICE, 2021; Association of the Scientific Medical Societies in Germany (AWMF), 2021). Some of the literature points to a lack of need, while others identify barriers and shortcomings in mental health care. Commonly mentioned issues include a lack of knowledge about autism among healthcare professionals (Dückert et al., 2023; Adams & Young, 2021; Maddox et al., 2019), the need for greater involvement in the treatment of autism-specific needs, inadequate services and limited access to services and improved collaboration between stakeholders (Dückert et al., 2023).

Currently, there is no literature that specifically addresses the predictors of outpatient psychotherapy utilization in adults with autism. The existing literature focuses primarily on the systemic and professional level and examines factors of utilization of psychotherapy from the perspective of healthcare professionals or caregivers of autistic adults. However, there is a critical gap in research focusing on the individual level. Therefore, this master's thesis aims to investigate various predictors that may be associated with the utilization of outpatient psychotherapy among autistic adults. By exploring this newly emerging topic, the work will pave the way for further research in the field of autism and psychotherapy. Furthermore, by identifying relevant factors, this work may contribute to the improvement of health care in psychotherapy for autistic people.

2 Theoretical Background

This chapter provides a theoretical overview of autism, covering some historical background, its classification, symptoms, diagnosis, epidemiology, etiology and co-occurring conditions. This is followed by a review of psychotherapy utilization, providing insights into intervention options for co-occurring medical conditions and an examination of the Anderson model, which illustrates overall healthcare utilization. In addition, current research findings on possible predictors of psychotherapy utilization in autistic adults are presented.

2.1 Autism Spectrum Disorder

Historically, the term "autism" (Greek: autos = self; ismos = state/orientation) originates from psychosis research by a German psychiatrist, Eugen Bleuler, in 1911. Initially, Bleuler intended to use "autism" to describe the most severe form of schizophrenia, a concept which he also coined. With the neologism from the Greek terms autos (self) and ismos (state), he describes the focus on oneself and one's own world of thoughts in connection with schizophrenic spectrum disorders (Evans, 2013; Rabsahl, 2016). Nonetheless, the doctors Leo Kanner and Hans Asperger, who independently published works on autistic children in the 1940s, led the way in differentiating and categorizing autism (Frese, 2022). In 1943, Kanner published a paper titled "Autistic disturbances of affective contact," wherein he detailed 11 children exhibiting profound abnormalities in interpersonal connections and communication, seemingly isolated from birth. Similarly, in 1944, Asperger presented four cases of male adolescents with challenges in social interaction and communication, which he termed "Autistic Psychopaths" in childhood. While Kanner's concept of "early childhood autism" was already under scientific discussion and clinical diagnosis by the 1950s, "Asperger syndrome" wasn't integrated into standard diagnostic systems until its translation into English in the 1980s (Riedel et al., 2020).

2.1.1 Classification

The WHO offers a coding and classification system for diseases and related health conditions to classify ASD (WHO, 2022). As of January 1, 2022, the latest edition, the International Classification of Diseases 11th Revision (ICD-11), has been published and is expected to replace previous versions in the coming years. Despite the existence of a German-translated draft version, it cannot currently be implemented in Germany due to licensing constraints, rendering it non-binding at present (Bundesinstitut für Arzneimittel und Medizinprodukte (BFRAM), o. D.). Another manual used, is the fifth version,

published in 2013, of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), a classification system for a range of mental disorders established by the American Psychiatric Association (American Psychiatric Association (APA), 2013). Both versions, DSM-5 and ICD-11, apply to all ages and levels of language and intellectual functioning, with a range of possible manifestations (Lord et al., 2022).

According to ICD-10, autism is listed under the group "pervasive developmental disorders (F84)". Officially, the ICD-10 distinguishes between various subtypes of autism spectrum disorders, including early childhood autism (F84.0), atypical autism (F84.1), Asperger syndrome (F84.5). In addition, ICD-10 lists overactive disorder with ID and movement stereotypes as a pervasive developmental disorder (WHO, 2019). As for the DSM-IV-TR, autism was also classified under “pervasive developmental disorder”, a distinction is made between autistic disorder (299.000), Asperger's Disorder (299.80) and pervasive developmental disorder (299.80). Rett syndrome and childhood disintegrative disorder are further pervasive developmental disorders that are mentioned (American Psychiatric Association, 2000). In both of the latest versions however (ICD-11 and DSM-5), the existing diagnostic subcategories were grouped together under one, termed "autism spectrum disorder" (WHO, 2022; American Psychiatric Association (2013). Table 1 provides an overview of the earlier (ICD-10 and DSM-IV-TR) and the latest versions (ICD-11 and DSM-5) of the classifications.

Table 1: *Comparison previous and latest classification*

Previous		**Latest**	
ICD-10[a]	DSM-IV-TR[b]	ICD-11[c]	DSM-5[d]
Pervasive developmental disorder		Neurodevelopmental disorders	
F84.0 Childhood autism F84.1 Atypical autism F84.2 Rett syndrome F84.3 Other childhood disintegrative disorder F84.4 Overactive disorder with intellectual disability and movement stereotypies F84.5 Asperger syndrome	299.00 Autistic Disorder 299.80 Rett’s Disorder 299.10 Childhood Disintegrative Disorder 299.80 Asperger Disorder 299.60 Pervasive Developmental Disorders NOS	6A02 Autism spectrum disorder	299.00 Autism spectrum disorder

F84.8 Other pervasive developmental disorders F84.9 Pervasive developmental disorder, unspecified			

Note. Classification from [a]WHO (2019). [b]American Psychiatric Association (2000). [c]WHO (2022).[d] American Psychiatric Association (2013). (own illustration)

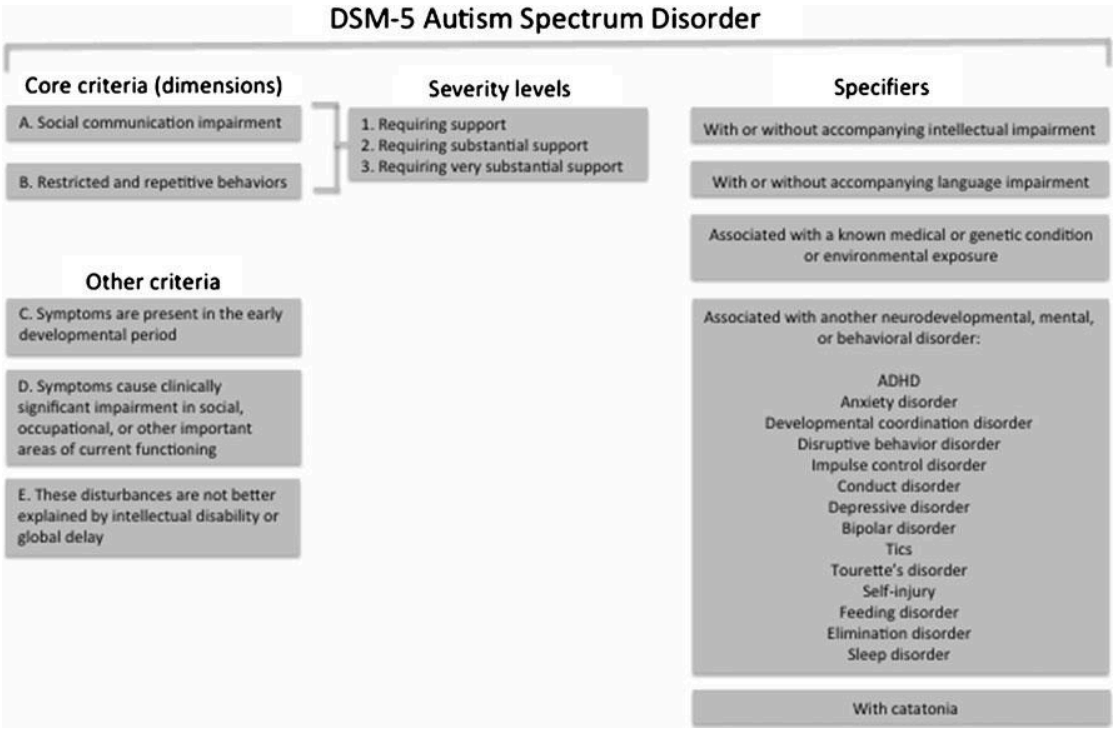
2.1.2 Symptoms and Diagnostic

According the DSM-5, autism is defined into two core criteria which can be across multiple context (Criterion A and B): A) Persistent deficits in social communication and social interaction and B) Restricted, repetitive patterns of behavior, interest or activities (APA, 2013). Examples for A): Deficits in social-emotional reciprocity, failure to initiate or respond to social interaction, deficits in understanding and use of gestures, total lack of facial expressions and nonverbal communication and difficulties in sharing imaginative play or in making friends. Examples for B) would be: Insistence on sameness, inflexible adherence to routines, Stereotyped or repetitive motor movements in use of objects or speech and hyper- or hypo reactivity to sensory input activities (APA, 2013). According to the American Psychiatric Association (2013) there are further three other aspects to consider which are: “C) Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life). D) Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning. E) These disturbances are not better explained by ID (intellectual developmental disorder) or global developmental delay.

As discussed in the previous chapter, the latest editions of DSM-5 and ICD-11 have replaced the broad term "pervasive developmental disorder" with "autism spectrum disorder" (WHO, 2022; APA, 2013). This change reflects the understanding that the characteristics of autism can be assessed along a continuum (dimensionally) of severity rather than distinct subtypes. As shown in Figure 1, unlike previous classifications, such as Asperger syndrome, the new classifications focus on specific criteria (Ousley & Cermak, 2014; WHO, 2022; APA, 2013). In the DSM-5, the criteria include assessing the severity of core ASD symptoms, such as needing support, substantial support, and very substantial support, in two psychopathological domains: social communication difficulties and restricted, repetitive behaviors, which should be assessed separately. Additional specifications that should be recorded are, the assessment of the presence of intellectual and/or language impairments, genetic or medical disorders and other co-

occurring neurodevelopmental disorders, mental disorders or behavioral disorders (APA, 2013). It should be noted that the level of severity may vary depending on the context and may change over time. Importantly, decisions about eligibility for or provision of services should not be made on the basis of the descriptive severity categories. Instead, these decisions need to be made at an individual level through conversations that focus on personal priorities and goals (APA, 2000).

Figure 1: *Autism DSM-5 diagnostic criteria and specifiers*



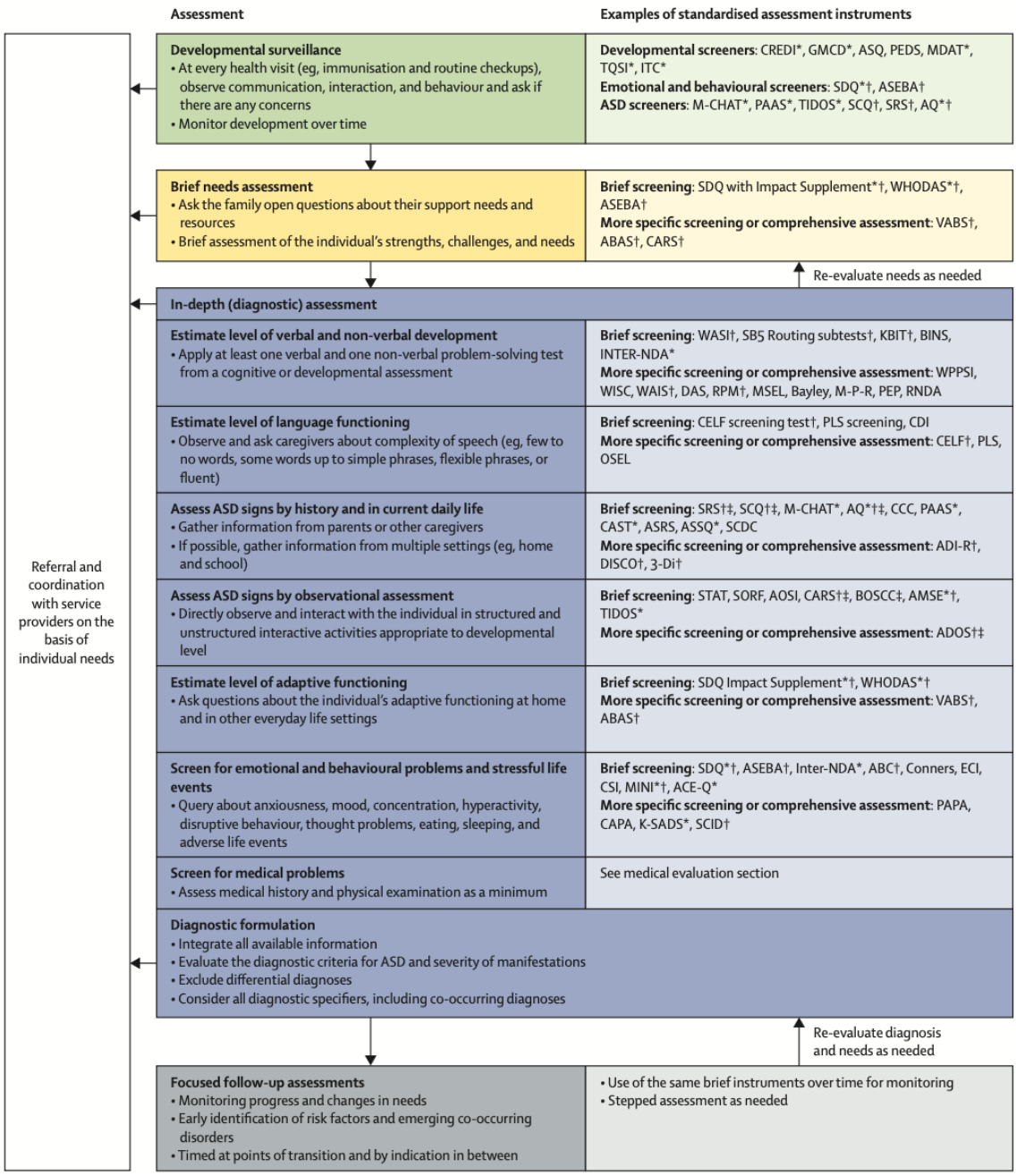
Note: Diagnostic criteria and specifiers from DSM-5. Reprinted from "Autism Spectrum Disorder: Defining Dimensions and Subgroups. Current Developmental Disorders Reports", by O.Y. Ousley, and T. Cermak, 2014, p. 20-28. Copyright 2013 by Springer International Publishing AG

Unchanged in ICD-11, the restrictions in the two core areas of social interaction and communication as well as restrictive, repetitive and inflexible behavior patterns and interests, remain decisive for the diagnosis. In common with the DSM-5, the ICD-11 specifies co-occurring limitations in intellectual and functional language abilities (WHO, 2019). However, it does not include information on co-occurring mental illness, catatonia, genetic or environmental etiology, or the need for support in daily living (Freitag, 2021). The five sub-specification according to the WHO (2019) are, "6A02. autism without disorder of intellectual development and with mild or no impairment of functional language, 6A02.1 autism with disorder of intellectual development and with mild or no impairment of functional language, 6A02.2 Autism without disorder of intellectual

development and with impaired functional language, 6A02.3 Autism with disorder of intellectual development and with impaired functional language, 6A02.5 Autism with disorder of intellectual development and with absence of functional language". A minority of autistic individuals may experience regression and usually the occurring is around the second year of life and mainly affecting language use and social responsiveness. There are two alternative specifications that indicate whether loss of previously acquired skills is part of the clinical history, that is, 6A02.x0: No loss of previously acquired skills, 6A02.x1: Loss of previously acquired skills (WHO, 2019).

Since there is no valid biomarker for the diagnoses of autistic individuals (Lord et al., 2022), the autistic specific experiences as describe above needs to be considered. It's important to recognize that individual symptoms are not unique to autism. They can be present in other conditions or in the general population (AWMF, 2016). Early surveillance can therefore be crucial, as when older, diagnosis can be challenging (Lord et al., 2022; (AWMF, 2016). In older children, adolescents and adults, diagnosis is often made more difficult by the fact that they have learned over the course of their lives to suppress conspicuous symptoms such as repetitive behavior or to compensate for difficulties in social interaction and communication. These strategies and behaviors are also known as masking or camouflaging. Compared to males of the same age, where the probability of a diagnosis is four times higher, women are often better at masking. (Alaghband-Rad et al., 2023; WHO, 2022). In addition, a diagnosis should be made by a multi-professional team. Due to the complex differential diagnosis, a specialist in child and adolescent psychiatry or adult psychiatry and/or psychotherapy should be consulted, depending on the age of the patient. At least one person close to the patient should also be involved in the diagnosis. For example, adults suspected of having autism should involve people who are familiar with early developments and/or documents from early childhood, e.g., reports from kindergarten and school (Witzmann & Kunerl, 2021). In case of suspected symptoms, the S3-Guidline proposed by the AWMF in 2016, suggests a the three-stage process which consist of fist, symptom assessment, second, screening and third, diagnosis. For the screening, there a various instruments (e.g., questionnaire) which can be looked up in Figure 2 (Lord et al., 2022). With the help of a systematic screening, an confirmation of autism diagnoses, an appropriate diagnostic procedure can be initiated. If the suspicion is not confirmed, still, an alternative psychiatric or neurological differential diagnoses can be considered or the development of symptoms should continue to be monitored closely (AWMF, 2016).

Figure 2: *Examples of standardized instruments for the assessment of autism*



Note: Flowchart of examples of standardized instruments for the assessment of autism. Reprinted from "The Lancet Commission on the future of care and clinical research in autism", by C. Lord et al., 2022. Copyright 2021 by Elsevier Ltd.

2.1.3 Epidemiology

As mentioned in the first chapter, the field of autism research has undergone a significant transformation over the years. Initially, it was a narrowly defined, rare disorder confined to childhood (Lord et al., 2018), but it has since transformed into a widely acknowledged and extensively studied lifelong condition. This shift has been accompanied by

discussions of an "epidemic" of autism due to the observed increase in prevalence rates over the past few decades (Chiarotti & Venerosi, 2020). In publications dating back to 1966, the prevalence of autism was initially estimated at around 5.5 per 10,000 people, rising to around 7.5 per 10,000 people by the end of the 1980s, coinciding with the change in diagnostic criteria (Ladwig, 2023). According to a recent study, the global prevalence of autism is estimated to be approximately 1% (Talantseva et al., 2023), while in Germany, the prevalence is estimated to be around 0.38% (Roy & Starte, 2023). This upward trend in prevalence has been attributed to several factors, including increased community awareness and changes in diagnostic criteria (Mazurek et al., 2023; Zeidan et al., 2022). However, according to the systematic review conducted by Talantseva et al. (2023), the studies included were predominantly from high-income countries (83.5%), with the majority originating from the USA (23.5%). A study conducted by the Centers for Disease Control and Prevention (CDC) from the United States, indicate an even higher prevalence rate, in 2018, where an average of 2.3% of 8-year-old boys were affected by autism (Maenner et al., 2021). In addition, national health registers in Denmark, Finland and Iceland, as well as registers in south-eastern and south-western France, showed different prevalence rates in 7- to 9-year-olds in 2015, ranging from 0.48% to 3.13% (Ladwig, 2023). As the number of children identified as autistic has increased, there has been a corresponding increase in the number of autistic adults within the Medicaid system, which serves as a major insurance provider for autistic adults in the US (Rubenstein et al., 2023). Rubenstein et al. (2023) also found that over a 9-year period, 403,028 adults had autism claims in their Medicaid records, of which 25.7% were female and 74.2% were male. Ethnic distribution of these adults is 3.3% Asian, 16.8% Black, 12.2% Hispanic, 0.8% Native American, 0.8% Pacific Islander, 74.3% White, and 4.2% multiracial. Notably, the largest increase over the nine-year period was in the 25-34 age group (195%), while the smallest increase was in the 55-64 age group (45%) (Rubenstein et al., 2023).

Across all age groups, the incidence of autism was consistently found to be at least twice as high in people of Caucasian descent as in people of other ethnicities. Historically, people with autism from marginalized groups have faced barriers to health care and people from disadvantaged ethnic backgrounds were diagnosed less often and received services later than their white counterparts, resulting into a variation in prevalence (Rubenstein et al., 2023; Zeidan et al., 2022). Importantly to note, there is an unequal gender ratio in prevalence. Contrary to previous studies suggesting a male to female ratio of 4:1, Loomes et al. (2017) found a ratio closer to 3:1 in their prevalence rates, suggesting a potential gender bias (Rubenstein et al., 2023). Additionally, it is known that

females with (without ID), hide their autistic traits better than males, making them vulnerable to under-recognition and delayed diagnostic assessment (Lehnhardt et al., 2016). Overall, the prevalence of autism is still not well defined worldwide, with significantly higher numbers reported in different countries and continents, while case numbers in low-income countries remain unclear due to a lack of assessment and diagnostic tools (Sauer et al., 2021).

2.1.4 Etiology

The exact cause of autism is still unclear, researchers have identified several genetic and non-genetic risk factors that may contribute to the onset of the disorder, either individually or in combination. One can assume that autism spectrum disorders can have very different causes (Sauer et al., 2021), also meaning that autism is a multifactorial neurodevelopmental disorder with a combination of genetic and environmental factors (Karimi et al., 2017). Currently, there are no diagnostic biomarkers for autism, and diagnosis is based on the identification of characteristic features, such as repetitive behaviors and challenges in social communication and interaction as already explained in chapter 2.1.2 (Sauer et al., 2021).

In order to explain the possible causes of autism, factors such as, genetic factors or non-genetic factors such as environmental factors are taken into account in various studies- Bai et al. (2019), proves that autism is highly heritable: The study conducted by Bai et al. (2019), found a significantly higher concordance for ASD diagnosis in monozygotic twins compared to dizygotic twins, indicating a strong genetic component. Additionally, the risk of siblings developing autism was found to be up to 50 times higher than in the general population. The heritability rate is 37% to 95%, while more recent population studies suggest a genetic contribution to autism risk of around 81% (Bai et al., 2019). Furthermore, subclinical autism traits were frequently observed in first-degree relatives, reinforcing the involvement of genetic factors. Another study by Wei et al. (2021), comprehensively reviewed genes associated with autism. They identified six candidate genes, through meta-analyses and systematic reviews. These genes were selected based on their consistent association with autism risk across studies. Among them, the MTHFR C667T variant emerged as a notable risk factor for autism, as indicated by the results of several literature reviews included in the study (Wei et al., 2021). However, about 70 percent of the affected autistic individuals cannot be explained by a genetic etiology (Zhang et al., 2021).

While autism is primarily attributed to genetic factors, environmental factors are thought to influence the expression of symptoms (Johnson & Myers, 2007) and have been found to be at least as important as genetic factors (Taylor et al., 2020). These factors can be divided into three categories that include prenatal risk factors, natal risk factors and postnatal risk factors (Karimi et al., 2017). Examples for prenatal could be: older parental age is associated with an increased risk of autism in offspring, possibly due to spontaneous de novo mutations or changes in genetic imprinting (Johnson & Myers, 2007; Karimi et al., 2017). Studies discovered that older paternal and maternal age are associated with an increased risk of the offspring with autism, possibly due to spontaneous de novo mutations and/or changes in genetic imprinting (Johnson & Myers, 2007). Furthermore, multiple studies have investigated the use of maternal medications during pregnancy. Exposure to valproic acid prenatally has been linked to a higher likelihood of autism (Lord et al., 2018). In terms of natal risk, the risk factors at birth can include fetal complications such as fetal distress, e.g. umbilical cord complications such as fetal nuchal cord and caesarean delivery (Karimi et al., 2017). Postnatal risk factors, including low birth weight, jaundice, and postnatal infections, stand out as the most significant contributors for a higher probability of autism (Karimi et al., 2017).

Additionally, neuropathological studies on autism suggest abnormalities within the central nervous system (CNS) evident in both gross morphology and cellular structure. For example, in studies examining neuropathological features, infants later diagnosed with autism were found to have a larger head circumference and intracranial volume. However, anatomical irregularities observed in older people, such as increased intracranial volumes, decreased cerebellar volumes and changes in the volumes of certain brain regions, have not been consistently found in large-scale studies (Sauer et al., 2021).

2.1.5 Co-occurring conditions

In the literature about autism, the term "comorbidity" is often used instead of "co-occurring conditions". In this paper, however, the term "co-occurring" is used as it is preferred by the autistic community and also autism is not a disease, even though it co-occurs with medical conditions or neurodivergences (Monk et al., 2022). Nevertheless, it is important to explain the term "comorbidity" to clarify its meaning in the context of autism. Comorbidity refers to the presence of one or more additional diseases or disorders alongside a primary one. It also represents a secondary diagnosis with core characteristics distinct from those of the primary disorder. Having one or multiple co-

occurring medical condition are more common withing the autistic population than the general population (Al-Beltagi, 2021).

Given that autism is a lifelong condition, the issue of co-occurring conditions holds significant relevance for a patient-centered health research, particularly as the average age of our population continues to rise (Casanova et al., 2020). In the past, psychiatric problems in both children and adults with autism were often attributed solely to autism itself. Therefore new research suggested that behaviors and symptoms traditionally considered secondary to autism actually indicate the presence of co-occurring conditions that may require a separate diagnosis (Romero et al., 2016). Recognizing this complexity, the DSM-5 permits the diagnosis of multiple conditions, including autism and ADHD, within psychiatry (Lord et al., 2018). Co-occurring conditions often exacerbate symptoms and affect the patient's emotions, behavior and self-perception, making diagnosis and treatment more complex and impacting patient and physician expectations. In order to provide an effective treatment and prognosis, it is curial to understand and monitor co-occurring medical conditions (Casanova et al., 2020).

In a study analyzing neurological, cognitive, psychiatric, and physical co-occurring conditions, it was found that the majority (74%) of individuals with autism had at least one co-occurring conditions, with an average higher number of co-occurring's than their siblings who are non-autistic (Khachadourian et al., 2023). Additionally, findings from a Swedish study conducted by Lundström et al. (2015), underscored the significant burden associated with autism, revealing that over 50% of individuals with autism, had four or more co-occurring conditions.

Matson & Goldin (2013) compiled a list of conditions in their systematic review, aiming to spotlight the most frequently studied conditions in connection with autism. For physical co-occurring conditions, the most commonly studied topic has been epilepsy and sleeping disorders. From most common to least common are: Gastrointestinal Disease, Autoimmune Disease, Developmental Coordination Disorder, Hearing Impairment, General Neurologic Disease, Seizures, Obesity, General Medical Disease, Cerebral Palsy, Birth Defects, Lyme Disease, Leopard Syndrome, Awkwardness, Handwriting Disorder, Motoric Disorder and Broken Bones. Another category that is covered, includes a general discussion of challenging behaviors which is, stereotypies, delinquency, aggression, self-injurious behavior, disruptive behavior, and selective eating. As for psychopathology co-occurring's prevalence data shows that the rate of ADHD in autism is over 50%. Furthermore, the prevalence in psychopathology are as follows (also from

ranking to most frequent to less): Anxiety disorders, depression, the combined themes of schizophrenia and psychosis, tics and Tourette syndrome, bipolar disorder, specific language impairment, catatonia, eating disorders, hoarding, gender identity disorder, and oppositional behavior disorder. ID stands out as being the most common co-occurring condition alongside autism, with estimates suggesting that up to 70% of individuals with autism. An ID is characterized by deficits in both cognitive and adaptive functions with an intelligence quotient (IQ) of less than 70 (Strang et al., 2012; Matson & Goldin, 2013). Given the significant overlap between ID and autism and their tendency to co-occur with other conditions, they pose significant challenges for mental health professionals as two of the most common, severe, and debilitating disabilities. As for co-occurring psychopathology, this is a widely studied area of research, with prevalence data indicating that ADHD co-occurs with autism in over 50% of cases. Prevalence rates of other psychopathologies, listed from most common to least common, are: anxiety disorders, depression, schizophrenia and psychosis, tics and Tourette's syndrome, bipolar disorder, specific language impairment, catatonia, eating disorders, hoarding, gender identity disorder, and oppositional defiant disorder. In addition ID is a prominent co-occurring condition with autism, with estimates suggesting that up to 70% of individuals with autism also have ID. This significant overlap between ID and autism, along with their tendency to co-occur with other conditions, presents significant challenges for mental health professionals given their status as two of the most common, severe, and debilitating disabilities (Matson & Goldin, 2013).

2.2 Utilization of Psychotherapy

This chapter reviews current research on the use of outpatient psychotherapy among autistic adults and presents findings through the lens of the Andersen model. It includes subsections on psychotherapy, the behavioral model, and culminates in a synthesis in the last section of this work, identifying the research status as on predictors of outpatient psychotherapy utilization among autistic individuals.

2.2.1 Psychotherapy

Given that autism is a lifelong condition, it cannot be expected that the core characteristic will disappear (Lipinski et al. 2019). The goal of therapeutic support options is to facilitate or enable participation in social life for autistic people, especially to those who are also confronted with mental health problems (Frese, 2022). Also, since co-occurring mental disorders have an exacerbating effect on the core characteristics of autism and influence the general course of development and outcome, the treatment of co-occurring mental disorders is highly relevant (AWMF, 2021). Given the incurable nature of autism,

statutory health insurance in Germany only covers therapies that are considered "curable" according to the German Social Code, Book V (SGB-5) (Beauftragter der Bundesregierung für die Belange von Menschen mit Behinderungen, 2023). Consequently, insurance coverage is primarily focused on the treatment of co-occurring conditions, such as psychotherapy for depression, rather than direct treatment of the core characteristics of autism (Frese, 2022). Further, outpatient psychotherapeutic treatment in Germany in particular, is only provided by licensed psychotherapists in local psychotherapeutic practices (Lipinski et al., 2022).

The range of interventions available for autistic children and adults varies greatly across the world and even within countries (Lord et al., 2018). However, it should be noted that most interventions are still designed for children or autistic people with severe support needs (Frese, 2022). Importantly an intervention should be selected flexible, which should be based on the specific individuals support need or co-occurring conditions (Frese, 2022). In the S3-Guideline, it is emphasized that individual treatment goals should be defined at the beginning of treatment, based on both, the core characteristics of autism and co-occurring psychiatric disorders of which practitioners can consult disorder-specific psychotherapeutic concepts to find appropriate coping strategies (AWMF, 2021). The British manual NICE from the UK, primarily recommends social skills training in individual or group settings (NICE, 2021). Social skills training involves teaching autistic children how to interact with their peers through direct, face-to-face instruction in conversation, friendship, and problem-solving skills in real-life situations (Soares et al., 2021). Additionally, the predominant evidence-based options include cognitive-behavioral therapy (CBT) and complementary/integrative mindfulness strategies, which are known for their effectiveness in reducing psychiatric symptoms such as depression in autistic adults without intellectual disabilities. With CBT, the aim is to enable people to take control of how they interpret and deal with things in their environment. In contrast, mindfulness-based interventions focus on changing thoughts and emotions by distancing oneself from them and aim to improve emotion regulation and self-awareness (Benevides et al., 2020).

Generally there are various types of treatment which could be named as behavioral, developmental, educational, social-relational, pharmacological, psychological, complementary and alternative (Centers for Disease Control and Prevention, 2022). Figure 3 outlines additional interventions specifically tailored to autistic adults, as detailed by Roy and Strate (2023). A few example manuals that are commonly used and show some evidence, will be introduced in the following:

One intervention manual that has generated significant empirical research and demand for services is the TEACCH (Treatment and Education of Autistic and Communication Handicapped Children) program (Virues-Ortega et al., 2013). It belongs to a the most well-known form of treatment which is the “Applied Behaviour Analysis (ABA)”. ABA, seeks to foster favorable behavioral modifications by leveraging principles of learning. The methodology operates under an optimistic premise, positing that environmental alterations can induce behavioral changes (Frese, 2022). The goal of the TEACCH program is to provide a safe and nurturing environment for autistic children and to help them develop the skills necessary to become independent learners. It is based on research, where individualized intervention plans that promote holistic development, and the integration of multiple methodologies including structure and visual supports (Frese, 2022; Colleen et al., 2019). Specific examples can be arranging activities in a predictable way (e.g., using visual schedules for the daily routine) or organizing materials and tasks to encourage the use of visual materials (Colleen et al., 2019).

KONTAKT and an the Zurich skills training for young people with autism spectrum disorders (COMPASS) are two structured training programs that were originally developed for children and adolescents with autism, but can also be transferred to adults. KONTAKT consists of several modules to teach basic social skills such as establishing and maintaining contact, understanding social rules, interpreting verbal and non-verbal signals, problem solving and increasing self-esteem. Similarly, COMPASS focuses on enabling participants to choose behaviors that match their current needs and social context, while improving their social skills and awareness of socio-emotional cues. Both programs include group training sessions that can be adapted to individual therapy situations (Frese, 2022).

Currently, there is an ongoing study as part of a randomized controlled trial (RCT) which is investigating a novel therapy concept to improve social skills in autistic adults without ID. The project, which is supported by the German Research Foundation (DFG), focuses on the effects of FASTER and SCOTT training (see figure 3). Participants are randomly assigned to one of three groups: Treatment as usual (TAU), SCOTT&EVA or the FASTER group therapy. SCOTT&EVA is an internet-based training that improves emotion recognition and understanding of complex social situations, while FASTER is a group therapy via video call, focusing on specific stress management, emotion recognition, communication, understanding two-way communication (social interaction) and discussion of important interactive skills with exercises (Tebartz van Elst et al., 2021).

For autistic adults, employment is a major challenge and requires special support. The whole process of finding employment can be daunting, with man struggling to manage aspects such as job searching, making initial contact with potential employers and further communication (Frank et al., 2018). With a unemployment rate of an estimated 50% for autistic adults, as reported by Ohl et al., (2017), the need for interventions such as vocational training programs becomes clear. Besides that, unemployment has also been identified as a risk factor for depressive disorders (Albantakis et al., 2018). Chadsey-Rusch (1992), for example, highlighted the crucial link between social skills and favorable employment outcomes. Figure 3 illustrates two vocational training interventions. Of these interventions, Job Tips, is an accessible online training program designed to improve the job interviewing skills of autistic individuals without ID. Using the Theory of Mind-based instruction, video demonstrations, visual supports, and virtual reality exercises, Job Tips aims to teach appropriate job interview skills. The Research conducted by Strickland et al. (2013) also found improvement in verbal skills among participants who underwent the program compared to those who did not. Similarly, Morgan et al. (2014) conducted job application training in a group setting with the goal of improving social pragmatic skills critical to successful job interviews. The study found that the experimental group, which received this training, showed greater improvements in social-pragmatic skills during simulated job interviews compared to the control group.

In terms of potential therapeutic options, pharmacotherapy may serve as a means of relieving co-occurring symptoms. However they do not have an effect of the core features of autism (Lord et al., 2018). For example, selective serotonin reuptake inhibitors (SSRIs) are often prescribed for co-occurring anxiety disorders or depression, while methylphenidate or atomoxetine are often used for co-occurring ADHD (AWMF, 2021). However, it should be noted that autistic people often have an increased vulnerability to drug-related adverse effects such as sedation and weight gain, which can pose risks to their long-term health (Lord et al., 2018; Frese, 2022). Caution is therefore required, especially when administering psychotropic drugs to children and adolescents, which requires careful monitoring and gradual adjustment of the dosage (Frese, 2022). It is worth noting that, according to the S3 guideline, the administration of antipsychotics such as risperidone or aripiprazole may be considered for a limited period of several weeks in cases of severe stereotyped behavior (AWMF, 2021). However, the evidence to support their use in adults is limited. For example, the effect size for risperidone is reported as a standardized mean difference (SMD) of 0.97 with a 95% confidence interval of [0.21; 1.74], while the effect size for aripiprazole (for children/adolescents) is reported as a SMD of 0.48 with a confidence interval of [0.26; 0.70] (Siafis et al., 2022).

Figure 3: *Therapeutic interventions for autistic adults*

Reference	Evidence level	Intervention	Effects	Comment
PEERS for young adults				
Gantman et al., 2012 (39) Laugeson 2015 (28)	Randomized controlled trials	Group training social competency with support by caregivers/reference persons/attachment persons for 14 weeks (one 90 minute session/ week)	• Gantman et al., 2012 (39) n (treatment) = 9, n (control) = 8 MANOVA: significant improvement in social competencies in different tests Wilks' Lambda = 0.34; F (1.16) = 4.27; p < 0.02 • Laugeson et al., 2015 (28): n (treatment) = 1; n (control) = 10 MANOVA: significant improvement in social competencies in different tests Wilks' Lambda = 0.14; F(5.11) = 12.43, p < 0.001	• No German language version available • Very small number of subjects
FASTER Manual				
Ebert et al., 2012 (26)	Non-controlled individual case studies	Group psychotherapy, modules: psychoeducation, stress management, training in social communication	• Decrease in depressive symptoms (BDI), n = 12: M1 = 17.42 (SD = 12.64), M2 = 11.33 (SD = 11.32), p = 0.027 • Increase in general self esteem (ASW), n = 12: M1 = 82.08 (SD = 33.09), M2 = 92.67(SD = 26,20); p = 0.028 • Improved quality of life (WHOQOL-BREF), n = 11: Environment: M1 = 15.55 (SD = 2.42), M2 = 16,75 (SD = 1.88), p = 0.048	• In German • RCT under way (van Elst et al., 2021) (40)
GATE Manual				
Gawronski et al., 2012 (27)	Non-controlled individual studies	Group psychotherapy, focus: psychoeducation, stress management, training for social competency	• Patients' experience of effective factors, n = 10: STEP-K: T = 45.4, STEP-P: T = 46.8, STEP-B: T = 54.1 • Trend to decrease of depressive symptoms (BDI-II), n = 10: M1 = 15.7 (SD = 15.3), M15 = 12.2 (SD = 16.8), p = 0.075	• In German
High functioning autism in adults (cognitive-behavioral therapeutic manual)				
Dziobek and Stoll, 2019 (25)	Authors' clinical experience	Individual psychotherapy, modules: psychoeducation, self esteem/identity, stress management, socio-emotional competency, partner relationship, professional orientation	• Not described	• In German
Job application training in a group setting				
Morgan et al., 2014 (29)	Randomized controlled trial	Training of skills relating to the application process over 12 weeks, among others via role play, video feedback, peer review	• Significant increase in job application skills, n (training) = 12; n (control) = 12: M (training) = 0.87, SD = 1.99; M (control) = –0.87, SD = 1.99 t (23) = 2.14, p < 0.05, Glass's delta = 0.87	• Very small number of subjects
JobTIPS; Job application training in an internet based individual setting				
Strickland et al., 2013 (30)	Randomized controlled trial	5 internet based and "virtual reality" lessons regarding job related interests, finding/ maintaining, and holding down a job, further job related themes	• Significant improvement to what is said in the answers in the job interview, n (training) = 11; n (control) = 11: M (training) = 0.448, SD = 0.41; M (control) = −0.034, SD = 0.17 F(1.20) = 17.46, p < 0.0001, η^2 = 0,47	• www.Do2Learn.com/ JobTIPS • Very small number of subjects

Note. Overview of therapeutic interventions for autistic adults. Reprinted from "Autism spectrum disorders in adulthood—symptoms, diagnosis, and treatment", by M. Roy and P. Strate, 2023, p. 87-93, Copyright 2023 by Dtsch Arztebl Int.

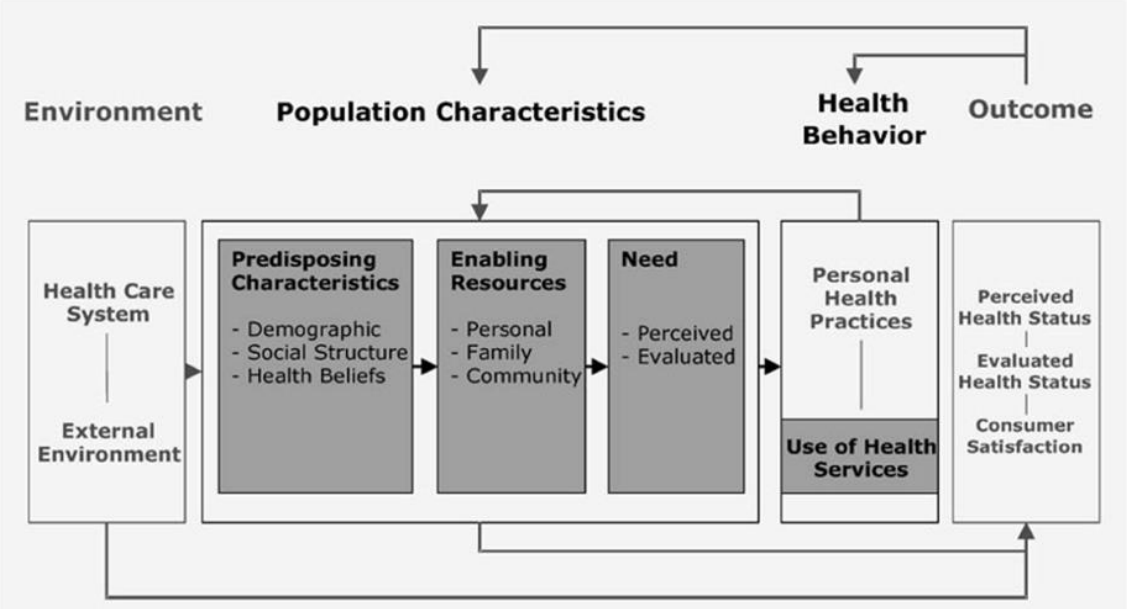
2.2.2 Behavioral Model of Health Services Utilization

The Behavioral Model of Health Service Use, formulated in 1968 by Ronald M. Andersen, an American medical sociologist and health services researcher, serves as a widely

accepted framework for describing utilization patterns in various health care settings (Babitsch et al., 2012).

Meaningly the framework provides a flexible and strong analytical structure for discussion, with variables that can be tested and applied in a variety of settings (Alkhawaldeh et al., 2023). Accordingly, the inclusion of this framework seems appropriate for this present study. In an effort to improve our understanding of the potential determinants affecting outpatient psychotherapy utilization, the behavioral model by Andersen not only provides a robust conceptual framework, but also serves as a valuable structural guide for identifying predictors, as discussed by Thode et al. (2005). Figure 4 gives an structural overview of the framework:

Figure 4: *Behavioral model for the use of health services*



Note: The theoretical framework by R.M. Andersen's health behavior model, which divides the influencing variables into the components predisposing characteristics, enabling sources and need factors. Reprinted from „Einflussfaktoren auf die ambulante Inanspruchnahme in Deutschland“, by N. Thode, E. Bergmann, P. Kamtsiuris and B.-M. Kurt, 2005, Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz, 48(3), p. 296–306. Copyright 2005 by © Springer Medizin Verlag.

The relevant category here are the “Population Characteristics” of the model, which divides into three categories of determinants for help-seeking health services. The “Predisposing characteristics”, typically, includes individuals' demographic and social attributes, as well as their health beliefs (Chen et al., 2021). This encompass demographics (e.g., biological imperatives such as gender, age), social structure (e.g.,

education, occupation, ethnicity), and health beliefs (e.g. attitudes, values) (Chen et al., 2021; Andersen, 1995). As for the “Enabling resources”, this encompasses family attributes like income, or own insurance coverage, accessibility to services and community features, e.g. own geographic location (Andersen, 1995). The “Need factors” describe the need for medical treatment, which directly influence the utilization of health care services (Andersen, 1995). A distinction is made between the patient’s perceived need and the evaluated need objectified by a professional assessment. Health status categories, as assessed by professionals, encompass factors such as disease severity, duration, and symptom intensity. Perceived health status encompasses overall quality of life, self-perceived health, activities of daily living (ADL), depression, psychosocial distress, and other psychological variables (Boer et al., 1997). Together, these factors interact on an individual and contextual level and influence healthcare utilization (Chen et al., 2021).

Research conducted in Germany, Hong Kong, and Taiwan, as demonstrated by Chen et al. (2021), underscores that factors linked to the necessity for medical care substantially influence variations in healthcare utilization. This discovery is strengthen by an earlier systematic review, which underscores that factors related to need are predominantly responsible for elucidating healthcare utilization, while "predisposing characteristics" and "enabling resources" play a secondary role in physician engagement (Boer et al., 1997).

2.2.3 Research status on predictors of outpatient psychotherapy utilization

Current guidelines from both the NICE and the S3-Guidline from Germany emphasize the use of psychosocial interventions in the treatment of co-occurring mental health conditions (NICE, 2021; AWMF, 2021). Strengthening this approach, recommendations from the National Health Service et al. (2023), emphasize the importance of providing accessible and effective mental health support to autistic adults at an early stage, with the aim of preventing worsening of symptoms and potentially reducing reliance on more intensive and costly inpatient care. In one particular case, detailed by Mandell et al. (2019), an analysis of claims data from more than 100,000 commercially insured children with autism found that spending on autism-specific outpatient services led to a slight but statistically significant reduction in the likelihood of subsequent psychiatric hospitalizations.

There is an acknowledged high demand for psychotherapy in co-occurring medical condition among autistic adults, as highlighted by Lipinski et al. (2019). In an older Australian national survey of autistic adults by Baldwin and Costley (2015), 73% of

participants reported a need for ongoing professional support to regulate or improve their mental health and well-being. In Germany, the increasing demand for psychiatric care is reflected in the growing number of specialized psychiatric outpatient clinics and other services tailored to autistic adults, which is a positive development. However, the waiting times can be up to 2-3 years, which is still not adequate (David, Dückert & Gewohn et al., 2022). Despite the recommendation on psychological intervention, a significant portion of autistic individuals does not access health care services. In fact, Lipinski et al. (2019) found that only 22% of adults diagnosed with autism (without ID) received psychotherapy. This percentage is significantly lower when compared to control groups consisting of non-autistic individuals with depression (ebd.). In addition, Lipinski et al. (2019) also shed light on the reasons why autistic adults seek psychotherapy after diagnosis, including the most common reasons being depression (76%), communication problems (48%) and social anxiety (44%). A different percentage is shown in a study conducted by Dudley et al. (2019), in which 274 caregivers participated. Their results show that 53% of their autistic adults (with and without ID) had used mental health services in the last two years. In a nationwide survey of autistic adults with ID and their caregivers in the United States, Schott et al. (2021) reported that 52.8% of participants had unmet needs for mental and behavioral health services. This study also examined the predictors of service utilization and found that ethnicities of African American and Hispanic descent, age over 21, and having a college degree indicated lower utilization of services (Schott et al., 2021)

Despite the apparent therapeutic need among adults diagnosed with autism, appropriate access to health care services is inadequate. In contrast to the variety of specialized treatments available for children and adolescents, there are few tailored options for adults without ID (Schweizer et al., 2024), suggesting a shift in service delivery according to age-related changes (Chan & Doran, 2023). The lack of need is noted in some of the literature, and some of the literature has identified barriers and needs. A recent qualitative German study by Dückert et al, (2023) covers the reasons for poor mental health care for autistic adults in Germany. These were characterized by lack of knowledge about autism among health care professionals, need for greater involvement/participation (consideration of autism-specific needs in treatment), lack of services, limited access to services, and improved collaboration among stakeholders (Dückert et al., 2023). The systematic review by (Adams & Young, 2021) also reports that the most common barriers to accessing mental health and emotional/behavioral services were lack of therapist knowledge and therapist unwilling/inability. This is also highlighted in the study by Maddox et al. (2019), which examined factors influencing the

use of CBT in autistic adults. The findings revealed that the majority of clinicians lacked strong intentions to initiate for autistic adults seeking treatment for anxiety or depression (Maddox et al., 2019). In outpatient care settings, patients typically have autonomy in deciding whether to seek treatment, in contrast to the more structured approach of inpatient care. Therefore, It is often a challenge for autistic adults to contact a therapist (Lipinski et al., 2019). This reduced engagement is often attributed to individual-level challenges, such as communication and interaction difficulties (David, Dückert & Gewohn et al., 2022).

Currently, there is a deficit of literature that specifically addresses the predictors of outpatient psychotherapy use among autistic adults. Most of the existing literature focuses on general health services and examines factors influencing psychotherapy utilization from the perspective of health professionals or caregivers of autistic adults. Barriers to mental health care can be discussed at three different levels (David, Dückert & Gewohn et al., 2022), with some literature covering the system or structural level and to some extent the professional level. However, there is a need for more research examining the individual level. Examining the literature on depression can provide valuable insights, as depression is a common co-occurring medical condition among autistic adults. For example, Kauhl et al. (2019) shed light on factors that influence the use of psychotherapeutic services for depression. Their study is in line with earlier findings from the study "Gesundheit in Deutschland aktuell" (GEDA) by Rommel et al. (2017), which also identified significant determinants. In addition, Rommel et al. (2019) investigated the utilization of psychiatric and psychotherapeutic services, examining both individual and regional factors. Similarly, Fischer-Kern et al. (2005) focused on identifying predictors of psychotherapy utilization. Thode et al. (2005) conducted a comprehensive study of various factors influencing the utilization of outpatient services. These studies were all conducted in Germany. The presented key literature along some others, are categorized according to the three underlying categories of the Anderson model, namely "Population Characteristics":

Within the ***predisposing characteristics*** category, several factors have been linked to the utilization of mental health services. Specifically, women (Thode et al., 2005; Rommet et al., 2019), unemployment status (Thode et al., 2005; Kauhl et al., 2019; Fisch-Kern et al., 2006), high socioeconomic status (Rommet et al., 2019), and higher educational attainment (Fischer-Kern et al., 200) showed correlations with the use of mental health services. The findings concerning age, however, present inconsistencies. Thode et al. (2015) suggest that women are more likely to access mental health services

at a younger age, while men tend to do so at an older age. However middle aged people showed the least contact rates. In contrast, Rommel et al. (2019) report that the highest utilization rates occur among individuals aged 50-59. There is a prevailing assumption that the utilization of mental health services diminishes with increasing age (Rommel et al., 2019; Kauhl et al., 2019). The study by Chen et al. (2021) also provides important insights as they examine the components of the Anderson model in a detailed empirical literature analysis. While age shows a notable association with health care use, there is also some inconsistency in terms of whether an older or younger population has higher health care utilization. In contrast, gender and education show a more consistent pattern in the literature, suggesting, for example, that women are more likely to use health services than men. One of the ***enabling factors*** is that individuals residing in densely populated and urban areas, such as cities, have a higher tendency to utilize mental health services (Khaul et al., 2019; Rommel et al., 2019). Furthermore, persons who are not in a marriage or relationship are more likely than others to use appropriate treatment (Rommel et al., 2019). Among the predictors of utilization, **need factors** play a decisive role. Utilization tends to increase with an increasing number of chronic diseases, as shown in the study by Kauhl et al. (2019), or in the presence of at least one disease with a chronical course, as found by Rommel et al. (2019) and Thode et al. (2005). Boerema et al. (2016) conducted a cross-sectional study of help-seeking behavior in depression and revealed that longer symptom duration positively influenced help-seeking behavior, while higher personal stigma was associated with a decreased tendency to seek help.

The literature introduced, provides a basis for exploring various predictors and not all can be used for this study the exact way as in the literature. For example, factors such as residence in urban areas may present a measurement challenge since this study has no specific data on whether they reside in urban or non-urban areas. When exploring predictors in the "Need Factors" category, it could be useful to consider both the level of support needed for autism-specific challenges according to DSM-5 criteria and the presence of co-occurring mental and physical health problems. One study has already used this classification and shown that “higher parent-reported symptom severity” correlates with higher use of therapies and specialized services for autistic children (Zuckerman et al., 2017). Additionally, the severity of psychiatric disorders can be of clinical importance as it determines the level of care required and influences the decision to seek state assistance for psychiatric challenges (Zimmermann et al., 2018). It suggests that children with more severe parent-reported symptoms receive a greater number of therapy services overall (ebd). Additionally, it is more common for autistic adults to have co-occurring medical conditions than the general population (Al-Beltagi,

2021), so this may be an interesting factor to consider as well. Importantly, it should be noted that the applicability of the Anderson model is context dependent, as demonstrated by the systematic review by Babitsch et al. (2012), which found notable inconsistencies in user-related outcomes, particularly depending on the different contexts and heterogeneity of the study populations examined.

3 Research questions and hypothesis

Following Anderson's (1995) model, the primary objective of this study is to investigate the factors that impact the utilization of outpatient psychotherapy among adult individuals with autism and explore variance within these outcome. The various studies (see chapter 2.2.2) show that adults with autism make less use of psychotherapy than those with other mental disorders or to a non-autistic population. Based on the current research findings, there is a notable lack of studies focusing on the utilization of psychotherapy among autistic adults. However, other epidemiologic studies have identified several factors that influence individuals' engagement with health care services generally. Given the limitations of including all of these factors within the scope of this paper, a set of ten factors were defined, based on the Anderson model and the literature review, to encompass a diverse range of variables. The investigation of this study might help finding autistic specific factors that explain variance in psychotherapy utilization or even individual barriers. Consequently, the research question guiding this study relates to the investigation of predictors that may explain variance in the utilization of outpatient psychotherapy among autistic adults:

- To what extent do “predisposing factors” such as age, gender, employment status, level of education, income and “enabling factors” including being in a partnership and “need factors” such as psychological/physical co-occurring’s and the level of support need (in social interaction and flexibility in behavior), contribute to explaining variance in utilizing outpatient psychotherapy among autistic adults living in Germany?

From the research question, hypotheses are formulated. The following hypotheses are statistically tested using binary logistic regression:

Null hypotheses (H_0): The variables gender, employment status, income, educational background, age, family status, co-occurring psychological, co-occurring physical,

support social interaction and support flexibility in behavior are not significant predictors of utilization in outpatient psychotherapy among autistic adults in Germany.

Alternative hypothesis (H_1): The variables gender, employment status, income, educational background, age, family status, co-occurring psychological, co-occurring physical, support social interaction and support flexibility in behavior are significant predictors of utilization in outpatient psychotherapy among autistic adults in Germany.

4 Method

This chapter provides a detailed description of the methods used in this thesis. First, the "BarrierfreeASD" (BASS) project, which forms part of the data basis, is presented. This is followed by more detailed information on the study design, recruitment and the study population. Relevant variables and the instruments, which are divided into dependent and independent variables, are then presented. This chapter also includes a description of the analytical approach and a description of the verification of the assumptions for the analysis.

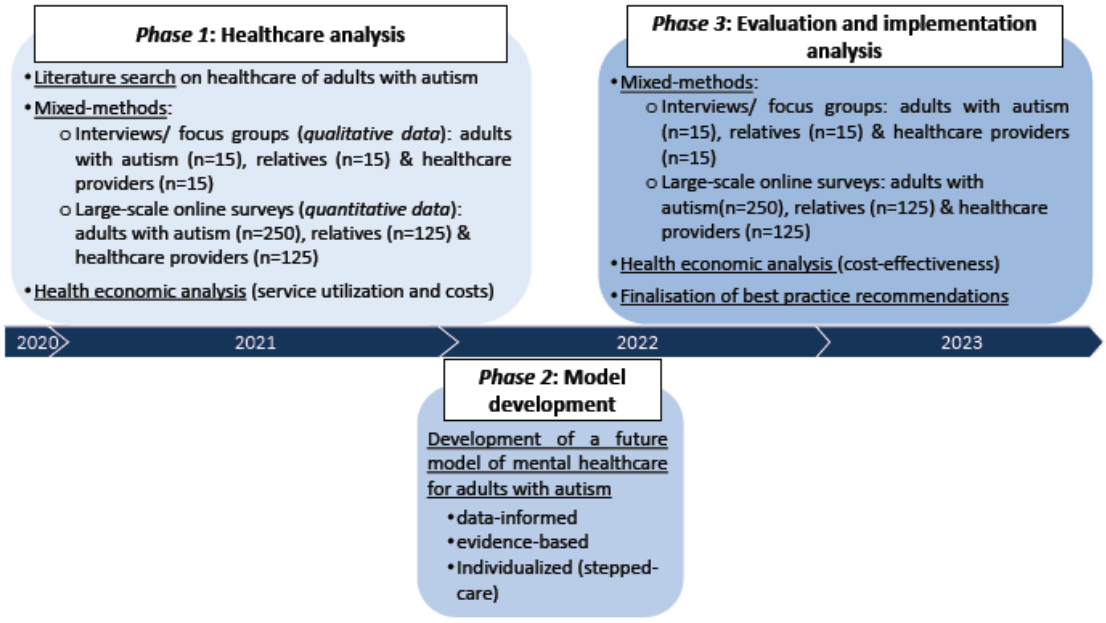
4.1 Data basis (BarrierfreeASD)

This master thesis is part of the project "BarrierfreeASD (BASS)", which is carried out by the Department of Medical Psychology at the University Medical Center Hamburg-Eppendorf (UKE).

Throughout the research project, there are three phases (see Figure 5) with two waves of data collection involving three groups of participants: autistic adults, relatives of autistic adults and professionals or clinicians. The first phase, "Health System Analysis," was initiated in 2020 and involved an literature review as the basis for a qualitative questionnaire used in one-on-one and focus group interviews. The primary objective of this phase was to identify barriers, needs and supports in the medical-psychotherapeutic care of autistic adults. Based on these findings, a large-scale online survey was developed as a quantitative approach. Building on these findings, the research team conducted a health economic analysis examining service utilization and costs. Second phase of the project, is based on the findings of the first phase, involved the development of a stepwise health care model with the aim of improving and supplementing existing health care services. In the third phase, "Evaluation and Implementation Analysis", data collection begins again with a qualitative approach through interviews. This qualitative

data collection then transitions into a large-scale survey using a quantitative approach for additional health economic analysis. Finally, the data that are obtained, are used as best practices for implementation within the stepped care model. This sequential combination of qualitative and quantitative methods uses a mixed methods design with its overall goal to optimize the health care system for autistic adults.

Figure 5: *Timeline and three study phases*



Note. From "Mixed-methods investigation of barriers and needs in mental healthcare of adults with autism and recommendations for future care (BarrierfreeASD): Study protocol", by David, N., Dückert, S., Gewohn, P., König, H., Rahlff, P., Erik, F., Vogeley, K., Schöttle, D., Konnopka, A., Schulz, H., & Peth, J., 2022, *BMJ Open*, *12*(8) (https://doi.org/10.1136/bmjopen-2022-061773). Copyright 2022 by BMJ Publishing Group Ltd.

4.2 Study design

This study is based on the second-wave data collection, covering the period from December 2022 to April 2023 (corresponding to the third phase of the project). Using a quantitative approach that involves the analysis of secondary data, the study employs a cross-sectional design that includes data collected from different regions across Germany.

4.3 Recruitment and study population

The participants were searched via publicly accessible contacts to autism organizations, including self-help and support groups. Further contacts were made with health associations such as medical associations and therapist associations, as well as local and national outpatient clinics. Participants were recruited nationwide through a strategic combination of target group, quota and snowball methods. To this end, an extensive cooperation network with cooperation partners was used. In addition, recruitment efforts were extended to various channels, including various social media platforms (David, Dückert & Gewohn et al., 2022). A total of 403 autistic adults, 121 relatives and 167 caregivers from different regions of Germany were finally included. However, the focus of this study is exclusively on the perspective of autistic adults. Therefore, eligible participants within this inclusion group must meet specific criteria, including being 18 years of age or older, having a confirmed diagnosis of autism without intellectual disability (IQ > 70). Individuals with intellectual disability, IQ < 70, limited German proficiency, or the inability to provide informed consent are excluded in this study.

4.4 Data collection

Data for this study were acquired by an online survey conducted on the LimeSurvey platform which is a free and open source web app. Participation was possible from December 2022 to April 2023. The research team provided information about the study and the data protection regulations in an accompanying document to the online survey in advance. This Info is that participation in the survey is completely voluntary and the anonymity of participants is guaranteed throughout the process. All data collected as part of the study, following explicit consent, will be treated in strict confidence and in accordance with the data protection provisions of the European General Data Protection Regulation (EU GDPR). Consequently, participants had to give their consent and indicate their role (choosing from options such as autistic adult, caregiver or healthcare professional) before starting the questionnaire. Depending on the role of the participant, the survey duration ranged between 30 and 60 minutes. Study participants perform a self-assessment by answering a standardized questionnaire containing both open and closed questions. The survey is conducted individually, without an interviewer asking the questions. Due to the online nature of the questionnaire, it is possible for participants to ask a second person for help. Participants didn’t receive any incentive in this survey.

The survey used for this thesis, primarily aims to capture the perspectives and assessments of the participants (autistic adults, their relatives and healthcare

professionals), in relation to the developed concept for better accessibility of healthcare. The framework will be presented through video presentations to facilitate the collection of feedback, evaluations and possible suggestions from participants. It's aim is to incorporate the opinions and assessments of these specific target groups into the refinement of the care concept. Responses are structured as a combination of single/multiple choice questions, numerical entries and questions with a Likert scale as well as free text fields. The survey consists of around 195 items divided into nine overarching topics. The first three sections are dedicated to the following topics: 1) Informed consent, 2) Information on the role of the survey group, 3) Duplicate entries and inclusion/exclusion criteria. For example, respondents are asked about possible double entries for the same person. The inclusion criteria explicitly require participants to state a confirmed diagnosis from the autism spectrum and to disclose any evidence of reduced intellectual abilities. The other topic categories include: 4) Personal details (socio-demographic information), 5) Presentation and evaluation of the care concept, 6) Health and therapy indication (e.g., indications of psychological and physiological co-occurring's), 7) Participation (e.g., integration into working life, 8) Utilization and indication according to the German fee schedule for physicians (Gebührenordnung für Ärzte, GOÄ) and 9) Additional items that reflect the support need and participation in ASD (e.g., International Classification of Functioning, Disability and Health (ICF)). The Flyer of the Questionnaire or for recruiting purposes can be found in the appendix I.

4.5 Relevant variables and instruments

This chapter deals with the variables that were extracted from the questionnaire, which is the corresponding instruments that was used. While a detailed explanation of the individual variables is still forthcoming in the following chapters, this table serves as a basic tool that provides a structured and systematic overview of the data. These variables are of central importance for the analysis and serve as basis for answering the research question and confirming or rejecting the hypotheses.

Table 2 provides a summary of the independent and dependent variables positioned within Anderson's "Behavioral Model of Outpatient Utilization". The table clarifies the final coding of each variable and serves as a visual aid for understanding the data. It is divided into two sections: the "Initial variables", which come directly from the BASS dataset, and the "Recoded data level", which was predominantly converted to a binary format. The variable psychological/physical co-occurring, categories consisted of a single variable with multiple response options

To increase clarity and facilitate navigation, the main categories and variables are written in italics in the following chapters.

Table 2: *Overview of the variables*

		Initial variable (BASS-Dataset)		Final variable (Master thesis)	
	Anderson Model	**Label**	**Data level**	**Name**	**Data level**
Dependent variable	**Use of health services**	Please indicate which of the outpatient doctors you have seen in the last 6 months. Answer: Psychotherapist/ psychologist for adults	Nominal	Utilization of outpatient Psychotherapy	**Nominal (binary):** 1 = utilization of outpatient psychotherapy 0 = no utilization of outpatient psychotherapy
Independent variable	**Predisposing characteristics**	Sex	Nominal	Gender	**Nominal (binary):** 1= female 0 = not female
		Employment Status	Nominal	Employment status	**Nominal (binary):** 1= employed 0 = unemployed
		Income	Nominal	Income	**Nominal (binary):** 1 = High: € 2,000 and more 0 = Low: Up to less than €2,000
		Educational Background	Nominal	Educational Background	**Nominal (binary):** 1 = University entrance qualification 0 = No University entrance qualification
		Age	Metric	Age	**Metric**
	Enabling factors	Family status	Nominal	Relationship status	**Nominal (binary)**: 1= In a relationship 0 = Not in a relation
	Need factors	Psychological Co-occurring	Metric	Psychological Co-occurring	**Metric:** Sum of comorbidities
		Physical Co-occurring	Metric	Physical Co-occurring	**Metric:** Sum of comorbidities
		Support need - Social interaction (DSM-5)	Ordinal	Severity - Social Interaction	**Ordinal:** 0 = lower support 1 = medium support 2 = higher support
		Support need - Flexibility in behavior (DSM-5)	Ordinal	Severity - Flexibility behaviour	**Ordinal:** 0 = lower support 1 = medium support 2 = higher support

Note. Own Illustration.

4.5.1 Dependent variable

In order to get an indication of the utilization of psychotherapy, the questionnaire for the Assessment of Medical and non-Medical Resource Utilization in Mental Disorders

(FIMPsy) by Grupp et al., 2017 was used. The item begins with an nominal scaled dichotomous question (answers with yes/no): "Have you visited outpatient healthcare practitioners in the last 6 months?". This question covers any form of visit to a doctor's office, including cases where there was no direct interaction with the doctor (e.g., picking up prescriptions, blood tests). Home visits also fall into this area. In the event of a “no” response, participants are directed to another section of the survey which continues with questions on the topic of "hospitalization/rehab". For participants who respond with “yes”, the survey continues with the following question: "Please indicate which outpatient practitioners you have seen in the last 6 months". The response categories include "psychotherapist/psychologist for adults", "psychiatrist or neurologist", "general practitioner or family doctor", "outpatient treatment in hospital, excluding emergency treatment (e.g., autism outpatient clinic, hospital outpatient clinic)", autism outpatient clinic, hospital outpatient clinic, psychiatric institute outpatient clinic (PIA), consultation hours, pre- and aftercare)", "physiotherapy (includes massages, heat/cold treatments, electrotherapy or therapeutic baths)", "occupational therapy", "speech therapy" and "other outpatient treatment". For the purpose of this analysis, only the first response category, *"psychotherapist/psychologist for adults,*" was selected. Finally, the variable was coded into a dummy variable with the reference 1 = utilization of outpatient psychotherapy and 0 = no utilization of outpatient psychotherapy.

4.5.2 Independent variable

A total of ten independent variables were selected as predictors. Based on the literature search, each of these variables were classified into the "Population characteristic" categories of the Anderson model, namely: Predisposing characteristics, enabling factors and needs factors.

<u>Predisposing characteristics:</u>

Overall, most of the predisposing characteristics are covered in the survey section four, sociodemographic variables. A total of five variables fall into the category of predisposing characteristics. The variable *gender* was asked through, whether the participant is female, male or divers. Fifteen of the category “divers” have been coded into not female. Given the hypothesis and findings in the literature indicating that women have a higher tendency in the utilization of healthcare services, the dummy variable coding was strategically chosen. The category "diverse" was coded together with the category "male", both of which were coded 0 = not female and the other category is therefore coded 1= female.

The *employment status* was queried with the question "What is your current employment status?". Respondents had six possible answers, namely: "full-time employment", "part-time employment", "marginal employment (€450; mini-job; one-euro job)", "in vocational training or retraining", "not employed (including pupils, students not working for pay, unemployed, pensioners with no income and early retirees)" and "not applicable". The coding of “Employment” in German “Erwerbstätigkeit”, followed the definition of the Bundeszentrale für politische Bildung, (2021). Specifically, the categories "not applicable" and "not employed" were assigned the code 0 = unemployed, while all other categories received the code 1 = employed.

For the variable *income* the net income of all household members added together were assed. The categories are “up to less than € 500”, “from € 500 to less than € 750”, “from € 750 to less than € 1,000”, “from € 1,000 to less than € 1,250”, “from € 1,250 to less than € 1,500”, “from € 1,500 to less than € 2,000”, “from € 2,000 to less than € 2,500”, “from € 2,500 to less than € 3,000”, “from € 3,000 to under € 3,500”, “from € 3,500 to under € 4,000” and “4,000 € and more”. The variable was recoded in a binary form using a median split, resulting in the categories 0 = less than €2,000 and 1 = €2,000 or more.

The variable *educational background* was evaluated with the item "Please state your highest school-leaving qualification”. This question refers exclusively to school-leaving qualifications. Training or university degrees are addressed in a follow up question. Seven responses categories were specified. The English terms used for the German graduation system may not be precise. As a result, the German term will be provided, with an additional clarification in parentheses after the English term if possible: "secondary modern school" (Hauptschul-/Volkshochschulabschluss), "secondary school certificate" (Realschulabschluss/Mittlere Reife/Abschluss der polytechnischen Oberschule), "University entrance qualification A-Levels" (Abitur/Fachabitur/Fachhochschulreife/Abschluss der erweiterten Oberschule), "still in school," "special school" (Förder-/Sonderschulabschluss), “without a school-leaving certificate” and "other school-leaving qualification". The categories were recoded as follows: 0 = no university entrance qualification and 1 = university entrance qualification

The variable *age* was collected by open questions, using a metric scale with the question "How old are you (in years)?". The variable maintains its metric scale level for analysis and interpretation.

<u>Enabling Factors</u>

The section on enabling factors, as outlined in the Anderson framework, includes one single variable. The data for the variable *relationship status* was collected, using the item "What is your family status?" with five response categories: "single", "married (spouse, registered partner) or in a stable partnership", "married (living separately)", "divorced" and "widowed". For the purposes of this analysis, the variable on family status was recoded, with 0 = not in a relationship and 1 = in a relationship.

Need Factors

Within the construct of need factors, four predictors are considered for the analysis. All variables were collected in survey section number six, "Health and therapy indication". The first variable described here is *physical co-occurring conditions.* Information on physical co-occurring's was collected using a dichotomous item with the question "In the last 6 months, have you had a physical illness for which you have sought medical care or visited a doctor's office?". If the answer was yes, participants were asked a follow-up question: "In the last 6 months, have you used health care services or visited a doctor's office for any of the following physical illnesses? Please select the appropriate details." Multiple answers were possible, and there were eight predefined answer options as well as an open-ended free text field. For analysis, the responses were summed and remained at a metric level.

After the assessment of physical co-occurring's, the variable for psychological co-occurring were surveyed using the item: "Now it's about mental illness. In the last 6 months, have you had a psychological disorder for which you have sought medical help or visited a doctor's office?" If the answer was yes, the participants were asked the following question: "In the last 6 months, have you used health services or visited a doctor's office for any of the following psychological conditions? Please select the answers that apply. Multiple answers are possible". This instrument offered eleven predefined answer options as well as a free text field for additional answers. The collected answers were then summed up and resulted in a variable on a metric level.

The last two variables were operationalized based on the DSM-5 criteria (APA, 2000). The assessment of the support need/ severity of autism includes the consideration of deficits in social communication and the presence of restricted, repetitive patterns of behavior, which is looked at separately. The severity levels (see chapter 2.1.2) can be used to briefly outline the current symptoms. The variable, *support of social interaction,* was assessed using the item: "How much support do you require due to difficulties in interpersonal exchange and cooperation?". Response options included: "Low support (it

is sometimes difficult/ I manage without or with little support), "Medium support (it is often difficult/ I sometimes or regularly need support)", and "High support (it is usually difficult/ I almost always need support)".
The variable assessing the *support flexibility behavior* employs the following question: "How much support do you require due to difficulties in your flexibility, characterized by adherence to important behavioral habits, routines, rituals, or interests (e.g., challenges in organization/planning or coping with change)?". The answer options mirror those mentioned earlier in reference with the *support of social interaction* variable.

4.6 Data analysis approach

For the analysis of the data, the statistical program IBM, Statistical analyses for the Social Sciences (SPSS) Version 29.0.1.0, was used. In order to make the results understandable and the analyses more replicable, all of the commands that were executed in SPSS are provided with the syntax in Appendix III.

First, a descriptive analysis is performed for each variable shown in Table 2. The purpose of these descriptive statistics is to present the socio-demographic characteristics of the sample group of autistic adults and to show the numerical distribution of the recoded variables used for the analysis. Variables such as "gender", "employment status", "income", "educational background " and "relationship status", which are characterized by a nominally dichotomous data status, are described only by the distribution of their frequencies. The same methodology is applied to ordinal variables, in particular to the "support of social interaction" and the variable "support of flexibility in behavior". For metrically scaled indicators such as "age", "psychological co-occurring" and "physiological co-occurring", the mean (M), standard deviations (SD) and minimum (min) and maximum (max) values as well as the range are calculated and illustrated.

Before running the binary logistic regression, the completeness of the data was checked, which revealed missing values. Among the predictors, 28 entries were missing, representing 11.3% of the missing values, with a cumulative missing rate of 10.6% (see appendix III). While a missing rate of 5% or less has negligible consequences, exceeding 10% is likely to introduce bias into the statistical analysis (Hyuk Lee & Huber Jr., 2021). The variables in question, namely "income" and "educational background", were provided as optional response fields in the survey. Consequently, this may have contributed to cases of missing data. In particular, the variable "income" could be considered as a highly sensitive issue for certain individuals, and despite the strict confidentiality measures in place for participants, this could have influenced the

occurrence of missing data. In order to understand the nature of missing values, it is necessary to examine both the quantity and the pattern (Tabachnick & Fidell, 2013). According to Tabachnick and Fidell (2013), missing values have the least impact when their distribution is completely at random (MCAR), meaning it cannot be predicted by other variables in the data set. SPSS recommends Little's test to evaluate the MCAR, but since the variables with missing data are only categorical, Little's test is not applicable and a logistic regression was utilized instead. For this purpose, model variables with missing values were re-coded by assigning a value of 1 to missing variables and 0 to others. Each variable with missing values was then included in the logistic regression model as a dependent variable, with all other variables as independent variables. Significance was assessed with a goal of $p < 0.05$ to indicate significance, however, a nonsignificant result is desired (results can be found in the appendix IV). After identifying the missing values, there are many ways of dealing with it. Multiple imputation (MI) was chosen for this work as it is said to be one of the most advanced statistical methods and can substitute with multiple values for missing with categorical variables (Urban et al., 2016). Moreover, opting for MI rather than listwise deletion of missing cases would preserve a larger effect size. The imputations to be carried out (m) are determined using the missing quota as described above (Mayerl & Urban, 2010). This results in $m = 11$ imputations.

Given the dichotomous characteristics of the dependent variable and the presence of both metric and categorical independent variables, binary logistic regression was chosen. Since the focus is on the question of "the probability of certain events occurring and which influencing variables determine this probability" (Backhaus et al. 2006), logistic regression pose as a suitable forecasting method. Within the logistic regression model, the value 0 stands for the reference category. In the context of this work, the reference category of all seven categorical variables therefore includes people who are not female, unemployed or not employed, have a low net income, are not in a relationship, do not have a university entrance qualification and have a lower need for support (for both, needing support in social interaction and support in flexibility behavior). Therefore the interpretation of the results and coefficients of the corresponding variables are relative to the reference category. In addition, Szumilas (2010) provides a reference framework for interpreting the odds ratio (OR) in the context of this study: An OR of 1 in this context indicates no association between outpatient psychotherapy use and the specific predictor variable being examined. In my study, an OR less than 1 would indicate a decreased likelihood of psychotherapy use in relation to the predictor variable, whereas

an OR greater than 1 would indicate an increased likelihood of use in relation to the same variable.

To calculate the power a post-hoc calculation has been done using an online power analysis calculator for regression analyses by Hemmerich (2019). With a coefficient of determination of $R^2 = .13$ (medium effect size), a sample size of 246 and a significance level of $\alpha = 0.05$, 10 predictors would have a statistical power of $1-\beta = 0.99481$. Furthermore, the effect size in the logistic regression model can be assessed through examination of the Nagelkerke's R-squared values. All hypotheses were tested two-sided with an α-error level of 5%. The 95% confidence intervals are given for all odds ratios.

4.7 Examining the assumptions for the analysis

Errors can occur in binary logistic regression analysis. For example, the maximum likelihood estimate may not converge, resulting in an incomplete estimate. Even if it converges, maximum likelihood estimation can lead to questionable parameter estimates. In addition, normal maximum likelihood estimation may produce erroneous results if certain model assumptions, such as the linearity of the relationship between the logit of the estimated probability and the predictor variables, cannot be maintained with the given data. Therefore, before performing the binary logistic regression, an assessment of the statistical assumptions must be made. These are the following:

1. **Binary dependent variable:** The dependent variable is nominally scaled with exactly two values (dichotomous), which is usually coded as 0 and 1 (Field, 2009).
2. **Correct coding independent variable:** The independent variable is either nominally scaled or at least interval scaled (Field, 2009).
3. **Independence of observations:** The concept of error independence means that data points should not show any correlations. This means, for example, that measurements on the same people at different times should be avoided (Field, 2009).
4. **Sufficient sample size:** Ideally, the sample to be analyzed should have a considerable size. Since maximum likelihood estimators exhibit asymptotic consistency and efficiency, the accuracy of the estimation results improves as the number of cases increases. Determining the specific size required for robust estimates is challenging and depends on factors such as the estimation algorithm, various model features (e.g., the number of predictors), and the

inherent data structures e.g., the scaling of the predictors (Mayerl & Urban, 2010). There are literature with some recommendation of the minimal sample size per predictor. Burmeister and Aitken (2012) suggest having 20 cases per predictor, while Peduzzi, Concato, Kemper, Holford, and Feinstein (1996) recommend 10 cases per predictor. Similar guidelines are proposed by Sathian et al. (1970), Moons et al. (2014), and Pavlou, Ambler, Seaman, De Iorio, and Omar (2015), all recommending 10 cases per predictor. In all, most literature recommend 10 cases per predictor.

5. **Multicollinearity**: The assumption of multicollinearity is not an actual assumption, but as with ordinary regression, it does pose a problem. The predictors should not be too strongly correlated (Field, 2009). In order to check this assumption, the correlation matrix in the output of the binary logistic regression is used to determine the multicollinearity. In this process, the individual correlations between the predictors are examined.
6. **Linearity**: While ordinary regression assumes a linear relationship between the outcome and predictors, this assumption is challenged in logistic regression due to the categorical nature of the outcome. To address this, the logarithm (or logit) of the data is employed. In logistic regression, the linearity assumption requires a linear relationship between all continuous predictors and the logit of the outcome variable (Field, 2009). For this purpose, the Box-Tidwell approach was chosen (Box & Tidwell, 1962), which inserts the interaction terms between the continuous predictors and their natural logarithm into the regression equation.
7. **No outliers:** If the proportion of outlier cases in the total number of all analyzed cases is high, the estimated model has a poor model fit. The model estimates can also be distorted by a high proportion of outlier cases (Mayerl & Urban, 2010). Outliers were first identified by looking into the case wise list output of the logistic regression analysis. The individual case list table contains details of observations with studentized residuals (in the SResid column) that exceed ±2 standard deviations. Outliers can be identified by using studentized residuals of ±3 (Pardoe, 2012; Yan & Su, 2009). The leverage values are also taken into account, with a limit value of 0.2 according to Huber (1981). The Cooks distance is also taken into account, whereby the rule is recommended to consider observations with a Cooks distance of 1 or more as outliers (Heiberger & Holland, 2015; Larose, 2006; Weisberg, 1985)

All assumptions have been checked and all conditions are fulfilled prior to the analysis. The output of the results linearity and outliers can be found in the Appendix II.

4.8 Ethical considerations

Ethical approval was granted by the local psychological ethics committee at the Centre for Psychosocial Medicine of the University Medical Center Hamburg-Eppendorf (#LPEK-0227; Dec. 2020). It was further conducted in accordance with the Declaration of Helsinki.

5 Results

This chapter begins with a comprehensive overview of the characteristics of the sample, highlighting the demographic composition and relevant background information of the participants studied. After examining the sample characteristics, this chapter presents descriptive statistics on the key variables used for the binary logistic regression. Finally, the chapter deals with the results of the binary logistic regression analyses conducted to examine the relationship between independent and dependent variables. The analytical approach, i.e. the regression analyses, aims to uncover patterns, associations and predictive factors by mainly examining odds ratios, confidence intervals and significance levels.

5.1 Sociodemographic sample description

The following descriptions refer to Table 3, in which general data, such as socio-demographic information on the sample, is presented. This study encompasses a total sample of N = 246 autistic adults, of which 91 (37%) are male, 15 participants (6.1%) describe themselves as diverse and the majority, 140 participants (56.9%) are female. The total average age of the participant are $\bar{x}$=39.5 (SD = 12.2), ranging from 18 – 71 years.

Looking at the family status, it can be seen that 140 participants (56.9%) the majority, are single while one third, 82 participant are married (33.3%). Regarding the income levels of the sample, the largest group consisted of 36 participants (16.1%) earning €4,000 or more. The next most commonly observed income segments are those earning between €1,500 and less than €2,000 and between €2,500 and less than €3,000, which each account for 24 respondents (10.7%). The least common income brackets are from €500 to less than €750, from € 3,000 to under € 3,500 and from € 3,500 to under € 4,000, each with 13 (5.8%) of participants. The distribution shows a concentration in the lower income categories, with a notable number of individuals in highest income category.

Table 3: *Descriptive statistic of sociodemographic variables*

Variable		**N**	**M (SD)**	**Range**
Age		246	39.5 (12.2)	18-71
			n	**%**
Gender		246		
	Female		140	56.9
	Male		91	37.0
	divers		15	6.1
Family status		246		
	Single		140	56.9
	Married*		82	33.3
	Married (living separately)		6	2.4
	Divorced		17	6.9
	Widowed		1	.4
Income		224		
	Up to less than € 500		21	9.4
	From € 500 to less than € 750		13	5.8
	From € 750 to less than € 1,000		26	11.6
	From € 1,000 to less than € 1,250		20	8.9
	From € 1,250 to less than € 1,500		15	6.7
	From € 1,500 to less than € 2,000		24	10.7
	From € 2,000 to less than € 2,500		19	8.5
	From € 2,500 to less than € 3,000		24	10.7
	From € 3,000 to under € 3,500		13	5.8
	From € 3,500 to under € 4,000		13	5.8
	4,000 € and more		36	16.1

Note. N/n: Sample size (N = 246), *M*: Mean, *SD*: Standard deviation.

**Married* (spouse, registered partner) or stable partnership.

Table 4 presents additional descriptive socio-demographic statistics. Educational background (school leaving qualifications only) indicates that a predominant number of

participants, 175 (72.9%), obtained a university entrance qualification (baccalaureate). This was followed by 49 (20.4%) of the participants who indicated that they had completed secondary school. In the third place, 10 (4.2%) of the participants stated that they had a secondary school diploma. Only a small number, 2 (0.8%), didn't have a high school diploma or were still in school (4 participants, 1.7%). Among the various employment statuses, “unemployed” represents the largest share at 36.6% (n = 93) and 19 participants (7.7%) stated not applicable.

Table 4: *Descriptive statistics on educational and occupational background*

Variable		**N**	**n**	**%**
Educational Background		240		
	Still in school		4	1.7
	Without a school-leaving certificate		2	.8
	Secondary modern school*		10	4.2
	Secondary school certificate		49	20.4
	University entrance qualification (A-Levels)		175	72.9
Employment status		253		
	Full-time employment		52	21.1
	Part-time employment		61	24.8
	Marginal employment (Minijob)		25	10.2
	In vocational training		13	5.3
	Unemployed		93	33.7
	Not applicable		19	7.7

Note. Different numbers of cases result from missing values. The variable "employment status" included multiple response options, resulting in an overcount of N (N =253) compared to the actual sample size of N = 246. N/n: Sample size (N=246).
*In German referred to as "Hauptschule”.

5.2 Descriptive of key predictors and dependent variable

Table 5 presents the distribution of the recoded categorical variables across the various categories. Furthermore, the frequencies of each category in relation to the utilization of

outpatient psychotherapy are descriptively observed. Of the total sample group, 114 people (46.3%) stated that they had sought the services of a psychotherapist or psychologist in the last six months, while the remaining 132 participants, of whom more than half (53.7%) stated that they had not done so. The majority, 140 participants (56.9%) are those who identify as female, while the other 132 participants (53.7%) are grouped as not female (males and divers together). Within this group, 74 (64.9%) female participants were most frequently represented in the search for a psychotherapist/psychologist for adults. In regards of the employment status, more than half of the participants, 146 (59.3%) are employed. 100 (40.7%) are unemployed. Most of the employed group, 71 (62.3%) participants contacted a psychotherapist/psychologist and the unemployed group, 43 (37.7%) of participants have not. The distribution of the binary income category shows a small divergence. 119 (53.1%) participants have a lower income (up to less than € 2,000) and the other half, 104 (46.9%) are in the higher income segment (€ 2,000 and more). A similar pattern of divergence can be seen in the use of psychotherapy. 56 (53.8%) of the participants with a low income and 48 participants (46.2%) in the higher income group sought out psychotherapy. A noticeable difference can be seen in the educational background category. A total of 175 (73.9%) participants have a university degree, of which only 65 (27.1%) do not. Here, a significant proportion, 91 (81.2%) of the participants who have a university entrance qualification, had utilized outpatient psychotherapy. Regarding the variable relationship status, 164 (66.7%) participants are single/not in a relationship, only one third, 82 (33.3%) are in a relationship. Looking at the need of support in the social interaction variable, within the "low support" category, which includes 97 cases (39.4%), 37.7%, 43 of the individuals have actively engaged in psychotherapy. Moving to the "medium support" level, with 119 cases (48.4%), a slightly higher proportion, 59 participants (51.8%), have sought outpatient psychotherapeutic interventions. In the "higher support" category, consisting of 30 cases (12.2%), the use of psychotherapy drops to 10.5%. Regarding the support of behavioral flexibility, the highest proportion of participants, 112 (45.5%), have a medium need for support/ severity in terms of their fixed behavioral habits. Within this category, 53 (46.5%) had sought psychotherapy. A slightly higher percentage of participants, namely 112 (45.5%), indicated a medium support need. This difference is large compared to the variable "support of social interaction" where only a small percentage (12.2%) of participants have a higher severity. 49 (43%) of the "high severity" category can be attributed to the use of outpatient psychotherapy. The smallest percentage are the 29 (11.8%) participants who have a low support, with also only 12 participants (10.5%) seek the use of psychotherapy.

Table 5: *Descriptive of categorical variables and outpatient psychotherapy*

Variable		**N**	**n (%)**	**N**	**Utilization of outpatient Psychotherapy (n/%)**
Utilization of outpatient		246			
Psychotherapy	Yes		114 (46.3)		
	No		132 (53.7)		
Gender		246		114	
	Female		140 (56.9)		74 (64.9)
	Not Female		106 (43.1)		40 (35.1)
Employment		246		114	
status	Employed		146 (59.3)		71 (62.3)
	Unemployed		100 (40.7)		43 (37.7)
Income		224		104	
	Lower: Up to less than €2,000		119 (53.1)		56 (53.8)
	Higher: € 2,000 and more		105 (46.9)		48 (46.2)

Educational		240		112	
background	University entrance qualification		175 (73.9)		91 (81.2)
	No University entrance qualification		65 (27.1)		21 (18.8)
Relationship status		246		114	
	In a relationship		82 (33.3)		43 (37.7)
	Not in a relationship		164 (66.7)		71 (62.3)
Support		246		114	
Social Interaction	Lower support		97 (39.4)		43 (37.7)
	Middle support		119 (48.4)		59 (51.8)
	Higher support		30 (12.2)		12 (10.5)
Support Flexibility		246		114	
in behavior	Lower support		29 (11.8)		12 (10.5)
	Middle support		112 (45.5)		53 (46.5)
	Higher support		105 (42.7)		49 (43.0)

Note. Different numbers of cases result from missing values. N/n: Sample size (N = 246)

Table 6 presents key metrics for the continuous variables. As discussed in Section 5.1.1, age has already been addressed. The mean number of psychological co-occurring's is rounded $\bar{x}$=1.44, with a standard deviation of SD=1.58 and a range from 0 to 8. Similarly, the mean number of physical co-occurring's is approximately $\bar{x}$=1.27, with a standard deviation of 1.27 and a range of 0 to 7 diseases.

Table 6: *Descriptive statistics of metric variables*

Variable	n	M	SD	Min – Max
Age	246	39.54	12.19	18 – 71
Number of Psychological Co-occurring	246	1.44	1.58	0 – 8
Number of Physical Co-occurring	246	1.27	1.48	0 – 7

Note. n = number of participants; M = mean; SD = standard deviation; Min = Minimum; Max = Maximum.

The results, shown in Table 7, provide a detailed insight into the distribution of outpatient psychotherapeutic utilization within the age groups examined. The age group of 18 to 29 years shows a comparatively high utilization of psychotherapy, with 32 (28.1%) of participants in this age group stating that they had seek for outpatient psychotherapy. In the next cohort, consisting of people aged 30 to 39, the use of psychotherapy is 24.6% which are 28 cases. The group of 40- to 49-year-olds have the highest utilization rate, with 34 (29.7%) of participants, stating the utilization of psychotherapy. In the 50-59 and 60-71 age groups, there seems to be a decline in the use of psychotherapy, with 16.7% and 0.9% of individuals in these groups, respectively, reporting the use of such services. Notably, the mean age of 39.54 suggests that the older cohort have fewer participants contributing to these statistics.

Table 7: *Age and utilization of outpatient Psychotherapy*

Age	Utilization of outpatient Psychotherapy (n/%)
18 - 29	32 (28.1)
30 - 39	28 (24.6)
40 - 49	34 (29.7)
50 - 59	19 (16.7)
60 - 71	1 (.9)

Note. Age range of the entire sample group (N=246), 18 - 71. The total number of groups utilizing outpatient psychotherapy is n = 114, those not utilizing psychotherapy is n = 132.

Table 8 shows the use of outpatient psychotherapy in relation to the number of physical and psychological co-occurring conditions. Among participants with no physical co-occurring, 43 (37.7%) reported receiving psychotherapy, indicating the highest utilization in this subgroup. Among those with one co-occurring, 26 (22.8%) and with two co-occurring, 14 (12.3%) participants used psychotherapy. This trend continues with 15 (13.2%) participants seeking psychotherapy with three physical co-occurring, followed by 11 (9.6%) with four co-occurring conditions , and 5 (4.4%) with five co-occurring conditions. Regarding the factor psychological co-occurring, 21 (18.4%) participants without co-occurring conditions reported seeking psychotherapy. With one psychological co-occurring, 23 (20.1%) participants sought psychotherapy, while with two psychological co-occurring, 28 (24.6%) participants sought psychotherapy, representing the largest cohort. With three co-occurring's, 27 cases (23.7%) sought psychotherapy. The more co-occurring conditions, the lower the rates in utilization, e.g., 8 (7.0%) participants with five co-occurring's. The presence of three co-occurring conditions was associated with 27 cases (23.7%) seeking psychotherapy.

Table 8: *Physical/Psychological co-occurring and outpatient psychotherapy*

	Utilization of outpatient Psychotherapy	
Number(s) of co-occurring medical condition	**Physical (n/%)**	**Psychological (n/%)**
0	43 (37.7)	21 (18.4)
1	26 (22.8)	23 (20.1)
2	14 (12.3)	28 (24.6)
3	15 (13.2)	27 (23.7)
4	11 (9.6)	8 (7.0)
5	5 (4.4)	2 (1.8)
6	-	3 (2.6)
7	-	1 (0.9)
8	-	1 (0.9)

Note. The total number of groups utilizing outpatient psychotherapy is n = 114, no utilization of outpatient psychotherapy n = 132.

Table 9 illustrates the descriptive of the use of outpatient psychotherapy among participants in relation to the presence of a co-occurring mental health condition. Among autistic individuals with a co-occurring mental health condition, the majority of the sample (64.2%, n=158) reported receiving outpatient psychotherapy services. Breaking the data down further, affective disorders were reported by 77 individuals, representing 32.8% of

the sample, making it the most common co-occurring mental health condition in this sample. In addition, 37 individuals (15.7%) reported an anxiety disorder, 30 individuals (12.8%) reported ADHD, and 31 individuals (13.2%) reported PTSD. Other conditions reported were somatic symptom disorder in 20 individuals (8.5%), obsessive-compulsive disorder in 13 individuals (5.5%), and eating disorder in 11 individuals (4.7%). In addition, 10 individuals (4.2%) reported personality disorder, 4 individuals (1.7%) reported psychosis, and 2 individuals (0.9%) reported addiction.

Table 9: *Utilization and single psychological co-occurring conditions*

Psychological co-occurring	**Utilization of outpatient psychotherapy (n/%)**
Yes	158 (64.2)
No	88 (35.8)
Affective disorders	77 (32.8)
Anxiety disorder	37 (15.7)
ADHS	30 (12.8)
Post-traumatic stress disorder (PTSD)	31 (13.2)
Somatic symptom disorder	20 (8.5)
Obsessive Compulsive Disorder	13 (5.5)
Eating disorder	11 (4.7)
Personality disorders	10 (4.2)
Psychosis	4 (1.7)
Addiction	2 (0.9)

Note. Answers include multiple response options. The total number of groups utilizing outpatient psychotherapy is n = 114, no utilization of outpatient psychotherapy n = 132.

5.3 Results of binary logistic regression

Binomial logistic regression was used to determine the effect of gender, employment status, income, education, age, marital status, psychological co-occurring, physical co-occurring, support of social interaction, and support of behavioral flexibility in predicting the likelihood of utilization of outpatient psychotherapy. The regression model included a total of N = 246 participants with missing values being substituted by multiple imputation. Since not all output tables received an pooled section/ estimate of the results, the illustration of the results will be shown in maximum and minimum range. However for the R^2 value, Mayerl & Urban, (2010) recommends calculating the arithmetic mean which can be used as “proxy” for all combined R^2 values. Therefore all elven (m = 11) of the

individual partial regressions for a specific R^2 variant are calculated an serve as an approximate value for the overall R^2 value.

As shown by Nagelkerke's R^2 = .270, the model was statistically significant, $\chi^2(12)$ = Range MI: [50.140, 52.208], $p < .001$, yielding an acceptable (small effect) amount of explained variance (Backhaus et al., 2006). The overall classification accuracy using all MI value ranges is 67.5% to 68.7%, with Range MI sensitivity of 57.9% to 61.4% and Range MI specificity of 75.0% to 76.5%.

Among the ten independent variables included in the regression model, two contributed significantly to the prediction of utilization in outpatient psychotherapy (see Table 10). One predisposing characteristic, educational background ($p < .035$), and one need factor, psychological co-occurring ($p < .001$), demonstrated significance. The remaining variables showed no significant effect, which included income ($p = .661$), physical co-occurring ($p = .911$), social interaction middle support need (1) ($p = .869$), social interaction higher support need (2) ($p = .440$), flexibility behavior support middle support need (1) ($p = .953$), and flexibility behavior higher support need (2) ($p = .720$). Variables showing some tendency or proximity to significance (closer to the .05 threshold) include age ($p = .154$), gender ($p = .146$), and relationship status ($p = .149$).

For the continuous variable age, autistic adults show a 1.8% decrease in the odds of receiving psychotherapy with each additional year of age. In essence, this means that with increasing age, utilization decreases by a factor of 0.928 (95%-CI [.958, 1.007]). However, the result remains not significant ($p = .154$). In the case of the employment status variable, the probability of utilizing outpatient psychotherapy is 1.442 times higher for employed autistic adults than for those who are unemployed (95%-CI [.773, 2.691]). With a $p = .250$, the result does not represent statistical significance. Furthermore, autistic adults that identify as female were 1.540 times more likely to seek psychotherapy than those that identify as not female (95%-CI [.861;2.752]). Likewise, this result is not statistically significant ($p = .146$). The probability of using psychotherapy for autistic adults who were in a relationship compared to those who were single is 1.622 times higher (95%-CI [0.841, 3.126]). The result however, is not significant ($p = 0.149$). When comparing autistic adults with low income to those with higher income (net income over 2,000 euros), the probability of seeking psychotherapy was 0.862 times lower. However, there is insufficient evidence to conclude that the effect is meaningful, and the odds of seeking psychotherapy may not be significantly different between individuals of lower and higher income in this sample, as $p = .661$. The analysis show that autistic adults with an certificate entrance qualification (Abitur) in comparison to autistic adults that do not

have an entrance certificate qualification (reference category), the probability of the utilization of outpatient psychotherapy is significantly 2.023 times greater (95%-CI [1.052, 3.892]). This result showed a significance of p = 0.35. When looking at the variable physical co-occurring, for each additional unit representing the number of co-occurring conditions, the probability of seeking psychotherapy decreases by a factor of 0.989 for the autistic adults in this study (95%-CI [.811, 1.206]). However, statistical significance is also lacking here (p = .911). In regards of the variable, psychological co-occurring condition, the result is statistically significant (p = < .001), by the factor of 1.738 which indicates that for each additional psychological co-occurring, the likelihood of utilizing psychotherapy increases by 73.8% (95%-CI [1.401, 2.156]). Regarding the support need of social interaction among autistic adults, with low support as the reference category, individuals with moderate support need, showed an increase by a factor of 1.055 in the odds of seeking psychotherapeutic support compared to those with low support (95%-CI [.562, 1.980]). On the other hand, participants with a higher support need had a 0.671 times (95%-CI [.244, 1.845]) lower chance of receiving outpatient psychotherapy compared to the group with an lower support. Neither the medium support level (p = .869) nor the higher support level (p = .440) were statistically significant. Looking at support in flexibility in behavior, the odds of utilizing outpatient psychotherapy are 1.029 higher for autistic adults with moderate support need than for those with lower support needs (95%-CI [.399, 2.650]). And the odds of utilizing outpatient psychotherapy are 0.833 fewer for those with a higher support level than for those with a lower support level (95%-CI .307, 2.261]). Significance cannot be demonstrated with respect to either the medium support level (p = .953) or the higher support level (p = .720).

Table 10: *Results of logistic regression analysis*

Variable	B	SE	Wald**	p	Odds Ratio	95% CI for OR	
						Lower Bound	Upper Bound
Age	- .018	.013	[1.818, 2.335]	.154	.982	.958	1.007
Employment status	.366	.318	[1.033, 1.499]	.250	1.442	.773	2.691
Gender	.431	.296	[2.056, 2.213]	.146	1.540	.861	2.752
Relationship status	.483	.335	[1.602, 2.525]	.149	1.622	.841	3.126
Educational background	.705	.334	[3.716, 5.430]	**.035***	2.023	1.052	3.892
Income	- .149	.339	[.035, .595]	0.661	.862	.443	1.676
Physical Co-occurring	- .011	.101	[.010, .022]	0.911	.989	.811	1.206
Psychological Co-occurring	.553	.110	[24.525, 25.961]	**< .001***	1.738	1.401	2.156
Support Social Interaction (1)	.053	.321	[.019, .049]	.869	1.055	.562	1.980
Support Social Interaction (2)	- .399	.516	[.501, .636]	.440	.671	.244	1.845
Support Flexibility Behavior (1)	.028	.483	[.002, .005]	.953	1.029	.399	2.650
Support Flexibility Behavior (2)	- .183	.510	[.089, .176]	.720	.833	.307	2.261
(Constant)	-1.747	.762	[4.995, 5.537]	.022	.174	.039	.776

Note. Degree of freedom (df) is 1 for all Wald statistics. *B*: Regression coefficients, *SE*: Standard error. *CI*: Confidence interval *OR:* Odds Ratio

*$p < 0.05$.

** The range is shown from min to max because as an pooled value is not available.

6 Discussion

The following chapter begins by examining and discussing the results of the study in relation to the existing state of research and the Anderson model. In the second section, the limitations of the studies that need to be taken into account when interpreting the results are explained. The research question and the hypothesis are also answered throughout this chapter.

6.1 Evaluation and discussion of results in the state of research

The primary goal of this study was to identify predictors that explain variance in outpatient psychotherapy use among autistic adults. Predictor categories that were investigated are predisposing characteristics (gender, employment status, income, educational background, age), enabling factors (family status), and need factors (co-occurring psychological/physical condition, need for support, social interaction/flexibility in behavior).

This study revealed that nearly half of the participants (46.3%) reported having sought the services of a psychotherapist or psychologist within the past six months. In Dudley et al.'s (2019) study, a similar proportion of autistic adults used psychotherapy services, with 53% reporting use of mental health services. However, Dudley et al.'s study included autistic individuals with ID. In another study with inclusion criteria more comparable to the current study and a similar sample size (N = 262) of autistic adults without ID, the use of psychotherapy services was way lower compared to the findings of the current study in the area of outpatient psychotherapy research. Specifically, in the Lipinski et al. (2019) study, less than one-fifth (22%) of autistic individuals had received psychotherapy. Anyhow, this difference in utilization rates may be influenced by temporal factors, as the Lipinski et al. (2019) study was conducted approximately six years prior to the current study. Additionally, as highlighted by David, Dückert & Gewohn et al. (2022), there has been a discernible increase in specialized psychiatric outpatient clinics and related services over time. This observed trend may indicate an increase in the use of psychotherapy services, with the Lipinski et al. (2019) study serving as a particularly relevant point of comparison.

In terms of the most common co-occurring psychological disorders, the sample in this study is mostly consistent with the existing literature, which shows a similar distribution of the most common mental disorders, namely affective disorders (including depression, mania and bipolar disorder) and anxiety (Mazurek et al., 2023; Lipinski et al., 2019).

Conversely, it is important to recognize that the descriptive statistics reveal that a significant portion (more than half) of the participants does not seek professional help. In addition, among participants with a co-occurring mental disorder, although the majority had actually indicated contact to a psychotherapist/psychologist, approximately one-third reported indicated no such contact. This suggests that it is possible that some of these participants with a co-occurring psychological condition may have gone untreated in the last six months or either had contact outside of this period. Other reasons for a non-seeking could also be the barriers as stated by Dückert et al., 2023, e.g., lack of knowledge about autism among health care professionals or lack of services. In addition, the question could be whether the participants who did not make use of psychotherapy opted for hospitalization or rehabilitation instead or whether they did not seek therapeutic help due to obstacles.

Overall the result of the binary logistic regression analysis, are showing two relevant factors as influencing the probability of utilizing outpatient psychotherapy. Both the variables educational background and (as a predisposing characteristic) and the presence of a psychological co-occurring condition (need factor) have a significant effect on the dependent variable. For each predictor, the hypotheses from chapter 3 are tested and categorized according to Anderson's model. These categories are then discussed in more detail in the following section:

Predisposing characteristics:

The variable gender did not show significance as a predictor, which is contrary to findings in previous literature from a general population, indicating higher utilization rates for females compared to males (Thode et al., 2005; Rommet et al., 2019). Despite the lack of statistical significance, the p-value for gender, was close to the threshold of significance. Consequently for this variable, the null hypothesis is confirmed and the alternative hypothesis is rejected. A larger sample size might have yielded a more significant result. Descriptively, female participation in this study was slightly higher than non-female participation. This observation is noteworthy, especially considering that males are more likely to be diagnosed with ASD without ID (Rujeedawa & Zaman, 2022). Thode et al (2005) suggest that certain gender-specific effects manifest themselves in different ways and impact on usage patterns and outcomes.

For the employment status variable, unemployment has been reported as a significant predictor in previous studies (Thode et al., 2005; Kauhl et al., 2019; Fischer-Kern et al., 2006). Fischer-Kern et al. (2006) proposed a plausible explanation, suggesting that individuals may be referred to treatment facilities covered by insurance and operating

during regular working hours, thereby facilitating accessibility for those with flexible schedules due to unemployment. To address this issue, Lord et al. (2022) suggest home-based health interventions to improve accessibility, particularly regarding schedule and time management challenges. 40.7% of the participants in this study are unemployed. This sample almost matches previous study as it to be said that around half of autistic adults are unemployed, which is significantly higher than the national unemployment rate (Ohl et al., 2017). The descriptive data shows that the proportion of employed people who indicate a utilization is higher (62.3%) than the proportion of unemployed people. The results partly coincide to other studies including autistic adults without ID (Proft et al. 2016; Kirchner & Dziobek, 2014). However “employment status” did not emerge as a significant predictor. Therefore, the null hypothesis is verified and the alternative hypothesis is rejected.

In a previous research study by Leppänen et. al. (2022), it was revealed that effects on *income* is quite inconsistent in the general utilization of psychotherapy. In a study by Epping et al. (2017), which examined social inequalities in the use of outpatient psychotherapy, it was found that the influence of low income is relatively small. Income can have a significant impact on one's decision to seek treatment, especially since public health insurance in Germany typically only covers therapies that are considered "curable". However autism is not an “curable” condition and therefore, insurance coverage mainly extends to the treatment of accompanying conditions, such as psychotherapy for depression, rather than directly addressing the specific autistic characteristics (Frese, 2022). The study reveals that a significant majority of participants (64.2%) experience co-occurring mental health conditions, suggesting they may have access to therapy through their insurance coverage. The distribution of utilization, however, is roughly split evenly in the descriptive statistics, with no significant explanation in variance observed for the income variable. This verifies the null hypothesis and rejects the alternative hypothesis.

Higher educational attainment, that is having a university entrance qualification (Abitur), was found to be significant in explaining the variance of seeking outpatient therapeutic help. In this case, the null hypothesis is rejected and the alternative hypothesis is verified. The results can be generally explained by the fact that mental health literacy, or the lack of understanding of mental illness and its treatability, is another factor influencing treatment seeking (Jorm et al., 1997). Studies suggest that increased knowledge of mental illness correlates with increased likelihood of seeking help (Thornicroft, 2008). Higher status is associated with greater mental health literacy and less stigma, particularly among women (Epping et. al., 2017). The results of this thesis is at least

consistent with those of Fischer-Kern et al. (2006), who found that higher educational attainment was a significant predictor of therapy use. However, Rommel et al. (2019) described that psychotherapy seeking was much higher in low socioeconomic status (including income, education, and training) than in the upper cohorts (middle and high socioeconomic status). Another large study in Finland found no such association between educational background and use of mental health services (Halme et al., 2023). However, the Finnish study also includes vocational training and a university degree, which makes it not comparable to this study. Another important point to note is that the proportion of participants in the group with a university degree is relatively high (73.9%) and the question here is if there is a selection biased. Some German studies (e.g. Frank et al. 2018; Proft et al. 2016) do indicate that Autistic people (without ID) do show an above-average general level of education in the form of school-leaving qualifications and a high level of formal education and training, which even exceeds the level of the general population. Both studies also showed that within their sample, many hold a University entrance qualification (Frank et al. 2018; Proft et al. 2016). This could indicate that a higher school education is actually more common among autistic people without ID.

For the continuous variable age, autistic adults show a decrease in the odds of receiving psychotherapy with each additional year of age. This suggests that utilization tends to decrease with age. In the literature review, there are some inconsistencies in the findings regarding age. Thode et al. (2015) suggest that women are more likely to seek mental health services at a younger age, while men tend to do so later in life. On the other hand, middle-aged individuals have the lowest contact rates. Conversely, Rommel et al. (2019) suggest that the highest rates of use are observed among individuals between the ages of 50 and 59. There is a general assumption that the use of mental health services decreases with age (Rommel et al., 2019; Kauhl et al., 2019). However, a precise comparison of the existing literature with the present study is not possible. One influence that could affect the result depending on age and is gender-specific would be the fact that men are diagnosed with ASD much earlier and therefore more frequently, while women are diagnosed later (Rujeedawa & Zaman, 2022). Also the diagnosis are more frequent when being in childhood (ebd.). Therefore, individuals diagnosed later in life may delay seeking psychotherapy, contributing to the observed decrease in utilization with older age. Nonetheless, result of the binary logistic regression suggests a trend toward significance. However, the null hypothesis must be validated and the alternative hypothesis is rejected.

Enabling factors:

Within the enabling factor, the variable of relationship status was examined. Looking at the descriptive statistics, the predominant response category shows that 66.7% of participants stated that they were single. The result of this thesis do reflect Howlin & Moss (2012) statement that autistic adults are also more likely to be unmarried, with long-term intimate relationships being rare. Among the single group, 62.3% sought therapeutic help, making them the largest subgroup using psychotherapy. It should be noted, though, that there are a relatively large number of single participants. Binary logistic regression yielded a nearly significant value suggesting that autistic adults in a relationship were 1.622 times more likely to seek psychotherapy than single individuals. This finding contrasts with Rommel et al. (2019), who reported that individuals who were not married or in a relationship were more likely to seek treatment. However, generalizing findings from the general population to this study may not be appropriate given the specific challenges that autistic individuals face in forming relationships, as discussed in chapter 2.1.1. Studies have shown that being in a relationship is a significant predictor of quality of life in autistic adults. While autistic individuals may develop coping mechanisms for social isolation as they age, the absence of perceived informal support (such as having someone to talk to or do things with) remains a significant predictor of lower quality of life (Mason et al., 2018). It could be argued that being in a relationship acts as a protective factor against loneliness and, in turn, reduces the likelihood of developing mental health challenges. Moreover, the presence of a supportive partner not only mitigates feelings of loneliness, but can also serve as a catalyst for seeking psychotherapy, as the partner can provide encouragement, help and practical support in accessing mental health services. Overall, based on this analysis, no significant correlation can be established between the existence of a relationship and the use of outpatient psychotherapy in autistic adults. In this case, the null hypothesis must be accepted and the alternative hypothesis rejected.

Need factors:

The predictor *psychological co-occurring* showed a significant association, indicating that each additional psychological co-occurring increased the likelihood of seeking psychotherapy by 73.8%. Therefore, the null hypothesis is accepted and the alternative is rejected. Based on the mean value of 1.44, it can be determined that on average the participants have at least one co-occurring psychological condition, with a standard deviation of 1.58. The number of psychological co-occurring conditions ranges from 0 to 8. The group with the highest seeking (24.6%) reports the simultaneous presence of two co-occurring psychological conditions. Among participants, the most common diagnoses were affective disorders (32.8%), anxiety disorders (15.7%), and ADHD (12.8%), which

is consistent with most research (Mosner et al., 2019; Lipinski et al., 2019; Buck et al., 2014). While the literature may not be directly transferable with the findings of this study, similar trends have been observed in other studies. For example, previous research by Kauhl et al. (2019) suggests that mental health service utilization tends to increase with the presence of multiple chronic conditions. Additionally, studies by Rommel et al. (2019) and Thode et al. (2005) found that individuals with chronic conditions are more likely to seek treatment, reflecting a pattern similar the findings of this study. According to Vohra and colleagues (2017), high healthcare utilization and costs are likely due to a lack of knowledge of autism among healthcare professionals, resulting in delayed care and frequent return visits to ambulatory, emergency, and hospital settings. This result could also mean that there is inadequate or overutilization (Vohra et al., 2017). Or contrary, it could also mean that a higher stress pressure with a higher number of co-occurring's, could lead to a higher probability of utilization. This can also be illustrated by the Anderson model, where the factor of perceived need (Boer et al., 1997), is intensified by the presence of multiple co-occurring psychiatric disorders. Overall, autistic people who have only one co-occurring psychological condition may still experience significant challenges. Compared to individuals with multiple co-occurring disorders, their overall distress may be at first glance less severe. Consequently, their need for psychotherapeutic support may be somewhat less. However, it might also depend on a specific co-occurring disorder or individual level of severity. It is important to note that even with a single co-occurring disorder, autistic people can benefit from psychotherapy to treat specific symptoms, improve coping skills and enhance general well-being.

In the case of physical co-occurrences, descriptively, the average number of physical co-occurrences reported by autistic participants is approximately 1.27, with a maximum of 7 total conditions. The largest number of participants (37.7%) with no physical co-occurring disorders showed that they sought the most contact with outpatient psychotherapy. As the result of the logistic regression analysis shows, the probability of seeking psychotherapy decreases by 1.1% as the number of accompanying physical illnesses increases. This might be due to that physical health problems are often treated by general practitioners or specialists, and while mental health issues are typically addressed by psychologists or psychotherapists. However, it's important to recognize the connection between physical and mental health. Physical ailments can affect mental well-being, leading to conditions such as anxiety or depression. Conversely, mental health issues can affect physical health by weakening the immune system or influencing behaviors that contribute to poor health (Noeker et al., 2022). However this result is not significant. In this case, the null hypothesis must be accepted and the alternative hypothesis rejected.

The following two predictors are discussed together. Neither the need for support in social interaction nor the support need for behavioral flexibility proved to be significant predictors. Therefore, the null hypothesis is accepted, while the alternative hypothesis is rejected. The descriptive statistics revealed notable differences between the variables. Interestingly, participants who were categorized as having a high need for support in social interaction showed the lowest engagement in outpatient psychotherapy at only 10.5%. Conversely, those classified as having low (37.7%) and medium (51.8%) support needs were more likely to seek psychotherapy. In contrast, the pattern was the opposite for the variable of behavioral flexibility. Participants with low support needs had a lower utilization of psychotherapy (10.5 %), while participants with medium (46.5 %) and high (43.0 %) support needs had a higher utilization of psychotherapy. One possible explanation for the lower use of psychotherapy among people with high support needs in social interaction could be that people with more severe mental illnesses have greater difficulty accessing outpatient psychotherapy services (Melchinger, 2008). A previous study, conducted by Zuckerman et al. (2017), has employed a classification, demonstrating that "higher parent-reported symptom severity" is associated with greater utilization of therapies and specialized services for children with ASD. However this doesn't align with this study.

6.2 Limitation

There are a few limitation which needs to be considered. A notable limitation of this study is related to the questionnaire used, as it was not explicitly designed for this research. The development of this questionnaire was based on an exploration of barriers and needs during the initial phase of the BASS project. In fact, this questionnaire initially serves as a basis for the evaluation of a stepped care approach (introduced from the BASS project), which is tailored to the specific needs of autistic adults. Consequently, there are instances in the questionnaire where participants have the option to provide certain information on a voluntary basis. While the socio-demographic information critical to this study was largely mandatory, other variables unrelated to the evaluation of the health care concept were optional. This decision had an impact on the sample size. The autistic adult sample originally consisted of 403 participants, but this number was reduced to a final sample size of N = 246 in this study. The reduction occurred because some participants did not fully complete the questionnaire, while others chose not to answer the relevant question (for this work) because it was optional. As a result, there were also instances of missing data on income and educational background, which could also be due to the sensitivity or privacy of this data for some individuals. However, the

questionnaire covered a wide range of individual characteristics, so that a variety of predictors could be used in this master thesis. Furthermore, the questionnaire which is not tailored to the parameters of this study may affect the generalizability of the findings from this work. For a more precise analysis, a further study with more specific (especially in regards of outpatient psychotherapy) and "mandatory" questions on the utilization of psychotherapy should therefore be conducted.

Given the instrument and the method of implementation, the generalizability of the results is limited. As this study also relies on self-report through an online survey platform, respondents were required to be able to self-report, which may have excluded those with limited self-reporting ability. It is therefore also not certain whether the questions were answered truthfully, neither can this be proven for the inclusion criterion of having an autism diagnosis. In regards of the item "Please indicate which outpatient practitioners you have seen in the last 6 months", there is uncertainty about the actual occurrence of psychotherapeutic treatment in the case of an answer that indicates a visit to a psychologist or psychotherapist. It cannot be determine whether the visit involved psychotherapeutic treatment sessions or other forms of engagement with practitioners. Consequently, this must be taken into account in the presented results. It would be informative for this study to investigate the reasons for seeking psychotherapy and to extend the investigation beyond the last six months to the entire lifetime. For the Support item (social interaction and behavioral flexibility), it was suggested that the diagnostic assessment should include a parent/caregiver or other person who could report on characteristics of early childhood autism. However, it is not possible to confirm whether someone has helped with the assessment. The validity of the support need should be considered carefully for rating and determining the severity level.

The limitation resulting from the selection of predictors for the analyses is twofold. Although the selection was informed by some literature and Anderson's (1995) “Behavioral Model of Health Services Utilization”, there are potential limitations. The categorization into predisposing characteristics, enabling factors and need factors could benefit from a more nuanced investigation with more predictors. In particular, the decision to include only one variable for the enabling factors may oversimplify, and additional variables such as geographic location or insurance could also lead to more comprehensive results. However, expanding the predictors, especially in the enabling factors category, would require a larger sample size for the logistic regression, which was not possible with the limited data set or sample size of the BASS project. The paper recognizes the conflict between including predictors that cover all population characteristics from the Anderson model in at least equal proportions for each category.

In order to ensure an appropriate sample size for the logistic regression, the study acknowledges that it was not possible to improve the analysis with a larger data set in this context. The inclusion of predictors in this study was limited by the lack or even non existing studies, that explicitly incorporates the perspectives of autistic adults in the field of outpatient psychotherapy. While there is a lack of studies that focus directly on the experiences of autistic adults in outpatient psychotherapy, this study draws on analogous research, such as studies of a variety of mental health disorders (with depression being the most common) that include both inpatient and outpatient psychotherapy use. In addition, studies examining predictors of mental health service use and general health care use are considered. Consequently, the transferability of statements derived from the selected literature to the autistic population is limited, primarily because this population has a differentiated utilization pattern influenced by the specific characteristics of autism. For example, challenges related to social skills may have a significant impact on health care utilization. Consequently, there is a risk that important predictors relevant to this population may be overlooked.

Another limitation of this study could be a selection bias in the sample group. It should be noted that people with a university entrance qualification (A-levels), who make up a significant proportion of the sample, may also have a higher level of awareness and engagement with surveys, research initiatives or other reasons. This increased awareness could be related to their educational background, so they may be better informed about health-related studies and more willing to participate. The disproportionate representation of participants with a higher education level (73.9%) and a heightened (descriptively) utilization of psychotherapy (81.2%) suggests that the findings may not be fully generalizable to the entire population of autistic adults in Germany. As this could limit the external validity of the study, as the results might not apply to those with lower educational attainment or those less likely to seek psychotherapeutic help. Additionally, there is an overrepresentation of female participants in this study. Given that individuals who identify as male are often more likely to receive ASD diagnoses, gender bias could influence the study's findings on utilization patterns and may contribute to other significant predictors of outpatient psychotherapy.

As Böwing-Schmalenbrock and Jurczok (2011) point out, it is crucial to recognize that MI, like any imputation approach, is a compromise that aims to compensate for measurement error rather than eliminate it completely. Altering data, even by imputation, is a delicate process that is prone to inaccuracies. No data set provides optimal conditions for predicting missing data with absolute certainty. Therefore, careful modeling and rigorous review of the imputation process are essential, requiring the

careful handling of imputed datasets with extreme care and caution. The presentation of pooled values derived from MI during the analysis posed a challenge in the presentation of results. It was found that not all tables or models provided pooled values from the eleven imputations performed in this study. The calculation of the mean appeared inappropriate for certain statistical measures, such as the Wald statistic. Therefore, the presentation strategy was changed to show the minimum and maximum values of all 11 imputations rather than relying on a single consolidated figure. This approach was chosen to maintain transparency and accurately portray the variability inherent in the imputation results. However for the handling of missing values, it stated to that MI prove to be the best method for dealing with missing values in complex data sets (Jurczok, 2011).

For ordinal variables with more than two categories, most categories were recoded into a binary variable. This was done, for example, by a median split procedure. Therefore, some information within the categories might be lost, but in binary logistic regression, creating more dummy variables would make the interpretation (also with regard to MI) more difficult. For variables that have a modal value, however, binary coding appears to be more suitable, as it can effectively capture the predominant value (e.g., educational background).

Other limitations include the cross-sectional nature of the study, as only data from a single point in time was analyzed. Therefore, no statements can be made about the course, consistency or causality of the reported results.

7 Conclusion

As more individuals receive ASD diagnoses, the demand for specialized care, including psychotherapy, continues to raise. Despite the importance of psychotherapy for coping with mental health problems in this population group, the use of outpatient psychotherapy is significantly lower among autistic adults compared to the general population. There is also a notable gap in the literature regarding individual-level factors in mental health-seeking behavior among autistic adults. Therefore a comparison to other studies was not possible. This gap complicates our understanding of the factors that influence seeking behavior and hinders the development of targeted interventions to improve access to outpatient psychotherapy services.

To address this gap, this study aimed to identify predictors of outpatient psychotherapy utilization among autistic adults. Possible factors were considered within the frame of the Anderson model which examines “population characteristics”. Autistic adults do often fall behind in accessing adequate mental healthcare, yet within this demographic, there are also marginalized subgroups that require increased visibility and support. As found in this study a higher level of education results in a higher probability in utilizing outpatient psychotherapy. Conversely, this suggests that mental health service providers should pay closer attention to autistic individuals with lower levels of education. However, it's important to interpret this finding cautiously, as this study sample had a high proportion of participants with a university entrance qualification. The predictor psychological co-occurring also proved to be significant, indicating an increased likelihood of therapy utilization in autistic persons with several psychological co-occurring’s. However, in addition to the quantity of co-occurring conditions, the specific psychiatric co-occurring conditions, such as anxiety, that significantly impact treatment utilization remain unclear.

In this study an limited amount of predictors (ten), were examined to shed light on the underlying predictors that explain variance in the utilization of outpatient psychotherapy. The study underscores the complexity of factors that may influence treatment-seeking behavior and emphasizes the necessity for additional research in this domain. Given that autism moves in a spectrum, characterized by a diverse range of traits and experiences, there may be additional predictors beyond those examined in this study. For example, it may be informative to analyze a particular co-occurring condition (e.g., depression), that contribute to psychotherapy utilization. Although most predictors did not show significance, four predictors within the category of predisposing characteristics showed marginal significance (age, relationship status, gender and employment status).

In conclusion, this thesis can contribute to the emerging field for a better mental healthcare for autistic adults which can be built upon by further research in the future. The identified significant predictors can offer valuable insights for shaping health interventions by targeting specific marginalized groups. Prospective studies are desirable for future work on this topic, as they can reveal cause-and-effect relationships. It would therefore be useful to repeat this study under improved conditions. In addition, a larger, more heterogeneous sample size and a improved survey instrument are needed in this study to draw more accurate conclusions and to better understand the relationship between predictors and mental health seeking behavior. For example, an examination of the specific type of psychotherapy that was used, such as cognitive behavioral therapy, would provide valuable insight and greater accuracy in determining whether psychotherapy was in fact being used. At last, not only do health care institutions or health care providers need to understand the needs of autistic individuals, but the public society. Thus, greater visibility of autistic people in society and increased awareness of autism could facilitate their integration into different areas of life, including employment and social relationships. This in turn could help to mitigate the mental health problems they face in the first place.

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Appendix

Appendix I: Flyer of the Questionnaire II „BarrierfreeASD” XXIII
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Appendix I: Flyer of the Questionnaire II „BarrierfreeASD"

UKE HAMBURG

Institut und Poliklinik für Medizinische Psychologie

Forschungsprojekt „BarrierefreiASS"

Umfrage zur Gesundheitsversorgung von Erwachsenen mit Autismus-Spektrum-Störung

Im Rahmen des **Forschungsprojekt „BarrierefreiASS"** wurden Bedarfe und Barrieren in der Gesundheitsversorgung von erwachsenen Autist:innen in Deutschland ermittelt. Darauf aufbauend wurde ein bedarfsgerechteres Versorgungskonzept entwickelt, welches zukünftig zu einer verbesserten Gesundheitsversorgung von erwachsenen Autist:innen beitragen könnte.

Ziel der Umfrage: Das entwickelte Versorgungskonzept von Autist:innen, Angehörigen und Behandelnden bewerten und ergänzen lassen. Ausführlichere Informationen erhalten Sie über das Infovideo auf der Studien-Homepage: https://www.uke.de/barrierefreiass

BASS

Teilnehmen können:

- **Autist:innen** (ab 18 J.) ohne Intelligenzminderung
- **Angehörige bzw. Partner:innen** (ab 18 J.) von erwachsenen Autist:innen
- **Behandelnde** aus allen Berufsgruppen der medizinisch-therapeutischen Versorgung mit und ohne Expertise in der Behandlung von Autist:innen

Die Umfrage erfolgt anonym und kann jederzeit ohne Angaben von Gründen abgebrochen werden. Der zeitliche Umfang der Umfrage variiert je nach Befragungsgruppe zwischen 25 und 60 Minuten, wobei 15 Minuten der Dauer Videos zu dem Versorgungskonzept umfassen.

Die Online-Umfrage ist von Dezember 2022 bis April 2023 über diesen Link abrufbar: https://umfragen.uni-hamburg.de/index.php/498188?lang=de

Für Rückfragen stehen wir Ihnen gerne unter der folgenden E-Mail-Adresse zur Verfügung: info-barrierefreiass@uke.de.

Wir würden uns freuen,
wenn Sie uns bei dieser Umfrage unterstützen.
Vielen Dank!

Universitätsklinikum Hamburg-Eppendorf

Appendix II: Assumption binary logistic regression

Linearity Results

Table A - 2.

Linearity check for metric variables

Variables in the Equation						
Imputation Number			B	S.E.	Sig.	Exp(B)
Pooled	Step 1[a]	Employment status(1)	,421	,327	,198	1,524
		Sex/Gender(1)	,413	,303	,172	1,511
		Relationship status(1)	,522	,345	,131	1,685
		Educational Background(1)	,673	,346	,052	1,960
		DSM-5 Social Interaction(1)	,111	,331	,737	1,118
		DSM-5 Social Interaction(2)	-,214	,527	,686	,808
		DSM-5 Flexibility of Behavior(1)	-,057	,505	,911	,945
		DSM-5 Flexibility of Behavior(2)	-,260	,530	,623	,771
		Income Median Split(1)	-,174	,351	,620	,840
		Age autistic adults	-,202	,395	,609	,817
		Quantity of physical co-occurring +1	,156	,724	,829	1,169
		Quantity of psychological co-occurring +1	2,142	,634	<,001	8,513
		Age autistic adults by Cod_Age_ln	,040	,084	*,637*	1,041
		Quantity of physical comorbidities +1 by Cod_ComorPhys_plus1_ln	-,079	,352	*,823*	,924
		Quantity of psychological comorbidities +1 by Cod_ComorPsycho_plus1_ln	-,782	,299	*,009*	,458
		Constant	-2,356	3,120	,450	,095

Note. With p < 0.00357 no linearity given. Relevant results in italics under the column Sig.

Outlier Assumption Results

Table A - 2.

Casewise list studentized residual

Casewise List[b]

Imputation Number	Selected Status[a]	Observed Utilization of outpatient psychotherapy	Predicted	Predicted Group	Temporary Variable		
					Resid	ZResid	SResid
Original	S	n**	,889	o	-,889	-2,829	-2,140
data	S	n**	,881	o	-,881	-2,720	-2,102
	S	n**	,912	o	-,912	-3,215	-2,232
1	S	o**	,131	n	,869	2,577	2,064
	S	n**	,878	o	-,878	-2,677	-2,090
	S	n**	,896	o	-,896	-2,928	-2,153
2	S	o**	,131	n	,869	2,574	2,063
	S	n**	,872	o	-,872	-2,607	-2,069
	S	n**	,894	o	-,894	-2,912	-2,148

3	S	o**	,131	n	,869	2,580	2,066
	S	n**	,878	o	-,878	-2,689	-2,094
	S	n**	,896	o	-,896	-2,943	-2,157
4	S	o**	,128	n	,872	2,615	2,076
	S	n**	,877	o	-,877	-2,671	-2,088
	S	n**	,895	o	-,895	-2,916	-2,149
5	S	o**	,133	n	,867	2,557	2,058
	S	n**	,873	o	-,873	-2,628	-2,076
	S	n**	,894	o	-,894	-2,900	-2,145
6	S	o**	,145	n	,855	2,432	2,016
	S	n**	,870	o	-,870	-2,586	-2,062
	S	n**	,893	o	-,893	-2,885	-2,140
7	S	o**	,134	n	,866	2,538	2,052
	S	n**	,874	o	-,874	-2,633	-2,077
	S	n**	,893	o	-,893	-2,894	-2,143
8	S	o**	,134	n	,866	2,545	2,054
	S	n**	,874	o	-,874	-2,638	-2,079
	S	n**	,856	o	-,856	-2,434	-2,003
	S	n**	,896	o	-,896	-2,928	-2,153
9	S	o**	,127	n	,873	2,619	2,078
	S	n**	,877	o	-,877	-2,675	-2,090
	S	n**	,856	o	-,856	-2,436	-2,005

	S	n**	,897	o	-,897	-2,948	-2,158
10	S	o**	,136	n	,864	2,519	2,046
	S	n**	,868	o	-,868	-2,565	-2,056
	S	n**	,892	o	-,892	-2,870	-2,136
11	S	o**	,131	n	,869	2,581	2,065
	S	n**	,885	o	-,885	-2,778	-2,121
	S	n**	,857	o	-,857	-2,444	-2,007
	S	n**	,899	o	-,899	-2,978	-2,166

Note. a. S = Selected, U = Unselected cases, and ** = Misclassified cases.

b. Cases with studentized residuals greater than 2,000 are listed

Studentized residuals from ±3

Table A - 3.

Leverage and cook distance

COO_1	LEV_1
,33995	,15892
,32530	,14549
,32030	,13973
,31954	,13875
,31798	,13769
,31779	,13742

Note. Snippet of cook distance and leverage list. Cooks distance outlier when ≥ 1 (Heiberger & Holland, 2015, p. 367; Larose, 2006, p. 53; Weisberg, 1985) Leverage limit value of 0.2 according to Huber (1981).

Appendix III: Syntax data preparation and analysis

```
* Encoding: UTF-8.

***Data preperation and analysis.
*Daraphone Phommahavong.
*Master thesis.
*Latest status: 14.03.2024

***Filtering the group to Autistic Adults (A1) and Delete A2 & A3 (N = 403).
DATASET ACTIVATE DataSet1.
USE ALL.
COMPUTE filter_$=(O1 = "A1").
VARIABLE LABELS filter_$ 'O1 = "A1" (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

*Delete Id's manually which incomplete the questionnaire until "AmblPsychoth" (-289).
Before (-157). N=246.

*Delete variables (manually) which are not needed for analysis.

**************************Recode & rename Variables*******************************
*Recode dependent variable "utilization of outpatient psychotheraphy.
RECODE AmbulPsychoth (1 = 1) (-99 = 0) (ELSE = -99) INTO Cod_AmbulPsychoth.
MISSING VALUES Cod_AmbulPsychoth (-99).
VALUE LABELS Cod_AmbulPsychoth 1 'outpatient psychotherapy' 0 'no outpatient
psychotherapy' -99 'missing'.
VARIABLE LABELS Cod_AmbulPsychoth 'Utilization of outpatient psychotherapy'.
EXECUTE.

*Recode Variable binary.
IF (GeschlAut = 1)  Cod_Gender = 1.
IF (GeschlAut = 2) OR (GeschlAut = 3)  Cod_AutSex = 0.
VALUE LABELS Cod_Gender 1 'female' 0 'not female'.
```

```
VARIABLE LABELS Cod_AutSex 'Gender'.
MISSING VALUES Cod_Gender (-99.0).
EXECUTE.

**Recode Employment binary.
IF (AutErwKein = 1) OR (AutErwNichtZutr = 1) Cod_Employ = 0.
IF (AutErwVollz = 1) OR (AutErwTeilz = 1) OR  (AutErwAusbil = 1) OR (AutErwGering
=1) Cod_Employ = 1.
VALUE LABELS Cod_Employ 1 'employed' 0 'not employed'.
VARIABLE LABELS Cod_Employ 'Employment status'.
EXECUTE.

IF (AutErwKein = 1) AND (AutErwNichtZutr = 1) Cod_Employ = 0.
IF (AutErwVollz = 1) AND (AutErwTeilz = 1) AND (AutErwAusbil = 1)  AND
(AutErwGering = 1) Cod_Employ = 1.
VALUE LABELS Cod_Employ 1 'employed' 0 'not employed'.
VARIABLE LABELS Cod_Employ 'Employment status'.
EXECUTE.

RECODE Cod_Employ (SYSMIS = -99).
MISSING VALUES Cod_Employ (-99).
EXECUTE.

*Recode Family status binary.
IF (FamstAut = 2) Cod_FamstAut = 1.
IF (FamstAut = 1) OR (FamstAut = 3) OR (FamstAut = 4) Or (FamstAut = 5)
Cod_FamstAut = 0.
VALUE LABELS Cod_FamstAut 1 'in a relationship' 0 'not in a relationship'.
VARIABLE LABELS Cod_FamstAut 'Relationship status'.
MISSING VALUES Cod_FamstAut (-99.0).
EXECUTE.

*Recode High school diploma, no high school diploma.
IF (AutSchule = 6) Cod_EduBack = 1.
IF (AutSchule = 1) OR  (AutSchule = 2) OR (AutSchule = 3) OR (AutSchule = 4) OR
(AutSchule = 5) Cod_AutSchul = 0.
VALUE LABELS Cod_AutSchul 1 'University entrance qualification' 0 'no University
entrance qualification'.
```

```
VARIABLE LABELS Cod_AutSchul 'University entrance qualification'.
EXECUTE.

RECODE Cod_AutSchul (SYSMIS = -99).
MISSING VALUES Cod_AutSchul (-99).
EXECUTE.

*Income. Median Split.

COMPUTE Median = 6.
DO IF (Einkommen <= Median).
  COMPUTE Cod_Income_Median = 0.
ELSE.

  COMPUTE Cod_Income_Median = 1. /* Gruppe über dem Median. */
END IF.

VALUE LABELS Cod_Income_Median 0 'lower 2.000 euros' 1 'higher 2.000 euros'.

RECODE Cod_Income_Median (SYSMIS = -99).
MISSING VALUES Cod_Income_Median (-99).
EXECUTE.

*Check cooding.

FREQUENCIES Cod_Income_Median.

CROSSTABS
  /TABLES=Einkommen BY Cod_Income_Median.
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT.

*Age - leave metric.

RECODE Cod_Age (SYSMIS = -99).
MISSING VALUES Cod_Alter (-99).
EXECUTE.
```

```
*Comorbidity Physical. Total score of comorbidities.
COMPUTE Cod_ComorPhys = 0.
IF (KomorbLunge <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbGelenk <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbStoffwechsel <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbDiabetes <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbScmerz <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbVerdauung <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbKrebs <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbHerz <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbHaut <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbOsteop <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
IF (KomorbEpilep <> -99) Cod_ComorPhys = Cod_ComorPhys + 1.
VARIABLE LABELS Cod_ComorPhys 'Quantity of physical comorbidities +1 '.
VARIABLE LEVEL Cod_ComorPhys (SCALE).
MISSING VALUES Cod_ComorPhys  (-99.0).
EXECUTE.

*Comorbidity Psychological. Total score of comorbidities.
COMPUTE Cod_ComorPsycho = 0.
IF (KomorbSucht <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbPsychose <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbAffekt <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbAngst <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbZwang <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbPTBS <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbSomatof <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbEssstrng <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbADHS <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
IF (KomorbPS <> -99) Cod_ComorPsycho = Cod_ComorPsycho + 1.
VARIABLE LABELS  Cod_ComorPsycho 'Quantity of psychological comorbidities +1'.
VARIABLE LEVEL Cod_ComorPsycho (SCALE).
MISSING VALUES Cod_ComorPsycho (-99.0).
EXECUTE.

*DSM 5 - Social interaction. Rename. No change in Value.
RECODE SchwGrInter (1 = 0) (2 = 1) (3 = 2) INTO Cod_SevInter.
VALUE LABELS Cod_SevInter 0 'low support' 1 'moderate support' 2 'high support'.
```

```
VARIABLE LABELS Cod_SevInter 'DSM-5 Social Interaction'.
MISSING VALUES Cod_SevInter (-99).
VARIABLE LEVEL Cod_SevInter (ORDINAL).
EXECUTE.

*DSM 5 - Flexebility in behavior. Rename. No change in Value.
RECODE SchwGrFlex (1 = 0) (2 = 1) (3 = 2) INTO Cod_SevFlexBehav.
VALUE LABELS Cod_SevFlexBehav 0 'low severity' 1 'moderate severity' 2 'high
severity'.
VARIABLE LABELS Cod_SevFlexBehav 'DSM-5 Flexibility of Behavior'.
MISSING VALUES Cod_SevFlexBehav (-99).
VARIABLE LEVEL  Cod_SevFlexBehav (ORDINAL).
EXECUTE.

**********Checking variables prerequisites for binary logistic regression******

****1. Dependent variable nominal scale (dichotomously). ✓.

FREQUENCIES VARIABLES=Cod_AmbulPsychoth
  /STATISTICS=RANGE MINIMUM MAXIMUM MODE
  /ORDER=ANALYSIS.

****2. Independet variables are nominal (kategorial) or metric. ✓.

****3. Independet observation. No matched data or data not from repeated
measurements. ✓.

****4. Sufficent cases per predictor. N = 246.  ✓.

*Peduzzi, Concato, Kemper, Holford und Feinstein (1996): 10 Fälle pro
Prädiktor
Sathian et al. (1970): 10 Fälle pro Prädiktor
Moons et al. (2014): 10 Fälle pro Prädiktor
Pavlou, Ambler, Seaman, De Iorio und Omar (2015): 10 Fälle pro Prädiktor
```

*Calculation with StatistikGuru (N= 246, R^2 0.13, Alphalevel 0.05 = Power of 0.99481)

****5. Outliers. ✓.

****6. Linearity x.

*Preperation variable Box-Tidwell to check Linearity.
* Calculate the logarithm of the continuous variable and save as a new variable
* Increase the values by 1 to avoid zeros, as zeros cannot be logarithmized.
COMPUTE Cod_ComorPhys_plus1 = Cod_ComorPhys + 1.
COMPUTE Cod_ComorPsycho_plus1 = Cod_ComorPsycho + 1.
Execute.

*Calculate the logarithm of the continuous variable and save as a new variable.

COMPUTE Cod_Age_ln=LN(Cod_Age).
COMPUTE Cod_ComorPhys_plus1_ln=LN(Cod_ComorPhys_plus1).
COMPUTE Cod_ComorPsycho_plus1_ln=LN(Cod_ComorPsycho_plus1).
EXECUTE.

*Calculate logistic regression with interaction terms.

LOGISTIC REGRESSION VARIABLES Cod_AmbulPsychoth
  /METHOD=ENTER Cod_Employ Cod_Gender Cod_FamstAut Cod_EduBack Cod_SevInter
    Cod_SevFlexBehav Cod_Income_Median Cod_Age Cod_ComorPhys_plus1
    Cod_ComorPsycho_plus1 Cod_Age*Cod_Age_ln
    Cod_ComorPhys_plus1*Cod_ComorPhys_plus1_ln
    Cod_ComorPsycho_plus1*Cod_ComorPsycho_plus1_ln
  /CONTRAST (Cod_Employ)=Indicator(1)
  /CONTRAST (Cod_Gender)=Indicator(1)
  /CONTRAST (Cod_FamstAut)=Indicator(1)
  /CONTRAST (Cod_EduBack)=Indicator(1)
  /CONTRAST (Cod_SevInter)=Indicator(1)

```
  /CONTRAST (Cod_SevFlexBehav)=Indicator(1)
  /CONTRAST (Cod_Income_Median)=Indicator(1)
  /CRITERIA=PIN(.05) POUT(.10) ITERATE(20) CUT(.5).

* Bei 10 Prädiktoren (plus der Konstante) wäre bei Variablen
* mit einem p < 0.00357 keine Linearität gegeben.

* With 10 predictors (plus the constant), variables
* with a p < 0.00357 there would be no linearity.

*Linearity II. Mit imputierten DatenSet (Syntaxx siehe unten) nochmal
berechnen. ✓.

**Calculate the logarithm of the continuous variable and save as a new variable.

COMPUTE Cod_Age_ln=LN(Cod_Age).
COMPUTE Cod_ComorPhys_plus1_ln=LN(Cod_ComorPhys_plus1).
COMPUTE Cod_ComorPsycho_plus1_ln=LN(Cod_ComorPsycho_plus1).
EXECUTE.

*Calculate logistic regression with interaction terms.

LOGISTIC REGRESSION VARIABLES Cod_AmbulPsychoth
  /METHOD=ENTER Cod_Employ Cod_Gender Cod_FamstAut Cod_EduBack
Cod_SevInter
    Cod_SevFlexBehav Cod_Income_Median Cod_Age Cod_ComorPhys_plus1
    Cod_ComorPsycho_plus1 Cod_Age*Cod_Age_ln
    Cod_ComorPhys_plus1*Cod_ComorPhys_plus1_ln
    Cod_ComorPsycho_plus1*Cod_ComorPsycho_plus1_ln
  /CONTRAST (Cod_Employ)=Indicator(1)
  /CONTRAST (Cod_Gender)=Indicator(1)
  /CONTRAST (Cod_FamstAut)=Indicator(1)
  /CONTRAST (Cod_EduBack)=Indicator(1)
  /CONTRAST (Cod_SevInter)=Indicator(1)
  /CONTRAST (Cod_SevFlexBehav)=Indicator(1)
```

```
  /CONTRAST (Cod_Income_Median)=Indicator(1)
  /CRITERIA=PIN(.05) POUT(.10) ITERATE(20) CUT(.5).

* With 10 predictors (plus the constant), variables
* with a p < 0.00357 there would be no linearity.

*7. No multicolinearity. ✓

**********Overview Missing Values**********

*Missings total.

MVA VARIABLES=Cod_ComorPsycho Cod_ComorPhys Cod_Age
Cod_SevFlexBehav Cod_SevInter
    Cod_Income_Median Cod_Employ Cod_EduBack Cod_FamstAut Cod_Gender
Cod_AmbulPsychoth
  /MAXCAT=25
  /CATEGORICAL=Cod_SevFlexBehav Cod_SevInter Cod_Income_Median
Cod_Employ Cod_EduBack Cod_FamstAut
    Cod_Gender Cod_AmbulPsychoth.

CROSSTABS
  /TABLES=Cod_Edu BY Cod_Income_Median
  /STATISTICS=CHISQ
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT EXPECTED.

*Kummulierte Missingquote.
COUNT missk = Cod_Income_Median Cod_EduBack (MISSINGS).
IF (missk > 0) missk = 1.
FREQ missk.

*Analyze Patterns of Missing Values.
```

```
MULTIPLE IMPUTATION  Cod_Income_Median Cod_AutSchul
   /IMPUTE METHOD=NONE
   /MISSINGSUMMARIES  OVERALL VARIABLES (MAXVARS=28
MINPCTMISSING=0.01) PATTERNS.
```

**********MCAR Property Verification using logistic regression**********
*******Since only categorical model variables show missings, this method must be chosen instead of the Littles test recommended by SPSS (Urban et al., 2016)****

*Missings must be recoded: Employment status, Highest high school degree, Income (Median).

```
RECODE Cod_Income_Median (MISSINGS =1) (ELSE = 0) INTO
Cod_Income_Median_Miss.

RECODE Cod_EduBack(MISSINGS =1) (ELSE = 0) INTO Cod_EduBack_Miss.
```

*High school diploma.

```
LOGISTIC REGRESSION VARIABLES Cod_EduBack_Miss
  /METHOD=ENTER Cod_ComorPhys_plus1 Cod_ComorPsycho_plus1
Cod_Income_Median Cod_SevFlexBehav
    Cod_SevInter Cod_Employ Cod_FamstAut Cod_Gender Cod_Age
Cod_AmbulPsychoth
  /CONTRAST (Cod_Income_Median)=Indicator(1)
  /CONTRAST (Cod_SevInter)=Indicator(1)
  /CONTRAST (Cod_Employ)=Indicator(1)
  /CONTRAST (Cod_FamstAut)=Indicator(1)
  /CONTRAST (Cod_Gender)=Indicator(1)
  /CONTRAST (Cod_SevFlexBehav)=Indicator(1)
  /CONTRAST (Cod_AmbulPsychoth)=Indicator(1)
  /CRITERIA=PIN(.05) POUT(.10) ITERATE(20) CUT(.5).
```

*Income

```
DATASET ACTIVATE DataSet1.
```

```
LOGISTIC REGRESSION VARIABLES Cod_Income_Median_Miss
  /METHOD=ENTER Cod_ComorPhys_plus1 Cod_ComorPsycho_plus1
Cod_SevFlexBehav Cod_SevInter Cod_Employ
    Cod_FamstAut Cod_Gender Cod_Age Cod_AmbulPsychoth Cod_EduBack
  /CONTRAST (Cod_SevInter)=Indicator(1)
  /CONTRAST (Cod_Employ)=Indicator(1)
  /CONTRAST (Cod_FamstAut)=Indicator(1)
  /CONTRAST (Cod_Gender)=Indicator(1)
  /CONTRAST (Cod_SevFlexBehav)=Indicator(1)
  /CONTRAST (Cod_AmbulPsychoth)=Indicator(1)
  /CONTRAST (Cod_EduBack)=Indicator(1)
  /CRITERIA=PIN(.05) POUT(.10) ITERATE(20) CUT(.5).

*RESULT: MCAR can be confirmed. No significant values.

**********Execution Imputation**********
********Since MCAR characteristic is given, the imputation can be carried
out.**********

*Impute Missing Data Values.
DATASET DECLARE Final_Imputated_DataSet_2_04.03.2024.
MULTIPLE IMPUTATION Cod_Income_Median Cod_EduBack Cod_FamstAut
Cod_Gender Cod_Employ Cod_Age
  /IMPUTE METHOD=AUTO NIMPUTATIONS=11 MAXPCTMISSING=NONE
  /CONSTRAINTS Cod_FamstAut( ROLE=IND)
  /CONSTRAINTS Cod_Gender( ROLE=IND)
  /CONSTRAINTS Cod_Employ( ROLE=IND)
  /CONSTRAINTS Cod_Age( ROLE=IND)
  /MISSINGSUMMARIES NONE
  /IMPUTATIONSUMMARIES MODELS
  /OUTFILE IMPUTATIONS=Final_Imputated_DataSet_2_04.03.2024.

  **********Descriptives/Sample description**********

  *Sociodemographic*

  DESCRIPTIVES VARIABLES=Cod_Age
    /STATISTICS=MEAN STDDEV MIN MAX.
```

```
FREQUENCIES VARIABLES=Cod_Gender Cod_FamstAut Cod_Income_Median
  /ORDER=ANALYSIS.

*Clinical Variables & Utilization outpatient psychotherpahy*

FREQUENCIES VARIABLES=Cod_ComorPsycho Cod_ComorPhys
  /ORDER=ANALYSIS.

DESCRIPTIVES VARIABLES=Cod_ComorPsycho Cod_ComorPhys
  /STATISTICS=MEAN STDDEV MIN MAX.

CROSSTABS
  /TABLES=Cod_ComorPhys Cod_ComorPsycho BY Cod_AmbulPsychoth
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT
  /COUNT ROUND CELL.

MRSETS
  /MDGROUP NAME=$psychkomorb_aut_set CATEGORYLABELS=VARLABELS
VARIABLES=KomorbSucht KomorbPsychose
    KomorbAffekt KomorbAngst KomorbZwang KomorbPTBS KomorbSomatof
KomorbEssstrng KomorbADHS KomorbPS
    VALUE=1
  /DISPLAY NAME=[$psychkomorb_aut_set].

MULT RESPONSE GROUPS=$psychkomorb_aut_set (komorbsucht
komorbpsychose komorbaffekt komorbangst
    komorbzwang komorbptbs komorbsomatof komorbessstrng komorbadhs komorbps
(1))
  /FREQUENCIES=$psychkomorb_aut_set.

CROSSTABS
  /TABLES=KomorbPsych KomorbSucht KomorbPsychose KomorbAffekt
KomorbAngst KomorbZwang KomorbPTBS
    KomorbSomatof KomorbEssstrng KomorbADHS KomorbPS BY
Cod_AmbulPsychoth
  /FORMAT=AVALUE TABLES
```

```
  /CELLS=COUNT
  /COUNT ROUND CELL.

 FREQUENCIES VARIABLES=KomorbPsych
  /ORDER=ANALYSIS.

 *Educational Background and Employment status*
 *Employ*

 MRSETS
  /MDGROUP NAME=$erwerb_aut_set CATEGORYLABELS=VARLABELS
VARIABLES=AutErwVollz AutErwTeilz
    AutErwGering AutErwAusbil AutErwKein AutErwNichtZutr VALUE=1
  /DISPLAY NAME=[$erwerb_aut_set].

 MULT RESPONSE GROUPS=$erwerb_aut_set (auterwvollz auterwteilz auterwgering
auterwausbil auterwkein
    auterwnichtzutr (1))
  /FREQUENCIES=$erwerb_aut_set.

 *School*

 FREQUENCIES VARIABLES=AutSchule
  /ORDER=ANALYSIS.

 *Utilization Psychotheraphy*

 FREQUENCIES VARIABLES=Cod_AmbulPsychoth
  /STATISTICS=RANGE MINIMUM MAXIMUM MODE
  /ORDER=ANALYSIS.

 *Categorical and utilization Psychotheraphy*

 CROSSTABS
  /TABLES=Cod_Employ Cod_Gender Cod_FamstAut Cod_EduBack Cod_SevInter
Cod_SevFlexBehav
    Cod_Income_Median BY Cod_AmbulPsychoth
  /FORMAT=AVALUE TABLES
```

```
  /CELLS=COUNT
  /COUNT ROUND CELL.

 *Metrics and utilization Psychotheraphy*

 CROSSTABS
  /TABLES=Cod_Age BY Cod_AmbulPsychoth
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT
  /COUNT ROUND CELL.

 CROSSTABS
  /TABLES=Cod_Age Cod_ComorPhys Cod_ComorPsycho BY Cod_AmbulPsychoth
  /FORMAT=AVALUE TABLES
  /CELLS=COUNT
  /COUNT ROUND CELL.

 ****************************************Binary Logistic Regression
**********************************.
 DATASET ACTIVATE Final_Imputated_DataSet.

 LOGISTIC REGRESSION VARIABLES Cod_AmbulPsychoth
  /METHOD=ENTER Cod_Age Cod_Employ Cod_Gender Cod_FamstAut
Cod_EduBack Cod_Income_Median
    Cod_ComorPhys_plus1 Cod_ComorPsycho_plus1 Cod_SevInter
Cod_SevFlexBehav
  /CONTRAST (Cod_Gender)=Indicator(1)
  /CONTRAST (Cod_FamstAut)=Indicator(1)
  /CONTRAST (Cod_Employ)=Indicator(1)
  /CONTRAST (Cod_EduBack)=Indicator(1)
  /CONTRAST (Cod_Income_Median)=Indicator(1)
  /CONTRAST (Cod_SevInter)=Indicator(1)
  /CONTRAST (Cod_SevFlexBehav)=Indicator(1)
  /SAVE=PRED COOK LEVER
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR SUMMARY CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

******When opening (and analyzing) the DataSet with the imputed values, use the following syntax commands so that SPSS recognizes the DataSet as a "Multiple Imputation" set*****.

```
DATASET ACTIVATE DataSet1.

SORT CASES  BY Imputation_.
SPLIT FILE LAYERED BY Imputation_.
```

Appendix V: Output missing values

Cumulative missing quota

missk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	220	89,4	89,4	89,4
	1,00	26	10,6	10,6	100,0
	Total	246	100,0	100,0	

Overview all variables and all missing's

Univariate Statistics

Imputation Number		N	Mean	Std. Deviation	Missing Count	Missing Percent	No. of Extremes[a] Low	No. of Extremes[a] High
Original data	Cod_ComorPsycho	246	1,4390	1,57608	0	,0	0	8
	Cod_ComorPhys	246	1,2724	1,48014	0	,0	0	7
	Cod_Age	246	39,54	12,185	0	,0	0	0
	Cod_SevFlexBehav	246			0	,0		
	Cod_SevInter	246			0	,0		
	Cod_Income_Median	224			22	8,9		
	Cod_Employ	246			0	,0		
	Cod_EduBack	240			6	2,4		
	Cod_FamstAut	246			0	,0		
	Cod_Gender	246			0	,0		
	Cod_AmbulPsychoth	246			0	,0		

Appendix IV: MCAR Test

Table B – 1.

MCAR using logistic regression with dependent variable "Income"

Variable	*p*
Utilization of outpatient Psychotherapy	0.44
Gender	0.14
Employment status	0.66
Educational Background	0.90
Age	0.34
Relationship status	0.87
Co-occurring Psychological	0.37
Co-occurring Physical	0.97
Severity Social Interaction	0.84
Severity Social Interaction (1)	0.72
Severity Social Interaction (2)	0.79
Severity Flexibility in behavior	0.91
Severity Flexibility in behavior (1)	0.87
Severity Flexibility in behavior (2)	0.93

Note. p: Significance. $p < .05$.

Table B – 2.

MCAR using logistic regression with dependent variable "Educational background"

Variable	*p*
Utilization of outpatient Psychotherapy	0.20
Gender	0.84
Employment status	0.78
Income	0.85
Age	0.72
Relationship status	0.69
Co-occurring Psychological	0.07
Co-occurring Physical	0.71
Severity Social Interaction	0.90
Severity Social Interaction (1)	0.67
Severity Social Interaction (2)	0.90
Severity Flexibility in behavior	1.00

Severity Flexibility in behavior (1)	1.00
Severity Flexibility in behavior (2)	1.00

Note. p: Significance. $p < .05$.

Statutory Declaration

I declare that I have authored this paper independently, that I have not used other than the declared sources / resources, and that I have explicitly marked all material which has been quoted either literally or by content from the used sources.

Hamburg, 26th March 2024

Daraphone, Phommahavong