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The Role of Self- and Informant-Reports on Symptoms and Impairments in the Clinical Evaluation of Adult ADHD

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Abstract: Little is known about which clinical features may aid the differentiation between attention deficit hyperactivity disorder (ADHD) and other clinical conditions. This study seeks to determine the role of self- and informant reports on symptoms and impairments in the clinical evaluation of adult ADHD and explore their association with objective neuropsychological test performance by examining data of 169 outpatients referred for a diagnostic evaluation of adult ADHD. Participants were assigned either to an ADHD group (ADHD, n = 73) or one of two clinical comparison groups, depending on whether they show indications (Clinical Comparison Group, CCG, n = 53) or no indications (Clinical Comparison Group—Not Diagnosed, CCG-ND, n = 43) of psychiatric disorders other than ADHD. All participants and their informants completed a set of questionnaires. Compared to the CCG-ND, the ADHD group obtained significantly higher scores on ADHD symptoms, impulsivity, cognitive deficits, and anxiety. Compared to the CCG, the ADHD group scored significantly higher on ADHD symptoms but lower on depression. Further regression analyses revealed that self- and informant reports failed to predict neuropsychological test performance. Self- and informant reported information may be distinct features and do not correspond to results of objective neuropsychological testing.

Keywords: adult ADHD; symptoms; impairments; clinical assessment; daily functioning

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1. Introduction

Attention deficit hyperactivity disorder (ADHD) is a neuropsychiatric childhood disorder that persists into adulthood in a sizeable proportion of individuals and is characterized by symptoms of inattention, hyperactivity, and impulsivity [1–4]. ADHD in adulthood commonly occurs together with symptoms of other forms of psychopathology, which is underscored by research revealing a rate of up to 60–80% of patients with ADHD being diagnosed with one or more comorbid psychiatric disorders, with anxiety disorders (34%) and mood disorders (22%) being the most prevalent ones [5–8]. Additionally, ADHD symptoms can be observed in patients with anxiety (20%) and mood disorders (17%) [9–11]. It has been demonstrated that symptoms of ADHD and comorbid conditions contribute to functional impairments that are commonly observed in this population, such as lower academic achievement [12–14], lower employment rate [15,16], poorer financial

situation [17,18], substance abuse [19,20], and more frequent divorces and relationship breakups [21–23].

Symptoms and impairments of adults with ADHD are assessed by employing various types of instruments, usually distinguishing between subjective reports (self-report and informant-report) and objective neuropsychological tests. Neuropsychological research using cognitive tests demonstrated marked impairments in adults with ADHD in a range of cognitive functions when compared to healthy individuals, including aspects of attention, memory, and executive control [24–29]. However, the differentiation between ADHD, other psychiatric disorders, and subclinical levels of impairment, as it is commonly seen in an outpatient referral context, appears to be more complex, as cognitive testing does not seem to provide incremental information for differential diagnostic purposes [30–32]. Patients' self-reports and, in many cases, also the ones of their informants are usually readily available and easily accessible and, thus, represent important sources of information in the clinical evaluation of adult ADHD [33–35]. However, even though patients with ADHD differ in their experiences from healthy individuals in many aspects of functioning [15,36,37], the diagnostic process in an outpatient referral context may be more puzzling, as adult ADHD is not only sought to be differentiated from healthy individuals but, also, from clinical conditions that may have overlapping clinical features and referral reasons. Thus, it remains a challenge for clinical research to identify characteristics, symptoms and impairments that are specific for adult ADHD and help the clinician to differentiate ADHD from subclinical levels of impairment and other clinical conditions.

Previous research in studying the role of self- and other reports for differential diagnostic purposes came to inclusive findings. Concerning ADHD symptoms, Suhr and colleagues demonstrated that the Conners' Adult ADHD Rating Scale (CAARS) failed to differentiate an ADHD group from a group being diagnosed with another psychiatric disorder; however, significant and large-sized differences were observed on the Wender Utah Rating Scale (WURS) in the way that the ADHD group endorsed more symptoms than the clinical control group. Yet, the WURS was found to be of only limited value to differentiate between ADHD and the other psychological disorders in a further study of the same group, which revealed a high rate of false positives (16%) in individuals who either were diagnosed with other psychological disorders or reported depressive symptoms [38,39]. In contrast, in a more recent study, Paucke and colleagues highlighted the utility of both the WURS and some subscales of the CAARS in the differentiation of ADHD and major depressive disorder [40]. Further, McCann and Roy-Byrne examined the utility of a number of ADHD self-report scales for the diagnostic screening of adults referred for an ADHD evaluation. The authors found, on the one hand, that all scales were sensitive to the presence of ADHD (ranging from 78% to 92%); on the other hand, however, a high proportion of individuals with other diagnoses than ADHD were also screened positive for ADHD by these scales (ranging from 36% to 67%), especially individuals with a major depressive episode and dysthymia [41,42]. In another study, Young reported small to medium-sized group differences between patients with ADHD and clinically referred comparison individuals (primarily suffering from anxiety, depression, and personality disorders), as well as healthy comparisons in all four subscales of the Young ADHD Questionnaire, both in the self- and the informant report. Yet, further discriminant analyses showed that only the ADHD symptomatology subscale had significant discriminant value. Of note, the ADHD symptom severity of adults with ADHD was only weakly associated between the self- and informant report in this and some further studies [34,43]. Nevertheless, moderate to large associations were reported in the German version of the CAARS [44].

The majority of the studies using self-reports to differentiate ADHD from clinical comparison groups were based on core symptoms of ADHD, including attention and concentration deficits, impulsivity, and hyperactivity, which are partly shared by other psychiatric conditions, such as mood disorders, anxiety disorders, impulsive-control disorders, and substance use disorders [8,45,46]. Given this well-documented overlap, it can be assumed that scales focusing on ADHD symptoms are not adequate instruments to serve

the purpose of differential diagnosis but that measures for other clinical conditions with which ADHD is commonly confused may be more promising. In this context, Paucke and colleagues reported a large-sized difference between adults with ADHD and adults with major depressive disorder in self-reported symptoms of depression, as assessed with the Beck Depression Inventory-II (BDI-II) [40]. However, this effect was not found in an earlier study comparing patients with ADHD and bipolar disorder [47]. Similarly, Nelson and Gregg showed that college students with ADHD and dyslexia could not be differentiated from each other and, also, not from college students not having any diagnosis based on self-reported symptoms of depression and anxiety [48].

Considering no firm conclusions can be drawn so far about the role of self- and informant reports on symptoms and impairments in the differential diagnosis of adult ADHD, more research is needed, especially comparing clinical samples from the same referral context. Thus, this study aims to advance our understanding of the role of subjective reports in the clinical evaluation of adult ADHD and for differential diagnostic purposes specifically and to provide clinicians recommendations on how to use and interpret the standardized self- and informant reports. This study employs a large sample of 169 individuals clinically referred to an ADHD outpatient assessment. All individuals completed a comprehensive battery of self- and informant report rating scales for symptoms and impairments, including ADHD symptom domains in childhood and adulthood, cognitive functioning, depression, anxiety, and impulsivity. By using a large clinical sample of individuals who all completed a comprehensive battery of self- and informant reports, this study aims to determine whether individuals meeting the diagnostic criteria of ADHD can be differentiated from relevant clinical controls in the same referral context by reported levels of symptoms and impairments. We expect (1) individuals diagnosed with ADHD to show more pronounced ADHD symptoms and impairments but less pronounced symptoms of depression and anxiety when compared to individuals not reaching diagnostic criteria of ADHD but showing evidence for other psychiatric disorders. However, when compared to individuals who did not show evidence for any psychiatric disorders, we expected (2) individuals diagnosed with ADHD to endorse higher symptom levels and more impairments on all scales applied. Furthermore, because of reliable findings showing symptom under-reported [35,49,50] or over-reported [37,38,51] in the self-report of individuals with ADHD, we expected (3) individuals diagnosed with ADHD to show a more pronounced discrepancy to informant reports compared to clinically referred individuals not reaching diagnostic criteria of ADHD. Finally, (4) on the basis of previous research questioning the relationship between subjective reports and an objective neuropsychological test performance [52–55], this study seeks to further define the role of subjectively reported complaints by relating symptoms and impairments to test the scores of cognitive functions.

2. Materials and Methods

2.1. Participants

A total of 248 participants were considered for inclusion in this study. All participants were recruited from the ADHD outpatient clinic of the Department of Psychiatry and Psychotherapy, LVR-Hospital Essen, University of Duisburg-Essen, Germany. Individuals were referred for a diagnostic assessment, because they were suspected of having ADHD by GPs, neurologists, psychiatrists, or by themselves. Qualified psychologists or psychiatrists performed a comprehensive assessment for all participants based on the criteria as outlined in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition [2]. A semi-structured interview was conducted to evaluate ADHD psychopathology (i.e., the Wender-Reimherr-Interview and the Essen Interview-for-school-days-related-biography) [56,57]. Furthermore, all participants and their informants completed a battery of self- and informant report rating scales for symptoms and impairments commonly seen in ADHD, including ADHD symptoms in childhood, current ADHD symptoms, impulsiveness, anxiety, depression, and cognitive disturbances. Further, all individuals underwent cognitive testing using a battery of neuropsychological tests (see the Methods

section for a detailed description of the applied measures). The diagnostic assessment also included objective measures of impairment (e.g. failure in academic and/or occupational achievement) and multiple informants (e.g. school reports, employer evaluation, partner or parent-reports) for all individuals.

Seventy-nine participants were excluded from data analysis for one of the following reasons, i.e., participants did not complete the diagnostic process, a formal diagnostic decision could not be established, or self- and informant report information was not assessed, resulting in a sample of 169 participants who were included in the final data analysis. All of those participants who were retained were assigned to one of three groups, i.e., the ADHD group (participants diagnosed with ADHD, $n = 73$), the Clinical Comparison Group (CCG; participants who did not fulfill diagnostic criteria for ADHD but showed evidence of one or more other psychiatric disorders; $n = 53$), and the Clinical Comparison Group-Not Diagnosed (CCG-ND; participants who did not fulfill diagnostic criteria for ADHD and were not diagnosed with any other psychiatric disorder; $n = 43$). Of those patients diagnosed with ADHD, 62 were diagnosed with the combined symptom presentation, and nine were diagnosed with the predominantly inattentive symptom presentation, while the symptom presentation of another two participants was not reported. Moreover, 27 patients diagnosed with ADHD showed evidence for one or more comorbid disorders, including mood disorders ($n = 16$), anxiety disorders ($n = 3$), addiction disorders ($n = 6$), personality disorders ($n = 2$), adjustment disorders ($n = 3$), obsessive-compulsive disorders ($n = 2$), intellectual development disorder ($n = 1$), mixed receptive expressive language disorder ($n = 1$), and autistic disorders ($n = 1$). Individuals in the CCG showed evidence for one or more psychiatric disorders other than ADHD, including mood disorders ($n = 37$), anxiety disorders ($n = 4$), addiction disorders ($n = 15$), personality disorders ($n = 1$), adjustment disorders ($n = 1$), obsessive-compulsive disorders ($n = 1$), eating disorders ($n = 3$), and schizoaffective disorders ($n = 1$). The characteristics of all the participants are presented in Table 1. A strict significance level of $p < 0.01$ was applied to control for alpha error inflation. Significant difference was observed between the groups in age, $F(2) = 6.453$, $p = 0.002$, but not in sex, $\chi^2(2) = 4.500$, $p = 0.105$, and not in educational level, $\chi^2(8) = 17.268$, $p = 0.027$. Compared to the CCG, patients with ADHD were on average significantly younger but did not differ significantly in sex and education level. The ADHD group did not differ significantly from the CCG-ND in either age, sex, or educational level.

Table 1. Characteristics (M ± SD) of the ADHD group (ADHD), Clinical Comparison Group (CCG), and Clinical Comparison Group-Not Diagnosed (CCG-ND).

	ADHD	**CCG**	**CCG-ND**	**ANOVA/Chi-Square**		**Pairwise Comparisons**			
	(*n* = 73)	**(*n* = 53)**	**(*n* = 43)**	***F*/χ^2**	***p***	**ADHD vs. CCG**		**ADHD vs. CCG-ND**	
						p	***Cohen's d***	***p***	***Cohen's d***
Age (in years)	32.4 ± 10.4	39.3 ± 11.0	33.7 ± 11.3	6.453	0.002 *	0.001 *	0.648	0.543	0.121
Sex (female/male)	26/47	23/30	24/19	4.500	0.105				
Education (% in 1/2/3/4/5) [1]	6/28.5/20/28.5/17	0/17/44/23/16	0/30/19/37/14	17.268	0.027				
Symptom presentation of ADHD [2]	62/9/0/2								
Psychiatric disorders other than ADHD [3]	16/3/6/2/3/2/1/ 1/1/0/0	37/4/15/1/1/1/ 0/0/0/1/1							

Note: ADHD = Attention Deficit Hyperactivity Disorder; CCG = Clinical Comparison Group; CCG-ND = Clinical Comparison Group—Not Diagnosed. [1] Percentage of individuals with different education levels per group (%). Education (1/2/3/4/5) = No school-leaving qualification/Compulsory schooling or intermediate secondary school/College or vocational training/Higher secondary school with university entrance qualification/University. [2] Symptom presentation of ADHD = combined/inattentive/hyperactive-impulsive/not reported. [3] Individuals were suffering from one or more psychiatric disorders other than ADHD: Mood disorders/anxiety disorders/addiction disorders/personality disorders/adjustment disorders/obsessive-compulsive disorders/intellectual development disorder/mixed receptive expressive language disorder/autistic disorders/eating disorders/schizoaffective disorders. * Statistically significant at $p < 0.01$.

2.2. Measures

The current study is part of a larger project on clinical and neuropsychological functioning of adults with ADHD in an outpatient referral context. Since the present study focuses on self- and informant-reported symptoms and impairments, it describes these

instruments in detail. The role of objective neuropsychological test performance has been addressed in a previous study of our group on an overlapping sample [32]. The current manuscript is therefore restricted to a brief description of neuropsychological tests.

WURS-K. The German version of the Wender Utah Rating Scale (WURS-K) was administered to all participants to quantify self-reported retrospective ADHD symptoms [58–60]. The scale includes 25 items on a 5-point Likert scale ranging from 0 (not at all or very slightly) to 4 (very much). Participants were asked to rate each item based on their recall of experiences in childhood. Internal consistency (Cronbach's alpha) of this scale was excellent and reported to be 0.91. A sum score was calculated for the severity of ADHD symptoms in childhood.

ADHD-SR. The German version of the ADHD Self-Report Scale (ADHD-SR) is a self-report scale used to assess the severity of current ADHD symptoms [61–63]. The ADHD-SR comprises 18 items corresponding to the diagnostic criteria of DSM-IV. Participants are asked to rate each item based on how often an ADHD symptom occurred over the past six months on a scale ranging from 0 (never) to 3 (very often). The internal consistency (Cronbach's alpha) of this scale was high and reported to be 0.90. A sum score was calculated for the severity of current ADHD symptoms.

CAARS. The Conners' Adult ADHD Rating Scales (CAARS) is a self- and informant report instrument that was developed to assist in the assessment of ADHD in adulthood [64]. The present study includes both the self-report (CAARS-S:L) and observer report form (CAARS-O:L). Each scale includes 66 items, which are rated on a 4-point Likert scale ranging from 0 (not at all/never) to 3 (very much/very frequently). Item scores are summed up to derive eight subscale scores, including inattention (CAARS_SR_IA and CAARS_OR_IA for the self- and other report, respectively), hyperactivity (CAARS_SR_HA and CAARS_OR_HA), impulsivity (CAARS_SR_IM and CAARS_OR_IM), problems with self-concept (CAARS_SR_SC and CAARS_OR_SC), DSM-IV: inattentive symptoms (CAARS_SR_DSM and, CAARS_OR_DSMI), DSM-IV: hyperactive-impulsive (CAARS_SR_DSMH and CAARS_OR_DSMH), DSM-IV: total ADHD symptoms (CAARS_SR_DSMT and CAARS_OR_DSMT), and the ADHD index (CAARS_SR_Index and CAARS_OR_Index). Internal consistency (Cronbach's alpha) of the CAARS was excellent and ranged from 0.74 to 0.95 [44].

STAI. The State-Trait Anxiety Inventory (STAI) is a self-report scale designed to measure the presence and severity of anxiety symptoms in adults. The inventory consists of 40 items, each rated on a 4-point Likert scale. Twenty items assess the presence of anxiety as an emotional state (state anxiety, STAI-S), whereas other 20 items assess individual differences in anxiety proneness as a personality trait (trait anxiety, STAI-T) [65,66]. Internal consistency (Cronbach's alpha) was reported to be 0.93 and 0.90 for state anxiety and trait anxiety, respectively [67]. The sum scores were calculated for both state and trait anxiety, with higher sum scores indicating higher levels of anxiety.

BDI-II. The Beck Depression Inventory-II (BDI-II) is a self-rated scale assessing the presence and severity of depressive symptoms in individuals aged 13 years and older. The BDI includes 21 items, each rated on a 4-point Likert scale [68]. To each item, participants are asked to select the statement that best characterizes their emotions and functioning in the past two weeks. The internal consistency (Cronbach's alpha) of the BDI-II was reported to be high (alpha $\geq$ 0.84) [69]. Scoring of the BDI includes the calculation of a total score, with high scores indicating more severe depressive symptoms.

BIS-11. The Barratt Impulsiveness Scale (BIS-11) is a self-report questionnaire designed to measure impulsiveness [70,71]. The scale consists of 30 items, each rated on a 4-point Likert scale ranging from 1 (rarely/never) to 4 (almost always/always). The internal consistency (Cronbach's alpha) of the BIS-11 was high (0.83) [71]. A total score was calculated for the BIS-11, with larger scores indicating higher levels of impulsiveness.

FLEI. The Questionnaire on Mental Ability (FLEI) was administered as a measure of subjectively experienced cognitive deficits [72]. In this scale, participants are asked to rate 35 statements regarding the presence of problems in attention, executive functioning,

and memory in everyday life. The FLEI includes 35 items scored on a 5-point Likert scale ranging from 0 (never) to 4 (very often). The internal consistency (Cronbach's alpha) of the FLEI was high (0.94) [72]. A sum score is computed to indicate the severity of the cognitive deficits.

Neuropsychological test battery. A battery of neuropsychological tests was administered to all participants to assess several aspects of cognition, including selective function (Perceptual and Attention Functions-Selective Attention, WAFS), vigilance (Perceptual and Attention Functions-Vigilance, WAFV), working memory (N-back Task), interference (Stroop Interference Test), inhibition (Go/No-Go Test), figural fluency (5-Point Test—Langensteinbach Version), flexibility (Trail Making Test—Langensteinbach Version, TMT-L), planning ability (Tower of London—Freiburg Version, TOL-F), and task switching (SWITCH Task). All tests were retrieved from the test set Cognitive Functions ADHD (CFADHD), which is a computerized test battery assessing cognitive functions in which adults with ADHD commonly show difficulties [73,74]. The test variables recorded include the speed of responses (mean reaction time); variability of response times (SD of reaction time); and accuracy measures (i.e., number of omission errors, commission errors, correct responses, correctly produced patterns, or number of solved items). Based on the test variables, compound Z-scores per domain are computed, e.g., basic attention, working memory, inhibition/interference control, cognitive flexibility, and convergent/divergent thinking (for details, see Guo et al. 2020 [32]).

2.3. Procedure

The assessment of symptoms, impairments, and neuropsychological functions using the various approaches was part of the standard clinical procedure for all participants referred to the ADHD outpatient clinic of the department of psychiatry and psychotherapy, LVR-Hospital Essen, University of Duisburg-Essen, Germany. All participants signed a written informed consent that declares their agreement for their data being used for scientific purposes. Furthermore, approval for this study was obtained from the ethical review board of the medical faculty of the University of Duisburg-Essen, Germany (20-9380-BO). It was stressed to all individuals that agreeing to take part in this study was voluntary, unpaid, and would not affect their clinical assessment or treatment. All participants were asked to complete the battery of self- and informant report questionnaires and to perform the neuropsychological assessment around the date of their clinical interview. The clinical assessment, including all measures, took about four hours in total.

2.4. Statistical Analysis

Descriptive statistics of all measures of self- and other reports are presented per group. Furthermore, self- and other reports of the CAARS subscales for inattention, hyperactivity, impulsivity, self-concept, and total ADHD index were contrasted by calculating discrepancy scores per person (i.e., computing scores of self-reports minus other reports) and presenting the mean and standard deviation of the absolute discrepancy scores per group. After checking for assumptions of parametric testing, groups were compared on all measures employing ANCOVA and post-hoc pairwise comparisons between the ADHD group and the CCG and CCG-ND, respectively. As the assumption check for STAI variables indicated a violation of the normality assumption (presumably because of the small sample size resulting from missing values), results of ANCOVA were confirmed by nonparametric testing (Kruskal–Wallis Tests). Age was taken as a covariate to control for age differences between groups. A strict significance level of $p < 0.01$ was applied to control for alpha error inflation. Effect sizes (Cohen's d) were calculated for significant pairwise group differences to indicate the magnitude of findings. Age-adjusted mean scores were used for the calculation of effect sizes to control for age differences. Based on the interpreting guidelines for Cohen's d, $d < 0.2$ indicates a negligible effect, $0.2 \leq d < 0.5$ indicates a small effect, $0.5 \leq d < 0.8$ indicates a medium effect, and $d \geq 0.8$ indicates a large effect [75].

Furthermore, to determine the validity of subjective reports in predicting an individual's diagnostic status, two binary logistic regression models, using backward elimination of predictor variables, were calculated for distinguishing the ADHD group from both the CCG and CCG-ND, respectively. Only scales that showed significant effects on the group were included as predictors in the models. To reduce the influence of multicollinearity between STAI-T and STAI-S, a new anxiety variable (STAI) was calculated by adding for each individual the scores of STAI-T and STAI-S and was included in a binary logistic regression analysis. Missing values (about 12% of the data) were replaced by group means for regression analyses to obtain a sufficiently large sample size.

Finally, the objective neuropsychological test performance per domain (i.e., basic attention, working memory, inhibition/interference control, cognitive flexibility, and convergent/divergent thinking) were presented per group and were compared using ANCOVA. In order to explore the predictive value of self- and other reports for objective neuropsychological test performance (following a clinically oriented order of prediction but not necessarily causal relationship), multiple linear regression models were computed for each group separately and the total group. To improve the power of regression models, binary correlation analyses were performed between all subjective reports and different aspects of objective neuropsychological test performance prior to the regression analyses. Only variables that were significantly correlated with the outcome in bivariate analyses were eventually included in multiple regression models. Additionally, backward elimination was used for potential predictor variables. All statistical analyses reported so far were performed using IBM SPSS 25 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Statistical power for the group comparisons was calculated with G-Power. These calculations indicate, based on a significance level of 0.05, large power to reveal medium (83.0%) and large effects (99.8%). However, in order to minimize the risk of running into a type-1 error, we decided to reduce the significance level to 0.01, which resulted in lower power for medium effects (63.0%) but retained high power for large effects (98.7%).

3. Results

Descriptive statistics and group comparisons (ANCOVA controlling for age, with post-hoc pairwise comparisons) of subjective reports of symptoms and impairments, as well as objective neuropsychological test performances, are presented in Table 2. Significant differences were found in symptom domains of ADHD, anxiety, depression, impulsiveness, and subjective experience of cognitive deficits, whereas no significant effects were observed in any of the discrepancy scores or in the neuropsychological test performance. Compared to the CCG, the ADHD group endorsed significantly higher symptom scores in the WURS-K, ADHD-SR, and CAARS-SR-IM (medium to large effects) and significantly less symptoms of depression (medium effect). The ADHD group did not differ significantly from the CCG in any variables of the informant report, anxiety, impulsiveness, and subjective experiences of the cognitive deficits (effects up to medium size). Compared to the CCG-ND, the ADHD group (and their informants) indicated significantly more symptoms in the WURS-K, ADHD-SR, CAARS-SR-HA, CAARS-SR-IM, CAARS-SR-Index, and CAARS-OR-HA (medium to large effects), significantly higher symptom scores in the STAI-T and STAI-S (large effects), BIS-11 (large effect), and FLEI (medium effect). Group differences between ADHD and CCG-ND on depression did not reach significance (negligible effect).

Table 2. Self- and other reports of symptoms and impairments in the various domains.

Variables	ADHD (n = 73)	CCG (n = 53)	CCG-ND (n = 43)	ANCOVA		Pairwise Comparisons			
						ADHD vs. CCG		ADHD vs. CCG-ND	
	M ± SD	M ± SD	M ± SD	F	p	p	*Cohen's d*	p	*Cohen's d*
ADHD Symptoms									
WURS-K [a]	44.6 ± 12.5	34.1 ± 11.8	27.9 ± 12.5	25.771	<0.001 *	<0.001 *	0.86	<0.001 *	1.34
ADHD-SR [b]	35.4 ± 9.8	30.1 ± 10.6	26.4 ± 11.8	11.012	<0.001 *	0.002 *	0.59	<0.001 *	0.87
CAARS-SR-IA [c]	24.2 ± 8.0	22.6 ± 5.7	20.0 ± 8.4	3.776	0.025				
CAARS-SR-HA [c]	22.1 ± 7.1	18.2 ± 7.7	15.0 ± 8.6	10.275	<0.001 *	0.015	0.53	<0.001 *	0.92
CAARS-SR- IM [c]	22.2 ± 8.4	18.2 ± 6.8	17.6 ± 8.2	6.066	0.003 *	0.005 *	0.58	0.003 *	0.58
CAARS-SR-SC [c]	11.4 ± 4.5	11.7 ± 4.1	10.6 ± 4.6	0.728	0.485				
CAARS-SR-Index [c]	23.3 ± 7.2	22.3 ± 5.3	19.1 ± 7.5	5.159	0.007 *	0.295	0.23	0.002 *	0.61
CAARS-OR-IA [c]	22.3 ± 9.4	21.6 ± 10.0	18.5 ± 9.2	1.958	0.145				
CAARS-OR-HA [c]	18.9 ± 9.8	15.8 ± 8.2	13.0 ± 6.7	5.706	0.004	0.057	0.38	0.001 *	0.68
CAARS-OR- IM [c]	20.0 ± 9.5	17.9 ± 7.5	16.0 ± 7.5	2.948	0.056				
CAARS-OR-SC [c]	10.3 ± 5.1	10.2 ± 4.8	10.2 ± 4.7	0.029	0.971				
CAARS-OR-Index [c]	20.9 ± 8.4	19.1 ± 7.0	17.4 ± 6.5	2.571	0.080				
Symptom Discrepancy Between Self- and Other Reports									
Discrepancy-CAARS-IA [d]	7.2 ± 6.2	7.8 ± 6.0	8.4 ± 5.9	0.598	0.552				
Discrepancy-CAARS-HA [d]	6.5 ± 5.2	6.6 ± 5.8	5.9 ± 4.1	0.198	0.821				
Discrepancy-CAARS-IM [d]	6.9 ± 6.1	7.4 ± 5.5	6.0 ± 5.5	0.550	0.578				
Discrepancy-CAARS-SC [d]	4.0 ± 3.8	4.7 ± 3.7	3.7 ± 2.5	0.911	0.405				
Discrepancy-CAARS-Index [d]	7.3 ± 6.4	7.3 ± 6.3	6.3 ± 5.3	0.348	0.707				
Anxiety									
STAI-T [e]	43.6 ± 15.7	51.3 ± 12.2	31.4 ± 9.9	14.840	<0.001 *	0.016	0.51	0.001 *	0.87
STAI-S [e]	43.3 ± 17.8	48.6 ± 14.3	28.9 ± 11.2	10.975	<0.001 *	0.213	0.26	<0.001 *	0.92
Depression									
BDI-II [f]	17.6 ± 12.4	24.8 ± 9.3	15.7 ± 11.5	7.757	0.001 *	0.002 *	0.60	0.367	0.17
Impulsiveness									
BIS-11 [g]	80.9 ± 11.7	76.7 ± 10.4	70.6 ± 15.1	9.705	<0.001 *	0.030	0.47	<0.001 *	0.81
Subjective Experiences of Cognitive Deficits									
FLEI [h]	78.3 ± 21.9	78.5 ± 15.3	64.2 ± 20.6	7.774	0.001 *	0.743	0.07	<0.001 *	0.68
Objective neuropsychological test performance									
Basic attention [i]	−0.19 ± 0.88	−0.08 ± 0.58	−0.0008 ± 0.54	1.569	0.212				
Working memory [j]	0.03 ± 0.86	0.04 ± 1.08	0.0009 ± 1.0	0.017	0.983				
Inhibition/interference control [k]	−0.12 ± 0.76	−0.06 ± 0.65	−0.02 ± 0.62	0.214	0.807				
Cognitive flexibility [l]	−0.02 ± 079	−0.04 ± 0.81	0.07 ± 0.74	0.327	0.720				
Convergent/ divergent thinking [m]	−0.27 ± 0.65	−0.21 ± 0.69	0.002 ± 0.78	2.103	0.125				

Note: ADHD = Attention Deficit Hyperactivity Disorder; CCG = Clinical Comparison Group; CCG-ND = Clinical Comparison Group—Not Diagnosed. [a] Wender Utah Rating Scale for childhood ADHD symptoms. [b] ADHD Self-Report Scale for current ADHD symptoms. [c] Self-reports (SR) or other reports (OR) of Conners' Adult ADHD Rating Scales. IA, inattention, HA, hyperactivity, IM, impulsivity, SC, problems with self-concept. Index, ADHD index. [d] Absolute discrepancy between self- and other reports of ADHD symptoms. [e] Trait and State anxiety subscales of State-Trait Anxiety Inventory. [f] Beck Depression Inventory. [g] Barratt Impulsiveness Scale. [h] Questionnaire on Mental Ability. [i] Compound Z-score of measures of processing speed and distractibility in tasks of selective attention, vigilance, and processing speed. [j] Z-scores of the N-back task. [k] Compound Z-scores of the Go/No-Go and Stroop tasks. [l] Compound Z-scores of the TMT-B/A and SWITCH tasks. [m] Compound Z-scores of the Tower of London and 5-Point tasks. * Statistically significant at $p < 0.01$.

Furthermore, two significant binary logistic regression models were obtained for the differential diagnosis between the ADHD group and both the CCG and CCG-ND, respectively. Regarding the differentiation between the ADHD and CCG groups, subjective reports had a significant predictive value for an individual's diagnostic status, $\chi^2(4) = 47.54$, $p < 0.001$, with 31.4% explained variance (Cox and Snell). This model correctly classified 75.4% of the individuals. The contribution of each scale to the model is presented in Table 3. Significant effects are observed for WURS-K, CAARS_SR_IM, and BDI-II. Regarding the differentiation between the ADHD and CCG-ND group, subjective reports again had a significant predictive value for an individual's diagnostic status, $\chi^2(4) = 69.79$, $p < 0.001$, with 45.2% explained variance (Cox and Snell) and 84.5% of the individuals correctly classified. Table 3 shows that WURS-K, CAARS_SR_HA, BDI, and STAI had significant effects on predicting the group membership.

Finally, multiple linear regression models were computed to explore the predictive values of self- and other reports for objective neuropsychological test performances (Table 4). For the ADHD group, the CAARS-OR-IM (*Beta* = −0.261, $p = 0.026$) and discrepancy-CAARS-HA (*Beta* = −0.265, $p = 0.022$) have significant predictive values for convergent/divergent thinking ($F = 6.356$, $p = 0.003$). For the CCG group, two significant regression models were obtained, i.e., the CAARS-SR-IA (*Beta* = −0.392, $p = 0.004$) has a significant predictive value for basic function ($F = 9.281$, $p = 0.004$), and BDI-II (*Beta* = −0.391,

$p = 0.004$) has a significant predictive value for inhibition and interference control ($F = 9.186$, $p = 0.004$). For the CCG-ND group, the BDI-II (*Beta* = −0.435, $p = 0.004$) has a significant predictive value for working memory ($F = 9.585$, $p = 0.004$). For the total group, two significant regression models were also obtained, i.e., the BIS-11 (*Beta* = −0.213, $p = 0.005$) and discrepancy-CAARS-SC (*Beta* = −0.167, $p = 0.026$) have significant predictive values for basic attention ($F = 6.433$, $p = 0.002$), whereas the CAARS_OR_HA (*Beta* = −0.238, $p = 0.002$) and FLEI (*Beta* = −0.141, $p = 0.061$) have significant predictive values for convergent/divergent thinking ($F = 7.632$, $p = 0.001$). However, adjusted R-square values remained below 17% for all models.

Table 3. Binary logistic regression models (backward elimination) based on the measures of self- and other reports to predict an individual's diagnostic status.

Predictors	B	*SE* B	Wald	*p*	Odds Ratio (95% CI [a])
Prediction of the differential diagnosis of ADHD and CCG					
WURS-K [b]	0.075	0.021	12.825	<0.001 *	1.078 (1.04~1.12)
CAARS-SR- IM [c]	0.092	0.036	6.733	0.009 *	1.097 (1.02~1.18)
BDI-II [d]	−0.081	0.023	12.340	<0.001 *	0.922 (0.88~0.96)
STAI [e]	−0.016	0.009	2.839	0.092	0.984 (0.97~1.10)
Total $R^2 = 0.314$ [f]					
Prediction of the differential diagnosis of ADHD and CCG-ND					
WURS-K [b]	0.095	0.025	14.290	<0.001 *	1.099 (1.05~1.16)
CAARS-SR-HA [g]	0.093	0.040	5.440	0.02	1.098 (1.01~1.19)
BDI-II [d]	−0.064	0.028	5.201	0.023	0.938 (0.89~0.99)
STAI [e]	0.063	0.016	14.979	<0.001 *	1.065 (1.03~1.10)
Total $R^2 = 0.452$ [f]					

Note: ADHD = Attention Deficit Hyperactivity Disorder; CCG = Clinical Comparison Group; CCG-ND = Clinical Comparison Group—Not Diagnosed. [a] Confidence interval. [b] Wender Utah Rating Scale for childhood ADHD symptoms. [c] Impulsivity subscale of self-report Conners' Adult ADHD Rating Scales. [d] Beck Depression Inventory. [e] State-Trait Anxiety Inventory. [f] Cox and Snell R^2. [g] Hyperactivity subscale of self-report Conners' Adult ADHD Rating Scales. * Statistically significant at $p < 0.01$.

Table 4. Multiple linear regression analyses of measures of self- and other reports (predictors) on objective neuropsychological test performances (criteria).

Criteria of Neuropsychological Test Performance	Regression Models				
	F		*R*-Square	Adjusted *R*-Square	*p*
	df (Regression, Residual)	*F*-value			
	ADHD (*n* = 73)				
Basic attention [a]	1, 71	5.182	0.068	0.055	0.026
Working memory [b]	-	-	-	-	-
Inhibition and interference control [c]	1, 71	6.450	0.083	0.070	0.013
Cognitive flexibility [d]	1, 71	5.400	0.071	0.058	0.023
Convergent/divergent thinking [e]	2, 70	6.356	0.154	0.130	0.003 *
	CCG (*n* = 53)				
Basic attention [f]	1, 51	9.281	0.154	0.137	0.004 *
Working memory [g]	2, 50	3.962	0.137	0.102	0.025
Inhibition and interference control [h]	1, 51	9.186	0.153	0.136	0.004 *
Cognitive flexibility [b]	-	-	-	-	-
Convergent/divergent thinking [b]	-	-	-	-	-
	CCG-ND (*n* = 43)				
Basic attention [b]	-	-	-	-	-
Working memory [i]	1, 41	9.585	0.189	0.170	0.004 *
Inhibition and interference control [b]	-	-	-	-	-
Cognitive flexibility [b]	-	-	-	-	-
Convergent/divergent thinking [j]	1, 41	5.460	0.118	0.096	0.024

Table 4. *Cont.*

Criteria of Neuropsychological Test Performance	Regression Models				
	F		*R*-Square	Adjusted *R*-Square	*p*
	df (Regression, Residual) Total (n = 169)	*F*-value			
Basic attention [k]	2, 166	6.433	0.072	0.061	0.002 *
Working memory [b]	-	-	-	-	-
Inhibition and interference control [l]	1, 167	4.716	0.027	0.022	0.031
Cognitive flexibility [b]	-	-	-	-	-
Convergent/divergent thinking [m]	2, 166	7.632	0.084	0.073	0.001 *

Note: ADHD = Attention Deficit Hyperactivity Disorder; CCG = Clinical Comparison Group; CCG-ND = Clinical Comparison Group—Not Diagnosed. Basic attention = Compound Z-score of measures of processing speed and distractibility in tasks of selective attention, vigilance, and processing speed. Working memory = Z-score of N-back task. Inhibition and interference control = Compound Z-score of Go/No-Go and Stroop tasks. Cognitive flexibility = Compound Z-score of TMT-B/A and SWITCH tasks. Convergent/divergent thinking = Compound Z-score of Tower of London and 5-Point tasks. [a] Model was estimated based on the candidate predictors CAARS-OR-HA and CAARS-OR-IM; CAARS-OR- IM was retained in the final model. [b] No regression estimated because no candidate predictor correlated significantly with the criteria. [c] Model was estimated based on the candidate predictors CAARS-OR-IA and CAARS-OR- HA; CAARS-OR- IA was retained in the final model. [d] The model was estimated based on the candidate predictors CAARS-SR- IM and CAARS-SR-SC; CAARS-SR-SC was retained in the final model. [e] The model was estimated based on the candidate predictors CAARS-OR-HA, CAARS-OR- IM, CAARS-OR-Index, discrepancy-CAARS-HA, and discrepancy-CAARS-IM; CAARS-OR-IM and discrepancy-CAARS-HA were retained in the final model. [f] The model was estimated based on the only candidate predictor CAARS-SR-IA. [g] The model was estimated based on the candidate predictors CAARS-SR-HA and discrepancy-CAARS-HA; both CAARS-SR-HA and discrepancy-CAARS-HA were retained in the final model. [h] The model was estimated based on the only candidate predictor BDI-II. [i] The model was estimated based on the candidate predictors BDI-II, CAARS-SR- IM, and discrepancy-CAARS-SC; BDI-II was retained in the final model. [j] The model was estimated based on the only candidate predictor BIS-11. [k] The model was estimated based on the candidate predictors WURS-K, ADHD-SR, BIS-11, CAARS-OR-IA, CAARS-OR-HA, CAARS-OR- IM, CAARS-OR-Index, and discrepancy-CAARS-SC; BIS-11 and discrepancy-CAARS-SC were retained in the final model. [l] The model was estimated based on the candidate predictors CAARS-OR-IA, CAARS-OR-HA, and CAARS-OR-Index; CAARS-OR-HA was retained in the final model. [m] The model was estimated based on the candidate predictors WURS-K, ADHD-SR, BIS, CAARS-SR-HA, CAARS-OR-HA, CAARS-OR- IM, CAARS-OR-Index, and FLEI; CAARS-OR-HA and FLEI were retained in the final model. * Statistically significant at $p < 0.01$.

4. Discussion

This study aimed to explore the role of self- and informant reports on symptoms and impairments in the clinical evaluation of adult ADHD and examine the predictive value of self- and informant reports for objective neuropsychological test performance.

Group comparisons revealed various significant effects of medium to large sizes between the ADHD group and both the CCG-ND and CCG. Compared to the CCG-ND, the ADHD group reported, consistent to our expectations, significantly more pronounced symptoms and impairments in most of the self-report scales. In line with previous findings, both the scales for current (ADHD-SR; CAARS) and retrospective ADHD symptoms (WURS-K) unfold to have discriminative value to distinguish individuals with and without ADHD [44,76–79]. Further, in line with the core features of ADHD and commonly seen comorbidity, patients with ADHD indicated more pronounced symptoms of impulsivity [80,81], cognitive deficits [24,26,27], and higher levels of anxiety [82,83]. Against our expectations, however, depressive symptoms did not differ between the ADHD group and CCG-ND. This is surprising, considering the indications of a large number of comorbid mood disorders in the ADHD sample (16 of 73). The pattern of group differences between the ADHD group and the CCG-ND is also reflected in the logistic regression analysis, revealing that subjective reports significantly predicted an individual's diagnostic status with almost 45% explained variance. The strongest predictors were self-reported ADHD symptoms in childhood and current anxiety. The observed predictive value of anxiety is consistent with the widely recognized knowledge that anxiety is one of the major comorbidities of ADHD [82,83]. Retrospective ADHD symptoms in childhood seem to stand out in the diagnostic process and appear to be most informative to identify ADHD in adulthood in a psychiatric outpatient referral context [76]. We conclude that the exploration of childhood onset and continuity of ADHD symptoms through adolescence and adulthood should be done with care and deserves sufficient time and resources in the assessment of first-time ADHD diagnosis in adulthood.

Comparing individuals with ADHD to the group of individuals showing indications of other psychiatric disorders (CCG), fewer differences were observed, i.e., the ADHD group reported higher scores on their current (ADHD-SR; CAARS) and retrospective (WURS-K) ADHD symptoms but lower scores on depression (BDI). Hence, also in differentiation to patients having other psychiatric disorders, ADHD symptomatology seems to have a key role and appears to have clinical value [38,40,42]. Considering the fact that the majority of individuals in the CCG showed indications of mood disorders (37 of 53), higher depression scores appear logical and may serve as useful information to differentiate ADHD from depressive disorders. The discriminative value of self-reported ADHD symptoms in childhood and adulthood, as well as depressive symptoms, are underscored in the logistic regression analysis, with no other score adding significantly explained variance for group differentiation. Compared to other ADHD scales used in this study, the CAARS appeared to play a minor role in distinguishing the ADHD group from the CCG, which adds evidence to previous works stressing the limited value of the CAARS for a differential diagnostic purpose [84–87]. In contrast to differences in depression, no significant effects were found for the symptoms of anxiety, impulsivity, and subjective reports of cognitive deficits. As an explanation, one may consider that whether or not group differences in psychopathology can be observed may depend on the composition of samples (comorbid disorders to ADHD; diagnostic status of the clinical comparison group) and may be difficult to generalize. Additionally, nonsignificant differences on a variety of scale scores support the view that it is difficult to differentiate ADHD from other psychiatric disorders based on self-reported information only [88–90].

Furthermore, against our expectations, neither the informant report scores nor any of the discrepancy scores between the patients and their informants contributed to the differentiation between the ADHD group, CCG, or CCG-ND. Against previous evidence questioning, the reliability of patients' self-reports due to symptom under- or over-reporting of patients with ADHD [35,37,38,49–51,91,92], the present study strengthens the role of patients' self-reports in the clinical evaluation of adult ADHD [33,34,81]. This must not be confused with the conclusion that informant reports are of no added value to the clinical evaluation of adult ADHD, as it has been repeatedly demonstrated that ratings from multiple informants on symptoms and impairments increase the accuracy of clinical evaluations [91,93]. Besides, even though no significant effects of discrepancy were observed on group levels, disagreement between different sources of information (e.g., including self- and informant reports) is believed to provide unique and crucial information in clinical evaluations [94,95]. On an individual basis, this means that, independent from the diagnostic group, disagreements between self- and other reports may, for instance, give an indication for noncredible symptom reporting and may represent a risk factor for an adverse outcome [96–98]. Such a disagreement between self- and other reports, however, may also indicate that patients lack awareness of their symptoms or that they may apply efficient coping strategies so that their significant others do not experience the full degree of their difficulties.

Finally, a number of significant regression models of subjective reports on objective neuropsychological test performances have been obtained in this study. However, considering the negligible to small proportions of explained variance, and no reoccurring patterns of prediction across the models, it can be concluded that subjective reports of symptoms and impairments have no meaningful predictive value for objective neuropsychological test performances [99,100]. While both subjective reports and objective test performance have been advocated to provide the clinician with valuable information in a clinical evaluation and treatment planning, they seem to be distinct and nonredundant sources of information and should not be treated interchangeably [53,55,91,101–104]. It remains a challenge for future research to determine the value of any of the information derived in a clinical assessment to predict the sustainable change, long-term outcome, improvement in symptoms, impairments, and general well-being.

Limitations

Several limitations of this study must be considered. First, the representativeness of group differences in the various scales of psychopathology is difficult to determine, because this largely depends on the composition of groups regarding ADHD symptom presentation, comorbidity (ADHD group), and psychopathology (clinical control groups). Second, it must be stressed that the various comorbid disorders of patients with ADHD and psychiatric conditions of individuals in the CCG were suggested based on the clinical assessment for ADHD but were not confirmed by subsequent psychiatric evaluations per specific disorders. Third, this study is largely based on self-reports, which are known to be vulnerable to bias, including over-reporting, under-reporting, or careless responding [35,51,91]. Fourth, because data were collected in a clinical setting and not under strict controlled experimental conditions, administrative challenges resulted in the occurrence of some missing values depending on the variable type, and individuals were not selected based on matching group criteria. Finally, the subjective reports and neuropsychological test results were accessible to clinicians establishing a diagnosis; thus, these data were not completely independent of diagnostic decision-making.

5. Conclusions

This study highlighted the role of self-reports of ADHD symptoms in the clinical evaluation of adult ADHD in an outpatient referral context, giving particular emphasis on the role of ADHD symptoms assessed retrospectively from childhood. Compared to self-reports, informant reports, and, also, the discrepancy between self- and informant-reported information unfolds to have limited values for the differential diagnosis of ADHD. While a comprehensive assessment of individual strengths and weaknesses, clinical diagnosis, treatment planning, and outcome assessments typically benefit from a comprehensive approach, including various types of information, self-reports still seem to be most informative for a differential diagnosis. This study also demonstrates that the present inventory of symptoms and impairments differentiated ADHD from a clinical comparison group without psychiatric disorders more successfully than from a clinical control group with indications of other psychiatric disorders. Comorbidities and shared features between ADHD and other psychiatric disorders may presumably be the main reasons for this effect. Finally, our data confirm previous evidence showing that subjective reports of symptoms and impairments on the one side and objective neuropsychological test performances on the other side are distinct and nonredundant information. The roles of various types of information for clinical evaluations, the prediction of outcomes, and sustainable improvement still need to be determined.

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References

1. Asherson, P.; Buitelaar, J.; Faraone, S.V.; Rohde, L.A. Adult attention-deficit hyperactivity disorder: Key conceptual issues. *Lancet Psychiatry* **2016**, *3*, 568–578. [CrossRef]
2. Association, A.P. *Diagnostic and Statistical Manual of Mental Disorders (DSM-5®)*; American Psychiatric Pub: Arlington, VA, USA, 2013.
3. Biederman, J.; Petty, C.R.; Clarke, A.; Lomedico, A.; Faraone, S.V. Predictors of persistent ADHD: An 11-year follow-up study. *J. Psychiatr. Res.* **2011**, *45*, 150–155. [CrossRef]
4. Barkley, R.A.; Murphy, K.R. *Attention-Deficit Hyperactivity Disorder: A Clinical Workbook*; Guilford Press: New York, USA, 2006.
5. Cumyn, L.; French, L.; Hechtman, L. Comorbidity in adults with attention-deficit hyperactivity disorder. *Can. J. Psychiatry* **2009**, *54*, 673–683. [CrossRef] [PubMed]
6. Kooij, J.; Bijlenga, D.; Salerno, L.; Jaeschke, R.; Bitter, I.; Balazs, J.; Thome, J.; Dom, G.; Kasper, S.; Filipe, C.N. Updated European Consensus Statement on diagnosis and treatment of adult ADHD. *Eur. Psychiatry* **2019**, *56*, 14–34. [CrossRef] [PubMed]
7. Biederman, J. Attention-deficit/hyperactivity disorder: A selective overview. *Biol. Psychiatry* **2005**, *57*, 1215–1220. [CrossRef] [PubMed]
8. Kooij, J.S.; Huss, M.; Asherson, P.; Akehurst, R.; Beusterien, K.; French, A.; Sasané, R.; Hodgkins, P. Distinguishing comorbidity and successful management of adult ADHD. *J. Atten. Disord.* **2012**, *16*, 3S–19S. [CrossRef] [PubMed]
9. Bowen, R.; Chavira, D.A.; Bailey, K.; Stein, M.T.; Stein, M.B. Nature of anxiety comorbid with attention deficit hyperactivity disorder in children from a pediatric primary care setting. *Psychiatry Res.* **2008**, *157*, 201–209. [CrossRef] [PubMed]
10. Tannock, R. Attention-deficit/hyperactivity disorder with anxiety disorders. In *Attention-Deficit Disorders and Comorbidities in Children, Adolescents, and Adults*; Brown, T.E., Ed.; American Psychiatric Publishing: Arlington, VA, USA, 2000; pp. 125–170.
11. McIntyre, R.S.; Kennedy, S.H.; Soczynska, J.K.; Nguyen, H.T.; Bilkey, T.S.; Woldeyohannes, H.O.; Nathanson, J.A.; Joshi, S.; Cheng, J.S.; Benson, K.M. Attention-deficit/hyperactivity disorder in adults with bipolar disorder or major depressive disorder: Results from the international mood disorders collaborative project. *Prim. Care Companion J. Clin. Psychiatry* **2010**, 12. [CrossRef]
12. Arnold, L.E.; Hodgkins, P.; Kahle, J.; Madhoo, M.; Kewley, G. Long-term outcomes of ADHD: Academic achievement and performance. *J. Atten. Disord.* **2020**, *24*, 73–85. [CrossRef]
13. Advokat, C.; Lane, S.M.; Luo, C. College students with and without ADHD: Comparison of self-report of medication usage, study habits, and academic achievement. *J. Atten. Disord.* **2011**, *15*, 656–666. [CrossRef]
14. Holst, Y.; Thorell, L.B. Functional impairments among adults with ADHD: A comparison with adults with other psychiatric disorders and links to executive deficits. *Appl. Neuropsychol. Adult* **2020**, *27*, 243–255. [CrossRef] [PubMed]
15. Gjervan, B.; Torgersen, T.; Nordahl, H.M.; Rasmussen, K. Functional impairment and occupational outcome in adults with ADHD. *J. Atten. Disord.* **2012**, *16*, 544–552. [CrossRef]
16. Faraone, S.V.; Biederman, J. What is the prevalence of adult ADHD? *Results of a population screen of 966 adults. J. Atten. Disord.* **2005**, *9*, 384–391. [PubMed]
17. Bangma, D.F.; Koerts, J.; Fuermaier, A.; Mette, C.; Zimmermann, M.; Toussaint, A.K.; Tucha, L.; Tucha, O. Financial decision-making in adults with ADHD. *Neuropsychology* **2019**, *33*, 1065–1077. [CrossRef] [PubMed]
18. Barkley, R.A. Educational, occupational, dating and marital, and financial impairments in adults with ADHD. In *Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment*; Barkley, R.A., Ed.; The Guilford Press: New York, USA, 2015; pp. 314–342.
19. Kalbag, A.S.; Levin, F.R. Adult ADHD and substance abuse: Diagnostic and treatment issues. *Subst. Use Misuse* **2005**, *40*, 1955–1981. [CrossRef]
20. Torgersen, T.; Gjervan, B.; Rasmussen, K. ADHD in adults: A study of clinical characteristics, impairment and comorbidity. *Nord. J. Psychiatry* **2006**, *60*, 38–43. [CrossRef]
21. Michielsen, M.; Comijs, H.C.; Aartsen, M.J.; Semeijn, E.J.; Beekman, A.T.; Deeg, D.J.; Kooij, J.S. The relationships between ADHD and social functioning and participation in older adults in a population-based study. *J. Atten. Disord.* **2015**, *19*, 368–379. [CrossRef]
22. Bruner, M.R.; Kuryluk, A.D.; Whitton, S.W. Attention-deficit/hyperactivity disorder symptom levels and romantic relationship quality in college students. *J. Am. Coll. Health* **2015**, *63*, 98–108. [CrossRef]
23. Klein, R.G.; Mannuzza, S.; Olazagasti, M.A.R.; Roizen, E.; Hutchison, J.A.; Lashua, E.C.; Castellanos, F.X. Clinical and functional outcome of childhood attention-deficit/hyperactivity disorder 33 years later. *Arch. Gen. Psychiatry* **2012**, *69*, 1295–1303. [CrossRef]
24. Salomone, S.; Fleming, G.R.; Bramham, J.; O'Connell, R.G.; Robertson, I.H. Neuropsychological deficits in adult ADHD: Evidence for differential attentional impairments, deficient executive functions, and high self-reported functional impairments. *J. Atten. Disord.* **2020**, *24*, 1413–1424. [CrossRef]
25. Tucha, L.; Fuermaier, A.B.; Koerts, J.; Buggenthin, R.; Aschenbrenner, S.; Weisbrod, M.; Thome, J.; Lange, K.W.; Tucha, O. Sustained attention in adult ADHD: Time-on-task effects of various measures of attention. *J. Neural Transm.* **2017**, *124*, 39–53. [CrossRef]

26. Alderson, R.M.; Kasper, L.J.; Hudec, K.L.; Patros, C.H. Attention-deficit/hyperactivity disorder (ADHD) and working memory in adults: A meta-analytic review. *Neuropsychology* **2013**, *27*, 287–302. [CrossRef] [PubMed]
27. Boonstra, A.M.; Oosterlaan, J.; Sergeant, J.A.; Buitelaar, J.K. Executive functioning in adult ADHD: A meta-analytic review. *Psychol. Med.* **2005**, *35*, 1097–1108. [CrossRef] [PubMed]
28. Nigg, J.T.; Stavro, G.; Ettenhofer, M.; Hambrick, D.Z.; Miller, T.; Henderson, J.M. Executive functions and ADHD in adults: Evidence for selective effects on ADHD symptom domains. *J. Abnorm. Psychol.* **2005**, *114*, 706. [CrossRef]
29. Quinlan, D.M.; Brown, T.E. Assessment of short-term verbal memory impairments in adolescents and adults with ADHD. *J. Atten. Disord.* **2003**, *6*, 143–152. [CrossRef]
30. Marchetta, N.D.; Hurks, P.P.; Krabbendam, L.; Jolles, J. Interference control, working memory, concept shifting, and verbal fluency in adults with attention-deficit/hyperactivity disorder (ADHD). *Neuropsychology* **2008**, *22*, 74–84. [CrossRef] [PubMed]
31. Walker, A.Y.; Shores, A.E.; Trollor, J.N.; Lee, T.; Sachdev, P.S. Neuropsychological functioning of adults with attention deficit hyperactivity disorder. *J. Clin. Exp. Neuropsychol.* **2000**, *22*, 115–124. [CrossRef]
32. Guo, N.; Fuermaier, A.B.; Koerts, J.; Mueller, B.W.; Diers, K.; Mroß, A.; Mette, C.; Tucha, L.; Tucha, O. Neuropsychological functioning of individuals at clinical evaluation of adult ADHD. *J. Neural Transm.* **2020**, 1–15. [CrossRef]
33. Magnússon, P.; Smári, J.; Sigurðardóttir, D.; Baldursson, G.; Sigmundsson, J.; Kristjánsson, K.; Sigurðardóttir, S.; Hreiðarsson, S.; Sigurbjörnsdóttir, S.; Guðmundsson, Ó.Ó. Validity of self-report and informant rating scales of adult ADHD symptoms in comparison with a semistructured diagnostic interview. *J. Atten. Disord.* **2006**, *9*, 494–503. [CrossRef] [PubMed]
34. Sandra Kooij, J.; Boonstra, A.M.; Swinkels, S.; Bekker, E.M.; de Noord, I.; Buitelaar, J.K. Reliability, validity, and utility of instruments for self-report and informant report concerning symptoms of ADHD in adult patients. *J. Atten. Disord.* **2008**, *11*, 445–458. [CrossRef]
35. Sibley, M.H.; Pelham, W.E., Jr.; Molina, B.S.; Gnagy, E.M.; Waxmonsky, J.G.; Waschbusch, D.A.; Derefinko, K.J.; Wymbs, B.T.; Garefino, A.C.; Babinski, D.E. When diagnosing ADHD in young adults emphasize informant reports, DSM items, and impairment. *J. Consult. Clin. Psychol.* **2012**, *80*, 1052–1061. [CrossRef] [PubMed]
36. Canu, W.H.; Hartung, C.M.; Stevens, A.E.; Lefler, E.K. Psychometric properties of the Weiss Functional Impairment Rating Scale: Evidence for utility in research, assessment, and treatment of ADHD in emerging adults. *J. Atten. Disord.* **2020**, *24*, 1648–1660. [CrossRef] [PubMed]
37. Fuermaier, A.B.; Tucha, L.; Koerts, J.; Aschenbrenner, S.; Weisbrod, M.; Lange, K.W.; Tucha, O. Cognitive complaints of adults with attention deficit hyperactivity disorder. *Clin. Neuropsychol.* **2014**, *28*, 1104–1122. [CrossRef] [PubMed]
38. Suhr, J.; Hammers, D.; Dobbins-Buckland, K.; Zimak, E.; Hughes, C. The relationship of malingering test failure to self-reported symptoms and neuropsychological findings in adults referred for ADHD evaluation. *Arch. Clin. Neuropsychol.* **2008**, *23*, 521–530. [CrossRef]
39. Suhr, J.; Zimak, E.; Buelow, M.; Fox, L. Self-reported childhood attention-deficit/hyperactivity disorder symptoms are not specific to the disorder. *Compr. Psychiatry* **2009**, *50*, 269–275. [CrossRef]
40. Paucke, M.; Stibbe, T.; Huang, J.; Strauss, M. Differentiation of ADHD and Depression Based on Cognitive Performance. *J. Atten. Disord.* **2019**, 1087054719865780. [CrossRef]
41. McCann, B.S.; Roy-Byrne, P. Screening and diagnostic utility of self-report attention deficit hyperactivity disorder scales in adults. *Compr. Psychiatry* **2004**, *45*, 175–183. [CrossRef]
42. McCann, B.S.; Scheele, L.; Ward, N.; Roy-Byrne, P. Discriminant validity of the Wender Utah Rating Scale for attention-deficit/hyperactivity disorder in adults. *J. Neuropsychiatry Clin. Neurosci.* **2000**, *12*, 240–245. [CrossRef]
43. Young, S. The YAQ-S and YAQ-I: The development of self and informant questionnaires reporting on current adult ADHD symptomatology, comorbid and associated problems. *Personal. Individ. Differ.* **2004**, *36*, 1211–1223. [CrossRef]
44. Christiansen, H.; Kis, B.; Hirsch, O.; Matthies, S.; Hebebrand, J.; Uekermann, J.; Abdel-Hamid, M.; Kraemer, M.; Wiltfang, J.; Graf, E. German validation of the Conners Adult ADHD Rating Scales (CAARS) II: Reliability, validity, diagnostic sensitivity and specificity. *Eur. Psychiatry* **2012**, *27*, 321–328. [CrossRef]
45. Moss, S.B.; Nair, R.; Vallarino, A.; Wang, S. Attention deficit/hyperactivity disorder in adults. *Prim. Care Clin. Off. Pract.* **2007**, *34*, 445–473. [CrossRef] [PubMed]
46. Gillig, P.M.; Gentile, J.P.; Atiq, R. Attention-deficit hyperactivity disorder in adults. *Psychiatry Board Review Manual. Hosp. Physician* **2005**, *9*, 1–11.
47. Torralva, T.; Gleichgerrcht, E.; Torrente, F.; Roca, M.; Strejilevich, S.A.; Cetkovich, M.; Lischinsky, A.; Manes, F. Neuropsychological functioning in adult bipolar disorder and ADHD patients: A comparative study. *Psychiatry Res.* **2011**, *186*, 261–266. [CrossRef] [PubMed]
48. Nelson, J.M.; Gregg, N. Depression and anxiety among transitioning adolescents and college students with ADHD, dyslexia, or comorbid ADHD/dyslexia. *J. Atten. Disord.* **2012**, *16*, 244–254. [CrossRef] [PubMed]
49. Manor, I.; Vurembrandt, N.; Rozen, S.; Gevah, D.; Weizman, A.; Zalsman, G. Low self-awareness of ADHD in adults using a self-report screening questionnaire. *Eur. Psychiatry* **2012**, *27*, 314–320. [CrossRef]
50. Du Rietz, E.; Cheung, C.H.; McLoughlin, G.; Brandeis, D.; Banaschewski, T.; Asherson, P.; Kuntsi, J. Self-report of ADHD shows limited agreement with objective markers of persistence and remittance. *J. Psychiatr. Res.* **2016**, *82*, 91–99. [CrossRef]

51. Cook, C.; Buelow, M.T.; Lee, E.; Howell, A.; Morgan, B.; Patel, K.; Bryant, A.M.; Menatti, A.; Suhr, J. Malingered Attention Deficit/Hyperactivity Disorder on the Conners' Adult ADHD Rating Scales: Do Reasons for Malingering Matter? *J. Psychoeduc. Assess.* **2018**, *36*, 552–561. [CrossRef]
52. Hoelzle, J.B.; Ritchie, K.A.; Marshall, P.S.; Vogt, E.M.; Marra, D.E. Erroneous conclusions: The impact of failing to identify invalid symptom presentation when conducting adult attention-deficit/hyperactivity disorder (ADHD) research. *Psychol. Assess.* **2019**, *31*, 1174–1179. [CrossRef]
53. Fuermaier, A.B.M.; Tucha, L.; Koerts, J.; Aschenbrenner, S.; Kaunzinger, I.; Hauser, J.; Weisbrod, M.; Lange, K.W.; Tucha, O. Cognitive impairment in adult ADHD—Perspective matters! *Neuropsychology* **2015**, *29*, 45–58. [CrossRef]
54. Jarrett, M.A.; Rapport, H.F.; Rondon, A.T.; Becker, S.P. ADHD dimensions and sluggish cognitive tempo symptoms in relation to self-report and laboratory measures of neuropsychological functioning in college students. *J. Atten. Disord.* **2017**, *21*, 673–683. [CrossRef]
55. Barkley, R.A.; Murphy, K.R. Impairment in occupational functioning and adult ADHD: The predictive utility of executive function (EF) ratings versus EF tests. *Arch. Clin. Neuropsychol.* **2010**, *25*, 157–173. [CrossRef]
56. Retz-Junginger, P.; Giesen, L.; Philipp-Wiegmann, F.; Roesler, M.; Retz, W. Wender-Reimherr self-report questionnaire on adult ADHD: German version. *Der Nervenarzt* **2017**, *88*, 797–801. [CrossRef]
57. Grabemann, M.; Zimmermann, M.; Strunz, L.; Ebbert-Grabemann, M.; Scherbaum, N.; Kis, B.; Mette, C. Neue Wege in der Diagnostik der ADHS bei Erwachsenen. *Psychiatr. Prax.* **2017**, *44*, 221–227. [CrossRef] [PubMed]
58. Ward, M.F. The Wender Utah Rating Scale: An aid in the retrospective diagnosis of childhood attention deficit hyperactivity disorder. *Am. J. Psychiatry* **1993**, *150*, 885. [PubMed]
59. Retz-Junginger, P.; Retz, W.; Blocher, D.; Stieglitz, R.-D.; Georg, T.; Supprian, T.; Wender, P.; Rösler, M. Reliabilität und Validität der Wender-Utah-Rating-Scale-Kurzform. *Der Nervenarzt* **2003**, *74*, 987–993. [CrossRef] [PubMed]
60. Retz-Junginger, P.; Retz, W.; Blocher, D.; Weijers, H.; Trott, G.; Wender, P.; Rössler, M. Wender Utah rating scale. The short-version for the assessment of the attention-deficit hyperactivity disorder in adults. *Der Nervenarzt* **2002**, *73*, 830–838. [CrossRef]
61. Adler, L.A.; Spencer, T.; Faraone, S.V.; Kessler, R.C.; Howes, M.J.; Biederman, J.; Secnik, K. Validity of pilot Adult ADHD Self-Report Scale (ASRS) to rate adult ADHD symptoms. *Ann. Clin. Psychiatry* **2006**, *18*, 145–148. [CrossRef] [PubMed]
62. Kessler, R.C.; Adler, L.; Ames, M.; Demler, O.; Faraone, S.; Hiripi, E.; Howes, M.J.; Jin, R.; Secnik, K.; Spencer, T. The World Health Organization Adult ADHD Self-Report Scale (ASRS): A short screening scale for use in the general population. *Psychol. Med.* **2005**, *35*, 245. [CrossRef] [PubMed]
63. Rösler, M.; Retz, W.; Retz-Junginger, P.; Thome, J.; Supprian, T.; Nissen, T.; Stieglitz, R.; Blocher, D.; Hengesch, G.; Trott, G. Tools for the diagnosis of attention-deficit/hyperactivity disorder in adults. Self-rating behaviour questionnaire and diagnostic checklist. *Der Nervenarzt* **2004**, *75*, 888.
64. Conners, C.; Erhardt, D.; Epstein, J.; Parker, J.; Sitarenios, G.; Sparrow, E. Self-ratings of ADHD symptoms in adults I: Factor structure and normative data. *J. Atten. Disord.* **1999**, *3*, 141–151. [CrossRef]
65. Spielberger, C.D. *State-Trait Anxiety Inventory for Adults*; Consulting Psychologists Press: Palo Alto, USA, 1983; pp. 1–76.
66. Spielberger, C.D. State-Trait anxiety inventory. In *Corsini Encyclopedia of Psychology*, 4nd ed.; Weiner, I.B., Craighead, W.E., Eds.; John Wiley & Sons: Hoboken, NJ, USA, 2010; p. 1.
67. Barnes, L.L.; Harp, D.; Jung, W.S. Reliability generalization of scores on the Spielberger state-trait anxiety inventory. *Educ. Psychol. Meas.* **2002**, *62*, 603–618. [CrossRef]
68. Beck, A.T.; Steer, R.A.; Brown, G. *Manual for the Beck Depression Inventory-II*; Psychological Corporation: San Antonio, TX, USA, 1996.
69. Kühner, C.; Bürger, C.; Keller, F.; Hautzinger, M. Reliability and validity of the revised Beck Depression Inventory (BDI-II). *Results from German samples. Der Nervenarzt* **2007**, *78*, 651–656. [PubMed]
70. Patton, J.H.; Stanford, M.S.; Barratt, E.S. Factor structure of the Barratt impulsiveness scale. *J. Clin. Psychol.* **1995**, *51*, 768–774. [CrossRef]
71. Stanford, M.S.; Mathias, C.W.; Dougherty, D.M.; Lake, S.L.; Anderson, N.E.; Patton, J.H. Fifty years of the Barratt Impulsiveness Scale: An update and review. *Personal. Individ. Differ.* **2009**, *47*, 385–395. [CrossRef]
72. Beblo, T.; Kunz, M.; Albert, A.; Aschenbrenner, S. *Vienna Test System (VTS): Mental Ability Questionnaire (FLEI)*; Schuhfried: Vienna, Austria, 2012.
73. Tucha, L.; Fuermaier, A.; Aschenbrenner, S.; Tucha, O. *Vienna Test System (VTS): Neuropsychological Test Battery for the Assessment of Cognitive Functions in Adult ADHD (CFADHD)*; Schuhfried: Vienna, Austria, 2013.
74. Schuhfried, G. *Vienna Test System: Psychological Assessment*; Schuhfried: Moedling, Austria, 2013.
75. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*; Academic Press: Cambridge, MA, UK, 2013.
76. Brevik, E.J.; Lundervold, A.J.; Haavik, J.; Posserud, M.B. Validity and accuracy of the Adult Attention-Deficit/Hyperactivity Disorder (ADHD) Self-Report Scale (ASRS) and the Wender Utah Rating Scale (WURS) symptom checklists in discriminating between adults with and without ADHD. *Brain Behav.* **2020**, *10*, e01605. [CrossRef] [PubMed]
77. Anbarasan, D.; Kitchin, M.; Adler, L.A. Screening for Adult ADHD. *Curr. Psychiatry Rep.* **2020**, *22*, 1–5. [CrossRef]
78. Ustun, B.; Adler, L.A.; Rudin, C.; Faraone, S.V.; Spencer, T.J.; Berglund, P.; Gruber, M.J.; Kessler, R.C. The World Health Organization Adult Attention-Deficit/Hyperactivity Disorder Self-Report Screening Scale for DSM-5. *JAMA Psychiatry* **2017**, *74*, 520–526. [CrossRef] [PubMed]

79. Murphy, K.R.; Adler, L.A. Assessing attention-deficit/hyperactivity disorder in adults: Focus on rating scales. *J. Clin. Psychiatry* **2004**, *65*, 12–17.
80. Winstanley, C.A.; Eagle, D.M.; Robbins, T.W. Behavioral models of impulsivity in relation to ADHD: Translation between clinical and preclinical studies. *Clin. Psychol. Rev.* **2006**, *26*, 379–395. [CrossRef]
81. Young, S.; Gudjonsson, G.H. Neuropsychological correlates of the YAQ-S and YAQ-I self-and informant-reported ADHD symptomatology, emotional and social problems and delinquent behaviour. *Br. J. Clin. Psychol.* **2005**, *44*, 47–57. [CrossRef]
82. Schatz, D.B.; Rostain, A.L. ADHD with comorbid anxiety: A review of the current literature. *J. Atten. Disord.* **2006**, *10*, 141–149. [CrossRef]
83. Tannock, R. ADHD with anxiety disorders. In *ADHD Comorbidities: Handbook for ADHD Complications in Children and Adults*; Brown, T.E., Ed.; American Psychiatric Publishing,: Washington, DC, USA, 2009; pp. 131–155.
84. Van Voorhees, E.E.; Hardy, K.K.; Kollins, S.H. Reliability and validity of self-and other-ratings of symptoms of ADHD in adults. *J. Atten. Disord.* **2011**, *15*, 224–234. [CrossRef] [PubMed]
85. Grogan, K.; Gormley, C.I.; Rooney, B.; Whelan, R.; Kiiski, H.; Naughton, M.; Bramham, J. Differential diagnosis and comorbidity of ADHD and anxiety in adults. *Br. J. Clin. Psychol.* **2018**, *57*, 99–115. [CrossRef] [PubMed]
86. Harrison, A.G.; Nay, S.; Armstrong, I.T. Diagnostic accuracy of the Conners' adult ADHD rating scale in a postsecondary population. *J. Atten. Disord.* **2019**, *23*, 1829–1837. [CrossRef] [PubMed]
87. Solanto, M.V.; Etefia, K.; Marks, D.J. The utility of self-report measures and the continuous performance test in the diagnosis of ADHD in adults. *CNS Spectr.* **2004**, *9*, 649–659. [CrossRef] [PubMed]
88. Faraone, S.V.; Antshel, K.M. Diagnosing and treating attention-deficit/hyperactivity disorder in adults. *World Psychiatry* **2008**, *7*, 131–136. [CrossRef]
89. Barkley, R.A.; Brown, T.E. Unrecognized attention-deficit/hyperactivity disorder in adults presenting with other psychiatric disorders. *CNS Spectr.* **2008**, *13*, 977–984. [CrossRef]
90. Montano, C.B.; Weisler, R. Distinguishing symptoms of ADHD from other psychiatric disorders in the adult primary care setting. *Postgrad. Med.* **2011**, *123*, 88–98. [CrossRef]
91. Nelson, J.M.; Lovett, B.J. Assessing ADHD in college students: Integrating multiple evidence sources with symptom and performance validity data. *Psychol. Assess.* **2019**, *31*, 793–804. [CrossRef]
92. Jiang, Y.; Johnston, C. The relationship between ADHD symptoms and competence as reported by both self and others. *J. Atten. Disord.* **2012**, *16*, 418–426. [CrossRef]
93. Martel, M.M.; Schimmack, U.; Nikolas, M.; Nigg, J.T. Integration of symptom ratings from multiple informants in ADHD diagnosis: A psychometric model with clinical utility. *Psychol. Assess.* **2015**, *27*, 1060–1071. [CrossRef] [PubMed]
94. De Los Reyes, A.; Kazdin, A.E. Informant discrepancies in the assessment of childhood psychopathology: A critical review, theoretical framework, and recommendations for further study. *Psychol. Bull.* **2005**, *131*, 483–509. [CrossRef]
95. Goodman, K.L.; de los Reyes, A.; Bradshaw, C.P. Understanding and using informants' reporting discrepancies of youth victimization: A conceptual model and recommendations for research. *Clin. Child Fam. Psychol. Rev.* **2010**, *13*, 366–383. [CrossRef] [PubMed]
96. Ferdinand, R.F.; van der Ende, J.; Verhulst, F.C. Parent-adolescent disagreement regarding psychopathology in adolescents from the general population as a risk factor for adverse outcome. *J. Abnorm. Psychol.* **2004**, *113*, 198–206. [CrossRef] [PubMed]
97. Sherman, E.M.; Slick, D.J.; Iverson, G.L. Multidimensional malingering criteria for neuropsychological assessment: A 20-year update of the malingered neuropsychological dysfunction criteria. *Arch. Clin. Neuropsychol.* **2020**, *35*, 735–764. [CrossRef]
98. Guion, K.; Mrug, S.; Windle, M. Predictive value of informant discrepancies in reports of parenting: Relations to early adolescents' adjustment. *J. Abnorm. Child Psychol.* **2009**, *37*, 17–30. [CrossRef] [PubMed]
99. Brooks, C. *Introductory Econometrics for Finance*; Cambridge University Press: Cambridge, UK, 2019.
100. Draper, N.R.; Smith, H. *Applied Regression Analysis*; John Wiley & Sons: Hoboken, NJ, USA, 1998.
101. Butzbach, M.; Fuermaier, A.B.M.; Aschenbrenner, S.; Weisbrod, M.; Tucha, L.; Tucha, O. Basic processes as foundations of cognitive impairment in adult ADHD. *J. Neural Transm. (Vienna)* **2019**, *126*, 1347–1362. [CrossRef]
102. Kallweit, C.; Paucke, M.; Strauß, M.; Exner, C. Cognitive deficits and psychosocial functioning in adult ADHD: Bridging the gap between objective test measures and subjective reports. *J. Clin. Exp. Neuropsychol.* **2020**, *42*, 569–583. [CrossRef]
103. Biederman, J.; Petty, C.R.; Fried, R.; Black, S.; Faneuil, A.; Doyle, A.E.; Seidman, L.J.; Faraone, S.V. Discordance between psychometric testing and questionnaire-based definitions of executive function deficits in individuals with ADHD. *J. Atten. Disord.* **2008**, *12*, 92–102. [CrossRef]
104. Barkley, R.A.; Fischer, M. Predicting impairment in major life activities and occupational functioning in hyperactive children as adults: Self-reported executive function (EF) deficits versus EF tests. *Dev. Neuropsychol.* **2011**, *36*, 137–161. [CrossRef]