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Subjective cognition in adults with common psychiatric classifications; a systematic review

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\(^{b}\) Department of Psychology, University of Amsterdam, Amsterdam, Netherlands
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\(^{d}\) Dr. Leo Kannerhuis, autism clinic (Youz/Parnassia Group), Amsterdam, Netherlands

A protocol is registered under https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020144867

1. Introduction

Subjective cognition is defined as a person’s experiences or views of their own cognitive processes such as attention, memory, and executive functioning. Subjective cognitive complaints (SCCs) occur frequently in older age. Prevalence reports show that among people over 50 years of age, between 11% to more than 55% (Geerlings et al., 1999; Reid and Maclullich, 2006; Srisurapanont et al., 2015) experience subjective decline in memory, attention, or other cognitive functions. SCCs are associated with a decreased ability to perform activities of daily life (Cordier et al., 2019; Montejo et al., 2012), and poor quality of life (Montejo et al., 2012; Rotenberg Shpigelman et al., 2019). Moreover, in older adults without clinical cognitive impairment, SCCs are associated with greater psychological distress (Hill et al., 2016). Also, SCCs (either self-observed or by a proxy) are a common cause for referral for neuropsychological testing. The SCCs play an important part in the diagnostic criteria for neurological disorders such as Mild Cognitive Impairment (MCI) and Alzheimer’s dementia (AD) (Albert et al., 2011; McKhann et al., 2011), thus it of the utmost importance to measure subjective cognition properly. In neurological patients, SCCs not necessarily reflect cognitive impairment, but might reflect comorbid fatigue, depression, worries and a subsequent focus on signs of cognitive failures. Longitudinally, SCCs in the absence of objective cognition deviations are often seen as a precursor for later AD (Jessen et al., 2014), but are also associated with an increased risk for future major depressive disorder (MDD)(Hill et al., 2016). While most psychiatric classifications are also characterized by SCCs (Bortolato et al., 2014; Pierre et al., 2019), the role of subjective cognition in clinical practice is even more elusive in psychiatry, as internalizing and/or externalizing symptoms are the most frequent reason for referral. SCCs are part of the core symptoms of many psychiatric problems (e.g., attention problems in internalizing classifications and attention-deficit/hyperactivity disorder (ADHD), problems in social cognition in
whether instruments developed for neurologic disorders and aging can
base of SCCs. Jonker and colleagues (Jonker et al., 2000) found that in
cating this, is the unclarity of the underlying construct that is at the
ever, the large variety in the instruments used to measure SCCs
ADHD but also in other psychiatric classifications it remains unclear
how we should see, and make use of SSCs, both in research and clinical
practice. Moreover, it is unclear whether SCCs associated with one
psychiatric classification underlie the same construct as in a different
psychiatric classification.

Since SCCs are a key referral reasons in neurological disorders and
aging, many instruments are developed for those populations. How-
ever, the large variety in the instruments used to measure SCCs
(Rabinulrab et al., 2015), but also in the definition of SCCs
(Abdulrab and Heun, 2008), complicate the research field. In clinical
practice the SCCs instruments that were developed for neurological
disorders and aging are also used in psychiatric populations, however
it is unclear whether this is a reliable and valid approach. Compli-
cating this, is the unclarity of the underlying construct that is at the
base of SCCs. Jonker and colleagues (Jonker et al., 2000) found that in
younger samples SCCs were related to depressive symptoms, while in
older samples associations with memory performance were found. This
suggests that at different ages, different constructs are at the base of
SCCs, and that they cannot just be attributed to ‘senior moments’. 
Moreover, while in aging memory complaints are possibly most
prevalent, in psychiatric classifications, other cognitive domains might
be more frequent, like difficulties with attention and concentration.
Whether this is also the case in other psychiatric classifications is
currently unknown. However, measuring SCCs is a cost-efficient and
fast way to measure common complaints in people with psychiatric
classifications, however, it is of the utmost importance to understand
what we are measuring, what we should measure, and which construct
is represented by SCCs.

The aim of this systematic review is twofold: i) we aim to assess
whether instruments developed for neurologic disorders and aging can
reliably be used in psychiatric research. ii) We aim to investigate which
constructs are associated with SCCs in ADHD and other psychiatric
classifications. A systematic review will be conducted in two steps. First,
we will identify commonly used instruments to measure SCC that are
developed for either neurological disorders or general use. Second, we
will use these instruments in further searches to identify research into
SCCs looking at common psychiatric diagnoses occurring in adulthood
(ADHD, ASD, mood and anxiety classifications, and schizophrenia). 
Moreover, by including multiple psychiatric classifications, we will 
compare the different dimensions of SCCs, and see whether they
represent different underlying constructs in different classifications.

2. Methods

A protocol for the current review is registered under https://www.
crd.york.ac.uk/prospero/display_record.php?ID=CRD42020144867.
Prisma guidelines were followed (prisma checklist available in the
Supplements).

2.1. Study selection

Study selection took place in two phases. The first phase was aimed at
identifying relevant instruments. In the second phase the instruments
identified in phase one where used combined with more general search
terms to identify relevant studies. Authors AG (cognitive neuroscientist,
postdoc, and lecturer) and SvD (registered clinical neuropsychologist,
clinical practitioner, and assistant professor) performed the screening of
studies. The complete search query is available in the Supplements.

2.2 Search phase one

The purpose of the first phase was to determine relevant question-
naires that are often used to assess subjective cognition in both neuro-
ological disorders and psychiatric classifications. Relevant instruments
were identified by searching in MEDLINE, PsycINFO, CINAHL and
EMBASE for reviews on subjective cognition in either brain disorders or
mental health classifications in adults. Search terms included synonyms
and hierarchical family forms (e.g., MESH terms) of subjective cognition
and meta-analyses or review and adult and brain diseases or mental
classifications. During this identification phase reviews were included
on neurological disorders (e.g., MCI, de-
mintia) or psychiatric classifications aimed at adults that described
research on subjective cognition as an outcome or predictor, or had
subjective cognition as their main outcome. Subjective cognition is
defined as a person’s experiences or views of their cognitive processes
such as attention, memory, and executive functioning. The following
inclusion criteria were applied to instruments to be included in our
further searches: The instrument should

i be a generic instrument, i.e., not disease specific
ii be developed for use in neurologic or brain disorders such as
dementia or developed for the general population
iii measure subjective reports of cognitive functions
iv be available in English
v be aimed at adults
vi look at two or more cognitive domains. Cognitive domains being:
attention, cognitive speed, motor skills, language, memory,
perception, planning, working memory, inhibition, and cognitive
flexibility
vii include at least a self-report form (only proxy ratings will be
excluded)
viii not only be a subscale of an instrument. Larger test batteries that
provide stand-alone questionnaires are?/were allowed.

2.3. Search phase two

The purpose of the second phase was to find relevant research to
answer our two main aims, i.e., to assess whether instruments developed
for neurologic disorders and aging can reliably be used in psychiatric
research and to investigate which factors are associated with SCCs in
psychiatric classifications. A similar search strategy was applied, but
search terms were supplemented with the names and abbreviated names
of the instruments identified in phase one (also see the Supplements for a
full copy of search criteria). In this phase only papers on ADHD, ASD,
anxiety, mood disorders, or schizophrenia (common psychiatric classi-
fications) were included. Furthermore, reference lists of relevant papers
were hand-searched to identify relevant research.

Papers that were included were written in English of Dutch,
described adult participants with a diagnosis of ADHD, ASD, anxiety, mood disorders, or schizophrenia based on the DSM IV (1994) or ICD-10 (1993) or later versions. Included papers should describe subjective cognition as an outcome, or should have subjective cognition as its main focus, measured using an instrument fulfilling our previously stated criteria. Papers aimed at children, subjective/narrative reviews, or papers describing one domain of cognition (i.e., attention, cognitive speed, motor skills, language, memory, perception, planning, working memory, inhibition, or cognitive flexibility) will be excluded.

2.4. Study quality

Authors APG and SvdW independently rated the quality of the selected studies using an adapted version of the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies, rating selection bias, performance bias, attrition bias, and detection bias. In contrary to our preregistration, inter-rated discrepancies were resolved by the first author. A full copy of the instrument used for quality assessment is available in the Supplements.

2.5. Data extraction

Since treatment effects on subjective cognitive complaints is beyond the scope of the current review, we extracted baseline information from RCTs. Data extraction was performed by APG. The following data (means, correlations, and significance of reported relations) was extracted from the manuscripts: classifications (i.e., diagnoses), classification method ((semi structured) interviews), clinical classification (DSM), type of study, comorbidity, measure of subjective cognition, other measures, number of participants, sex of the participants, country of origin, age of the participants, main conclusion concerning subjective cognition.

3. Results

3.1. Eleven relevant instruments were identified in phase one

Twenty reviews (for PRISMA flowchart see the Supplements) describing at least two SC instruments were identified. Eleven instruments (i.e., Behavior rating inventory of executive function (BRIEF), Cognitive difficulties scale (CDS), Cognitive complaints Questionnaire, Cognitive failures questionnaire (CFQ), Cognitive problems in daily life checklist, cognitive self-report questionnaire, Multiple abilities self-report questionnaire (MASQ), Nuremberg self-assessment list (NSL), Subjective cognitive decline questionnaire, and Subjective cognitive complaints scale) met our inclusion criteria and were added to the search in the second phase. Instruments that were identified but not deemed suitable can be found in the Supplement

3.2. The majority of SCC studies focus on ADHD and mood disorders

In the second phase of the search 35 studies were identified (prisma flowchart available in Supplement). Of those 16 were aimed at ADHD, 14 at mood disorders (eight bipolar, six depression), three at autism, two at schizophrenia, and none at anxiety. A summary of the identified studies, summarized per diagnosis, can be found in Table 1.

3.3. Mood disorders

In depression (Iverson and Lam, 2013; Lam et al., 2016) reported elevated SCCs. In bipolar disorder, all but one study found that those with a diagnosis had elevated scores compared to controls (of those reporting this (Peters et al., 2014; Stange et al., 2011; Van Der Werf-Eldering et al., 2011)). Interestingly, in the one study that did not find elevated scores people in bipolar disorder, excluded current mood disorders. Moreover, it was the only study performed in older adults (Schouws et al., 2012).

In bipolar disorder, two studies reported significant weak correlations between objective and subjective cognition. One found that SCCs as measured with the CDS (cognitive difficulties scale) were related to short term memory (Burdick et al., 2005), the other found that a higher
Table 1
Study characteristics.

<table>
<thead>
<tr>
<th>Study</th>
<th>Dx</th>
<th>Classification method</th>
<th>Type of study</th>
<th>N</th>
<th>Sex (%male)</th>
<th>age</th>
<th>comorbidity</th>
<th>Measure of SC</th>
<th>Other measures</th>
<th>Country of origin</th>
<th>Quality score</th>
<th>Main conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adler et al. 2014</td>
<td>ADHD</td>
<td>ACDS 1.2</td>
<td>Double-blind placebo-controlled trial of ATX</td>
<td>Total n = 328 (ATX 161, con n = 167)</td>
<td>77.5%</td>
<td>18-30</td>
<td>NR</td>
<td>BRIEF-A SR</td>
<td>None related to BRIEF-A</td>
<td>USA</td>
<td>55.6</td>
<td>93.6% scores abnormal (T &gt; 60) on GEC, 73.97% on BRI, and 93.15% on MI</td>
</tr>
<tr>
<td>Adler et al., 2013</td>
<td>ADHD</td>
<td>Clinical DSM-IV &amp; ADHD-RS-IV baseline score &gt; 28</td>
<td>Double-blind placebo-controlled trial of lisdexamfetamine dimesylate</td>
<td>Total n = 159 (Lisdexamfetamine n = 79, placebo n = 80)</td>
<td>52.2%</td>
<td>18-55</td>
<td>Excluded: Conditions controlled with prohibited medication or uncontrolled including severe axis I or II dxs.</td>
<td>Brief-A SR or informant report</td>
<td>None related to BRIEF-A</td>
<td>USA</td>
<td>66.7</td>
<td>All but 2 participants had GEC T &gt; 65 NB. GEC T &gt; 65 was inclusion criterion.</td>
</tr>
<tr>
<td>Adler et al. 2014 (executive)</td>
<td>ADHD</td>
<td>DSM-IV-TR</td>
<td>open-label treatment with atomoxetine</td>
<td>1898</td>
<td>58.7</td>
<td>18-50, 33.2</td>
<td>Excluded: BP psychotic, anxiety dx or. current major depression</td>
<td>BRIEF-A SR and informant</td>
<td></td>
<td>USA</td>
<td>66.7</td>
<td>1638/1898 individuals GEC T &gt; 65 according to SR, 1245/1784 informant reports T &gt; 65 on GEC. All BRIEF-A subscale scores except emotional control and self-monitor were elevated (T &gt; 60)</td>
</tr>
<tr>
<td>Adler et al. 2014</td>
<td>ADHD</td>
<td>ACDS 1.2</td>
<td>Crossover clinical trial</td>
<td>24</td>
<td>66.7%</td>
<td>19-55</td>
<td>Exclusion: history of MDD, dysthymia, or anxiety current Axis I psychiatric and BP or psychotic dxs.</td>
<td>BRIEF</td>
<td></td>
<td>USA</td>
<td>44.4</td>
<td></td>
</tr>
<tr>
<td>Arntzberg Grane et al. 2014</td>
<td>ADHD</td>
<td>DSM-IV criteria with semi-structured interview</td>
<td>Case-con ATMTR n = 36, Con n = 35</td>
<td>47.9%</td>
<td>19-53-ADHD 31.8 ± 10, Con 32.2 ± 9.5</td>
<td>Excluded: Memory problems and substance use dxs</td>
<td>BRIEF-A (SR and informant)</td>
<td>TOVA (go reaction time, reaction time variability, go signal omission error, no go commission.</td>
<td>Norway</td>
<td>66.7</td>
<td>ADHD &gt; cons on all SR BRIEF subscales. Informant reported all but organization of materials T &gt; 65. SR T &gt; 65 for Initiate, Working Memory, Plan/Organize, Task Monitor, inhibit, and MI and BRI, informant scores did not reach T &gt; 65. Significant correlations between CE (r_self = -0.45, r_other = -0.54), OE (r_self = -0.54, r_other = -0.40),</td>
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<tr>
<td>Study</td>
<td>Dx</td>
<td>Classification method</td>
<td>Type of study</td>
<td>N</td>
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<tr>
<td>Biederman et al., 2012</td>
<td>ADHD</td>
<td>DSM-IV (SCID &amp; KSADS)</td>
<td>RCT</td>
<td>87</td>
<td>60.91</td>
<td>19–60</td>
<td>33.87</td>
<td>BRIEF-A</td>
<td>Excluded: clinically unstable psychiatric dx (i.e. bipolar dx, psychosis, suicidality), ANT, stop signal test, digit symbol, working memory, color word inhibition, Trails number letters</td>
<td></td>
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<tr>
<td>Brod et al. 2014</td>
<td>ADHD</td>
<td>Conners’ Diagnostic Interview (DSM-IV)</td>
<td>randomized withdrawal trial of ATX</td>
<td>1819</td>
<td>59.2</td>
<td>18–50</td>
<td>m = 33.2(9.1)</td>
<td>BRIEF-A</td>
<td>Excluded: BP dx, current MDD, a current anxiety dx or any history of a psychotic dx were excluded</td>
<td>AAQOL</td>
<td>USA &amp; European countries</td>
<td>33.3</td>
</tr>
</tbody>
</table>

RTvar ($r_{self} = -0.35$, $r_{other} = -0.35$), and organization of materials, OE ($r_{self} = -0.34$), and plan/organize, OE ($r_{self} = -0.40$) and initiate, and CE and Task monitor ($r_{other} = -0.40$). 99% of ADHD EFD on >2 BRIEF scales, compared to 40% on >2 objective measures. Only the BRIEF inhibition, emotional con and self-monitor were associated with EFDs (i.e. ADHD without objective EFDs reported more impairment) All subscales of the AAQOL (life productivity, psychological health, life outlook and relationships) correlated with BRIEF A metacognition ($r = -0.80$, $r = -0.54$, $r = -0.48$, $r = -0.54$ resp.), behavioral regulation ($r = -0.60$, $r = -0.66$, $r = -0.44$, $r = -0.62$ resp.), and GEC ($r = -0.77$, $r = -0.64$, $r = -0.49$, $r = -0.62$ resp.)

(continued on next page)
<table>
<thead>
<tr>
<th>Study</th>
<th>Dx</th>
<th>Classification method</th>
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<th>Measure of SC</th>
<th>Other measures</th>
<th>Country of origin</th>
<th>Quality score</th>
<th>Main conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durell et al., 2013</td>
<td>ADHD</td>
<td>DSM-IV clinical interview</td>
<td>RCT</td>
<td>161 ATX, 167 placebo</td>
<td>61.44</td>
<td>24.7</td>
<td>excluded current MDD, panic, posttraumatic stress, eating dx, or SUDs, and current or lifetime obsessive-compulsive, bipolar dx, or psychosis.</td>
<td>BRIEF-A SR</td>
<td>No correlations with other measures were reported</td>
<td>USA &amp; Puerto Rico</td>
<td>66.8</td>
<td>Mean raw scores of 156 (+T-scores of 76) on the GEC.</td>
</tr>
<tr>
<td>Fuermaier et al., 2015</td>
<td>ADHD</td>
<td>DSM-IV clinical interview</td>
<td>Case-con ADHD (n=55), con n = 66 ADHD = 47.3</td>
<td>Con = 31.9 ± 10.2 m ADHD = 34.6 ± 10.7</td>
<td></td>
<td></td>
<td></td>
<td>Memory self-efficacy questionnaire, Comprehensive assessment of prospective memory, Dysexecutive questionnaire*</td>
<td>Visual Scanning, vigilance, (TAP), word recognition, logical memory (WMS), delayed task execution, stroop, TMT-B, word fluency.</td>
<td></td>
<td>Germany</td>
<td>33.3</td>
</tr>
<tr>
<td>Gray et al., 2014</td>
<td>ADHD</td>
<td>confirmed dx of ADHD cohort</td>
<td>135</td>
<td>42</td>
<td>18–35 (23.7 ± 3.6)</td>
<td></td>
<td>all registered with learning disability. major neurological dysfunction and psychosis, and (3) current use of sedating or mood altering medication</td>
<td>CFQ</td>
<td>ASRS-6</td>
<td>Canada (same sample as Gray 2014)</td>
<td></td>
<td>Higher total ADHD score on the ASRS correlated moderately with more cognitive complaints (total CFQ scores; $r = 0.55$).</td>
</tr>
<tr>
<td>Gray et al., 2016</td>
<td>ADHD</td>
<td>confirmed dx of ADHD cohort</td>
<td>135</td>
<td>42</td>
<td>18–35 (23.7 ± 3.6)</td>
<td></td>
<td></td>
<td>CFQ and BDEFS</td>
<td>ASRS, GRIT (+ambition), KS-10. Digit span forward, backward, sequencing (WAIS), Spatial span task and spatial working memory task (CANTAB), Math fluency (woodcock johnson), Test of word reading efficiency, GPAs</td>
<td>Canada</td>
<td>22.2</td>
<td>Impairments in EF compared to clinical threshold BDEFS. High scores on CFQ, females &gt; males. Higher psychological stress, higher symptoms, and lower grit, associated with more everyday cognitive</td>
</tr>
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<td>Study</td>
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<tr>
<td>Low et al., 2018</td>
<td>ADHD</td>
<td>DIVA DSM-IV</td>
<td>Prospective nonrandomized nonblinded 6 week follow up study</td>
<td>ADHD n = 42 Con n = 42</td>
<td>ADHD= 66%, Con = 57.1%</td>
<td>ADHD 26.9 ± 7.38, Con 26.7 ± 5.6</td>
<td>Exclusion of primary neurological or psychiatric diagnosis other than ADHD</td>
<td>BRIEF-A SR (planning, working memory inhibition) and Quick delay questionnaire</td>
<td>ASRS</td>
<td>Denmark</td>
<td>55.6</td>
<td>complaints (r between 0.38 and 0.60). Lower scores on digit span were related to BDREFS and test of word reading efficiency scores to the CFQ. ADHD &gt; con BRIEF Working memory (d = 2.78), planning (d = 3.67) &amp; inhibition (d = 3.37). QDQ correlated to ADHD subscales (rest between 0.34 and 0.46). Only BRIEF inhibition correlated to ADHD hyperactivity (r = 0.45). ADHD &gt; con MI (d = 1.42), BRI (d = 0.71), but not emotional regulation (d = 0.39, ns). Greater depressed mood was associated worse MI (r = 0.76, p = 0.004) and Emotional Regulation (r = 0.68, p = 0.02), but unrelated BRI (r = 0.30, p &gt; 0.34). ADHD &gt; con on MI than BRI, working memory scale was highest and self-monitor lowest. 90.1% / 88.7% of ADHD scores above T&gt;65 compared to 0% of con on MI and GEC.</td>
</tr>
<tr>
<td>Roth et al., 2013</td>
<td>ADHD</td>
<td>DSM-IV</td>
<td>Case con</td>
<td>19 ADHD, 19 Con</td>
<td>ADHD= 63.2, Con= 52.6</td>
<td>18–35 (25.21 ± 5.65)</td>
<td>Eight patients had a history of mood dx, three generalized anxiety dx, and one alcohol use dx</td>
<td>BRIEF-A SR</td>
<td>Beck depression inventory</td>
<td>USA</td>
<td>33.3</td>
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<tr>
<td>Stern et al. 2014</td>
<td>ADHD</td>
<td>DSM-IV</td>
<td>Structured interview</td>
<td>ADHD n = 81, Con n = 58</td>
<td>ADHD 49.4, Con 37.9</td>
<td>ADHD 35.2 ± 10.18, Con 29.29 ± 8.03</td>
<td>Exclusion of acute psychiatric ds according to SCID</td>
<td>BRIEF-A</td>
<td>Canadian occupational performance measure, ASRS, AAQOL</td>
<td>Israel</td>
<td>33.3</td>
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<tr>
<td>Zhao et al.,</td>
<td>ADHD</td>
<td>SCID DSM-IV</td>
<td>Case con</td>
<td>ADHD n = 28, Con n = 30</td>
<td>ADHD 53.5</td>
<td>27.07±5.48</td>
<td>no current diagnosis of schizophrenia, severe major depression, clinically significant panic dx, bipolar dx, pervasive developmental ds, or mental retardation</td>
<td>BRIEF-A</td>
<td>Resting state functional connectivity</td>
<td>China</td>
<td>44.4</td>
<td>ADHD and con differed on all BRIEF scores. BRIEF GEC was correlated to COPM (r = −0.331) and AAQOL (r = −0.489). Correlations between BRIEF WM and RSFC between the left AI and right precuneus (r = 0.557), right inferior temporal gyrus (r = −0.449) and left superior occipital gyrus (r = −0.512), and RSFC of the right AI and left cuneus (r = −0.455) in health con, but not in ADHD.</td>
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<td>2017</td>
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<tr>
<td>Davids et al.,</td>
<td>Autism</td>
<td>ADOS and/or a semi-structured DSM-5 ASD interview</td>
<td>Case con</td>
<td>ASD=36, con=36</td>
<td>50–84</td>
<td>NR</td>
<td>Brief-A SR and proxy</td>
<td>SRS-A, Processing Speed Index of the WAIS-IV-NL, ToL, Zoo map of BADS, semantic and phonetic verbal fluency</td>
<td>NL</td>
<td>55.6</td>
<td>SR ASD &gt; con on GEC, BRI and MI. Correlations SR and proxy were large (GEC r = 0.64, BRI r = 0.68, MI r = 0.67). No differences between groups on the cognitive tasks except that ASD used more time on Tower. In ASD group significant correlations between the Tower percentile scores and MI scale and subscale scores of the self BRIEF. Negative correlation between age and</td>
<td>2016</td>
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<tr>
<td>Joshi et al., 2016</td>
<td>ASD</td>
<td>DSM-IV-TR criteria for autistic, Asperger, or pervasive developmental dx</td>
<td>Prospective open label trial</td>
<td>18</td>
<td>78%</td>
<td>28 ± 9.5</td>
<td>Unstable psychiatric conditions, diagnosis of psychotic dx, and/or a recent history (in last 3 months) of substance dependence</td>
<td>BRIEF-A SR</td>
<td>na</td>
<td>USA</td>
<td>44.4</td>
<td>BRIEF-shifting was found No elevated BRIEF index or subscale scores in ASD. ±33% report EFD on BRIEF-A scales (T-score ≥65): shift (41%), initiate (35%), plan/organize (35%), self monitor (30%), and working memory (30%).</td>
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<tr>
<td>Study</td>
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<td>age (mean ± SD)</td>
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<tr>
<td>Demant et al., 2015</td>
<td>Bipolar dx</td>
<td>DSM-IV SCID or MINI</td>
<td>Cohort</td>
<td>77</td>
<td>44.4</td>
<td>67.3</td>
<td>Excluded dx schizophrenia, schizoaffective dx, significant suicide risk, current SUDs</td>
<td>RAVLT, Rapid Visual Information Processing (CANTAB), Repeatable Battery of the Assessment of Neuropsychological Status, coding and digit span TMT-B WAIS-III Letter-Number- Sequencing and verbal and semantic fluency</td>
<td>NL</td>
<td>11.1</td>
<td>There were no significant correlations between SCC on the CFQ and objective cognitive dysfunction (p-values &gt; 0.176).</td>
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Paans et al., 2018

Bipolar dx

DSM-IV SCID or MINI

Cohort

90

44.4

67.3

Exclusion of primary substance use dx and dementia

CFQ

Coping

NL

11.1

Subjective cognitive complaints (according to CFQ) were not associated with active or passive coping.

Peters et al., 2014

Bipolar dx I

DSM-IV confirmed with MINI

Cohort

68

54

35.21 ± 13.43

Lifetime comorbidities of 69% anxiety, 2% eating dx, 60% SUDs, 12% ADHD.

BRIEF and FrSBE

Manic symptoms (YMRS) and depressive symptoms (HAM-D)

USA

55.6

Impairment on all subscales of BRIEF and FrSBE compared to norms. Manic symptoms were associated with BRIEF impulsiveness/distractibility, emotional con, attention, Task monitoring and organization, and FrSBE behavioral control and executive dysfunction. Depressive symptoms were associated with Cognitive flexibility, emotional con, initiate, attention, and plan FrSBE behavioral control and executive dysfunction. More lifetime

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<tr>
<td>Schouws et al., 2012</td>
<td>Bipolar II and II, SCID-I</td>
<td>Case con</td>
<td>BP: many complaints (n = 43), BP: few complaints (n = 58), (Comparison n = 76)</td>
<td>8</td>
<td>41.9 ± 7.5</td>
<td>Excluded schizophrenia, schizoaffective, delusional psychotic dxs, MDD or mood congruent or incongruent psychotic features, b) SUDs</td>
<td>BRIEF and FrSBe</td>
<td>nr</td>
<td>USA</td>
<td>55.6</td>
<td>No difference in CFQ total score between con and BP. BP with few complaints had a longer duration of illness than PB with many complaints. BP with few cognitive complaints had worse cognitive functioning (attention and executive function) than those with many complaints. CFQ total score was associated with executive function after controlling for age. Above norm on BRIEF inhibit (1.2SD above mean), Emotional con (0.8 SD above mean), Self-monitor (0.6 SD above mean), Initiate (1.5 SD above mean), working memory (1.8 SD above mean), Plan Organize (1.8 SD above mean), task monitor (1.8 SD above mean), and organization (continued on next page)</td>
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<tr>
<td>Stange et al., 2011</td>
<td>Bipolar dx</td>
<td>DSM-IV (mini)</td>
<td>Treatment trial nonrandomized prepost design</td>
<td>8</td>
<td>25</td>
<td>41.9 ± 7.5</td>
<td>Excluded schizophrenia, schizoaffective, delusional psychotic dxs, MDD or mood congruent or incongruent psychotic features, b) SUDs</td>
<td>BRIEF and FrSBe</td>
<td>nr</td>
<td>USA</td>
<td>55.6</td>
<td>No difference in CFQ total score between con and BP. BP with few complaints had a longer duration of illness than PB with many complaints. BP with few cognitive complaints had worse cognitive functioning (attention and executive function) than those with many complaints. CFQ total score was associated with executive function after controlling for age. Above norm on BRIEF inhibit (1.2SD above mean), Emotional con (0.8 SD above mean), Self-monitor (0.6 SD above mean), Initiate (1.5 SD above mean), working memory (1.8 SD above mean), Plan Organize (1.8 SD above mean), task monitor (1.8 SD above mean), and organization (continued on next page)</td>
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Psychiatric comorbidities were associated with BRIEF Impulsiveness, and organization, and FrSBe executive dysfunction.
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<tr>
<td>VdWerf et al. 2011</td>
<td>Bipolar dx</td>
<td>DSM-IV mini</td>
<td>Case con</td>
<td>BP n = 108, C n = 75</td>
<td>BP = 38, C n = 36</td>
<td>BP = 45.8, C n = 40.8</td>
<td>NR</td>
<td>CFQ</td>
<td>Processing speed, (CANTAB), speed of information processing (stroop color and word and RT CANTAB), attention switching (CPT), Verbal memory (California VLT) Visual memory (pattern recognition), executive function/WM (spatial WM CANTAB), IDS</td>
<td>NL</td>
<td>33.3</td>
<td>No associations between CFQ total or scales and cognitive scores, except for memory for names (CFQ) and information processing speed ($r = 0.257$). Correlations between IDS and CFQ total ($r = 0.532$), CFQ memory ($r = 0.478$), CFQ distractibility ($r = 0.558$), and CFQ blunders ($r = 0.485$). Depressive symptoms did not moderate between subjective and objective cognition.</td>
</tr>
<tr>
<td>Iverson et al. 2013</td>
<td>Depression</td>
<td>SCID-I</td>
<td>Case con</td>
<td>Depression n = 62, 31.2, M = 47.4 ± 12</td>
<td>All who were interviewed were found to be free of a current Axis I dx</td>
<td>BC−CCI</td>
<td>none</td>
<td>Canada</td>
<td>11.1</td>
<td>Depression &lt; con on (forgetfulness, poor concentration, expressing thoughts word finding, slow thinking, and problems solving) and total score. No correlation with age or sex. Lower correlation in con between BDI and subjective cognition ($r = 0.43$) than in</td>
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<tr>
<td>Keilp et al., 2018</td>
<td>Unipolar depression</td>
<td>Case con</td>
<td>Depression n = 252, Con n = 140</td>
<td></td>
<td>38.5%, Depressed (18–80)</td>
<td>20.6% borderline, Depressed (mean 38.1 ± 12), Con (mean 33.8 ± 12.4)</td>
<td>CFQ Choice RT, Digit symbol CPTd' Stroop interference, Buschke SRT total recall, WCST errors, Letter &amp; category fluency, Gonogo commission errors, logical reasoning, BDI</td>
<td>USA</td>
<td>22.2</td>
<td>CFQ total score was correlated with CPT d' (r = 0.14, ns), the blunders subscale was correlated with CPT d' (r = 0.18). BDI correlated with CFQ total (r = 0.31), memory complaint (r = 0.27), distractibility (r = 0.34), and blunders (r = 0.23). BDI subjective depression (r = 0.32) and self blame (r = 0.30) associated with CFQ total score and most strongly with CFQ distractibility (r = 0.34, and r = 0.32). Objective measures of cognition were not correlated to BDI except choice RT (r = 0.14). All participants had some degree of perceived cognitive impairment, as measured by the BC–CCI.</td>
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<tr>
<td>Lam et al., 2016</td>
<td>MDD</td>
<td>MINI DSM-IV-TR Non randomized treatment with desvenlafaxine</td>
<td>40</td>
<td>45</td>
<td>39±10.8</td>
<td>Excluded lifetime dx of bipolar dx or other significant primary psychiatric dx, active SUDs in past year</td>
<td>BC–CCI na</td>
<td>Canada</td>
<td>66.7</td>
<td>CFQ not associated with age, age at onset, depressive severity and antidepressant drug, menopausal (continued on next page)</td>
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<tr>
<td>Pae et al., 2008</td>
<td>MDD (pre and post menopausal women with MDD)</td>
<td>DSM-IV with SCID prospective, 6-week, open-label naturalistic study</td>
<td>39</td>
<td>0</td>
<td>nr</td>
<td>Excluded: AXIS 1 dxs CFQ 1 dxs</td>
<td>Hormone levels, MADRS depression</td>
<td>Korea</td>
<td>66.7</td>
<td>CFQ not associated with age, age at onset, depressive severity and antidepressant drug, menopausal (continued on next page)</td>
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<tr>
<td>Sawada et al., 2019</td>
<td>Depression</td>
<td>ICD-10</td>
<td>Cohort</td>
<td>102</td>
<td>45</td>
<td>50.5 ± 14.7</td>
<td>nr</td>
<td>PDQ</td>
<td>QIDS, MADRS</td>
<td>Japan</td>
<td>55.6</td>
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<tr>
<td>Serra-Blasco et al., 2019</td>
<td>MDD</td>
<td>DSM-IV clinical diagnosis</td>
<td>cohort</td>
<td>Acute depression n = 81, remitter n = 57</td>
<td>18-65 Remitted n = 51.09 ± 11.68, Acute 53.99±6.64</td>
<td>Exclusion of bipolar dx schizophrenia past or present substance abuse or axis II diagnosis.</td>
<td>PDQ-20</td>
<td>HDRS-17, Composite scores of attention (TMT-A, Digit span forward, spatial span forward, WMS-III), memory (RAVLT).</td>
<td>Canada</td>
<td>55.6</td>
<td>HDRS scores correlated with subjective cognition (attention r = 0.64, memory r = 0.57) Objective and subjective attention correlated (r = 0.34 in acute group not remitted r = 0.26, ms.), Memory in the acute r = 0.35 group not remitted r = 0.05 ns.). The remitted group overestimated their ability while the active (continued on next page)</td>
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<tr>
<td>Bulzacka et al., Schizophrenia 2013</td>
<td>Schizophrenia</td>
<td>Diagnostic Interview for Genetic Studies (DSM-IV)</td>
<td>Case con</td>
<td>31</td>
<td>81</td>
<td>39.7</td>
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<td>BRIEF-A</td>
<td>Verbal Fluency, Wisconsin Card Sorting Test, TMT, Stroop Test and Digit Span forward and backward.</td>
<td>France</td>
<td>22.2</td>
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<tr>
<td>Kumbhani et al., 2010</td>
<td>Schizophrenia</td>
<td>DSM-IV SCID</td>
<td>Case con</td>
<td>Schizophrenia n = Con n =</td>
<td>Schizophrenia 51.7, con 50.0</td>
<td>Excluded of significant systemic medical illness and SUDs</td>
<td>BRIEF SR and informant on subset</td>
<td>Obsessive compulsive inventory</td>
<td>Lebanon</td>
<td>55.6</td>
<td>SR and informant reported lower scores on the BRIEF on working memory, and shift. Informant reported lower scores on all subscales. Obsessing correlated with most BRIEF subscales according to informant and SR ($r = 0.31–0.47$). Informant reports correlated more often with subscales than SR. T-score of several scales and indices were abnormally elevated. BRIEF-A GEC associated to GAF ($r = -0.25$), and SBS ($r = 0.59$); similar trends were observed for both BRI and MI T-scores.</td>
</tr>
<tr>
<td>Power et al., 2012</td>
<td>Schizophrenia</td>
<td>ICD-10 cohort</td>
<td>112</td>
<td>72.3</td>
<td>44.5 ± 13.03</td>
<td>No exclusion criteria</td>
<td>BRIEF-A (IR) GAF, SBS</td>
<td>Australia</td>
<td>33.3</td>
<td>T-score of several scales and indices were abnormally elevated. BRIEF-A GEC associated to GAF ($r = -0.25$), and SBS ($r = 0.59$); similar trends were observed for both BRI and MI T-scores.</td>
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<tr>
<td>Lovstad et al., 2016</td>
<td>ADHD, BP-I/BP-II, BPD</td>
<td>ADHD: 34</td>
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<td>ADHD: 47.1</td>
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<td></td>
<td>BRIEF-A</td>
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<td>Con -- PFC &amp; con -- CC (any index, PD(GEC, BRI), on all other test patients differed from con. con scored around 40, neurological disorders between 45 and 50 and neuropsychiatric groups around T = 65, neuropsychiatric vs con. But neurological group = con. neuropsychiatric group, as did not differ on any BRIEF index. No correlations between IQ and EF index and BRIEF scores. One association was significant, i.e., CWIT and BRI in the PD group (r = 0.39). In ADHD SCL-90 GSI correlated with BRIEF GEC (r = 0.51) and BRI (r = 0.56), in BP and BPD SCL 90 and the BRI were correlated (r = 0.58). Correlations were lower in neuropsychiatry (r range 0.35--0.55; p &lt; 0.01--0.001; R2 = 0.12--0.30), and the MI did not correlate. In the Con PFC, CC and PD groups no difference between self and informant.</td>
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<td>BP-II: 21</td>
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<td>BP-II: 14.3</td>
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<td>BPD: 18</td>
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<td>BPD: 27.8</td>
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<td>Neurological groups (TBI: 125, PPC: 29, CC: 24, PD: 42)</td>
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<td>Con = 115</td>
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<td>Con = 42.6</td>
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<td>ADHD: 31.7</td>
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<td>BRIEF-A</td>
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<td>BP-II: 26.2</td>
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<td>BPD: 33.2</td>
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<td>Neurological groups (TBI: 77.4, PPC: 43.3, CC: 22.5, PD: 59.8)</td>
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<td></td>
<td>Con = 31.3</td>
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Informant. Informants in ADHD reported lower scores, while in TBI group informant reported higher scores but only on GEC and MI. NB age and education used as covariates in all analyses. No informant ratings were available in BP and BPD.

Note. AAQOL=Adult adhd quality of life; ACDS=Adult ADHD Clinical Diagnostic Scale; ASRS=adhd self report scale; ATX=Atomoxetine; BDEFS=Barkley Deficits in Executive Functioning Scale–Short Form; BP=bipolar; BPD=borderline personality disorder; BRI=behavioral regulation index; CC=Cerebellar lesions; con=controls; CE=commission errors; CFQ=Cognitive failures questionnaire; CDS=Cognitive difficulties scale; Dx=psychiatric classification; GAF=Global assessment of functioning; GEC=Global Executive Composite; FrSB=Frontal systems behavior rating scale; HAM-D=Hamilton Depression Rating Scale; IDS=Inventory depressive symptoms; KS-10=Kessler psychological distress scale; MADRS=Montgomery–Asberg Depression Rating Scale; MI=Metacognitive Index; OE=Omission Errors; PAOF=patient assessment of own; PD=Parkinson disease; PFC=prefrontal lesions; QIDS=Quick Inventory of Depressive Symptomatology.; RAVLT=Rey Auditory Verbal Learning Test; RTVar=reaction time variability; SBS=social behavior schedule; SC=Subjective Cognition; SCAN=Schedule for Clinical Assessment in Neuropsychiatry; SCID_I=Structured Clinical Interview for DSM-IV; SR=self-report; SRS-A=Social Responsiveness Scale-Adults (SRS-A); SUDs= substance use disorders; TBI=traumatic brain injury; TOVA=Test of variables of attention; YMRS=Young Mania Rating Scale functioning * these are available in English, two german questionnaires are not mentioned here.
score on the CFQ subscale names was associated with lower speed of information processing (Van Der Werf-Eldering et al., 2011). Concurring with findings in ADHD, one study showed that responders with few SCCs had worse cognitive functioning on attention and EF compared to those with many SCCs (Schouws et al., 2012).

Both studies in depression showed weak, but significant correlations between objective and subjective cognition. One study showed a very weak relation ($r = -0.14$) between total CFQ score and continuous performance task d’, which appear to be driven by the subscale CFQ blunders (Keilp et al., 2018). The other study found scores on a composite measure of memory, and attention to correlate with subjective memory and attention (Serra-Blasco et al., 2019).

In bipolar disorder, results concerning subjective cognition in relation to mania symptoms is unclear. One study found lower subjective cognition related to higher mania scores (Peters et al., 2014), but another did not find this (Burdick et al., 2005). Possibly, these inconsistent results are due to the various phases of illness. Additionally, comorbid classifications, both somatic and psychiatric, were found to be related to higher cognitive complaints (Peters et al., 2014).

Interestingly, two studies in bipolar disorder and depression did not find a relation between depressive symptoms and SCCs (Burdick et al., 2005; Keilp et al., 2018). These studies included only subjects above a cut-off on a questionnaire (Keilp et al., 2018), or participants in various phases of illness (Burdick et al., 2005), which could possibly indicate that these patients were more severely affected than those in other studies. Possibly, this could indicate an effect of medication, as also found by Peters and colleagues (Peters et al., 2014), but it could also indicate that in highly depressed individuals, depression gets the hand over SCCs and both stop going hand in hand. However, one study indicated that the relation between depressive symptoms and subjective cognition was highest in active MDD compared to partially and fully remitted group MDD (Serra-Blasco et al., 2019).

### 3.8. Schizophrenia

In schizophrenia (Bulzacka et al., 2013; Kumbhani et al., 2010; Power et al., 2012) studies note more self-reported difficulties in cognition compared to controls. In schizophrenia only one significant correlation was found between objective and subjective cognition, namely working memory and self-reported inhibition on the BRIEF.

In schizophrenia, lower subjective cognition was related to higher scores on several dimensions of obsessive compulsive disorder (Kumbhani et al., 2010), lower global functioning, and more behavioral difficulties (Power et al., 2012).

### 3.9. Positive relation between psychiatric, psychological or behavioral symptoms and SCCs across classifications

In 16 studies the relation between reported psychiatric, psychological, or difficulties and subjective cognition was reported (six in ADHD (Brod et al., 2015; Gray et al., 2016, 2014; Low et al., 2018; Roth et al., 2013; Stem and Maer, 2014), one in ASD (van Heijst and Geurts, 2015), four in bipolar disorder (Burdick et al., 2005; Paans et al., 2018; Peters et al., 2014; Van Der Werf-Eldering et al., 2011), four in depression (Keilp et al., 2018; Paie et al., 2008; Sawada et al., 2019; Serra-Blasco et al., 2019) and two in schizophrenia (Bulzacka et al., 2013; Power et al., 2012)). The most common outcome investigated outcome (in seven out of 16 studies) in relation to subjective cognition was depression (Burdick et al., 2005; Keilp et al., 2018; Peters et al., 2014; Roth et al., 2013; Sawada et al., 2019; Serra-Blasco et al., 2019; Van Der Werf-Eldering et al., 2011). Most studies report that higher depressive symptoms are related to more SCCs. Moreover, increasing psychiatric, psychological and behavioral difficulties, are associated with more SCCs.

### 3.10. Limited and small correlation between subjective and objective cognition across classifications

A total of 13 studies reported on the relation between objective measures of cognition and subjective measures of cognition (four in ADHD (Arntsberg Grane et al., 2014; Biederman et al., 2012; Fuermaier et al., 2015; Gray et al., 2016), two in ASD (Davids et al., 2016; Lever and Geurts, 2016), four in bipolar disorder (Burdick et al., 2005; Demant et al., 2015; Schouws et al., 2012; Van Der Werf-Eldering et al., 2011), two in depression (Keilp et al., 2018; Serra-Blasco et al., 2019), and one in schizophrenia (Bulzacka et al., 2013)).

The majority of studies report (mostly) nonsignificant correlations between objective measures of cognition and SCCs (Arntsberg Grane et al., 2014; Biederman et al., 2012; Bulzacka et al., 2013; Burdick et al., 2005; Demant et al., 2015; Fuermaier et al., 2015; Gray et al., 2016; Keilp et al., 2018; Lever and Geurts, 2016; Van Der Werf-Eldering et al., 2011), the correlations found are weak to moderate at best, and correction for multiple comparisons is rare in these types of studies.

There were not enough studies across diagnoses to make a comparison about specific patterns of cognitive functions between classifications. One relation seems notable: the small but significant relation between working memory as measured with the digit span backwards and subjective cognition, as this was reported by two studies in different classifications (Bulzacka et al., 2013; Gray et al., 2016).

### 3.11. The impact of demographic characteristics

Although many studies used standardized scores removing the effect of age and gender, thus decreasing the possibility to draw conclusions about the effect of sex and age, some did not. Studies showed that females had more SCCs than males (Gray et al., 2016; Sawada et al., 2019), but reports of this effect was inconsistent (Iverson and Lam, 2013), possibly due to differential and higher depression scores in females (Sawada et al., 2019). Another possible explanation lies in the sex hormone estradiol, which was strongly related to SCCs in post-menopausal, but not pre-menopausal women, even after controlling for depression scores (Pae et al., 2008).

Generally, very few studies (Davids et al., 2016; Lever and Geurts, 2016; Paans et al., 2018; Pae et al., 2008; Schouws et al., 2012) focus on older (i.e., with an age above 65) individuals with psychiatric classifications. Studies on psychiatric classifications have shown inconsistent results on the relation between age and cognitive complaints, two studies report an increase in cognitive complaints in older individuals (Davids et al., 2016; Demant et al., 2015), but two others did not find this effect (Iverson and Lam, 2013; Sawada et al., 2019).

### 3.12. The Brief is most commonly used

Of the eligible papers, the most frequently used instrument was the Behavior Rating Inventory of Executive Function (BRIEF $n = 20$ times), followed by the cognitive failures’ questionnaire (CFQ $n = 9$). Other instruments were used less frequently (Perceived difficulties questionnaire (PDQ $n = 3$), British Columbia Cognitive Complaints Inventory (BC$-\text{CCI}$ $n = 2$), Frontal Systems Behavior Scale (FrSBe $n = 2$), cognitive difficulties scale (CDS $n = 1$). Overall, the BRIEF was also used most frequently across classifications, in 4 out of 5 disorder studies used the BRIEF.

The BRIEF was the only questionnaire used in multiple diagnoses, where studies also reported subscales (NB not all studies reported all subscales). In ADHD two subscales (self-monitor and emotional control; (Adler et al., 2014a; Arntsberg Grane et al. 2014; Biederman et al., 2012; Stem and Maer 2014) were consequently below 65, and four subscales (task monitor, plan/organize, working memory and initiate; (Adler et al., 2014a; Arntsberg Grane et al. 2014; Biederman et al., 2012; Low et al., 2018; Stem and Maer 2014) and two index scores (general executive composite [GEC] and metacognitive index [MI];(Adler et al., 2014a; Arntsberg Grane et al. 2014; Biederman et al., 2012; Stem and Maer 2014) were used.
despite the lack of a strong relation between SCC and such objective patients (e.g., Green, 2016; Knight and Baune, 2018), we argue that because they are related to various functional outcomes in psychiatric behavior. Where objective measures are already known to be of value they are related to quality of life, depression, and other measures of performance. As analogous to well validated measures of objective cognition, they are instruments or diagnosis. In ADHD commonly SCCs (often measured with the BRIEF) are used as outcome measure in studies, and it is often assumed that this reflects objective performance. However, SCCs show inconsistent and low associations to objective measures of cognition across psychiatric classifications, including ADHD, higher and more consistent relations are found with behavioral outcomes (such as symptoms of depression (Burdick et al., 2005; Keilp et al., 2018; Peters et al., 2014; Roth et al., 2013; Sawada et al., 2019; Serra-Blasco et al., 2019; Van Der Werf-Eldering et al., 2011), OCD (Kumbhani et al., 2010), and ADHD symptoms itself (Gray et al., 2016, 2014; Low et al., 2018) and QoL (Brod et al., 2015; Stem and Maeir, 2014; van Heijst and Geurts, 2015). While SCCs do not correlate well with objective measures of cognition in any psychiatric classification, and should thus not be seen as analogous to well validated measures of objective cognition, they are of clinical value. SCCs reflect suffering, behavioral difficulties and problems experienced by those with psychiatric problems in daily life, as they are related to quality of life, depression, and other measures of behavior. Where objective measures are already known to be of value because they are related to various functional outcomes in psychiatric patients (e.g., Green, 2016; Knight and Baune, 2018), we argue that despite the lack of a strong relation between SCC and such objective measures both are of importance for clinical practice.

Interestingly, associations between objective and subjective cognition vary considerably with respect to the cognitive functions involved (Davids et al., 2016; Serra-Blasco et al., 2019). For example, a relation between organization of materials of the BRIEF and reaction time, and inhibition (Arntsberg Grane et al., 2014) and CFQ names and speed of information processing, and working memory (Van Der Werf-Eldering et al., 2011). Moreover, several studies reported a negative relationship between objective cognitive performance and SCCs, in that those with worst cognitive performance, had less SCCs (Arntsberg Grane et al., 2014; Biederman et al., 2012; Schouws et al., 2012). Possibly poor meta cognitive ability, or the ability to self-monitor cognition, can lead to over or underestimating your cognitive ability. This concurs with the finding that a stronger relation was found between SCCs as reported by a clinician compared to self-reports (Burdick et al., 2005); however, we here focused on self-reports, given that these are the easiest to obtain. It has also been argued that subjective and objective measures of cognition reflect different aspects of cognition (Toplak et al., 2013). In most studies of psychiatric diagnoses SCCs are reported, independent of instrument and disorder.

The relation between depressive mood and SCCs was most commonly observed across classifications. Depressive mood can color one's view on all aspects of life. Possibly, this relation confounds other identified relationships, as most measures used are self-reported, and thus have this depressive view incorporated in them. For example, self-reported QoL can be influenced strongly by a depressed mood, but also SCCs are influenced in this way. Confirming this, is that higher relation between depression severity and SCCs are found in those with active depression compared to those in partial or full remission (Serra-Blasco et al., 2019), and that those individuals with a higher medication load (often endogenous to more severe suffering due to ones' disorder) had more SCCs (Peters et al., 2014). Therefore, we conclude that SCCs partly reflect overall suffering.

It has previously been suggested that in younger samples worrying about neurological difficulties, SCCs were related to depressive symptoms, while in older samples SCCs are more related to objective cognition (Jonker et al., 2000). This seems the same for the psychiatric population. While most studies in younger adults report a relation between SCCs and depressive symptoms (Burdick et al., 2005; Keilp et al., 2018; Peters et al., 2014; Roth et al., 2013; Sawada et al., 2019; Serra-Blasco et al., 2019; Van Der Werf-Eldering et al., 2011) or OCD (Kumbhani et al., 2010), there is no clear indication that SCCs are related to objective cognition in older adults. One study in elderly psychiatric individuals did find somewhat higher correlations (Davids et al., 2016) than most studies in younger individuals; however, this is not exclusive for older age, as correlations in the same range were found in ADHD (mean age 32 years; Arntsberg Grane et al., 2014), and no direct correlation with age was reported. Moreover, in a study into old individuals with bipolar disorder, without current mood problems (Schouws et al., 2012), it was found that individuals who did not report SCCs, did perform worse on objective measures of cognition. Additionally, results concerning the effect of age on SCCs in psychiatric classifications remains inconclusive (Davids et al., 2016; Demant et al., 2015; Iverson and Lam, 2013; Sawada et al., 2019). While one would anticipate increasing cognitive complaints with increasing age, when filling out such questionnaires people do compare themselves to other peoples performance, or what they expected from old age. This might cause them to take this into account, and consequently do not experience this as a burden or handicap, as it considered “normal” for their age. Taken together, similar to neurological disorders, we do not find any evidence for a relation between objective cognitive performance and subjective cognition at any age in psychiatric classifications. However, studies into older adults are warranted.

The strength of the current review lies in the inclusion of different psychiatric classifications, which allowed us to draw conclusions across classifications. Additionally, we used a rigorous method to determine relevant instruments that measure SCCs. However, our results should also be interpreted in the light of several limitations. First, in different classifications different instruments were preferred. Studies using these disease specific instruments were excluded from the current examination as including these would have made true generalizability difficult. Importantly, especially in ADHD the BRIEF was used often, however, there is a very large overlap between the items on the BRIEF and the symptoms of ADHD, which might have led to an overestimation of the SCCs in ADHD. Additionally, although we worked from the clinical observation that many instruments developed for use in neurological disorders were used, we did not find this in the research papers despite our rigorous setup to identify relevant questionnaires for this purpose. Therefore, we were not able to answer the hypothesis whether instruments developed for neurological disorders can reliably be used in psychiatric classifications. Regardless of the population, we see that SCCs reflect a different construct than objectively measured cognitive performance. However, the instruments used do seem to have some face validity to be used in psychiatric groups.

Despite these caveats, we can conclude that SCCs are common among psychiatric classifications and not unique for ADHD SCCs among ADHD were minimally associated with objective measures of cognition, but significantly related to daily distress and disability measures, as such mirroring findings among other psychiatric conditions.
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Supplementary materials


References


