Effects of Methylphenidate on Cognitive Functions in Children and Adolescents with Attention-Deficit/Hyperactivity Disorder: Evidence from a Systematic Review and a Meta-Analysis

Supplemental Information

Search Strategy

A common search strategy was used for all cognitive domains using a range of electronic databases between 1980 to 2012: - Science Citation Index Expanded (SCI-expanded), Current Contents Connect, MEDLINE, Ovid MEDLINE(R), PsycINFO, EMBASE Classic+EMBASE, Web of Science, ERIC, CINHAL. Searches were limited to human studies. Papers written in English, German, Italian and Portuguese were included in the search. Database searches were supplemented by hand searching of published reviews (2000 onwards). Common terms for participants (e.g. all variants of ADHD, hyperkinetic disorder, attention deficits) and study design terms were used across domains. The design terms were: controlled trial(s); randomised controlled trial(s); cluster randomised controlled trial(s); clinical trial; controlled clinical trial; crossover procedure or cross over study; crossover design; double blind procedure; double blind method; double blind study; single blind procedure; single blind method; single blind study; random allocation; randomization; random assignment; randomized controlled trial. The initial search included a broad range of both general and specific search terms used to identify studies with neurocognitive outcomes: cognition, cognitive, neuropsychological, neuropsychological test, neuropsychology, neurocognitive, task performance, memory, working memory, short term memory, long term memory, recognition memory, cognitive control, attention, attention control, vigilance, response variability, motor speed, naming speed, planning, inhibition, interference control, executive functioning, delay aversion, choice delay, reaction time and variability; however only those studies addressing executive and non-executive aspects of memory, reaction time and reaction time variability and response inhibition were included in this review. For other neuropsychological domains there were either too few studies (e.g. delay aversion) or too diverse a range of outcomes (e.g. attention) to be combined in a meta-analysis. For the specific syntax and language specific formulations used in different databases see the
published study protocol. Following the initial search (Seth and Usala) two follow up searches were conducted (Currie and Coghill, Gagliano and Pedroso) to identify any new studies published during the review process. On each occasion two authors separately conducted and cross-checked all searches which were finalized in May 2012.
Figure S1: PRISMA Flow Diagram of the Literature Reviewing Process on the Effectiveness of MPH on Cognitive Functions in ADHD Children
**Figure S2: Forest Plot with Standardized Mean Difference, Effect Size, and Homogeneity Statistics for Meta-Analysis Comparing the Effects of Methylphenidate and Placebo on Response Inhibition (only studies using Stop Signal Task).** CI, confidence interval; MPH, methylphenidate.

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>IV, Random, 95% CI</th>
<th>Std. Mean Difference</th>
<th>IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedard et al, 2003</td>
<td>-0.41 [-0.94, 0.12]</td>
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<tr>
<td>DeVito et al, 2009</td>
<td>-1.39 [-2.07, -0.71]</td>
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<td>Konrad et al, 2004</td>
<td>-0.28 [-0.64, 0.07]</td>
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<td>Konrad et al, 2005</td>
<td>-0.67 [-1.10, -0.24]</td>
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<tr>
<td>Overtoom et al, 2003</td>
<td>-0.02 [-0.72, 0.67]</td>
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<tr>
<td>Scheres et al, 2003</td>
<td>-0.63 [-1.23, -0.02]</td>
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<td>Scheres et al, 2003</td>
<td>-1.13 [-1.79, -0.48]</td>
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<tr>
<td>Scheres et al, 2003</td>
<td>-0.59 [-1.24, 0.06]</td>
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<tr>
<td>Tannock et al, 1995a</td>
<td>-0.21 [-0.73, 0.32]</td>
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<tr>
<td><strong>Total (95% CI)</strong></td>
<td>-0.56 [-0.81, -0.31]</td>
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<tr>
<td><strong>Heterogeneity:</strong></td>
<td><strong>Tau² = 0.07; Chi² = 15.40, df = 8 (P = 0.05); I² = 48%</strong></td>
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<tr>
<td><strong>Test for overall effect:</strong></td>
<td><strong>Z = 4.32 (P &lt; 0.0001)</strong></td>
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</table>
Figure S3: Forest Plot with Raw Data, Standardized Mean Difference, Effect Size, and Homogeneity Statistics for Meta-Analysis Comparing the Effects of Methylphenidate and Placebo on Executive Aspects of Memory. CI, confidence interval.
Figure S4: Forest Plot with Raw Data, Standardized Mean Difference, Effect Size, and Homogeneity Statistics for Meta-Analysis Comparing the Effects of Methylphenidate and Placebo on Non-Executive Aspects of Memory. CI, confidence interval.
Figure S5: Forest Plot with Raw Data, Standardized Mean Difference, Effect Size, and Homogeneity Statistics for Meta-Analysis Comparing the Effects of Methylphenidate and Placebo on Reaction Time. CI, confidence interval.
Figure S6: Forest Plot with Raw Data, Standardized Mean Difference, Effect Size, and Homogeneity Statistics for Meta-Analysis Comparing the Effects of Methylphenidate and Placebo on Reaction Time Variability. CI, confidence interval.
Figure S7: Forest Plot with Raw Data, Standardized Mean Difference, Effect Size, and Homogeneity Statistics for Meta-Analysis Comparing the Effects of Methylphenidate and Placebo on Response Inhibition. CI, confidence interval.
Table S1: Full text articles excluded because not meeting the inclusion criteria (n = 94).

<table>
<thead>
<tr>
<th>Reasons for Exclusion</th>
<th>Studies</th>
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<tr>
<td>Study design (not controlled studies, no crossover design; no passive control, cohort</td>
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<tr>
<td>studies, pre-post design, quasi experimental designs with matched controls)</td>
<td>Aman &amp; Turbott, 1991b; Ben-Pazi et al., 2006; Fuchs et al., 2003; Gau et al., 2009;</td>
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<td>Gawrilow &amp; Gollwitzer, 2008; Heiser et al., 2004; Hermens et al., 2005; Huang et al., 2007;</td>
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<td>Jung et al., 2007; Kim et al., 2009; Kuhle et al., 2007; Lee et al., 2009; Ohashi et al., 2010;</td>
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<td>Semrud-Clikeman, 2008; Sheppard et al., 1999; Song et al., 2005; Yildiz et al., 2007</td>
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<tr>
<td>Sample size &lt;10</td>
<td>Ballinger et al., 1984; Byrne et al., 1998; Hale et al., 1998; Srinivas et al., 1992; Vickers et al., 2002; Zang et al., 2005</td>
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<tr>
<td>Age below 5 and above 18</td>
<td>Agay et al., 2010; Bush et al., 2008; Byrne et al., 1998; Coons et al., 1987; Fallu et al.,</td>
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<td>2006; Garfinkel et al., 1986; Kurscheidt et al., 2008; Laurence, 1995; Musten et al., 1997;</td>
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<td></td>
<td>Schweitzer et al., 2004; Tucha et al., 2006; Wilson et al., 2006;</td>
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<tr>
<td>Diagnostic criteria: DSM III or IV and ICD 9 or 10 not used or not specified</td>
<td>Ackerman et al., 1982; Ballinger et al., 1984; Castellanos et al., 2005; Coons et al., 1987;</td>
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<td>Dalby et al., 1998; De Sonneville et al., 1991; Dykman et al., 1980; Garfinkel et al., 1986;</td>
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<td>Groom et al., 2010; Hall &amp; Kataria, 1992; Kemner et al., 2004; Klein et al., 2002; Klorman et al., 1994; Krusch et al., 1996; Laurence, 1995; Lubar et al., 1999; Pelham et al., 1987; Pelham et al., 1989; Peloquin &amp; Klorman, 1986; Reid &amp; Borkowski, 1984; Shea, 1982; Solanto &amp; Conners, 1982; Srinivas et al., 1992; Swartwood et al., 1998; Vickers et al., 2002</td>
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<tr>
<td>IQ &lt;70 or no explicit exclusion of mental retardation</td>
<td>Aman et al., 1991a; Aman &amp; Turbott, 1991b; Brodeur &amp; Pond, 2001; Butter et al., 1984;</td>
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<td></td>
<td>Feldman et al., 1989; Gawrilow &amp; Gollwitzer, 2008; Hale et al., 1998; Hall &amp; Kataria, 1992;</td>
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<td></td>
<td>Kobel et al., 2009; Kuhle et al., 2007; Kurscheidt et al., 2008; Laurence, 1995; Mostofsky et al., 2001; Sallee et al., 1992; Sebrechts et al., 1986; Shea, 1982; Swartwood et al., 1998; Teicher et al., 2004; Wienbruch et al., 2005; Wilson et al., 2006</td>
</tr>
<tr>
<td>Neurological impairment; chronic physical illness; sensory or motor impairment;</td>
<td>Aman et al., 1991a; Aman &amp; Turbott, 1991b; Brodeur &amp; Pond, 2001; Butter et al., 1984;</td>
</tr>
<tr>
<td>psychosis, autism spectrum disorders, abuse of any illegal drugs – Included or not</td>
<td>Caplan et al., 1996; Castellanos et al., 2005; Coons et al., 1987; Feldman et al., 1989; Gau et al., 2009; Gawrilow &amp; Gollwitzer, 2008; Hale et al., 1998; Hall &amp; Kataria, 1992; Kemner et al., 1994; Krusch et al., 1996; Laurence, 1995; Lubar et al., 1999; Pelham et al., 1987; Pelham et al., 1989; Peloquin &amp; Klorman, 1986; Reid &amp; Borkowski, 1984; Shea, 1982; Solanto &amp; Conners, 1982; Srinivas et al., 1992; Swartwood et al., 1998; Vickers et al., 2002</td>
</tr>
<tr>
<td>explicitly excluded</td>
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<td>Category</td>
<td>References</td>
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<tr>
<td>No neuropsychological tasks/measures</td>
<td>Abikoff &amp; Gittelman, 1985; Loo et al., 1999; Pelham et al., 1989; Rapport &amp; DuPaul, 1986; Vickers et al., 2002</td>
</tr>
<tr>
<td>Use of other stimulants/medications or no separate results for methylphenidate</td>
<td>Barnett et al., 2005; Cairney et al., 2001; Caplan et al., 1996; Chelonis et al., 2002; Garfinkel et al., 1986; Hirayama et al., 2004; Kempton et al., 1999; Lopez et al., 2004; Sallee et al., 1992; Semrud-Clikeman et al., 2008; Vance et al., 2003</td>
</tr>
<tr>
<td>Met inclusion criteria but did not have data on memory, reaction times or response inhibition</td>
<td>Baldwin et al., 2004*; Barkley et al., 1997; Douglas et al., 1995; Gan et al., 1982; Hazel-Fernandez et al., 2006; Kopecky et al., 2005; Lajoie et al., 2005; Milich et al., 1991; Pelham et al., 1986; Rapport et al., 1989; Rapport et al., 1995; Rubia et al., 2003*; Rubia et al., 2009; Solanto &amp; Wender, 1989; Tannock &amp; Schachar, 1992; Tannock et al., 2000; Vyse et al., 1989; Winsberg et al., 1982</td>
</tr>
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</table>

* These studies focused on timing tasks and whilst both included a measure of reaction time and reaction time variability we concluded what they were measuring was somewhat different from reaction time in the usual sense and certainly different from the way reaction time was interpreted in the other studies and that they should therefore not be included in these domains.
Table S2: Studies meeting all inclusion criteria but not able to be included in the meta-analysis (this table is domain specific, some studies listed here are included in the meta-analyses for other domains).

<table>
<thead>
<tr>
<th>Reference</th>
<th>Neuropsychological Tasks Used</th>
<th>Sample Size</th>
<th>Medication Regimen</th>
<th>Authors’ Overall Conclusions</th>
<th>Reason for Non-Inclusion in Meta-Analysis</th>
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</thead>
<tbody>
<tr>
<td><strong>Executive and Non-Executive Memory</strong></td>
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</tbody>
</table>
| Bental *et al.*, 2008 | Matching Familiar Figures Task  
Porteus Maze  
Wisconsin Card Sorting Test  
Listening Sentence Span Test  
Listening Number Span Test  
Animal and Food Retrieval Tests | 25          | A single dose of methylphenidate (0.3 to 0.4 mg/kg) and placebo | MPH selectively improved strategy/set shift and facilitated improved rapid naming and word/non-word accuracy. | Inadequate data presented                  |
| Tannock *et al.*, 1995b | Serial addition task  
Working memory (CHIPASAT) | 40          | 4 conditions: placebo, methylphenidate 0.3 mg/kg, methylphenidate 0.6 mg/kg, methylphenidate 0.9 mg/kg | MPH improved WM in non-anxious group but not in anxious group. MPH reduced activity level in both groups. | Inadequate data presented                  |
| **Reaction Time and Reaction Time Variability** |                                                                                                |             |                                                                                     |                                                                                             |                                          |
| Berman *et al.*, 1999 | Tracing task  
Paired Associates Learning  
Complex visual-memory search task  
Arithmetic task | 17          | Acute dosage methylphenidate trial: placebo and 3 different doses of MPH (0.3, 0.6, and 0.9 mg/kg) | Effects of MPH varied with information load. On low-processing loads, all doses of MPH improve accuracy with no cost to reaction time. On high loads, higher MPH doses improved error rates while slowing reaction time. MPH improves self-regulatory ability, enabling | No available SD for reaction time            |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Neuropsychological Tasks Used</th>
<th>Sample Size</th>
<th>Medication Regimen</th>
<th>Authors’ Overall Conclusions</th>
<th>Reason for Non-Inclusion in Meta-Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Castellanos et al., 2005</td>
<td>Eriksen Flanker (this study was a secondary analysis of the Scheres et al. 2003, 2004 data)</td>
<td>24</td>
<td>Up to 5 conditions (baseline $n = 22$, double-blind crossover placebo $n = 23$), and low (5 mg, $n = 24$), medium (10 mg, $n = 24$), and high (15 mg [20 mg if weight = 25 kg], $n = 23$) doses of immediate-release MPH</td>
<td>The oscillations in RT were suppressed by MPH.</td>
<td>No available RT results in msec</td>
</tr>
</tbody>
</table>
| Douglas et al., 1986            | Arithmetic self-correction task  
Spelling study task  
Word discovery task  
Paired associate learning task  
Delayed reaction time task | 16          | Methylphenidate 0.3 mg/kg twice daily                                              | MPH induced improvements on a majority of the measures. Changes reflected increased output, accuracy and efficiency and improved learning acquisition. There was also evidence of increased effort and self-correcting behaviors. | No available separate RT measures        |
| Fitzpatrick et al., 1992        | Continuous Performance Task  
Paired Associates Learning                                 | 19          | 4 pharmacological conditions: sustained-release methylphenidate; standard methylphenidate; combination of both and placebo | MPH conditions were superior to placebo and comparable to one another. Findings suggest comparable effectiveness for sustained release and standard preparations of MPH. | No available RT results in msec          |
| Hanisch et al., 2004            | Various attention tasks from Amsterdam Neuropsychological test battery                           | 45          | Comparison of 2 age groups on and off medication  
Methylphenidate mean dose | Positive MPH effects on sustained attention in both age groups.                            | No available RT results in msec                                                          |
<table>
<thead>
<tr>
<th>Reference</th>
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<th>Medication Regimen</th>
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<tbody>
<tr>
<td>Johnson et al., 2008</td>
<td>Fixed sequence sustained attention to response task</td>
<td>31</td>
<td>Various methylphenidate based preparations (Ritalin; Concerta or Ritalin LA). Dose variable between participants from 0.18 to 0.82 mg/kg/day (mean 0.51 ± 0.20)</td>
<td>MPH reduced and normalized levels of commission errors and fast, moment-to-moment variability in RT. MPH did not affect the rate of omission errors, standard deviation of RT or slow frequency variability in RT. Specific effect on those components that reflect sustained attention and top–down control rather than arousal.</td>
<td>No available RT results in msec</td>
</tr>
<tr>
<td>Lawrence et al., 2005</td>
<td>Continuous Performance Task</td>
<td>18</td>
<td>ADHD children medicated with their prescribed dose of methylphenidate after 1st session.</td>
<td>MPH ameliorated some of the dysfunctions in ADHD children, reflected in behavioral and ERP measures.</td>
<td>Inadequate data presented for RT analysis</td>
</tr>
<tr>
<td>Mehta et al., 2004</td>
<td>CANTAB Pattern and Spatial Recognition memory</td>
<td>47</td>
<td>Single dose methylphenidate (0.5 mg/kg) and placebo</td>
<td>MPH improved spatial WM, attentional set shifting and visual search task performance.</td>
<td>Inadequate data presented for RT analysis</td>
</tr>
<tr>
<td>Ridderinkhof et al., 2005</td>
<td>Eriksen Flanker task</td>
<td>20</td>
<td>4 treatment conditions: placebo, 5, 10 or 20 mg</td>
<td>Response inhibition deficit was eliminated by MPH treatment, but these effects were highly dose specific.</td>
<td>RT measures in msec are only displayed graphically and</td>
</tr>
<tr>
<td>Reference</td>
<td>Neuropsychological Tasks Used</td>
<td>Sample Size</td>
<td>Medication Regimen</td>
<td>Authors’ Overall Conclusions</td>
<td>Reason for Non-Inclusion in Meta-Analysis</td>
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<tr>
<td>Scheres et al., 2006</td>
<td>Stop Signal Task</td>
<td>20</td>
<td>Baseline and best medication condition (3 optimal dose groups)</td>
<td>The slower SSRTs were, the less children benefited from MPH. Moreover, children with longer SSRTs needed higher doses of MPH for optimal symptom relief than children with shorter SSRTs.</td>
<td>No available RT results in msec</td>
</tr>
<tr>
<td>Shafritz et al., 2004</td>
<td>Selective attention task</td>
<td>19</td>
<td>4 conditions: 15, 20 or 25 mg of methylphenidate and placebo</td>
<td>MPH may act to normalize activity in attentional networks. MPH resulted in increased activation in the left ventral basal ganglia but had no effect on task performance.</td>
<td>No separate results presented for MPH and placebo</td>
</tr>
<tr>
<td>Spencer et al., 2009</td>
<td>Letter discrimination task</td>
<td>49</td>
<td>3 conditions: placebo, low (mean dose 39.24) and high (mean dose 73.44 mg) doses of long-acting MPH (18 to 90 mg)</td>
<td>MPH significantly reduced the peak and skew of RT distributions.</td>
<td>RT measures in msec are only displayed graphically and not in the text</td>
</tr>
<tr>
<td>Sunohara et al., 1997</td>
<td>Paired Associates Learning</td>
<td>26</td>
<td>Responders: mean best dose 0.21 mg/kg Non-responders: mean higher dose 0.33 mg/kg, mean lower 0.17 mg/kg</td>
<td>On MPH: - Non-responders had significantly longer P3 latencies than responders - Differential performance on PAL between responders and non-responders</td>
<td>RT measures for ADHD group are provided separately for responders and non-responders</td>
</tr>
<tr>
<td>Tannock et al., 1995a</td>
<td>Modified Stop-Signal task</td>
<td>28</td>
<td>4 conditions: methylphenidate 0.3, 0.6 and 0.9 mg/kg and</td>
<td>MPH enhanced cognitive flexibility although the</td>
<td>No specific results for RT</td>
</tr>
<tr>
<td>Reference</td>
<td>Neuropsychological Tasks Used</td>
<td>Sample Size</td>
<td>Medication Regimen</td>
<td>Authors’ Overall Conclusions</td>
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<tr>
<td>Coghill et al.</td>
<td></td>
<td></td>
<td>placebo</td>
<td>high dose was less effective than lower doses in enhancing response inhibition.</td>
<td></td>
</tr>
<tr>
<td>Taylor et al., 1993</td>
<td>Visual feature detection task (oddball paradigm)</td>
<td>32</td>
<td>Mean low dosage 0.2 mg/kg (range 0.1-0.3 mg/kg) Mean higher dosage 0.4 mg/kg (range 0.2-0.7 mg/kg)</td>
<td>MPH normalized the baseline latency differences between the ADHD group and controls. No significant distributional effects either between groups, or with the ADHD children as a function of medication; No significant differences in reaction time measures.</td>
<td>No available RT results in msec</td>
</tr>
<tr>
<td>Teicher et al., 2003</td>
<td>Continuous Performance Task with infrared motion analysis</td>
<td>Study 1 - 14</td>
<td>4 conditions: methylphenidate 0.25, 0.4 and 0.75 mg/kg and placebo</td>
<td>Higher doses of MPH altered activity and attentiveness in a rate-dependent manner. “These findings illustrate a clear inverse association between symptom severity and degree of therapeutic response.”</td>
<td>No available RT results in msec</td>
</tr>
<tr>
<td>van der Mj et al., 1999</td>
<td>Go-No/Go task</td>
<td>53</td>
<td>Randomly assigned without replacement to placebo, MPH or clonidine</td>
<td>No difference in task performance between groups treated with placebo, MPH and clonidine.</td>
<td>No available RT results in msec</td>
</tr>
<tr>
<td>Verbaten et al., 1994</td>
<td>Continuous Performance Task</td>
<td>12</td>
<td>MPH (10 mg) or placebo</td>
<td>MPH resulted in an increase of the parietal P3, both to targets and non-targets.</td>
<td>No available SD of RT measures</td>
</tr>
<tr>
<td>Reference</td>
<td>Neuropsychological Tasks Used</td>
<td>Sample Size</td>
<td>Medication Regimen</td>
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<tr>
<td>Response Inhibition</td>
<td>targets, as well as a significant increase in percentage of hits.</td>
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<tr>
<td>Ashare et al., 2010</td>
<td>Bilateral startle eye blink&lt;br&gt;Tone discrimination task</td>
<td>36</td>
<td>3 treatment conditions: 2 different doses of methylphenidate (0.9 and 1.8 mg/kg/day) and placebo</td>
<td>MPH enhanced prepulse inhibition during attended, but not during ignored stimuli.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Bental et al., 2008</td>
<td>Matching Familiar Figures Task&lt;br&gt;Porteus Maze&lt;br&gt;Wisconsin Card Sorting Test&lt;br&gt;Listening Sentence Span Test&lt;br&gt;Listening Number Span Test&lt;br&gt;Animal and Food Retrieval Tests</td>
<td>25</td>
<td>A single dose of methylphenidate (0.3 to 0.4 mg/kg) and placebo</td>
<td>MPH selectively improved strategy/set shift and facilitated improved rapid naming and word/non-word accuracy.</td>
<td>No separate data for the two groups</td>
</tr>
<tr>
<td>Broyd et al., 2005</td>
<td>Auditory cued Go/Nogo task</td>
<td>18</td>
<td>A single dose of methylphenidate (mean dose of 28 mg)</td>
<td>MPH ameliorates deficits in response inhibition.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Loo et al., 2003</td>
<td>Continuous Performance Task</td>
<td>27</td>
<td>A single dose of methylphenidate (10 mg) and placebo</td>
<td>DAT1 polymorphism mediates medication-related changes in cortical activity among children with ADHD. DAT1 allele status was associated with performance on a sustained attention task and medication-related EEG changes.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Loo et al., 2004</td>
<td>Continuous Performance Task</td>
<td>36</td>
<td>A single dose of methylphenidate (10 mg) and placebo</td>
<td>MPH increases beta activity in children with Inadequate data presented</td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td>Neuropsychological Tasks Used</td>
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<tr>
<td>Rapport et al., 1993</td>
<td>Continuous Performance Task</td>
<td>16</td>
<td>5 treatment conditions: 3 different doses of methylphenidate (10, 15 or 20 mg, twice a day), desipramine (DMI) and placebo</td>
<td>MPH improves vigilance, short term memory, visual problem solving.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Ridderinkhof et al., 2005</td>
<td>Eriksen Flanker task</td>
<td>20</td>
<td>4 treatment conditions: 3 different doses of methylphenidate (5, 10 or 20 mg) and placebo</td>
<td>Response inhibition deficit was eliminated by MPH treatment, but these effects were highly dose specific.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Scheres et al., 2006</td>
<td>Stop Signal Task</td>
<td>20</td>
<td>4 treatment conditions: 3 different doses of methylphenidate (5, 10 and 20 mg) and placebo, twice daily, each administered for a week</td>
<td>Children with faster SSRTs at baseline improved more during the optimal MPH dose than children with relatively slow SSRTs.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Seifert et al., 2003</td>
<td>modified Continuous Performance Task</td>
<td>17</td>
<td>A single dose of methylphenidate (10 mg)</td>
<td>MPH exerts a highly potent effect on stimulus recognition and resulting consequences.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Smithee et al., 1998</td>
<td>Choice reaction time task</td>
<td>26</td>
<td>Mean dose of methylphenidate of 0.78 mg/kg/day (divided in</td>
<td>MPH increases accuracy and speed in younger</td>
<td>Standard deviations not</td>
</tr>
<tr>
<td>Reference</td>
<td>Neuropsychological Tasks Used</td>
<td>Sample Size</td>
<td>Medication Regimen</td>
<td>Authors’ Overall Conclusions</td>
<td>Reason for Non-Inclusion in Meta-Analysis</td>
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<td>Coghill et al.</td>
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<td>3 administrations) and placebo</td>
<td>children and curtailed variability of reaction time in all children.</td>
<td>available</td>
</tr>
<tr>
<td>Vaidya et al., 1998</td>
<td>Go/NoGo task</td>
<td>10</td>
<td>A single dose of methylphenidate</td>
<td>MPH improved response inhibition in both groups on stimulus controlled task and only in ADHD children on the response controlled task.</td>
<td>Inadequate data presented</td>
</tr>
<tr>
<td>Van der Mjet et al., 1999</td>
<td>Go/NoGo task</td>
<td>53</td>
<td>3 treatment conditions: methylphenidate (0.3 mg/kg, twice daily), clonidine and placebo</td>
<td>Task performance improved in all 3 groups, with no difference between groups treated with placebo, MPH and clonidine.</td>
<td>Inadequate data presented</td>
</tr>
</tbody>
</table>

ADHD, attention-deficit/hyperactivity disorder; CANTAB, Cambridge Neuropsychological Test Automated Battery; CHIPASAT, Children's Paced Auditory Serial Addition Task; CPT, Continuous Performance Task; EEG, electroencephalogram; ERP, event-related potential; MPH, methylphenidate; PAL, Paired Associates Learning; RT, reaction time; SSRT, stop signal reaction time; WM, working memory.
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