

成人ADHD患者的执行功能缺陷研究综述

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摘要

注意缺陷/多动障碍(ADHD)是一种以多动、注意力不集中和冲动为特征的新发育障碍,如果在儿童期不加以干预治疗,则会一直影响到成年期。从临床角度来看,患有ADHD的成年人表现出执行功能缺陷。本文总结了现有经常被使用的被用来分析执行功能的研究方法,分析考察了直至目前国内外对成人ADHD患者的执行功能缺陷的研究现状,未来的研究可能会着力于从其他角度对成人ADHD患者的执行功能缺陷展开探究。

关键词

ADHD, 执行功能, 工作记忆

A Review of Executive Function Deficits in Adults with ADHD

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Abstract

Attention-deficit/hyperactivity disorder (ADHD) is a new developmental disorder characterized by hyperactivity, inattention, and impulsivity that can persist into adulthood if not treated with intervention in childhood. From a clinical perspective, adults with ADHD exhibit deficits in executive functioning. This article summarizes existing research methods that have been frequently used to analyze executive functioning, analyzes and examines the current state of national and international research on executive functioning deficits in adults with ADHD up to the present time, and suggests that future research may focus on other perspectives on executive functioning deficits in adults with ADHD.

Keywords

ADHD, Executive Function, Working Memory

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1. 注意力缺陷/多动障碍

注意缺陷/多动障碍(ADHD)是一种以多动、注意力不集中和冲动为特征的新发育障碍,影响了近 5% 的儿童和 2.5% 的成人(Pallanti & Salerno, 2020)。根据 Barkley (2013)的说法, ADHD 可能代表了典型人类特征的一种极端形式,而不是大多数情况下的病理障碍。有研究认为,有症状的成人 ADHD 患病率约为 6.76% (Song et al., 2021)。ADHD 患者如果在儿童期不加以干预治疗,则会一直影响到成年期。成年后的多动症与学业失败、心理障碍、人际关系冲突、意外事故和就业困难有关(Antshel & Barkley, 2009; Barkley, et al., 2008)。有研究显示,患有多动症的大学生在留校查看期间不仅平均绩点较低,而且与其他大学生相比,他们的学业问题更多(Frazier et al., 2007; Heiligenstein et al., 1999)。研究表明,成年期多动症的症状可能对就业造成困难(Dige & Wik, 2005; Hervey et al., 2004; Seidman et al., 1998; Woods et al., 2002)。因此,对于成年期的 ADHD 患者,提供适当的干预和治疗非常重要。执行功能(EF)的神经心理功能缺陷是导致 ADHD 的原因之一(Barkley, 2011; Brown, 2006)。从临床角度来看,患有 ADHD 的成年人表现出的症状超出了 DSM-5 所描述的注意力分散和多动冲动以及混合型的症状,表现出执行功能缺陷(Adler et al., 2019; Goodman et al., 2011)。执行功能缺陷(executive functions disorders, EFDs)包括认知领域,如反应抑制、非语言工作记忆、语言工作记忆、情绪和动机自我调节、计划制定和解决问题。

2. 执行功能概述

执行功能(executive functions, EFs),也称执行控制或认知控制,指对各种认知过程进行一系列自上而下的心理调节的高级认知功能(李红等, 2004)。执行功能被认为有三个核心成分,包括抑制(自我控制和干扰控制)、工作记忆、认知灵活性(Lehto et al., 2003; Zelazo et al., 1997)。Pennington 和 Ozonoff (1996)提出执行功能有五个方面:流畅性(在提示下快速生成单词),计划(确定解决问题所需的步骤),工作记忆(在解决问题时记住信息的能力),抑制(控制自己反应的能力)和转移(从一件事转移到另一件事的能力)。在这些执行功能中,反应抑制困难被认为会导致工作记忆、记忆、计划和流畅性方面的问题(Barkley, 1997; Dige & Wik, 2005; Stavro et al., 2007; Woods et al., 2002),但在认知能力方面没有(Rashid et al., 2001)。“执行功能”是一个总括性术语,涵盖了几个领域,可以大致分为“热”执行和“冷”执行(Yang et al., 2011)。“热”执行,包括处理情绪和社会行为,由于缺乏研究执行控制的情绪/社会行为的不同亚型的框架。“冷”执行,它不直接涉及情绪处理,它包括各种相关但可区分的领域,可以在同一实验环境中单独研究(Borges et al., 2013; Ginani et al., 2011; Vaz et al., 2011)。

3. 常见成人 ADHD 患者的执行功能的研究方法

3.1. 实验范式

停止信号任务(stop-signal task, SST; Verbruggen & Logan, 2008),在该任务中,被试被要求在一个“go”

信号后做出强制选择反应，例如，一个指向左边或右边的箭头，并分别按下左边或右边的按钮。至关重要是，在一小部分试验中，在启动信号之后会出现听觉或视觉上的“stop”信号，实验保留被试行为反应。

可控口语单词联想(controlled oral word association, COWAT; Spreen & Benton, 1977)，是一项测试语言流畅性的测试。它评估在指定的时间间隔内产生以特定字母开头的不同单词的能力。

连续作业测验(CPT; Conners, 1995)，这项任务要求参与者在电脑屏幕上看到除了字母 X 外的任意字母时尽快按下空格键并记录反应。

韦氏成人智力量表(WAIS-R; Wechsler, 1981)，在子测试 DS 中，参与者被要求重复一系列由实验者大声朗读的数字。在 DS-FW 中，被试必须按照阅读的顺序重复该系列。在 DS-BW 中，序列必须向后重复，这种操作需要工作记忆。

Stroop 色词干扰测试(stroop color word Test; Stroop, 1992)，在这项任务中向被试展示三张不同的卡片，前两张卡片需要读颜色名称(W 牌)和命名颜色(C 牌)。第三张牌(颜色字: CW)是实际的干扰牌，它由颜色名称组成，颜色名称要么用指定的颜色(红色用红墨水印刷)，要么用不同的颜色(红色用绿墨水印刷)。要求被试说出墨水的颜色，而不是颜色的名称。通常选择 CW 牌上正确命名的颜色的数量来表示干扰。

路径测试(TMT; Reitan & Wolfson, 1985)，该任务要求被试连接一系列的圆圈。在 A 部分(TMT-A)中，圆圈包含数字(1-25)，被试要按照计数顺序将它们连接起来，这部分需要串行信息处理、视觉扫描和电机速度。B 部分(TMT-B)有数字圈和字母圈。指示是通过数字和字母交替连接圆圈(即 1-A-2-B 等)，TMT-B 是对工作记忆和干扰控制(抑制)的测量。

威斯康星卡片分类任务(Wisconsin Card Sorting Task, WCST; Kongs et al., 2000)被用来测量认知灵活性。被试需要将一副牌分成不同的类别，而没有提供关于分类规则的明确指示。可能的分类是基于卡片表面的形状、颜色或项目数量。卡片一直留在屏幕上，直到它们被分类。被试通过完成最大数量的测试(包括 2 副 64 张牌，总共 128 张牌)或成功完成 6 个方块的 10 次正确的颜色、形状或数字测试，达到任务的结束。

3.2. 问卷测量

执行功能行为评定量表(BRIEF; Gioia et al., 2000)，该量表包含 86 个项目，这些项目将问题行为分为 (1) 从未发生，(2) 有时发生，或(3) 过去一个月经常发生。用于评估执行功能能力的独特方面，包括抑制、转移和情绪控制量表，它们共同构成行为调节指数，以及启动、工作记忆、计划/组织、材料组织和监测量表，它们共同构成元认知指数。

执行障碍问卷(DEX; Burgess et al., 1996)，该量表包含 20 个项目，旨在筛选获得性脑损伤后可观察到的执行功能障碍日常表现的变化。它涵盖了广泛的具体问题，包括注意力、记忆、信息处理、行为控制、情绪调节和意识方面的困难。项目按 5 分(0~4)李克特量表进行评分，被试得分越高表示执行功能缺陷越严重(从“从不”到“经常”)。

4. 成人 ADHD 患者的执行功能的研究进展

人们提出了许多理论模型来解释 ADHD 背后的神经认知机制。Pennington 和 Ozonoff (1996)是最早为 ADHD 的病因设计理论模型的人之一，他们假设在 ADHD 患者身上观察到的注意力问题和冲动行为是由于执行功能的缺陷引起的。他们观察到，多动症的一些症状与额叶病变患者的症状相似，尤其是在前额皮质，并假设前额皮质功能下降导致多动症患者的执行功能缺陷。这一假设为后来的理论模型奠定了基础。Barkley 的行为抑制模型(BBM; Barkley, 1997)是研究 ADHD 症状的最全面的方法之一，其中行为抑

制起主要作用。由于工作记忆在解释 ADHD 症状中的重要作用, Barkley (2019)近几年更新了他的模型,将工作记忆从一个中介变量提升到一个与行为抑制并列的主要位置,并将他的新模型命名为新版 Barkley 执行功能模型(BUEFM)。关于 ADHD 的神经认知方面的实验和相关发现表明,工作记忆是 ADHD 症状的关键和主要机制(Alderson et al., 2010; Groves et al., 2020; Kofler et al., 2008; Lee, 2005; Rapport et al., 2001; Tarle, 2015)。钱英等(2011)人证明了这一点,他们使用了一系列包括测验对成人 ADHD 患者的工作记忆、抑制、转换、计划和流畅性等方面进行评估,结果表示成人 ADHD 患者仅在工作记忆方面存在缺陷,其他方面无明显差异。

除工作记忆外,成人 ADHD 患者在许多特定的电磁场过程中表现出明显的缺陷(Adler et al., 2017; Barkley, 1997; Biederman et al., 2006; Brown, 2006; Barkley & Murphy, 2010; Barkley, 2011),神经影像学研究也证实了这一点,这些研究支持成人 ADHD 与执行功能障碍之间的关系(Abramov et al., 2019; Cortese et al., 2012; van Ewijk et al., 2015)。此外, Silverstein 等人(2020)得出结论, ADHD 症状与一般执行功能问题密切相关并具有预测性。Woods 等人(2002)讨论了将执行功能测量方法用于成人 ADHD 样本的研究,他们的结论是,与正常对照组相比,患有多动症的成年人在注意力和执行功能、听觉-语言学习和复杂信息处理速度等方面表现出细微的缺陷,他们进一步得出结论:区分 ADHD 成人与健康对照组的最显著和最可靠的措施是一系列 Stroop 任务、口头字母流畅性、听觉-口头学习和持续作业测试。潘美蓉等(2017)人采用了横断研究,对符合标准的 ADHD 成人患者以及健康对照组进行比较分析,探讨成人 ADHD 患者的执行功能特点及其与 ADHD 症状之间的相关性,结果发现成人 ADHD 患者存在不同维度的执行功能缺陷,并且这些缺陷都与 ADHD 的核心症状相关。

也有研究发现 ADHD 的成人患者的执行功能缺陷程度可能会受到各种条件变量的影响。Milioni 等(2016)人发现 IQ 更高的 ADHD 成人患者可以通过智商来弥补在执行功能上的缺陷,从而影响对于这部分人群临床上的诊断。Halleland 等(2015)人的研究结果也发现,除了智商因素,存在执行功能缺陷的 ADHD 亚组在儿童时期的阅读和写作能力方面的问题更多,自我报告的 ADHD 症状也比正常组多。

5. 总结

执行功能始终是一个还需要不断探索的认知领域,研究结果不仅对 ADHD 相关研究有着理论意义,还对其他方面有着重要实践意义。ADHD 虽然是儿童时期常见的一种发育障碍,研究儿童 ADHD 的学者也更多,但是 ADHD 对成人的影响也受到了不少人的关注。本文展示了如何实现建立一个全面的认知概况来定义 ADHD 是一种包括所有注意力缺陷的疾病模式(注意力缺陷、冲动行为和无关刺激干扰、分散注意力),执行功能的流畅性、计划、工作记忆、抑制和转移。有助于未来对成人 ADHD 的研究发展,但现有国内外文献仍未对执行功能有一致性的研究,对 ADHD 患者的损伤可以通过不同的执行功能和与疾病相关的其他症状来预测,为了改善临床实践,应考虑各方面的结果。因此更多有关 ADHD 的执行功能方面的缺陷,还需要不断地探索和思考。

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