How Substance Users With ADHD Perceive the Relationship Between Substance Use and Emotional Functioning

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Abstract

Objective: Although substance use (SU) is elevated in ADHD and both are associated with disrupted emotional functioning, little is known about how emotions and SU interact in ADHD. We used a mixed qualitative–quantitative approach to explore this relationship. Method: Narrative comments were coded for 67 persistent (50 ADHD, 17 local normative comparison group [LNCG]) and 25 desistent (20 ADHD, 5 LNCG) substance users from the Multimodal Treatment Study of Children with ADHD (MTA) adult follow-up (21.7-26.7 years-old). Results: SU persisters perceived SU positively affects emotional states and positive emotional effects outweigh negative effects. No ADHD group effects emerged. Qualitative analysis identified perceptions that cannabis enhanced positive mood for ADHD and LNCG SU persisters, and improved negative mood and ADHD for ADHD SU persisters. Conclusion: Perceptions about SU broadly and mood do not differentiate ADHD and non-ADHD SU persisters. However, perceptions that cannabis is therapeutic may inform ADHD-related risk for cannabis use. (J. of Att. Dis. 2018; 22(9S) 49S-60S)

Keywords

substance use, qualitative research, MTA study, ADHD

Introduction

ADHD is a childhood-onset condition that often persists with many adverse outcomes (Barkley, Murphy, & Fischer, 2008), including substance use (SU) and substance use disorders (SUDs; Dunne, Hearn, Rose, & Latimer, 2014; Kessler et al., 2006; Molina & Pelham, 2014; van Emmerik-van Oortmerssen et al., 2012). In a meta-analysis of studies that prospectively followed children with and without ADHD into adolescence or adulthood, childhood ADHD predicted nicotine, alcohol, cannabis, and cocaine SUDs (Lee, Humphreys, Flory, Liu, & Glass, 2011). Assessing malleable behavioral mechanisms underlying this association may inform treatment and prevention efforts. Here we examine the role of emotional functioning in the context of SU and childhood ADHD by adopting a mixed qualitative–quantitative approach to identify novel directions for future research and intervention.

Disrupted emotional functioning is associated with both ADHD and SU. In ADHD, emotion dysregulation is argued to be either a core (Barkley, 2010) or associated component (Martel, 2009). Features of emotion dysregulation (e.g., quickness to anger) are predictive of negative functional outcomes over and above core ADHD symptoms (Barkley & Fischer, 2010; Barkley & Murphy, 2010) and are not fully accounted for by psychiatric comorbidity (Surman et al., 2011). Regarding SU, negative reinforcement models propose that a primary motive among regular users is to escape or avoid negative affect that occurs during periods of non-use.
Perceptions also play an important role in SU (Del Boca, Darkes, Goldman, & Smith, 2002; Goldman, 2002). For example, in a longitudinal study of students in Grades 7 to 11, expected liking of a substance was predictive of SU initiation and escalation (Fulton, Kruskal, & Stewart, 2012). In another prospective study of young adults with alcohol-dependent fathers, alcohol expectations mediated the relationship between externalizing symptoms and alcohol use (Schuckit & Smith, 2006), indicating that SU perceptions are an important factor in maladaptive use in at-risk samples. However, despite being at-risk for various SU outcomes, individuals with ADHD endorse lower levels of expectancies about the effects of different forms of SU (Harty, Pederson, Gnagy, Pelham, & Molina, 2015; Pedersen, Harty, Pelham, Gnagy, & Molina, 2014), suggesting that ADHD may be associated with decreased awareness of subjective effects of SU using traditional rating scales (Harty et al., 2015). To best capture such complex perceptions of SU and emotions in those with ADHD, qualitative methodology may have utility. Quantitative scales typically have a narrow, pre-determined focus, whereas a qualitative approach may provide a more inclusive examination of emotional experience using participants’ own explanations, experiences, and terminology.

In short, little is known about perceptions regarding emotional functioning and SU in youth with ADHD, and exploratory work may have important implications. We therefore examine young adults’ narrative comments using mixed quantitative–qualitative analyses in a subsample of persistent and desistent substance users from the Multimodal Treatment Study of Children with ADHD (MTA; MTA Cooperative Group, 1999). Given that this is a well-characterized sample with and without ADHD who have been assessed for SU over time and were recruited across multiple sites, the MTA is a particularly rich sample to address the overarching goal of this study: to better understand the perceived role of emotional functioning in the context of SU in youth with a history of ADHD. To allow for variation in SU experience, we examined both SU persistence and desistence. In this exploratory investigation, we first assessed group differences (i.e., childhood ADHD/non-ADHD and SU persistence/desistence) regarding emotional functioning and SU via group comparisons of coded excerpts from qualitative interviews. Second, we performed substance-specific qualitative analyses to determine whether specific classes of substances yielded unique perceived emotion–substance relations.

Method

Participants

Participants were drawn from the 183 young adults who participated in the qualitative interview substudy of the MTA (detailed in Weisner et al., of this special section). In brief, recruitment aimed to oversample participants with an ADHD history as well as participants with persistent SU into early adulthood from four of the original seven MTA sites. For the current study, 92 young adults (n = 70 ADHD, n = 22 LNCG) were selected based on qualitatively confirmed persistent and desistent SU (see Jensen et al., of this special section). ADHD and LNCG groups did not significantly differ in age, sex, race, SU persistence, mood or anxiety disorders in the past year according to a semi-structured diagnostic interview conducted with young adults (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000), or site source (Table 1). Young adults in the ADHD group originally received a diagnosis of ADHD, Combined Type at study entry when they were 7.0 to 9.9 years old using procedures detailed by the MTA Cooperative Group (1999). Diagnostic and recruitment information on later assessments is available in Molina et al. (2013).

Procedures

Qualitative study recruitment. Participant recruitment and interviews occurred closest in time to MTA participants’ regularly scheduled 14- or 16-year follow-up assessments, with the intention of oversampling participants with an ADHD history and participants with persistent SU through adolescence into early adulthood.

Qualitative interviews. A qualitative interviewing approach identified as the Eco-Cultural Family Interview and described in detail by Weisner et al. was conducted. This
format features an approximately 2-hr guided conversation with interviewer prompts to discuss certain topics. Examples of interviewer prompts (if the information did not spontaneously emerge) included:

- What are current stressors affecting you these days?
- What makes you similar or different emotionally from other young adults?
- When you first tried (insert substance), how did you feel?
- What substance do/did you like the best?
- What are some of the negative aspects of (insert substance)?
- Did your emotions affect your substance use?
- Did your substance use affect you emotionally?

**Qualitative interview coding and reliability.** As described in Weisner et al., interviews were digitally recorded, transcribed, and entered into a web-based research and analysis database system that allows integration of qualitative and quantitative data (Dedoose.com; Lieber & Weisner, 2010). The following topics were identified by raters of the interview transcripts:

- Topic 1: Emotional states precipitate SU
- Topic 2: SU positively affects emotional states
- Topic 3: SU negatively affects emotional states

When a topic was identified, it was coded on a 0 to 8 ordinal scale reflecting the degree of perceived association between emotion and SU for that particular topic: none (0), mild (1-2), moderate (3-5), substantial (6-8). Raters were blind to the scores of other raters and to the sites from which the excerpts were drawn. Kappa coefficients were >.70 between raters when determining whether a topic should be coded. Intra-class correlations indicated excellent consistency (ICC = .90) between raters when applying scores on the 0 to 8 scale.

The distribution of scores are reported by topic for descriptive purposes in Figure 1. The following percent of individual mean scores were in the moderate or substantial range (i.e., mean scores ≥ 3.0) for SU persisters and desist-ers, respectively: 88% and 67% (Topic 1), 76% and 21% (Topic 2), and 54% and 50% (Topic 3). An additional variable, a difference score of two topics, assessed the relative balance of positive and negative perceptions of SU and was created by subtracting the average score on a scale of 0 to 8 for each young adult for Topic 2 from Topic 3.

**Data Analysis**

Two-way between-groups analyses of variance (ANOVA) were conducted across all four variables to evaluate main effects for ADHD/LNCG group and SU persister/desister group, and their interaction. Given the small sample size of
some subgroups (i.e., n = 5 for those in the LNCG/SU desister group), interactions were underpowered and effect sizes (Cohen’s $d$) are emphasized (Cohen, 1988), consistent with our exploratory aims. We then examined substance-specific themes. The prevalence of endorsements of these themes was calculated across groups and subjected to chi-square analysis.

**Results**

**Quantitative Analysis of Emotion and SU Topics**

Across the four variable (three topics, one difference score), two main effects for SU persister/desister status emerged (Table 2) such that SU persisters scored higher than SU desisters on Topic 2 (the perception that SU positively affects emotional status; $p < .001$) and the difference score (the relative balance of positive from negative perceptions of SU; $p = .04$). Examination of effect sizes for both variables revealed large effects for ADHD/SU persisters in comparison with SU desisters with or without ADHD ($d$s = 0.85-2.83). Effect sizes for LNCG/SU persisters in comparison with both SU desister groups were also large for Topic 2 ($d$s = 0.97-1.68). Main effects and interactions were not significant for any other variable.

**Qualitative Analysis of Emotion and SU Topics**

Because the most robust difference between SU persisters and desisters emerged for Topic 2, we conducted an exploratory qualitative analysis of participant narratives for this topic at a substance-specific level. The majority of interview excerpts for that topic ($n = 423$ across participants) involved cannabis (49%), alcohol (29%), or cigarettes (14%). Overall, 82% of excerpts involved at least one of these substances for Topic 2. We limited qualitative analyses to these three substances. Two themes emerged.

**Qualitative Theme 1:** There is a perceived positive impact of cannabis on emotional functioning in persistent substance users via improvement in positive mood or reduction in negative mood—reduction in negative mood appears to be most apparent in ADHD persistent substance users. The frequency of endorsements indicating that cannabis was perceived to enhance positive mood was not equivalent across all four groups ($\chi^2 = 8.10, p = .044$; Table 3). Pairwise comparisons were conducted and excluded the LNCG/SU desister subgroup given its small sample size for this and all other comparisons. These analyses indicated that significantly more ADHD/SU persisters (63%) and LNCG/SU persisters (60%) endorsed this qualitative theme than ADHD/SU desisters (24%; $\chi^2 = 7.77, p = .005$ and $\chi^2 = 4.39, p = .036$, respectively). ADHD and LNCG SU persisters did not differ. Types of positive mood identified by participants included descriptors such as feeling “good” or “relaxed.” To exemplify these narratives, when one ADHD/SU persister participant was asked about the effects of smoking cannabis, he stated,

(I) just relax for a minute, take a break or I don’t know . . . Just the good feeling. (Smoking cannabis) just gives you a good feeling. I don’t know . . . Gives you a nice good “I can do it” feeling.

**Figure 1.** Percent of participants endorsing a moderate/substantial perceived relationship for each topic.

Note. Each topic was scored on a scale from 0 to 8, where 0 to 2 corresponds to no/mild perceived relationship and 3 to 8 corresponds to moderate/substantial perceived relationship. Sample sizes varied because not all participants received a rating for each topic ($n = 41-47$ ADHD/SU persisters, $n = 15-16$ LNCG/SU persisters, $n = 17-20$ ADHD/SU desisters, $n = 4$ LNCG/SU desisters). $SU =$ substance use; LNCG = local normative comparison group.
Table 2. Means (SD) From Emotion and Substance Use Topics as a Function of ADHD/LNCG Group and Substance Use Persistence/Desistence Group.

<table>
<thead>
<tr>
<th>Variables</th>
<th>SU persisters</th>
<th>SU desisters</th>
<th>F values</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 1: Emotional states precipitate SU</td>
<td>ADHD (n = 39-47)</td>
<td>LNCG (n = 15-16)</td>
<td>ADHD (n = 17-20)</td>
<td>LNCG (n = 4)</td>
</tr>
<tr>
<td>Topic 2: SU positively affects emotional states</td>
<td>4.40 (1.45)</td>
<td>4.36 (1.48)</td>
<td>3.85 (1.79)</td>
<td>3.54 (1.40)</td>
</tr>
<tr>
<td>Topic 3: SU negatively affects emotional states</td>
<td>3.96 (1.30)</td>
<td>3.36 (1.72)</td>
<td>1.76 (1.59)</td>
<td>1.28 (0.33)</td>
</tr>
<tr>
<td>Difference of positive from negative perception scores</td>
<td>3.05 (1.71)</td>
<td>3.30 (1.80)</td>
<td>2.76 (2.07)</td>
<td>2.14 (1.59)</td>
</tr>
<tr>
<td>Note</td>
<td>1.02 (2.05)</td>
<td>-0.06 (1.88)</td>
<td>-1.00 (2.68)</td>
<td>-0.86 (1.52)</td>
</tr>
</tbody>
</table>

Notes. Sample sizes varied because not all participants received a rating for each topic. Topics are focused on emotions as an antecedent to SU (i.e., Topic 1) and consequence of SU (i.e., Topics 2 and 3). Topics 1 to 3 were scored on a scale of 0 to 8. The difference score variable is the within participant average of Topic 2 minus the within participant average of Topic 3, which was then averaged across participants. The values listed here do not equal the difference of Topic 2 from Topic 3 for some groups (e.g., for the MTA/SU persister group, 3.96 − 3.05 = 1.02) as some participants did not have scores for both Topics 2 and 3. Those participants who had values for only Topic 2 or 3 were excluded in the calculation of the difference score variable. SU = substance use; LNCG = local normative comparison group.

*p < .05. **p < .001.
Table 3. Frequency Endorsements (%) for Each Qualitative Theme.

<table>
<thead>
<tr>
<th>Qualitative Theme 1</th>
<th>SU persisters</th>
<th>SU desisters</th>
<th>χ²</th>
<th>p</th>
<th>Pairwise contrasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis perceived to enhance positive mood</td>
<td>29 (63%)</td>
<td>9 (60%)</td>
<td>8.10</td>
<td>.044</td>
<td>1.2 &gt; 3</td>
</tr>
<tr>
<td>Cannabis perceived to reduce negative mood</td>
<td>26 (57%)</td>
<td>7 (47%)</td>
<td>8.27</td>
<td>.041</td>
<td>1 &gt; 3</td>
</tr>
<tr>
<td>Alcohol perceived to enhance positive mood</td>
<td>18 (60%)</td>
<td>3 (38%)</td>
<td>3.75</td>
<td>.289</td>
<td></td>
</tr>
<tr>
<td>Alcohol perceived to reduce negative mood</td>
<td>9 (30%)</td>
<td>1 (13%)</td>
<td>1.06</td>
<td>.787</td>
<td></td>
</tr>
<tr>
<td>Cigarettes perceived to enhance positive mood</td>
<td>8 (32%)</td>
<td>2 (50%)</td>
<td>1.31</td>
<td>.728</td>
<td></td>
</tr>
<tr>
<td>Cigarettes perceived to reduce negative mood</td>
<td>17 (68%)</td>
<td>2 (50%)</td>
<td>3.87</td>
<td>.276</td>
<td></td>
</tr>
</tbody>
</table>

Notes. LNCG SU desisters were excluded from pairwise contrasts due to small sample size. SU = substance use; LNCG = local normative comparison group.

Qualitative Theme 2: There is a perceived positive impact of cannabis use on ADHD in ADHD persistent substance users. The frequency of endorsements for this qualitative theme was not equivalent across all four groups (χ² = 14.09, p = .003; Table 3). Pairwise comparisons indicated that significantly more ADHD/SU persisters (50%) endorsed this theme than LNCG/SU persisters (13%) and ADHD/SU desisters (12%; χ² = 6.29, p = .012 and χ² = 7.58, p = .006, respectively). As an example of endorsements for this theme, some ADHD/SU persisters stated that cannabis helped attentional aspects of their ADHD.

But over the years, now that I’ve got older it helps me focus . . . I would rather smoke before I go to class than not cause I pay attention better in class. I will take better notes . . . and . . . ask the teacher more questions if I smoke before I go to class.

Some ADHD/SU persisters reported that cannabis improved their ADHD, but then qualified this with a statement about the emotional impact of cannabis. For example, one participant indicated that smoking cannabis was therapeutic for her ADHD symptoms, but then stated,

It’s like a teddy bear. It’s something that makes me feel better. I’m sure that’s what addicts say all the time. It does. It makes me feel like I’m like, okay, it’s a winder down . . . I’ll go home and have a half of a blunt and probably pass out and watch some TV . . . it’s a relaxation device for me.
Other ADHD/SU persisters referenced improvement in mood as a function of cannabis use and described positive effects on mood that appeared to calm hyperactive-impulsive ADHD symptoms:

I feel like (cannabis) calms me down. Like I said, I do—I do like my personality, I’m not gonna complain about the ADHD. I’m not gonna complain about being on the go all the time. But, like I said, you got to have some downtime.

Moreover, some ADHD participants perceived their ADHD and mood as intermingled: if smoking cannabis improved their ADHD, then it also had a positive impact on their mood (and vice versa). For example, when one participant was asked about his ADHD and then about cannabis use, he stated,

I mean, at times (ADHD) makes me really angry and stuff like that . . . People are supposed to be on the same wavelength as me or something . . . When, they’re not. And, I just get really enraged and I get pissed off . . . Yeah, “What the fuck? Are you doing this shit to fuck with me?” And, they’re not, you know? But, it’s just that’s just my personality, that’s just who I am . . . (To manage this), smoking weed, really, really, really helps like—I can fucking go ape shit and I’ll go fucking smoke a blunt or I’ll smoke a bowl, or I’ll smoke a joint or something, and I’ll just—I’ll chill out.

A similar pattern did not emerge for alcohol or cigarette use.

Discussion

Prospective studies of children diagnosed with ADHD, including the MTA, have demonstrated a relationship with SU and SUDs (Howard et al., 2015; Molina et al., 2007; Molina et al., 2013). The current study utilized a mixed qualitative-quantitative approach that extended such findings by examining the role of emotional functioning in SU in a subsample of persistent and desistent substance users. We first performed a quantitative analysis of topics coded from interviews with young adults that yielded main effects for SU persistence on two of four topics. SU persisters perceived that (a) SU had a positive impact on their emotional functioning and (b) the positive benefits of SU on emotional functioning outweighed the negative impact of use in comparison with SU desisters. Consistent with these findings, other studies assessing the narratives of SU persisters and desisters indicate that the experience of SU differentiates these two groups. For example, Liebregts et al. (2015) reported that desistent cannabis users exhibit differences in agency, goal-setting strategies, and ability to envision another self when attempting to quit in comparison with persistent cannabis users. Findings from the current study add to the evidence for such group differences and indicate that perceptions about the role of emotional functioning in SU are important as well. In terms of treatment implications, one key barrier to SU treatment is the belief that treatment is not needed (Gates, Copeland, Swift, & Martin, 2012). Findings from this study would add that persistent substance users may be dissuaded from seeking treatment because their SU is perceived to be adaptive (i.e., SU has a positive impact on emotional functioning, which outweighs the negative emotional impact). Perceptions about the role of emotion in SU did not differentiate ADHD and LNCG persistent substance users in this study; therefore, treatment development efforts targeting perceptions about the role of emotion may not be specific to those with a history of ADHD—at least in regards to SU in general.

In-depth exploratory analysis of the personal reflections regarding this positive emotional outcome of SU allowed greater specification by different substances. Two themes emerged. First, there was a perceived positive impact of cannabis on emotional functioning in persistent substance users (both ADHD and LNCG groups) via improvement in positive mood or reduction in negative mood (the latter was particularly applicable to the ADHD group). Such perceptions are consistent with research on the subjective effects of cannabis use (Green, Kavanagh, & Young, 2003). The perceived mitigating effects of cannabis on negative mood for ADHD SU persisters is consistent with models of SU in ADHD patients. For example, Molina and Pelham (2014) propose that negative mood may maintain patterns of use, and expectancies about use (e.g., beliefs that negative mood will improve following SU episodes) may be substance-specific in individuals with ADHD. In accordance with our findings, this may be particularly applicable to cannabis users with childhood ADHD. One clinical implication of this is that treatments should target how cannabis users with a history of ADHD cope with their negative emotional states. Mindfulness and acceptance-based interventions may be particularly promising treatments to address this mechanism given their effects on negative mood as a mediator of treatment outcome (Brewer, Elwafi, & Davis, 2013; Brown et al., 2008; Witkiewitz et al., 2014).

The second theme that emerged from our exploratory analysis was that 50% of ADHD/SU persisters perceived that cannabis improved ADHD. Endorsement rates for other subgroups ranged from 0% to 13%. To our knowledge, only one other study (Harty et al., 2015) has considered perceptions about cannabis use in a sample with ADHD in childhood, and no study has identified a perception that cannabis is therapeutic for ADHD in an ADHD sample. Such perceptions are common online (Mitchell et al., 2016) and have been advocated in case study findings (Strohbeck-Kuehner, Skopp, & Mattern, 2008), but are in stark contrast with laboratory-based studies in non-ADHD cannabis-using samples on neurocognition (McDonald, Schleifer, Richards, & de Wit, 2003; Ramaekers, Kauert, Theunissen, Toennes, &
Moeller, 2009; Ramaekers et al., 2006). Findings from this study suggest that these perceptions need to be compared against the acute and chronic effects of cannabis use in a controlled laboratory setting. Future studies should also differentiate between perceptions that cannabis improves mood versus improving ADHD symptoms—some in our sample appeared to conflate the effects on ADHD with effects on mood.

At a broad level, there is a need to understand the deleterious effects of cannabis use (Volkow, Baler, Compton, & Weiss, 2014; Volkow et al., 2016), particularly in vulnerable populations such as those with ADHD, as legalized recreational use among adults could significantly increase access to cannabis among youth and is a growing concern for pediatric health in the United States (Saloner, McGinty, & Barry, 2015). This exploratory analysis also demonstrates the utility of a qualitative approach to identify perceptions that are not captured using traditional quantitative methods (Harty et al., 2015; Pedersen et al., 2014). Contrary to past studies that have demonstrated nicotine (Conners et al., 1996; Levin et al., 1996; Potter & Newhouse, 2004, 2008) and ad libitum cigarette smoking (Mitchell et al., 2014) improve attention in adults with ADHD, participants with ADHD histories did not perceive improvement in such functioning when asked to reflect on their smoking in the current study. This may be another disjunction between fact and perception among individuals with ADHD.

Limitations and Future Directions

Small sample size limited power to detect group differences for subgroup analyses, particularly for analysis of specific substances (i.e., alcohol, tobacco, cannabis). Furthermore, while the aim of this study was to examine childhood ADHD, we did not examine persistence of ADHD into adulthood. In addition, although the purpose of the current study was to examine perceptions about SU in general given that this is an understudied topic in substance users with ADHD, future studies should explore aspects of emotional functioning over the course of SU (e.g., initiation, maintenance, and cessation). Finally, despite that internalizing disorders may be characterized by poor emotion regulation, they were infrequent in the current sample: rates between ADHD and LNCG samples were low (i.e., <10%) and did not differ between groups. Other aspects of emotional dysregulation, such as anger, may be just as, if not more, relevant to SU in ADHD than depression or anxiety (Molina & Pelham, 2014).

Conclusion

These findings are the first, to our knowledge, to incorporate qualitative methodology to examine the relation between emotions and SU in a longitudinal sample of childhood diagnosed with ADHD. Young adults’ narratives revealed that those who are persistent substance users perceive a link between their emotions and SU in comparison with SU desisters, particularly the perception about the positive impact of SU on emotional states and the relative balance of positive and negative effects of use. Secondary exploratory analyses revealed cannabis-specific effects themes associated with childhood ADHD: Cannabis is perceived to have a therapeutic effect on negative mood and ADHD symptoms. The current study is the first to identify such perceptions about the effects of cannabis in an ADHD sample, which can generate testable novel hypotheses about cannabis use and perceived effects on mood and ADHD in the laboratory setting and natural environment. Clarifying the role of these potentially malleable perceptions may inform development of treatment and prevention efforts.

Acknowledgments

The Multimodal Treatment Study of Children with ADHD (MTA) was a National Institute of Mental Health (NIMH) cooperative agreement randomized clinical trial, continued under an NIMH contract as a follow-up study and finally under a National Institute on Drug Abuse (NIDA) contract. Collaborators from NIMH: Benedetto Vitiello, MD (Child & Adolescent Treatment and Preventive Interventions Research Branch), Joanne B. Sever, MS (Clinical Trials Operations and Biostatistics Unit, Division of Services and Intervention Research), Peter S. Jensen, MD (currently at REACH Institute and Mayo Clinic), L. Eugene Arnold, MD, MEd (currently at Ohio State University), Kimberly Hoagwood, PhD (currently at Columbia); previous contributors from NIMH to the early phases: John Richters, PhD (currently at National Institute of Nursing Research); Donald Vereen, MD (currently at NIDA). Principal investigators and co-investigators from the sites are: University of California, Berkeley/San Francisco: Stephen P. Hinshaw, PhD (Berkeley), Glen R. Elliott, PhD, MD (San Francisco); Duke University: Karen C. Wells, PhD, Jeffery N. Epstein, PhD (currently at Cincinnati Children’s Hospital Medical Center), Desiree Murray, PhD; previous Duke contributors to early phases: C. Keith Conners, PhD (former PI); John March, MD, MPH; University of California, Irvine: James Swanson, PhD, Timothy Wigal, PhD; previous contributor from UCLA to the early phases: Dennis P. Cantwell, MD (deceased); New York University: Howard B. Abikoff, PhD; Montreal Children’s Hospital/ McGill University: Lily Hechtman, MD; New York State Psychiatric Institute/Columbia University/Mount Sinai Medical Center: Laurence L. Greenhill, MD (Columbia), Jeffrey H. Newcorn, MD (Mount Sinai School of Medicine), University of Pittsburgh: Brooke Molina, PhD, Betsy Hoza, PhD (currently at University of Vermont), William E. Pelham, PhD (PI for early phases, currently at Florida International University). Follow-up phase statistical collaborators: Robert D. Gibbons, PhD (University of Illinois, Chicago); Sue Marcus, PhD (Mt. Sinai College of Medicine); Kwan Hur, PhD (University of Illinois, Chicago). Original study statistical and design consultant: Helena C. Kraemer, PhD (Stanford University). Collaborator from the Office of Special Education Programs/US Department of Education: Thomas Hanley, EdD Collaborator from Office of
Juvenile Justice and Delinquency Prevention/Department of Justice: Karen Stern, PhD. Additional investigators involved in Qualitative Interview Substudy: Thomas S. Weisner, PhD, & Jeffrey Good, PhD UCLA.

Declaration of Conflicting Interests
The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of this article: In the past 2 years: Dr. Mitchell has received royalties from New Harbinger Press. Dr. Jensen receives royalties from several publishing companies: Random House, Oxford, and APPI, Inc. He is also a part owner of a consulting company, CATCH Services, LLC. He is the CEO/President of a non-profit organization, the REACH Institute, but receives no compensation. The REACH Institute has received an unrestricted gift from Shire, Inc. Dr. Arnold has received research funding from Curemark, Forest, Lilly, Neuropharm, Novartis, Noven, Shire, Supernus, and YoungLiving (as well as NIH and Autism Speaks) and has consulted with or been on advisory boards for Arbor, Gowlings, Neuropharm, Novartis, Noven, Organon, Otsuka, Pfizer, Roche, Seaside Therapeutics, Sigma Tau, Shire, Tris Pharma, and Waypoint; Dr. Hechtman has received research funding, served on the advisory boards and has been speaker for Ely Lilly, GlaxoSmithKline, Ortho Janssen, Purdue, and Shire; Dr. Wells receives royalty income from Multi-Health Systems; Dr. Kollins has received research support and/or consulting fees from the following: Akili Interactive, Alcobra, Arbor, Atentiv, CogCubed, Kempharm, Intelligent Automation, Ironshore, Neos, NIH, Purdue Canada, Rhodes, Shire, Sunovion, Tris, and SK Life Sciences; Dr. Belendiuk has stock/equity in Shire and Roche. None of the other authors have any additional declarations.

Funding
The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The work reported was supported by cooperative agreement grants and contracts from the National Institute of Mental Health (NIMH) and the National Institute on Drug Abuse (NIDA) to the following: University of California–Berkeley: U01MH50461, N01MH12009, N01DA-8-5550; Duke University: U01MH50477, N01MH12012, N01DA-8-5554; University of California, Irvine: U01MH50440, N01MH12011, N01DA-8-5551; University of Pittsburgh: U01 MH50467, N01MH 12010, N01DA-8-5553; McGill University N01MH12008, N01DA-8-5548. Additional funding support provided by NIDA (K23DA032577 to J.T.M., K24DA023464 to S.H.K., R01DA039881 to B.S.G.M.). The opinions and assertions contained in this report are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of Health and Human Services, the National Institutes of Health, NIMH, or NIDA.

Notes
1. Sample sizes varied across topics because not all participants received a rating (on a scale of 0 to 8) for each topic. Data analysis was repeated with 0 entered for any participant who did not receive a rating for a particular topic—this supplemental analysis, available from the first author, did not result in any change in statistical significance or interpretation.

2. Examples that typified endorsements are reported. Vague use of pronouns (e.g., “it”) were replaced with specific terms used elsewhere in the post (e.g., “smoking cannabis”) and denoted by use of parentheses. Also, use of . . . . within quotes indicates a natural pause in speech or excerpt portions removed to allow for brevity while maintaining the overall context of the quote.

References
Author Biographies

John T. Mitchell, PhD, is an assistant professor of Psychiatry and Behavioral Sciences at Duke University School of Medicine and the Duke ADHD Program. His research interests include ADHD in adulthood, ADHD and substance use, treatment development, and mobile health.

Thomas S. Weisner, PhD, is a distinguished professor of Anthropology, Emeritus, in the Departments of Psychiatry and Anthropology, UCLA. His research interests are in culture and human development, families and children at risk, mixed research methods, and evidence-informed policy. His books include Discovering Successful Pathways in Human Development, and Higher Ground (with Greg Duncan and Aletha Huston), and his publications are available at www.tweisner.com.

Peter S. Jensen, MD, is a professor of Psychiatry in the College of Medicine at the University of Arkansas for Medical Sciences, and is president and CEO of the REACH Institute, a non-profit organization dedicated to transforming US children’s mental health services with evidence-based assessment and treatment practices. Prior to founding REACH, he served as an associate director, National Institute of Mental Health, for Child & Adolescent Research, and the Ruane professor of Child Psychiatry, Columbia University. With scholarly publications numbering more than 300 articles and chapters, and 22 books, his current research focuses on implementation and dissemination of evidence-based practices.

Desiree W. Murray, PhD, is a senior research scientist and an associate director of research at the Frank Porter Graham Child Development Institute at the University of North Carolina at Chapel Hill. Her current work focuses on the development and evaluation of school-based self-regulation interventions. She was previously associate director of the Duke ADHD program, where she provided leadership for the Multi-Modal Treatment Study for ADHD (MTA) and published extensively on ADHD assessment and treatment in young children.

Brooke S. G. Molina, PhD, is a professor of Psychiatry, Psychology, and Pediatrics and a director of the Youth and Family Research Program at the University of Pittsburgh. Dr. Molina’s research focuses on the long-term course, etiology, and treatment of ADHD and substance abuse with a focus on adolescence and early adulthood.

L. Eugene Arnold, MED, MD, is a professor emeritus of psychiatry at Ohio State University, where he obtained his MD. He interned at University of Oregon and took general and child psychiatry residencies at Johns Hopkins, where he also obtained his MED. His research interests include ADHD, autism, and complementary/alternative treatments. He is in the ChADD (Children and Adults with ADD) Hall of Fame and received the 2016 Nisonger Champion Award. His publications include 9 books, 70 chapters, and 275 articles.

Lily Hechman, MD, FRCP, is a professor of psychiatry and pediatrics at McGill University and a director of research for the Division of Child Psychiatry. She received her medical and child psychiatry training at McGill University in Montreal, Canada, and her adult psychiatry training at Albert Einstein College of Medicine.
in New York. Her research has focused on long-term prospective follow-up studies of ADHD; diagnosis and treatment of adults with ADHD; and multisite, multimodal treatment studies of children with ADHD. Intervention studies have included developing a cognitive behavior program for adolescents and adults with ADHD. Most recent studies focus in determining what optimal follow-up approach will best maintain treatment gains. She has been continuously funded since 1968 by National Institute of Mental Health (NIMH), National Institute on Drug Abuse (NIDA), and the Canadian Institutes of Health Research (CIHR).

**James M. Swanson**, PhD, is a professor emeritus at the University of California, Irvine (UCI), and part-time professor of psychiatry at Florida International University (FIU). He obtained his PhD at Ohio State University in 1970, and spent most of his career at UCI. In 1984, he founded the UCI Child Development Center that focused on treatment and research on ADHD. From 2005 to 2012, he was one of the seven principal investigators for the Vanguard Centers of the National Children’s Study. His current research interests are auxology and psychopharmacology.

**Stephen P. Hinshaw**, PhD, is a professor of Psychology at the University of California, Berkeley, and a professor and vice-chair for Psychology in the Department of Psychiatry at the University of California, San Francisco. He edited Psychological Bulletin from 2009-2014. His work focuses on developmental psychopathology and mental illness stigma; he has authored 320 publications and 12 books, having received over US$20 million in federal research funding.

**Elizabeth C. Victor**, PhD, is a post-doctoral fellow at Children’s Health/Children’s Medical Center, Dallas. Her research focuses on adolescent health risk behaviors.

**Scott H. Kollins**, PhD, is a professor of Psychiatry and director of the Duke ADHD Program at the Duke University School of Medicine. He has worked with adults, adolescents, and children with ADHD for over 15 years and has published over 100 papers in the areas of ADHD and psychopharmacology.

**Karen C. Wells**, PhD, is an associate professor of Medical Psychology at Duke University Medical Center. She is the PI of the Duke site and led the development of the Parent Training component of the behavior management condition for the MTA. She has published extensively in the areas of ADHD, Disruptive Behavior Disorders, and family processes and interventions.

**Katherine A. Belendiuk**, PhD, earned a joint doctorate in clinical and developmental psychology from the University of Pittsburgh. She spent nearly a decade researching developmental psychopathology, specifically the role of ADHD in adolescence as a predictor of alcohol and drug use in early adulthood. She is currently a research scientist at Genentech.

**Andrew Blonde**, MBA, was a research assistant at Duke University Medical Center. He is currently a manager for PwC’s Healthcare Advisory Division out of the NY metro market.

**Celeste Nguyen**, PhD, is a licensed psychologist with clinical background working with children, adolescents, and adults. Her research interests include multicultural issues and ADHD, behavioral treatment of ADHD, and psychopharmacology treatment of ADHD.

**Lizeth Ambriz**, BA, received her degree in Anthropology from UCLA and currently is a research assistant at UCLA. Her current research interests focus on expanding access to healthcare, reducing racial disparities, and ensuring informed decision-making through the dissemination of culturally competent education.

**Jenny L. Nguyen**, BS, was a research assistant at the Child Development Center at UC Irvine and the Center for Autism and Neurodevelopmental Disorders. She is currently studying software development and is a project manager at a digital marketing company.