Are There Placebo Effects in the Medication Treatment of Children With Attention-Deficit Hyperactivity Disorder?

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ABSTRACT: Placebos have been shown to produce significant positive changes in several health and mental health problems, referred to as placebo effects. Although it is well established that stimulant medication is an empirically supported treatment for children with attention-deficit hyperactivity disorder (ADHD), little is known about the role of placebos in the medication treatment of children with ADHD. This article reviews existing studies that evaluate whether placebos produce significant changes in children with ADHD. Published literature and the author’s own empirical work were used to evaluate whether placebo effects are present in the medication treatment of children with ADHD. There is little evidence that placebos produce significant changes in the behavior or cognition of elementary school-age children with ADHD. However, there may be significant placebo effects in adults who evaluate children with ADHD. Evidence suggests that parents and teachers tend to evaluate children with ADHD more positively when they believe the child has been administered stimulant medication and they tend to attribute positive changes to medication even when medication has not actually been administered. Several viable mechanisms for these placebo effects are suggested.


Attention-deficit hyperactivity disorder (ADHD) is one of the most commonly diagnosed and impairing behavior disorders of childhood, occurring in 3% to 7% of school-age children.¹ Empirically supported treatments of ADHD include behavior therapy and stimulant medication.² ³ Treatment guidelines published by professional organizations and advocacy groups argue that stimulant medication is an essential component of empirically supported treatment for ADHD.⁴ ⁵ ⁶ ⁷ ⁸ This recommendation is based on hundreds of peer-reviewed scientific studies that show that administering stimulant medication to children with ADHD typically results in lower behavior problems, at least in the short term, with few serious side effects.⁹ ¹⁰ Furthermore, results from the largest clinical trial to examine treatment of ADHD are widely interpreted as demonstrating that stimulant medication treatments are initially superior to other forms of treatment and therefore should be considered the front-line treatment of ADHD,¹¹ although others have persuasively disagreed with this interpretation.¹² ¹³ Data suggest that these recommendations are consistent with current practice, as use of stimulant medication to treat ADHD has increased substantially over the past few decades¹⁴ ¹⁵ ¹⁶ ¹⁷ and is currently the most common form of treatment for ADHD.¹⁸

With the short-term efficacy of stimulant medication firmly established, researchers have begun to turn their attention to examining the mechanisms of action. Although pharmacologic effects of medication are significant and likely the primary mechanism through which stimulants have their effects,²⁰ ²¹ ²² the role of nonpharmacologic effects of medication—placebo effects—remains unclear. The purpose of this review is to examine theory and research on whether placebo effects play a role in stimulant medication treatment of children with ADHD.

WHAT ARE PLACEBO EFFECTS?

A placebo effect can be defined as “...a genuine psychological or physiological effect, in a human or another animal, which is attributable to receiving a substance or undergoing a procedure, but is not due to the inherent powers of that substance.”²³ A placebo effect can be conceptualized as the change in a symptom or condition that occurs after the administration of a placebo minus the change that would have occurred naturally had nothing been done.²⁴ ²⁵ Just as a medication effect can be defined as the response shown after administration of a drug minus the placebo response, a
placebo effect can be defined as the response shown after administration of a placebo minus the natural history response.25

Numerous examples of placebo effects have been observed in the medical treatment literature, including studies of insomnia, epilepsy, asthma, hypertension, cerebral palsy, low birth weight, mental retardation, genetic disorders, and pain.24,25,27–29 Placebo effects have also been shown to be a significant component of response to several pharmacologic agents, including analgesics, tranquilizers, alcohol, and stimulants.30 These effects have been demonstrated across diverse participant groups and include both physiologic and psychological changes.25,31 In one study, participants who were led to believe they had ingested various doses of caffeine had both objective (i.e., pulse rate changes) and subjective (i.e., self-reported alertness) responses that mirrored the purported caffeine dose.32 These results demonstrate that placebos can induce genuine physiologic changes in symptoms, rather than just subjectively experienced change. Importantly, although few studies have examined placebo effects in children, the few studies that have been conducted suggest that placebo effects may be larger in children than in adults.29,33,34

The placebo effect has also been demonstrated in treatments for several psychiatric disorders including autism, depression, and various anxiety disorders.28,35 One review of psychosocial treatments found that participants randomly assigned to placebo showed a positive treatment response that was on average 1.6 times higher compared with participants randomly assigned to no treatment.36 For instance, several meta-analytic reviews of antidepressant medication treatment for adults have shown that although antidepressants are clearly more effective than control conditions, placebo effects may account for as much as 80% of the treatment response57–40 and that placebos induce changes in brain functioning in ways that are associated with antidepressant response.41 Furthermore, adults who receive placebos show improvement that is (on average) nearly 3 times larger than those who do not receive a placebo.37–42 Just like placebo response to other medical conditions, response rates to placebo treatment of depression seem to be even higher in pediatric samples than in adult samples.43 In sum, there is evidence that placebo effects can be significant in the treatment of both physical and mental health problems, and this may be especially true for treatment of pediatric samples.

**WHY EXAMINE PLACEBO EFFECTS IN TREATMENT OF CHILDREN WITH ADHD?**

There are several reasons why it is important to examine whether placebo effects play a part in the medication treatment of ADHD. First, examining the role of placebo effects provides information about what percentage of the positive response to medication is the result of pharmacologic versus psychological factors. Further exploration may also lead to the identification of patients most likely to respond to placebo treatments, pharmacologic treatments, both, or neither.

Second, for pediatric ADHD, medication efficacy is usually evaluated by gathering ratings from parents and teachers, not the children themselves. If placebo effects are found to be a significant factor in this process, it would suggest that more objective measures that do not rely solely on adult perspectives are needed.44,45 Considering that behavior ratings are universally relied on to measure treatment response in medication studies and in clinical practice with children with ADHD, demonstration of a strong placebo effect in these ratings could have a profound impact on research and clinical service for children with ADHD.

Third, evaluating whether placebo effects play a role in medication treatment would also have significant implications for the need for conducting placebo-controlled medication trials. Placebo-controlled medication assessments have long been recommended for evaluating the effects of medication for children with ADHD,46 but these trials can be costly and difficult to conduct. If placebo effects do not play a significant role in the assessment of medication effects, then the inclusion of a placebo condition in a stimulant medication trial may prove less critical than previously presumed.

Fourth, new treatments for ADHD are frequently marketed to the public before the establishment of a sound evidence base. Some examples include nutritional supplements, biofeedback, chiropractic manipulations, exercise, play therapy, and even dolphin therapy.47 Although the only empirically supported treatments for ADHD are stimulant medication, behavior therapy, and the combination of the two,3 other treatments are often promoted as effective by their proponents. It is possible that these alternative treatments do produce improvement in children, but this improvement is the result of a placebo effect. Determining whether placebo effects play a significant role in established, empirically supported treatments would provide important information about the magnitude of placebo effects that could be expected from a nonsupported treatment. This, in turn, would help researchers, clinicians, and parents to determine whether nonsupported treatments are likely due solely to placebo effects or instead exceed the expected placebo effect.

Finally, there is recent evidence that placebos are being used in clinical practice. One study surveyed doctors in internal medicine departments of medical schools and found that 45% of them reported using a placebo in clinical practice.48 Consistent with this finding, a second survey of 1200 practicing internists and rheumatologists in the United States found that 46% to 58% indicated that they regularly prescribe placebos as a treatment for their patients.49 These surveys do not provide information about the extent to which doctors prescribe placebos for children, including children with ADHD, but a recent article in the *New York Times* reported on a company...
that is marketing placebos to parents for use with their children.50

**IS THERE A PLACEBO EFFECT IN MEDICATION TREATMENT OF CHILDREN WITH ADHD?**

Although not well studied, several lines of evidence suggest there is a significant placebo effect in the stimulant medication treatment of children with ADHD. One meta-analytic review of the effects of stimulant medication on ADHD children found an average effect size of 0.32 for response to administration of a placebo, indicating that there was approximately 30% improvement in children with ADHD who were given a placebo compared with children with ADHD who were given nothing, although results across studies were highly variable.51 Several other independently conducted reviews of stimulant medication for children with ADHD also report that the average rate of positive response to placebos ranges from about 20% to 30%.9,10,51–55 As concluded in one comprehensive review of stimulant medication: “...a significant and relatively large placebo effect should be expected when evaluating the short-term response to stimulant medication.”9 (pp 302)

Research from blinded, placebo-controlled trials also is suggestive of a placebo effect. The most common cause of “unblinding” in such trials is the child’s experience of side effects from medication, rather than differences in children’s level of symptoms.56 If there were negligible placebo effects for stimulants, then one would expect that children and raters could reliably differentiate active from placebo medicine based solely on differential efficacy, which is not the case.

In addition to group-level evidence of average placebo responses to stimulant medication, other research has focused on individual differences in children’s response to placebos. These studies suggest that a percentage of ADHD youth can be considered positive responders to placebo. Using a sample of 118 children with ADHD (ages 6–14) who participated in a double-blind, placebo-controlled evaluation of stimulant mediation, Ulman and Sleator57 used teacher ratings of children’s behavior to classify children based on their response to the medication assessment. Results showed that 55% of the children responded positively to medication, defined as demonstrating 20% improvement on the best dose of medication versus placebo. Another 27% of children were nonresponders to medication, and the final 18% of children were placebo responders, defined as having 20% improvement on placebo compared with baseline. Comparisons of these groups showed that the medication responders had the greatest improvement as compared with their own baseline (56%), but the placebo responders also showed significant improvement (49%), much more than the nonresponders (8%).

More recently, Sandler et al have begun to investigate the use of placebos incorporated into medication treatment of ADHD. The first published study of their work examined the effects of using a placebo to enhance the efficacy and duration of active medication.58 Participants were 26 boys and girls, ages 7 to 15, recruited from a community-based treatment clinic. Effects of stimulant medication were examined under 3 conditions: (1) the child’s usual dose (2); a 50% reduced dose; and (3) a 50% reduced dose plus a placebo. Parents, children, and their doctors were fully aware of the use of a placebo, but the placebo was described as potentially having “dose-extender” effects. Results showed some support for a placebo effect. Parent ratings of children’s ADHD behavior were marginally ($p = .06$) better on the usual dose versus the reduced dose when no placebo was administered (condition 1 vs 2), but ratings of behavior in the usual dose did not differ from those of the reduced dose plus placebo (condition 1 vs 3). Individual difference analyses indicated that consistent with past research 30% of the sample responded positively to the placebo.

In summary, although limited in its scope there is consistent evidence that approximately 20% to 30% of children with ADHD who participate in controlled medication trials show a positive response to placebo, suggesting that placebo effects are a significant factor in treatment response for at least a subset of ADHD youth.

**POSSIBLE MECHANISMS FOR THE PLACEBO EFFECT IN ADHD**

Sandler28 has argued that there are multiple possible mechanisms through which placebos may operate. First, placebos may produce change through expectancy effects on the child with attention-deficit hyperactivity disorder. Second, placebos could operate by producing changes in how caregivers perceive children with attention-deficit hyperactivity disorder. Third, placebos could operate by producing changes in how caregivers behave toward children with attention-deficit hyperactivity disorder, which, in turn, produce changes in the child with attention-deficit hyperactivity disorder. Fourth, placebos may operate through classical conditioning by producing a conditioned response to placebos. Each of these potential mechanisms is discussed next.

**EXPECTANCY EFFECTS ON CHILDREN’S BEHAVIORS AND COGNITIONS**

Expectancy effects in response to placebos refer to changes that result because the recipient of the placebo expects change to occur; administering a placebo produces an expectation of change, and that expectation then produces the change.23 Several studies have examined whether there is medication expectancy effect for children with ADHD. Unlike other areas of mental health, where expectancy effects are generally described as having a potentially positive effect, one common objection to stimulant treatment that has been raised by both scientific and nonscientific sources is that administering medication to children with ADHD may have an iatrogenic expectancy effect. Specifically, it has been argued that children who receive stimulant medication for ADHD may come to view their own successes and
failures as dependent on medication, which in turn is hypothesized to result in decreased effort at challenging tasks and an increased likelihood of reliance on pharmacologic substances later in life.59,60

We completed a series of studies that used a balanced placebo design to examine whether expectancy effects positively or negatively influence elementary school-age boys with ADHD. Balanced placebo designs allow for the separate evaluation of the pharmacologic effects of medication from the psychological effects of medication (i.e., medication expectancies). This is accomplished by crossing the actual medication participants receive (active medication or placebo) with the medication they are told they were given (told they were given active medication vs told they were given a placebo). The balanced placebo design is considered one of the best means of evaluating expectancy effects.61

The first study we completed that used a balanced placebo design examined the effects of medication and medication expectancies on children’s academic performance.62 Participants were 60 boys with ADHD who received one of 4 experimental manipulations: (1) given stimulant medication (single dose 0.3 mg/kg of methylphenidate) and told that they were given real medication; (2) given stimulant medication but told that they were given placebo; (3) given placebo but told that they were given medication; and (4) given a placebo and told that they were given placebo. All participants completed an academic task (find a word puzzles) twice—once when they experienced success (experimentally manipulated) followed by a neutral test condition with no success or failure manipulation, and once when they experienced failure (experimentally manipulated) followed by the same neutral test condition. Results showed significant and positive pharmacologic effects of medication on several measures, consistent with the extant literature. However, medication expectancies had no significant effect on any of the measures; that is, the performance of boys who were told they were given medication did not differ from that of boys who were told they were given a placebo. Further, boys did not attribute their performance (either success or failure) to medication or to the lack of medication. These results show that the pharmacologic effects of medication were significant, but expectancy effects had virtually no effect on children’s behaviors or cognitions during an academic task.

A second study used identical procedures but examined social rather than academic outcomes.63 Participants were 157 boys with ADHD, ages 7 to 12, drawn from a summer treatment camp. All boys participated in 5-minute interactions with another boy of their age, during which they tried to convince the other boy to come to the summer camp and tried to get him to like them. In reality, the other boy was a child confederate who was taught to act in standard ways so that each ADHD participant experienced social success when they completed the task one time and social failure when they completed it another time (with order counterbalanced). Immediately after the social success and social failure experience, participants were given a brief break and then interacted with the same confederate for another 5 minutes, during which the confederate was taught to behave in a neutral manner; this interaction served as the test condition. Although there were large differences between success and failure, indicating the manipulation worked as intended, results showed no pharmacologic effects on any measure, indicating that boys did neither better nor worse on the social task when they were given medication. More important to this review, and consistent with results from the academic task, results also showed no effect of the medication expectancy manipulation; boys who were told they received medication performed neither better nor worse than boys who were told they received a placebo, and boys attributed their performance (both success and failure) to factors other than the type of pill they took.

A third study extended this research to more ecologically valid outcomes—children’s performance during a summer day treatment program.64 Participants were 136 boys with ADHD, ages 7 to 12, who were enrolled in an 8-week summer day treatment program. This study also used a balanced-placebo design, but in contrast to the above studies, the balanced-placebo manipulation was within-subject rather than between-subject. Each day during the 40-day treatment program, boys received one of 4 medication/expectancy conditions: (1) given medication and told he was given medication; (2) given medication and told he was given placebo; (3) given placebo and told he was given medication; and (4) given placebo and told he was given placebo. In other words, participants experienced multiple instances of all 4 conditions, with different conditions occurring on different days following a randomly determined schedule. Consistent with many other studies, results showed large and significant positive effects of medication on daily behaviors during camp. However, there were no significant medication expectancy effects; boys’ behavior at the summer camp was not influenced by the type of medication they thought they received. Further, participants strongly denied that medication had an impact on either success or failure.

Finally, we extended this research to examine children’s performance in school.64 Participants were 110 boys with ADHD who were a subset of the 136 children who participated in the above study. The study also used a within-subjects balanced-placebo design, but classroom behaviors were the dependent measures. Results paralleled those from the summer camp; there were numerous significant positive effects of medication, but no significant effects of medication expectancies. That is, performance did not differ when boys were told they were on a real versus fake pill and boys denied that medication had any impact on either success or failure in their classrooms.

In summary, these studies generally showed significant pharmacologic effects of stimulant medication on

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the behavior of boys with ADHD but no significant impact (either positive or negative) of children’s expectancies about medication. Furthermore, children with ADHD denied that medication was related to either their success or their failure. These findings emerged in diverse settings, ranging from controlled experiments to school classrooms.

Results from other research on this same topic are consistent with these studies in finding few or no differences in self-evaluations or attributions when children take a placebo as compared with medication. For instance, in a double-blind placebo-controlled trial, Ialongo et al. found medication produced significant positive changes in behavior, but no change on self-evaluations or attributions in children with ADHD. Using data from a summer treatment program, Pelham et al. compared the behavior, attributions, and self-evaluations of boys with ADHD on days when they received no pill to days when they received a placebo and to days when they received a low dose of medication. There were no differences in how the boys evaluated their own behavior on no-pill days as compared with placebo days, nor did they differ in the attributions they made for success or failure in these 2 conditions. Finally, using an academic performance task, Carlson et al. found no differences between placebo and no pill conditions on measures of behavior, on their self-evaluations of performance, or on their attributions for success and failure.

Taken together these findings suggest that the behavior change associated with stimulant medication in children with ADHD is the result of the direct pharmacologic effect of medication and that there is little evidence supporting a medication expectancy effect on children with ADHD.

**CHANGES IN CAREGIVER PERCEPTIONS**

A second possible mechanism for the placebo effect is change in caregiver perception of their child’s behavior. Caregivers may believe that administering a medication will produce an effective change in their child and thus begin to perceive change independent of the pharmacologic effects of medication. This is similar to an expectancy effect influencing a child, in that belief about the treatment produces change, but here the change is in the caregiver’s perception. As one example of how this may occur, parents who administer a placebo to their child may expect the placebo to produce meaningful change. This belief may seem validated when they observe natural day-to-day variation in the child’s functioning, with positive fluctuation attributed to the placebo and negative changes ignored or attributed to other factors. Thus, administering the placebo could induce change in the caregiver’s perceptions of the child independent of pharmacologic effects. This is a particularly important mechanism to evaluate in understanding treatment of children with ADHD because parent and teacher ratings of children’s behavior are the primary outcome measures in nearly every published study of stimulant medication for children with ADHD. This raises the important question of whether changes in caretaker perception might influence their evaluations of the child’s response to treatment. Although this question has never been directly evaluated for children with ADHD, related research suggests this may be the case.

First, parental expectancies regarding substances given to their child have been shown to significantly influence their evaluations of their child’s behavior. Hoover and Milich used an expectancy manipulation to evaluate whether beliefs about sugar significantly influence parental evaluations of children’s behavior because parents widely believe that sugar causes children to exhibit behaviors consistent with ADHD. Parents and their child were randomly assigned to one of 2 experimental conditions: (1) child given sweet, nonsugar drink and parent told child was given sugar; or (2) child given a sweet, nonsugar drink and parent told the child was not given sugar. Results of the study showed that mothers who believed their child had ingested sugar rated their child as more hyperactive and noncompliant than did mothers who believed their child did not ingest sugar, even though all children ingested the same thing. In fact, children in the sugar expectancy group, who were rated by their mothers as more hyperactive, actually had significantly lower activity levels as measured by a wrist actometer. Thus, parent ratings of children’s behavior can be significantly influenced by beliefs about substances administered to their child, independent of whether the substance has an actual pharmacologic effect.

Second, there is evidence that parents perceive treatment effects differently depending on whether they believe their child received medication. In one study, mothers whose children with ADHD had completed a problem solving treatment differed in their assessments of the effectiveness of that treatment depending on whether their child received a placebo pill or did not receive a pill. Specifically, mothers rated children who had received a placebo as more capable of independently solving problems as compared with mothers of children who did not receive a pill, suggesting that the mothers who believed that their child received medication altered how they evaluated their child’s abilities.

Third, there is evidence that objective and subjective measures of treatment response in children with ADHD provide somewhat different data. Some (but not all) research suggests that stimulant medication dose–response curves produced from subjective measures (i.e., behavior ratings) differ from dose–response curves produced from objective measures (e.g., academic seatwork measures, frequency counts of behavior). Subjective and objective measures of medication effects also show relatively low correlations with each other. One specific example of how objective and subjective measures of treatment response differ can be seen in a study that examined the effects of different intensities of behavioral intervention, alone and in combination with varying doses of methylphenidate. Participants were
explanation for their child’s behavior, with presence of
caregivers perceptions of children with ADHD 
function of medication, with more positive ratings when
subjective measures and that medication effects may be inflated by
In the same study, children’s response to treatment implemented at home was evaluated using objective measures (records of how often the child met treatment goals on a daily report card) and using subjective measures (parent ratings of ADHD symptoms and impairment). Analyses showed that parent ratings did not differ as a function of behavior modification but did differ as a function of medication, with more positive ratings when children were on medication. However, examination of the objective measures showed that behavior modification (as well as medication) did have a significant effect on child behavior. Taken together, these findings suggest that behavior therapy and stimulant medication had separate positive effects on children’s behavior when they were evaluated using objective measures, but parents apparently attributed all positive effects to medication and not to behavior therapy when they were evaluated using subjective measures. In other words, the effects of medication for the same child in the same setting measured at the same time differed depending on whether the child’s behavior was measured subjectively (using rating scales) or objectively (using the daily report card). Although subjective measures are influenced by pharmacologic and psychological effects of medication, objective measures are influenced only by pharmacologic effects of medication. Thus, these findings suggest that caregiver medication expectancies are a significant influence on their evaluations of treatment response in children with ADHD.

A fourth piece of evidence suggesting placebos may influence caregivers perceptions of children with ADHD comes from research examining parental explanations for children’s behavior. There is evidence that mothers of children with ADHD use medication status as an explanation for their child’s behavior, with presence of medication used to explain why the child succeeded and absence of medication used to explain why the child failed. There is also evidence that mothers make more adaptive, healthy attributions for their child’s behavior when they believe the child is medicated. Thus, there is agreement across a handful of studies that mothers of children with ADHD seem to make different attributions for their children’s behavior when they believe the child has received medication, with positive behaviors being attributed to medication, suggesting that they have positive medication expectancies.

In an extension of the study described earlier, in which behavior therapy and stimulant medication were examined alone and in combination, each night parents were asked to indicate whether or not they thought their child had received medication or placebo that day. This method has been recommended as a means of measuring placebo effects in double-blind trials of medication. These ratings were crossed with actual medication condition, and kappa was computed for each parent. Kappas ranged widely (−.04 to 1.0) but averaged 0.33 (SD = 0.24), indicating low agreement between actual and inferred medication status. Parents were least accurate in judging whether or not their child was on medication when their child had actually received a placebo; parents thought their children were actively medicated on more than half (58%) of the placebo days. Likewise, teachers at the summer treatment program thought children were actively medicated on approximately one-half (46%) of the days when the child had actually received a placebo, and a subsample (19%) of the children were rated by the teacher as never having received a placebo even though all children received a placebo on 25% of the days. The fact that parents and teachers frequently guessed that the children were medicated when they had received a placebo suggests that the adults evaluated the child’s positive behaviors as resulting from medication. This would seem to indicate that parents and teachers hold positive medication expectancies.

To address this possibility directly, parents’ ratings of their child’s behavior and impairment, and ratings of their own perception of their effectiveness in parenting their child, were compared on placebo days when the parent incorrectly guessed the child was on medication versus placebo days when the parent correctly guessed the child was on placebo. As shown in Table 1, parents rated children more positively when they guessed medication than when they guessed the child was on placebo, suggesting that when parents perceive their child as behaving well, they are likely to assume that their child was medicated. Clearly, parents associate medication with improved behavior for their child and for themselves. These differences were not trivial; Cohen’s D effect sizes

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proven psychiatric symptoms. Extending this reasoning to increasing persistence at difficult tasks, and may thus improve adaptive ways, such as resuming a daily schedule or active coping. These changes subsequently alter behaviors self-defeating thoughts, and produces increases in positive changes they see in their child result from medication rather than to behavior therapy. The implication of this finding is that parents of children who receive combined treatments (i.e. both medication and behavior management) may believe that positive changes they see in their child result from medication rather than from their own efforts via behavior modification, providing further evidence that parents of children with ADHD have positive expectancies about medication and tend to minimize the effects of their own parenting practices when children are medicated. Overall, these studies suggest that placebos may change how parents perceive their child with ADHD, and this may be a viable mechanism for the placebo effect in children with ADHD.

CHANGES IN CAREGIVER BEHAVIOR

A third possible mechanism for placebo effects is that placebos may influence parents and teachers behavior toward children. It has been theorized that the act of providing medication (either active medication or placebo) produces reductions in anxiety, hopelessness, and self-defeating thoughts, and produces increases in positive coping. These changes subsequently alter behaviors in adaptive ways, such as resuming a daily schedule or increasing persistence at difficult tasks, and may thus improve psychiatric symptoms. Extending this reasoning to the treatment of ADHD, it is possible that when parents, who almost always initiate treatment, administer stimulant medication to their children with ADHD, they begin to feel less anxious, hopeless, and depressed—areas that are routinely demonstrated to be problematic for parents of children with ADHD. Decreases in these areas could then lead to positive changes in the parents’ own behaviors, such as increases in the frequency and appropriateness of how parents interact with, monitor, communicate with, and respond to children. Such changes are central components of well-established psychosocial treatments for ADHD and are likely to result in improved behavior and performance on the part of the child.

There is, in fact, some evidence that administration of a placebo leads to changes in the behavior of mothers of children with ADHD. In the sugar expectancy study described earlier, Hoover and Milich found that mothers who believed their child was given sugar behaved differently toward their child relative to mothers who believed their child was not given sugar—they stayed closer to their child, talked more to them, and criticized them more often than mothers who believed their child was not on sugar. The fact that mothers change their behaviors based on their beliefs about what their child ingested indirectly supports the hypothesis that placebo effects may be the result of changes in parent behaviors toward the child that stem from their beliefs about the effects of medication on the child.

CONDITIONING

Conditioning may also be a mechanism producing a placebo effect in the treatment of attention-deficit hyperactivity disorder (ADHD). A conditioning approach to explaining the placebo effect postulates that characteristics of the placebo become repeatedly paired with the active treatment (which produces an unconditioned response) and becomes a conditioned stimuli. Thus, the placebo effect is produced because patients learn a response from an active treatment and transfer this learning to the placebo. This effect has been demonstrated as a viable mechanism for the placebo effect in other disorders and treatments (such as treatments for chronic pain and respiratory discomfort), as well as in animals. To our knowledge, there is presently no published research that has examined conditioning as a mechanism for the placebo response in children with ADHD, though a recent article by Sandler suggested positive findings from research in progress evaluating this mechanism. Additional research examining whether placebo effects can be conditioned in children with ADHD would be informative.

Alternatively, one could speculate that conditioning may play a role in eliciting a placebo effect in parents of children with ADHD. That is, parents who consistently

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### Table 1. Summary of Parental Ratings on Placebo Days When Parent Guessed Their Child was on Placebo vs Guessed Their Child was on Medication

<table>
<thead>
<tr>
<th>Measure</th>
<th>Guessed Placebo</th>
<th>Guessed Medication</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impulsive/overactive</td>
<td>5.04</td>
<td>2.84</td>
<td>111.56*</td>
</tr>
<tr>
<td>Oppositional defiant</td>
<td>4.24</td>
<td>2.12</td>
<td>101.66*</td>
</tr>
<tr>
<td>Overall impairment</td>
<td>3.15</td>
<td>2.10</td>
<td>105.04*</td>
</tr>
<tr>
<td>Daily report card</td>
<td>66.69</td>
<td>75.13</td>
<td>29.78*</td>
</tr>
<tr>
<td>Parental effectiveness</td>
<td>3.00</td>
<td>2.01</td>
<td>118.21*</td>
</tr>
</tbody>
</table>

Impulsive/overactive and oppositional defiant from the IOWA Conners Parent Rating Scale, with higher scores indicating more severe behavior. Overall impairment from the Children’s Impairment Rating Scale, with higher scores indicating greater impairment. Daily report card data are percentages of behavioral goals attained by the child, with higher scores indicating better performance. Parental effectiveness data are Likert ratings, with higher scores indicating greater effectiveness. Degrees of freedom for F test are 1, 142; *p < .05.
administer stimulant medication to their child and then observe immediate improvement in their child's behavior will likely learn that administering a pill is associated with improvement in their child's behavior, and this association could be transferred to administering other pills (placebos) that seem similar to the medication. This association could occur through observing the effects of stimulants on their own child or on other children with ADHD or it could occur through conversations with a medical or mental health expert (pediatrician, psychologist). Likewise, given the current high prevalence of stimulant medication treatment, teachers are almost certain to have past experience with children who respond positively to medication treatment. Once this association between administering a pill and positive behavior change is established, it could be transferred to situations in which a placebo is administered. Thus, conditioning is a viable mechanism for understanding placebo effects, either directly through the child or through parents and teachers.

**SUMMARY AND CONCLUSIONS**

There is good evidence from many years of accumulated studies that the majority of children with ADHD exhibit an acute positive response to stimulant treatment, typically as detected by parents and teachers. This positive change is certainly related to the pharmacologic properties of the medication, but it may also be partly related to the psychological properties of administering medication, referred to as placebo effects. A number of studies have found that about 30% of children with ADHD show a positive response to placebos, but it remains unclear what mechanism might account for these placebo effects. Recent research suggests that medication expectancies do not induce changes in children's behaviors or cognitions, but it remains unclear whether children's behaviors or cognitions would change in response to a conditioned placebo effect. In addition, there is emerging evidence that placebos may significantly impact caregiver evaluations of their child's treatment response and their attributions of their child's positive behavior change in response to treatment. Namely, the act of administering medication may induce positive expectancies about the effects of that medication in parents and teachers, which may, in turn, influence how parents and teachers evaluate and behave toward children with ADHD. Given that medication treatment for children with ADHD is frequently measured using parent and teacher ratings, these findings suggest that the pharmacologic effects of medication may be somewhat overestimated when subjective measures are used. Many questions remain unanswered, such as the magnitude of placebo effects, which raters are most susceptible to them, what contextual and environmental factors influence placebo effects, and whether mechanisms such as classical conditioning also contribute to the placebo effect.

It is worth emphasizing that placebo effects do not seem to account for all or even most of the pharmacologic effects of stimulant medications. Current evidence does not support the widespread use of placebos as an alternative to stimulant medication treatment, although interesting work has recently been done evaluating how placebos may be a useful adjunct to medication treatment. It may be that with additional progress in understanding the mechanisms, ethical use of placebos may be a valid and useful complement to empirically supported practices for children with ADHD.

Finally, the review suggests that positive expectations about medication effects on the part of caregivers seem to play a significant role in subjective evaluations of children's treatment response (such as parent and teacher ratings) but do not seem to influence objective measures of treatment response (such as frequency counts of children's behavior). One implication is that placebo-controlled trials for stimulants are critically important when subjective ratings are the primary outcome measure but may be less critical when objective outcomes are used. The fact that subjective measures are the most widely used measures of treatment response in children with ADHD argues for the need to better understand how medication expectancies influence these measures and argues for the need to design trials that can accurately assess the direct pharmacologic effects separately from placebo effects. Indeed, the experience with antidepressants in children has clearly demonstrated that there are risks of not addressing this issue. Almost all such trials that failed to find an effect of medication had very large placebo response rates, upward of 50% in some studies, making it extremely hard for the active treatment to outperform the placebo arm. In contrast, trials specifically designed to address placebo effects, through such mechanisms as a multistage screening process before enrollment to ensure persistence of symptoms over time, have repeatedly found antidepressants to be more efficacious than placebo. Likewise, better understanding of the extent to which medication expectancies influence measures of treatment response and how these effects occur could provide important information about the physiologic and psychological aspects of medication treatment for children with ADHD.

**REFERENCES**


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A comprehensive and practical reference for those involved in the development of systems to improve social and emotional health in early childhood, this book would be most useful for those who are planning or implementing mental health services. This guide encourages the ‘building of bridges’ between mental health and medical, educational, and social services. It is from a series titled, *Systems of Care for Children’s Mental Health* and includes contributions from 25 experts in the fields of child development and education. From previous research, poverty, poor quality early care and learning experiences, and parental risks and behaviors are identified as risk factors for poor social-emotional development. The goals of this volume include describing the importance of early social and emotional development, highlighting early intervention and prevention programs, and providing ideas and guidelines for programs and policy makers.

The book is divided into 3 parts. In the first section, the authors discuss the importance of a strong social and emotional foundation for future school readiness and success. This includes the importance of relationships, especially between mother and child, as well as the amount and the quality of early child care. The authors emphasize that school readiness is not only based on academic preparation, but on social-emotional qualities, such as self-regulation and social skills. In addition, the authors address the cultural diversity of the United States and how understanding different cultures is essential to those planning and providing services to young children.

The second section is a more detailed discussion on building systems of care for young children, which includes financing, developing a workforce, and partnering with families. The authors describe the history of early childhood mental health services, and the development of interagency systems. They stress the importance of access to services and limiting duplication of services. A framework for early childhood mental health is provided in the form of a diagram. The components of this framework are described in detail with specific examples. The importance of child-focused and family-centered care, cultural sensitivity, and evidence-based services are proposed in a set of values that can be used as a starting point for developing a system. Examples of a vision and mission statement are given. Other important building blocks discussed are outcome evaluation and data management. Specific examples are provided from many programs from several different states. The appendix provides valuable practical resources—a funding guide for policy makers and advocates to promote social and emotional health and school readiness, and self-assessment tools for those providing services and supports for children. In conclusion, this book is not only an inspiration to providers and policy makers of early childhood mental health services, but it also gives them practical tools to put vision into practice. This book would be most useful for those who are planning or implementing mental health services for our youngest citizens.

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