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## BETTER LONG-TERM OUTCOME FOR HYPNOTHERAPY THAN FOR CBT IN ADULTS WITH ADHD: RESULTS OF A SIX-MONTH FOLLOW-UP

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SEPPO HILTUNEN<sup>1</sup>, MAARIT VIRTA<sup>1</sup>, ANITA SALAKARI<sup>1</sup>, MERVI ANTILA<sup>2</sup>, ESA CHYDENIUS<sup>3</sup>, MARKUS KASKI<sup>3</sup>, RISTO VATAJA<sup>4</sup>, MATTI IIVANAINEN<sup>3,5</sup>, MARKKU PARTINEN<sup>6,7</sup>

*<sup>1</sup>Institute of Behavioural Sciences, University of Helsinki, Helsinki, Finland, <sup>2</sup>National Institute for Health and Welfare (THL), Finland, <sup>3</sup>Rinnekoti Research Centre, Finland, <sup>4</sup>Kellokoski Hospital, Finland, <sup>5</sup>Department of Child Neurology, University of Helsinki, Helsinki, Finland, <sup>6</sup>Helsinki Sleep Clinic, Vitalmed Research Centre, Helsinki, Finland, <sup>7</sup>Department of Clinical Neurosciences, University of Helsinki, Helsinki, Finland*

### ABSTRACT

This is the first controlled, randomized follow-up study investigating the effectiveness of hypnotherapy in treating adults with attention deficit hyperactivity disorder (ADHD). The aim was to compare the follow-up outcome of short cognitive behavioural therapy (CBT) and hypnotherapy. Six-month follow-up data were analyzed from 10 weekly individual treatments with cognitive hypnotherapy ( $n = 8$ ) and CBT ( $n = 9$ ). The treatment benefits were measured by self-report ADHD symptom scales (BADDs, SCL-16), psychiatric symptom scales (SCL-90, BDI-II), quality of life scale (Q-LES-Q) and independent evaluation (CGI). The treatment benefits remained with both treatment groups when measured with self-report ADHD symptom scales. However, the hypnotherapy and CBT groups differed statistically significantly from each other in general psychological well-being (SCL-90), anxiety (SCL-90) and depression (BDI-II), and almost significantly in ADHD symptoms (SCL-16) indicating better long-term outcome for hypnotherapy. Independent evaluators' ratings qualitatively supported the results. Hypnotherapy seems to be a usable method for treating ADHD in adults. The possible causes discussed for better long-term outcome for hypnotherapy than for CBT include stronger alliance in hypnotherapy, impact of deep relaxation to core symptoms and greater influence of hypnotherapy to emotional regulation. The generalization of the results requires further studies.

*Keywords:* ADHD, attention deficit hyperactivity disorder, hypnotherapy, cognitive behavioural therapy (CBT)

### INTRODUCTION

Attention deficit hyperactivity disorder (ADHD) is a developmental neurobiological disability that emerges in childhood. In adults, the prevalence of ADHD has been estimated to be around 4% (Kessler et al., 2006). The major symptoms according to DSM-IV are inattention and/or impulsivity and hyperactivity (American Psychiatric Association, 1994). Problems in executive functioning, such as organizing and prioritizing, are typical. The core neurobiological impairments

can lead to long-lasting behavioural and emotional symptoms. Life-long experiences of failure or underachievement reinforce problems via negative cognitions and beliefs (Safren et al., 2004; Safren, 2006) and may often result in problems of self-esteem (Newark and Stieglitz, 2010). There is growing evidence that emotional dysregulation is also a core feature in adult ADHD (e.g. Mitchell et al., 2012; Retz et al., 2012). Psychiatric comorbidities such as anxiety, depression, bipolar disorder, personality disorders, and substance abuse are common (Biederman, 2004; Jacob et al., 2007; McGough et al., 2005; Sobanski et al., 2007; Sprafkin et al., 2007). Adults with ADHD often have considerable difficulties in managing finances, work, and/or social relationships (Goodman, 2007).

The management of ADHD in adulthood is based on pharmacological and psychological treatments. Both individual cognitive behavioural therapy (CBT) (Rostain and Ramsay, 2006; Safren et al., 2005; Safren et al., 2010; Wilens et al., 1999) and various group interventions (Emilsson et al., 2011; Hesslinger et al., 2002; Hirvikoski et al., 2011; Philippsen et al., 2007; Solanto et al., 2008; Solanto et al., 2010; Stevenson et al., 2002; Virta et al., 2008; Zylowska et al., 2008) have yielded promising results in treating ADHD adults. There is some evidence that relaxation training or hypnotherapy (Calhoun and Bolton, 1986; Copeland, 1980; Denkowski and Denkowski, 1984; Dunn and Howell, 1982; Raymer and Poppen, 1985) may be effective in children with attention deficit disorder or hyperactivity. Alladin (2008; 2009) has described an approach of cognitive hypnotherapy. It is theoretically based on CBT but also utilizes hypnotherapy techniques. Cognitive hypnotherapy has been effective in treatment of depression (Alladin and Alibhai, 2007), which is a common comorbidity in ADHD. To the best of our knowledge, only one previous controlled experiment has been published on either hypnotherapy alone, or on hypnotherapy combined with CBT in adults with ADHD (Virta et al., 2010a) with promising results.

There have been at least three group interventions where the ADHD participants have been followed after treatment. In the study by Stevenson et al. (2002), the improvement found in ADHD symptomatology and organizational skills after the intervention was still preserved after one year. In a study by our group (Salakari et al., 2010) treatment responders maintained most of the benefit during a six-month follow-up. Emilsson et al. (2011) found that the treatment effect still increased during a three-month follow-up. Of individual interventions, there has been only one follow-up study where Safren et al. (2010) found that responders and partial responders of 12 sessions CBT maintained their treatment gain during a 12-month follow-up.

In our previous papers (Virta et al., 2010a; Virta et al., 2010b), we investigated the utility and efficacy of novel short-treatment procedures, individual CBT and hypnotherapy, specifically tailored for treating adult ADHD. It was found that both treatments resulted in reduced self-reported ADHD symptoms. There was no difference in symptom reduction between CBT and hypnotherapy groups (Virta et al., 2010a). Here, our aim was to further evaluate the outcome of these therapy modalities by determining (a) whether the improvement was still maintained during the six-month follow-up and (b) whether there was a difference in efficacy between the two treatments in follow-up.

## METHOD

### *PARTICIPANTS*

Participants were recruited by announcements in an ADHD magazine, in an adult ADHD internet discussion forum, and by informing local physicians and clinics specializing in treating ADHD in adults. The inclusion criteria were as follows: (1) 18–49 years of age, (2) ADHD diagnosis made by a physician, (3) no diagnosis of psychosis, severe depression, or paranoia, (4) deficits of attention, executive functions, or working memory found by neuropsychological evaluation, (5) no current alcohol dependency or drug use, (6) not retired, (7) no participation in our previous group rehabilitation study, (8) currently not undergoing any other psychological rehabilitation, and (9) no medication or medication that has been stable for at least three months. In total, 71 interested candidates contacted the researchers, 46 were accepted and 39 were participating. For more details about included and excluded participants and recruiting in general see Virta et al. (2010a; 2010b).

The participants were originally randomized to three treatment groups (hypnotherapy, CBT, cognitive training) and to a control group. Participants in the control group didn't take part in the follow-up period of the study. The follow-up period was six months and the participants were evaluated after three months (T3) and after six months (T4) from the end of the treatment (T2). Because the participants of our previous studies (see Virta et al., 2010a; 2010b) gained benefit only from hypnotherapy and CBT treatments, these two interventions were selected for the follow-up. Originally, there were nine participants in hypnotherapy treatment and ten participants in CBT treatment, but two participants (one in each treatment group) didn't participate in the follow-up. Thus, there were eight follow-up participants in the hypnotherapy group, and nine follow-up participants in the CBT group. The demographic data of the groups at the beginning of the intervention are presented in Table 1.

In hypnotherapy group, six of the eight follow-up participants received medication for ADHD: five of them took methylphenidate and one took dextroamphetamine at the beginning of the treatment. There were no medication changes during the treatment. In follow-up, medication of one participant was changed twice: the dose of dextroamphetamine was decreased during the first three months and then increased back to the original level during the last three months. In the CBT group, five of the nine follow-up participants were receiving medication for ADHD at the beginning of the treatment, and all of them took methylphenidate. One participant ceased taking her medication during the treatment, and one added short-acting methylphenidate to the previous long-acting methylphenidate. During the follow-up, medication of four participants was changed twice: one participant's short-acting methylphenidate was first reduced during the first three months and then removed in the second three-month period, two participants ceased taking long-acting methylphenidate in the first three-month period and then returned back to the original level in the second three-month period, and one participant without medication started dextroamphetamine during the first three months but it was removed in the last three months. In addition, one participant's medication was changed only during the last three months of the follow-up: long-acting methylphenidate was removed.

The groups of hypnotherapy and CBT follow-up participants did not differ at the beginning of the treatment, as analyzed by an analysis of variance or chi-squared test (Fisher's exact test), in age, gender, education, work status, Wender Utah Rating Scale (WURS, see Ward

*Table 1. Characteristics of the follow-up study participants at the beginning of the treatment.*

	Hypnotherapy	CBT
Participants ( <i>n</i> )	8	9
Age: mean (range)	32.1 (21-42)	39.0 (25-49)
Gender: male/female	3/5	3/6
Education: compulsory/additional <sup>a</sup>	2/6	1/8
Working or studying: yes /no <sup>b</sup>	6/2	4/5
ADHD medication ( <i>n</i> )	6	5
Antidepressant medication ( <i>n</i> )	1	2
Psychiatric comorbidity ( <i>n</i> )	4	7
depression ( <i>n</i> )	2 <sup>c</sup>	6
anxiety ( <i>n</i> )	3 <sup>c</sup>	0
personality disorder ( <i>n</i> )	1	1
WURS score: mean (SD)	50.9 (18.5)	53.1 (13.0)
Severity of ADHD (CGI): mean (SD)	3.6 (0.7)	3.8 (0.8)

*a Compulsory = the participant had completed only lower secondary education (i.e. Finnish compulsory education)*

*b Working/studying yes = the participant was working (at least a half-time job) or studying*

*c two participants had both depression and anxiety diagnosis*

et al., 1993) score, severity of ADHD (measured by Clinical Global Impressions, CGI, at the baseline), number of participants having psychiatric comorbidity or number of participants having certain psychiatric diagnosis (all *ps* > 0.05).

The study was approved by the Ethics Committee of Helsinki University Central Hospital, Finland and performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. All participants gave their written informed consent prior to participating in the study.

### HYPNOTHERAPY

The hypnotherapy treatment, designed and implemented by Virta et al. (2010a), was theoretically grounded in cognitive hypnotherapy. It consisted of a set of hypnotherapeutic interventions. The themes of the treatment sessions were selected to cover the main ADHD symptoms set out in the DSM-IV diagnostic criteria (American Psychiatric Association, 1994), and by Brown (2000, 2005) when suitable for the hypnotherapy.

Before the hypnotherapy, participants were evaluated by a psychiatrist (R.V.) to ensure that there were no contraindications for hypnosis. None of the participants was excluded. Hypnotic susceptibility was also evaluated using the Finnish version (Kallio, 1996; Kallio and Ihamuotila, 1999) of the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) (Shor and Orne, 1962). The mean susceptibility score was 5.9 (range from 2 to 10).

The hypnotherapy consisted of 10 weekly sessions led by a psychologist experienced in hypnosis and ADHD (M.V.). The themes and content of the sessions were: stillness/calming, motivation to change, attention, initiation of activities, memory, self-esteem, three individually chosen topics (e.g. fear of social situations, reducing impulsivity, anger management, second treatment of previous themes) and continuation of the process. See Virta et al. (2010a) for more details about the content of the sessions. Each session followed the same procedure: discussion of the preceding hypnotherapy session, discussion of the current theme, induction, hypnotherapy, and discussion. The duration of a session was 40 to 60 minutes.

### *CBT*

CBT treatment was designed and implemented by Virta et al. (2010b). The themes of the treatment sessions were selected to cover the main ADHD symptoms set out in the DSM-IV diagnostic criteria (American Psychiatric Association, 1994), and by Brown (2000; 2005). The CBT consisted of 10 weekly sessions led by a psychologist experienced in ADHD and training in CBT (A.S.). The themes and contents of the sessions were: treatment goals and symptoms of ADHD, attention, motivation and initiation of activities, organization and planning, stress management and relaxation, self-esteem, three individually chosen topics (e.g. memory techniques, managing impulsivity, anger management, second treatment of previous themes) and continuation of the process. The therapeutic procedures are discussed in more detailed in Virta et al. (2010b).

The psychologist followed a written manual (Virta et al., 2009) and used a whiteboard and written material for illustrating the most important points and tasks at hand in the therapy. Individually tailored homework was given at each semi-structured session. Each session followed the same procedure: discussion of the previous homework and theme, introduction and discussion of the new theme, and assignment of the new homework and distribution of the written material. The duration of a session was approximately 60 minutes.

### *OUTCOME MEASURES*

Self-report questionnaires and independent evaluations were used as outcome measures. Data were collected before the treatment (T1), immediately after the treatment (T2), three months after the end of the treatment (T3), and six months after the end of the treatment (T4). The mean time elapsed between T2 and T3 (i.e. the first three-month follow-up period) self-report questionnaires was 94 days (range 77–105) for the hypnotherapy group and 89 days (range 77–99) for the CBT group. The mean time elapsed between T3 and T4 (i.e. the second three-month follow-up period) self-report questionnaires was 84 days (range 64–111) for the hypnotherapy group and 81 days (range 67–100) for the CBT group. T3 and T4 independent evaluations were collected within nine days of the collection of self-report questionnaires. The independent evaluator was a clinical psychologist experienced in adult ADHD (M.A.) who was blind to the study group of the participants.

For this follow-up study, we chose the ADHD symptom measures that had proved most sensitive in our previous studies (see Virta et al., 2010a; 2010b). The outcome measures for ADHD symptoms, psychiatric symptoms, quality of life and independent evaluation were:

*Brown Attention Deficit Disorder Scale – Adult Version (BADD5) (Brown, 1996)*

BADD5 is a 40-item inventory from which we used the self-report version. From the BADD5, a total score and scores of the five sub-domains of activation, attention, effort, affect, and memory were derived. Higher scores indicate a greater impairment.

*Symptom Check List (SCL-90) (Derogatis et al., 1973)*

SCL-90 is a 90-item self-report scale for the measurement of psychiatric symptoms. Several subscales can be calculated, e.g. for anxiety and depression. Total scores and subscale scores were used in the analyses of the follow-up period. Moreover, a 16-item sum score (SCL-16) reflecting the characteristics prominent in ADHD (Hesslinger et al., 2002) was calculated from the SCL-90. The higher the scores the greater were the symptoms.

*Beck Depression Inventory – Second Edition (BDI-II) (Beck et al., 1996)*

BDI-II is a 21-item scale that evaluates current self-reported symptoms of depression. Higher scores reflect greater problems.

*Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q) (Endicott et al., 1993)*

Q-LES-Q is a 93-item self-report scale, from which 91 items can be grouped into eight subscales that indicate: satisfaction with physical health, subjective feelings, work, household duties, school, leisure activities, social relationships, and general activities. We combined the work and school subscales into a work/study subscale, as done earlier (Virta et al. 2010a; 2010b). If the participant gave both scores, the more important score was used (i.e. if the participant was working full-time and also taking some educational courses, the work score was used). Higher scores indicate greater enjoyment or satisfaction. The scores are reported as a percentage of the maximum score.

*Clinical Global Impressions (CGI) (Guy, 1976)*

CGI was completed by the independent evaluator. At T1, severity of ADHD was evaluated according to the CGI, which is a single seven-point rating scale of functioning varying from 1 = normal, not at all ill, to 7 = among the most extremely ill patients. At T2, T3 and T4, global improvement was assessed using a seven-point scale varying from 1 = very much improved, to 7 = very much worse (4 = no change). Each assessment was performed in comparison to the participant's preceding evaluation.

## STATISTICAL ANALYSIS

Missing values on the questionnaires were substituted with that particular respondent's mean score. However, no replacements were made in Q-LES-Q as the scores were calculated as a percentage of the maximum score. If the participant's outcome scores were missing completely for T3 or T4, the participant was excluded from the analysis. Distribution properties of the variables were inspected visually and with Shapiro-Wilk tests. Parametric tests were chosen for the statistical analyses. The repeated measures ANOVA was performed to find time x group

interactions for outcome variables at follow-up. Where Mauchly's test indicated violation of the sphericity assumption, Greenhouse–Geisser corrected values were used. The effect sizes were quantified by partial eta squared ( $\eta_p^2$ ). Paired samples *t*-tests were performed for both groups separately for comparing T2 versus T4 outcomes. Changes in CGI were analyzed using the chi-squared test (Fisher's exact test,  $\chi^2$ ).

## RESULTS

Mean scores of the self-report measures for the hypnotherapy and the CBT groups are presented in Table 2.

To compare the hypnotherapy group with the CBT group during the follow-up, repeated measures ANOVA was performed (see Table 2). There was a significant time  $\times$  group interaction in SCL-90 total score of overall psychiatric symptoms [ $F(2,30) = 4.10, p = .03, \eta_p^2 = .215$ ], a significant interaction in BDI-II score of the depression symptoms [ $F(2,30) = 3.34, p < .05, \eta_p^2 = .182$ ] and an almost significant in SCL-16 score of ADHD symptoms [ $F(2,30) = 3.24, p = .053, \eta_p^2 = .178$ ]. There was no significant time  $\times$  group interaction found in BADDs total scale or any of the BADDs subscales. However, there was a trend in BADDs Affect subscale [ $F(2,30) = 1.96, p = .16, \eta_p^2 = .116$ ]. As seen from Table 2, Figure 1 and Figure 2, there was decreasing trend of the symptoms in the hypnotherapy group during the six-month follow-up. In CBT group, there was more variation in the treatment outcome during the follow-up, but qualitatively the symptoms seemed to increase during the second three-month period of the follow-up as compared to the preceding evaluation (see Table 2, Figure 1 and Figure 2). When inspecting the treatment gains of the whole treatment and follow-up period in BADDs subscales (i.e. (T4–T1)/T1), it was found that the groups differed most in the BADDs Affect subscale: CBT group had only 2.4% decrease of symptoms from T1 to T4 whereas hypnotherapy group had 14.1% decrease of symptoms.

To evaluate how the improvement gained from the treatment remained during follow-up, ADHD symptoms were compared between T2 and T4 for both groups separately. In the hypnotherapy group, there was a decrease of ADHD symptoms in SCL-16 [ $t(7) = 3.01, p < .05$ ] and no change in BADDs total [ $t(7) = 0.44, p > .05$ ]. Thus, ADHD symptoms decreased or did not increase during follow-up in hypnotherapy group (see Figures 1 and 2). In the CBT group, ADHD symptoms of SCL-16 appeared to increase between T2 and T4 qualitatively (see Figure 1), but the increase was not statistically significant [ $t(8) = -1.41, p > .05$ ]. Also, there was not a statistically significant change in BADDs total scale between T2 and T4 in the CBT group [ $t(8) = -0.11, p > .05$ ]. In BADDs total scale, there was no statistically significant change between T2 and T4 in the CBT group [ $t(8) = -0.11, p > .05$ ]. Mean value of the BADDs total scale at T4 was about the same level as at T2, despite of the trend of symptom increase from T3 (see Figure 2). As a summary, treatment outcome as measured with ADHD symptoms appears more stable in the hypnotherapy group during follow-up.

In SCL-90 subscales, there was a significant Time  $\times$  Group interaction in repeated measures ANOVA for the follow-up period (T2–T3–T4) in anxiety symptoms [ $F(2,30) = 5.73, p = .01, \eta_p^2 = .28$ ], and almost significant interaction in depression [ $F(2,30) = 3.23, p = .05, \eta_p^2 = .18$ ], hostility [ $F(2,30) = 3.09, p = .06, \eta_p^2 = .17$ ] and psychotic symptoms [ $F(2,30) = 3.45, p = .07, \eta_p^2 = .19$ ].

Mean scores of the SCL-90 depression subscale and BDI-II for the groups changed in quite similar way during the follow-up: in the CBT group, mean scores seemed to increase towards the end of the follow-up, whereas in the hypnotherapy group mean scores typically remained in the decreased level or even decreased more. For instance, when comparing BDI-II scores between T2 and T4 for both groups separately with a paired *t*-test, there was an almost statistically significant decrease in BDI-II scores in the hypnotherapy group [ $t(7) = 2.16, p = .07$ ]. Between T1 and T4, the decrease was statistically significant [ $t(7) = 2.55, p = .04$ ]. In the CBT group, on the contrary, BDI-II scores seemed to return to the pretreatment level (Figure 3). However, increase of BDI-II scores from T2 to T4 was not statistically significant [ $t(8) = -1.89, p > .05$ ].

According to the independent evaluators' CGI ratings, three of the eight participants in the hypnotherapy group improved from T2 to T4 and none declined. In the CBT group, one individual of the nine participants improved from T2 to T4, and two declined. However, statistically the group differences were not significant (Fisher's exact test:  $\chi^2 = 2.61, p > .05$ ).

## DISCUSSION

At follow-up, ADHD symptoms of the hypnotherapy group either remained at the decreased post-treatment level (measured by BADDS total) or even continued to decrease from the post-treatment level (as measured by SCL-16). In the CBT group, no difference was found between the end-of-treatment ADHD symptoms and symptoms at six months follow-up, indicating persistence of treatment benefits as well. However, in CBT group, there was more individual variation and a general tendency towards symptom increase during the last three months of the follow-up. Thus, long-term treatment outcome of hypnotherapy was generally stronger and more stable than the outcome of CBT. In our previous studies (Virta et al. 2010a; 2010b), both CBT and hypnotherapy were effective in treating adults with ADHD. The CBT and the hypnotherapy groups did not differ in any of the outcome measures during the treatment period (Virta et al. 2010a).

The finding that ADHD symptoms might start to return during the follow-up is in line with the previous results of CBT interventions. To the best of our knowledge, only one individual CBT intervention study with a long follow-up period has been previously published. In this Safren et al. (2010) study, participants showing at least partial response to CBT, maintained their improvement at the follow-up assessments, up to nine months post-treatment. However, CBT participants had increasing scores of small magnitude in the self-report measure of ADHD symptoms during follow-up. The similar tendency, i.e. increase of ADHD symptoms during follow-up, has been found in CBT group intervention studies as well. In our previous study (Salakari et al. 2010), the improved participants had some increase of ADHD symptoms three months after the treatment. They, however, maintained improvement when compared to the pre-treatment level. In Stevenson et al. (2002) study with a one year follow-up, there was a slight decrease of ADHD symptoms at two months post-treatment and thereafter an increase of ADHD symptoms towards the post-treatment level when looking at the mean scores of ADHD symptoms. At the end of follow-up, the mean score of ADHD symptoms in the group still remained under the post-treatment level. In Emilsson et al. (2011) study, self-reported ADHD symptoms did not start to increase during three-month follow-up period, which matches well with the results of our current study at three-month posttreatment. Slight qualitative differences between the results

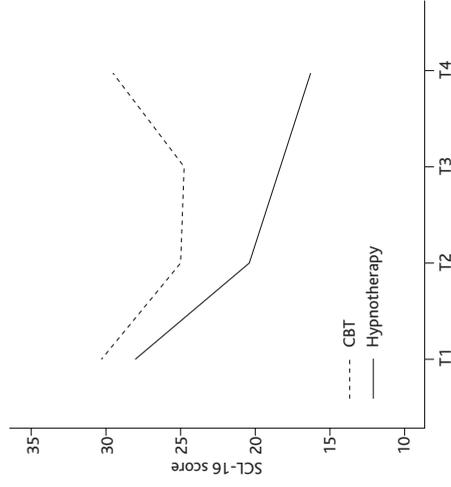
Table 2. Mean (standard deviation) scores for participants' self-ratings at T1 (before treatment), T2 (immediately after treatment), T3 (three months after treatment), and T4 (six months after treatment) with the results of Time x Group interaction in repeated measures ANOVA for the follow-up period (T2-T3-T4).

	Hypnotherapy (n = 8)				CBT (n = 9)				F(2,30)	p-value
	T1	T2	T3	T4	T1	T2	T3	T4		
BADDS										
Activation	17.8 (5.3)	14.4 (6.5)	15.3 (6.8)	14.9 (6.0)	20.2 (2.2)	17.4 (4.7)	15.3 (3.9)	17.2 (3.5)	0.94	ns
Attention	18.9 (4.9)	16.6 (5.7)	14.6 (7.6)	16.0 (6.5)	21.8 (3.1)	18.1 (5.3)	15.7 (5.2)	18.1 (5.5)	0.08	ns
Effort	14.8 (5.5)	13.5 (4.9)	11.5 (6.0)	11.6 (6.2)	18.2 (4.5)	15.9 (4.6)	13.7 (6.0)	14.4 (4.7)	0.05	ns
Affect	9.3 (4.0)	7.5 (3.8)	7.9 (4.4)	7.4 (2.9)	11.4 (2.2)	9.8 (2.9)	8.9 (4.0)	11.3 (4.4)	1.96	ns
Memory	12.9 (4.1)	10.6 (2.5)	11.3 (2.9)	9.9 (3.7)	11.8 (4.4)	10.1 (5.1)	9.4 (3.6)	10.8 (4.5)	1.85	ns
Total	73.5 (17.0)	62.6 (17.7)	60.5 (21.3)	59.8 (19.9)	83.4 (12.8)	71.3 (19.7)	63.0 (18.7)	71.9 (18.4)	0.69	ns
SCL-16	28.1 (12.4)	20.4 (10.0)	18.5 (9.7)	16.3 (8.8)	30.3 (7.5)	25.1 (5.6)	24.9 (11.6)	29.6 (12.6)	3.24	.05
SCL-90	87.6 (46.5)	62.0 (40.8)	56.6 (33.0)	51.6 (36.2)	92.3 (19.9)	78.7 (27.3)	80.9 (53.7)	106.4 (54.5)	4.10	.03
BDI-II	12.0 (10.8)	9.6 (10.9)	6.4 (4.6)	6.5 (7.4)	13.3 (5.8)	9.0 (8.8)	12.0 (10.6)	13.6 (6.9)	3.34	.05
Q-LES-Q										
General	57.0 (17.4)	65.1 (13.8)	67.8 (12.4)	70.6 (16.3)	56.4 (8.8)	63.0 (14.1)	60.0 (14.2)	57.3 (9.6)	1.37	ns
Work/study <sup>a</sup>	72.0 (20.5)	83.3 (17.8)	90.0 (9.7)	88.0 (13.0)	45.8b (23.1) <sup>b</sup>	75.2 (17.6)	78.3 (16.6)	71.5 (14.6)	0.77	ns

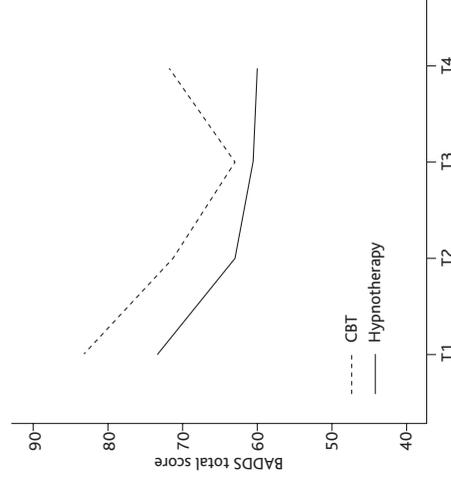
<sup>a</sup> included the participants, which have the value in every three measures (T2, T3 and T4), n = 4 in hypnotherapy and n = 6 in CBT group. All the participants have Q-LES-Q Work scale here, since those who had Q-LES-Q study as their main score had missing values in some of the T2, T3 or T4 measures.

<sup>b</sup> n = 4

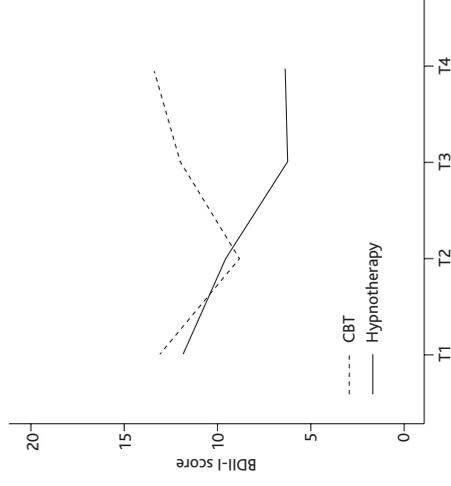
*Figure 1. SCL-16 score for ADHD symptoms at T1 (before treatment), T2 (immediately after treatment), T3 (three months after treatment) and T4 (six months after treatment) for CBT (n=9) and hypnotherapy (n=8) groups*



*Figure 2. BADDs total score for ADHD symptoms at T1 (before treatment), T2 (immediately after treatment), T3 (three months after treatment) and T4 (six months after treatment) for CBT (n=9) and hypnotherapy (n=8) groups*



*Figure 3. BDI-II score for depression symptoms at T1 (before treatment), T2 (immediately after treatment), T3 (three months after treatment) and T4 (six months after treatment) for CBT (n=9) and hypnotherapy (n=8) groups*



in the CBT studies may be due to different ADHD symptom scales and due to different contents of the therapy.

Since there are no other controlled studies about hypnotherapy for treating adults with ADHD, the long-term outcome results are not available for comparison. In Kirsch et al. (1995) meta-analysis, CBT was compared with the same therapy supplemented by hypnosis. There was follow-up data available only for the treatment of obesity. When hypnosis was used, the biggest weight loss actually happened during six months after the treatment and the weight remained at reduced level at two year follow-up. Kirsch et al. (1995) speculated that advantages of adding the hypnosis to CBT treatment may increase over time regardless of the target disorder. Our study suggests that the treatment outcome in adult ADHD has become more stable with the hypnotherapy than CBT during the follow-up.

During six-month follow-up, the outcome of the treatments differed from each other to the favour of the hypnotherapy group in overall psychological well-being (SCL-90 total), depression (BDI-II), anxiety (SCL-90 anxiety) and almost statistically significantly in some of the ADHD symptoms (in SCL-16, not in BADDs). In the second three-month period of the follow-up, self-reported ADHD symptoms and self-reported psychiatric symptoms tended to increase in the CBT group whereas in the hypnotherapy group, the symptoms remained at decreased post-treatment level or even continued to decrease from that. This is in line with Alladin and Alibhai (2007) study where cognitive hypnotherapy and CBT were compared in treating depression. At one year follow-up, hypnotherapy was found to be more efficient than CBT. However, improvement in depression symptoms also remained in the CBT group during the whole one year follow-up. Our CBT was designed for treating ADHD, not for treating anxiety or depression, so this may have had an influence on the returning of psychiatric symptoms. The outcome of the treatments did not differ in quality of life at follow-up. As discussed in Virta et al. (2010a), it may be that Q-LES-Q scale is not sensitive enough for assessment of the adult ADHD population.

There was no statistically significant change in independent evaluator's ratings (CGI) during follow-up or between the groups in follow-up. However, there was a tendency that the improvement of the hypnotherapy participants remained better than in the CBT group. The limitations of the independent evaluation procedure are more widely discussed in Virta et al. (2010a; 2010b): the impairments may not be clearly apparent in a short discussion, participants may want to give a better impression, and blindness for the therapy method cannot always be secured in the assessment situation.

It is not clear from the literature why hypnotherapy yields longer-lasting improvement than CBT, but several possible reasons and mechanisms can be suggested. Since the outcome of the two treatments did not differ at the end of the actual treatment period, difference in efficiency emerged during the follow-up. Baker and Jensen (2011) have suggested that the use of hypnosis can lead to a more powerful and rapid alliance than with any other therapy method. The alliance, on the other hand, is known to correlate well with the outcome of therapy (Horvath and Symonds, 1991; Horvath and Bedi, 2002; Martin et al., 2000). Huynh et al. (2008) have discussed that in hypnotherapy one main goal is often to teach the attitude of hope within the context of mastery. Expectations of the patient have been recognized as one of the influencing factors in psychological treatments (Greenberg et al., 2006; Mondloch et al., 2001). Can expectations be higher with hypnotherapy than with CBT? At least, after the treatment our hypnotherapy participants had more belief than the CBT participants that

things in their life are going to get better in the future. They estimated this question with a 0–4 scale at each evaluation point from T1 to T4 (the group main effect [ $F(1,15) = 10.73$ ,  $p < .01$ ,  $\eta_p^2 = .41$ ] in favour of the hypnotherapy group at the follow-up period (T2–T3–T4), whereas there was no difference in the scores before the treatment [ $t(15) = .58$ ,  $p > .05$ ]). Interestingly, if there is stronger effect in expectations in hypnotherapy than in CBT, it seems to last at least six months.

Hypnotherapy and CBT of our study were mainly designed for teaching new skills, new coping strategies and addressing secondary problems of ADHD, such as negative thoughts and beliefs. Hypnotherapy, with focused attention involved, may strengthen the new positive thoughts and beliefs more than CBT. In addition, the hypnotherapy may also have a direct impact on ADHD core symptoms, which is not similarly possible with CBT. We suggest here three possible factors that hypnotherapy may bring to the treatment of ADHD core deficits: First, the deep relaxation experience produced by hypnosis may influence directly in the hyperactivity and impulsivity symptoms. Such an experience, happening for the first time in the participant's life, may be an unforgettable and empowering experience (Alladin and Alibhai, 2007). Creating direct and compelling evidence for participants, that their subjective experience can be altered, might give rise to a new sense of hope (Alladin, 2012b). However, it is known from the previous research that relaxation alone without hypnosis and with psychoeducational support is not as effective as CBT for treating adults with ADHD (Safren et al., 2010).

Second, hypnosis itself may exercise the brain's attentional and executive functions. Hypnotic induction and suggestions contain focusing or narrowing the attention. We suggest that this may serve directly as a rehabilitation exercise for the brain areas involved in attentional functions, which are impaired in ADHD. In addition, hypnosis has a capability of reducing the activation of the anterior cingulate cortex (Kihlstrom, 2013). Anterior cingulate cortex is crucial for executive functioning, inhibitory control monitoring, target detection and error processing (Schneider et al., 2006), in which functions the ADHD adults typically have problems. One main difference between the CBT and hypnotherapy is that the hypnotherapy has traditionally been concerned with insight and unconscious reframing, while CBT concentrates on cognitive restructuring (Alladin, 2012a). Therefore, hypnotherapy may have a broader influence in different brain functions and regions than is possible with CBT.

Third, hypnosis might influence the emotional regulation. Interestingly, the difference in the long-term outcome of hypnotherapy and CBT was most evident in the area of emotional regulation, as measured with BADDs Affect subscale. Lately it has been discussed, that there is enough evidence for the emotional dysregulation to be included to the core deficits in adult ADHD (Retz et al., 2012). The emotions play a role in all executive functions: they can influence attention, memory, decision making, planning and even muscle tension. In general, when the emotional regulation is improved, it may have a positive influence on all other executive functions as well. From the follow-up point of view, when the improvement in emotional regulation remains, it may support to maintain improvement gained in other executive functions as well. Surely, emotional dysregulation have a role on depression and anxiety symptoms, which are common comorbidities of ADHD.

In our current study, the CBT participants had several medication changes during follow-up. When inspecting the follow-up ADHD symptoms and depression symptoms of the five CBT participants with medication changes and the symptoms of the rest of the CBT participants, it

seemed that both subgroups had a quite similar increasing trend of symptoms during the last three months of the follow-up. Thus, medication changes did not seem to explain the slight increase of the symptoms during the last three months. Treatment groups in our study did not differ statistically from each other at pre-treatment, but participants in the CBT group had slightly more ADHD symptoms in general. Also, qualitative differences in comorbidity between the participants in the treatment groups may have influenced the long-term outcome, especially when short interventions such as ours are used.

Our study has limitations that should be considered when interpreting the results. First, the sample consisted only eight participants in the hypnotherapy group and nine in the CBT group, which are small numbers. Thus, the results of the follow-up must be considered with caution. Second, there was no control group during the follow-up period. The third limitation is the severity of the ADHD symptoms of the participants. In CGI, participants were rated mildly to markedly ill, thus leaving the most extreme cases missing. Also, the recruitment of the participants may have caused some bias to the more motivated and less severely disabled ADHD adults to participate in the study. Thus, the results cannot be generalized to the whole ADHD population.

Despite these limitations, our study has many strengths. All diagnoses were made by a specialist who is familiar with neuropsychiatric disorders, and they were duly verified. The outcome measures were wide-ranging (self-report questionnaires, independent evaluations), and participants were randomly allocated to different treatment groups. Both treatments are originally designed to take account the characteristics of ADHD.

It may be a sum of all the factors discussed about that leads to the longer-lasting improvement in the hypnotherapy group. According to Rostain and Ramsay (2006), the pharmacotherapy is a 'bottom up' treatment for the core symptoms of ADHD and the CBT provides a 'top-down' psychosocial approach for addressing functional problems, modifying negative thought patterns and developing new coping strategies. In a way, hypnotherapy may contain elements of both 'bottom up' and 'top-down' approaches.

Since both interventions had long-lasting treatment effects, our study supports the utility of psychological interventions in treatment of adult ADHD. The findings of this study suggest that hypnotherapy yields longer-term benefits than CBT in treating adults with ADHD. Since this is the first follow-up study on hypnotherapy for treating ADHD in adults, further studies with larger sample sizes, longer treatments and longer follow-ups are needed to generalize the results.

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Correspondence to Maarit Virta, Institute of Behavioural Sciences, Division of Cognitive and Neuropsychology, P.O.Box 9, 00014 University of Helsinki, Finland  
Email: maarit.virta@helsinki.fi  
Phone: +358 2941 29535