



Coping strategies among adults with ADHD: The mediational role of attachment relationship patterns



Michal Al-Yagon*, Michal Lachmi, Lilach Shalev

School of Education, Tel-Aviv University, Tel-Aviv, Israel

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ABSTRACT

Background: For adults with attention/hyperactivity disorder (ADHD), research is scarce on their coping with stress (despite studies demonstrating other self-regulation deficits) and their attachment patterns (despite rare research in younger persons with ADHD showing high vulnerability to insecure attachments). Attachment was linked with coping and self-regulation in general populations but not yet in ADHD. This study explored the possible mediational role of attachment patterns in explaining associations between adults' ADHD symptoms and dysregulated coping.

Methods: Participants comprised 62 adults (32 females, 30 males) ages 21–40 years ($M = 27.60$, $SD = 4.80$) in two groups: 31 adults with formally diagnosed ADHD and 31 demographically matched adults without ADHD. Instruments included computerized neuropsychological tests (sustained/executive attention) and self-reports (ADHD, coping, attachment).

Results: Disorder status was verified via ADHD-symptom self-reports and computerized testing. Preliminary analyses revealed significant intergroup differences on coping strategies and attachment. PROCESS analyses (Hayes, 2013) pinpointed attachment measures' mediating role (especially attachment anxiety) regarding ADHD's association with coping.

Conclusions: Significantly more maladaptive attachment and coping outcomes emerged for adults with ADHD than controls. Attachment insecurity's role in mediating ADHD's association with coping was partially supported. Possible unique adaptive value of attachment relationships was discussed for coping with stressors in adulthood with ADHD.

1. Introduction

Coping with stress is considered a major aspect of self-regulation, offering important information regarding individuals' capacities to manage their emotions and cognitions, regulate their behavior, control their autonomic arousal, and structure their environments to handle stress successfully (see [Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001](#) for a review). The present study focused on a unique possible pathway underlying this self-regulatory dimension in adults with attention deficit hyperactivity disorder (ADHD), who commonly evidence a high prevalence of dysregulation in emotional, social, cognitive, and behavioral domains ([Shaw, Stringaris, Nigg, & Leibenluft, 2014](#)). ADHD, a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, is one of the most common disorders reported for children and adolescents, with 5% prevalence rates reported across different cultures (*DSM-5*, [American Psychiatric Association – APA, 2013](#)). Research has shown that ADHD persists into adulthood for the vast majority of those who were clinically identified with the disorder in childhood ([Adler, Barkley, &](#)

* Corresponding author at: Department of School Counseling and Special Education, Tel-Aviv University, Tel-Aviv, 69978, Israel.
E-mail address: alyagon@post.tau.ac.il (M. Al-Yagon).

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Newcorn, 2008), with a worldwide prevalence of ~2.5–4.9 % for ADHD in adulthood (Edvinsson & Ekselius, 2018).

Across the lifespan, ADHD symptoms reveal clear associations with clinically significant academic and/or socioemotional impairments (APA, 2013; DuPaul et al., 2017; Nigg, 2013; Ramos-Galarza, Fiallo-Karolys, Ramos, Jadán-Guerrero, & Paredes-Núñez, 2018). For example, adults with ADHD often report highly maladaptive functioning like academic failure, erratic employment, risky behaviors, substance abuse, marital difficulties, and driving problems (Adler et al., 2008; Hechtman et al., 2016). Notably, adults with ADHD commonly show comorbid disorders like mood and anxiety disorders, personality disorders, and specific learning disabilities (Thapar & Cooper, 2016). Furthermore, 34–70 % of adults with ADHD have been found to manifest self-regulation deficits (Shaw et al., 2014).

Current theoretical models of ADHD suggest multiple pathways underlying these individuals' possible dysregulation, such as links between cognitive and emotional regulatory systems (e.g., physiological arousal, inhibitory control, attentional control, cognitive flexibility) and shared neurocognitive deficits (Barkley & Fischer, 2011; Hirsch, Chavanon, Riechmann, & Christiansen, 2018; Shaw et al., 2014). However, studies have rarely explored the possible role of attachment in adults with ADHD for explaining their coping behavior, despite the growing literature on attachment theory in the general population as a framework for explaining individual variations in self-regulation capacities (Mikulincer & Shaver, 2007, 2013). Adults with ADHD may be expected to demonstrate greater vulnerability to insecurity in their close relationships, considering the higher incidence of insecure attachments shown for individuals with ADHD at younger ages compared to their non-ADHD peers (Al-Yagon, 2016; Thorell, Rydell, & Bohlin, 2012). The current study explored the possible links between ADHD, attachment, and coping resources in adults.

1.1. Coping strategies

Coping refers to the complex set of self-regulatory mechanisms by which individuals adapt to stress (Folkman & Moskowitz, 2004; Lyons, Leon, Roecker, & Dunleavy, 2010). Largely, models of stress and coping (Folkman & Moskowitz, 2004; Lazarus, 1999, 2006) have defined coping as the process of applying cognitive and behavioral efforts to manage external and/or internal demands that may exceed the individual's resources. Coping strategies may be future-oriented, to proactively prevent or curb an upcoming stressor, or they may be past-oriented, in reaction to an ongoing stressor (Sohl & Moyer, 2009). Likewise, coping may reflect volitional, conscious effort to change distressing circumstances or may reflect automatic, involuntary efforts without conscious control (Compas et al., 2001). Research (Abery, 2006; Folkman & Moskowitz, 2004; Richardson, 2002) has underscored several major types of coping strategies: (a) *task-oriented or active* coping strategies that attempt to solve a problem, to reconceptualize the problem, or to minimize the effect of a problem, such as information seeking and problem solving; (b) *emotion-oriented* coping such as affective responses and self-preoccupation; and (c) *avoidance-oriented* coping strategies to deny or escape the stressful situation including social diversion efforts or distracting oneself by engaging in a substitute task.

Overall, studies on the general population have emphasized the role of coping strategies as central mediators of potential stress-related responses that affect individuals' well-being, behavior, and adjustment (Al-Yagon & Margalit, 2013; Folkman & Moskowitz, 2004). However, knowledge is conspicuously absent regarding such self-regulatory strategies for coping with stress among adults with ADHD. This paucity of literature on coping continues despite the recent upsurge of interest regarding the dysregulation of adults with ADHD in other self-regulatory domains (Barkley & Fischer, 2010). The rare available research focusing specifically on the coping strategies of adults with ADHD (Young, 2005) has reported their higher use of maladaptive coping strategies compared to adults without ADHD, such as aggressively confronting stressful situations or else turning to escape or avoidance strategies. Young's (2005) study likewise indicated that, as a group, adults with ADHD showed deficits in adaptive problem-solving coping strategies such as the ability to outline a relevant plan of action and follow it.

1.2. An attachment perspective on self-regulation capacities

The attachment theory framework (Bowlby, 1969/1982Bowlby, 1969/1982, 1988) highlighted the role that early interactions with significant others play in explaining individual variations in personality and socioemotional development. Although this theory focused on early life, it is considered a highly relevant framework for exploring adults' patterns of attachment and understanding individual variability in adjustment across the lifespan (see Mikulincer & Shaver, 2007 for a review). Briefly, attachment theory emphasizes that over the course of the first year of life, infants develop a specific and enduring relationship with their primary caretakers (Ainsworth & Wittig, 1969). Proximity to an available, supportive, and responsive caregiver ("attachment figure") provides the infant with a sense of "secure base," which refers to a set of expectations about others' availability and responsiveness in times of stress. Children's experiences with these attachment figures become internalized into "working models of attachment" – mental representations of significant others and of the self (Bowlby, 1969/1982Bowlby, 1969/1982; Waters & Cummings, 2000). These mental "working model" representations unfold as unique attachment styles, comprise stable patterns of cognitions and behaviors manifested in later close relationships and social interactions across the lifespan.

Notably, researchers have applied diverse approaches to assess attachment relationships during adulthood, including interviews (e.g., Adult Attachment Interview, George, Kaplan, & Main, 1985) and questionnaires (e.g., Experiences in Close Relationships Scale, Brennan, Clark, & Shaver, 1998). Data from research utilizing questionnaire measures have focused on the role of two orthogonal dimensions of attachment insecurity: anxiety and avoidance (Brennan et al., 1998; Mikulincer & Shaver, 2007). *Attachment anxiety* refers to a strong desire for closeness and protection, intense worries about significant others' availability and one's own value for these significant others, and the tendency to use hyperactivating behaviors to deal with interpersonal insecurity. *Attachment avoidance* refers to an individual's discomfort with the closeness of significant others, preference for emotional distance, and high tendency for

self-reliance, as well as using deactivating behaviors to deal with interpersonal distress (Shaver & Mikulincer, 2010).

A body of evidence on attachment in individuals with typical development has pinpointed the important role of adults' attachment representations in explaining various psychological and self-regulatory resources such as affect regulation and coping with distress (e.g., Manning, Dickson, Palmier-Claus, Cunliffe, & Taylor, 2017; Mikulincer & Shaver, 2007, 2013). In contrast, less research has investigated attachment among adults with ADHD, despite growing awareness about the higher incidence of insecure attachment patterns reported for children and adolescents with ADHD, compared to their young peers without ADHD (Al-Yagon, 2009, 2016, 2018; Thorell et al., 2012). The little existing research on attachment in adults with ADHD has reported a similar association between insecure attachment and ADHD symptoms (Storebø, Rasmussen, & Simonsen, 2016), calling for additional exploration.

1.3. The current study

Altogether, research on coping with stress is scarce for adults with ADHD, despite prior studies on their other self-regulation deficits. Likewise, research is lacking on attachment patterns in adults with ADHD, although the few studies available on younger persons with ADHD have shown a vulnerability to more insecure attachment relationships than in the general population. Moreover, attachment has been linked with coping and with self-regulation in the literature, but not for individuals with ADHD despite their possible higher risk in these areas. Thus, the current study objectives attempted to narrow theoretical and empirical gaps in the study of adults with ADHD by: (a) exploring features of coping strategies – which are assumed to be a major dimension of self-regulation processes – as manifested differently for adults with and without ADHD, in light of the dysregulation found previously for adults with ADHD in other self-regulatory domains; (b) extending the investigation of attachment patterns to adults with ADHD – by assessing attachment relationships as manifested differently for adults with and without ADHD, in light of the vulnerability to insecure attachments found at younger ages for individuals with ADHD; and (c) examining the possible mediation role of attachment measures (anxious/avoidant) as risk/protective factors in explaining the association between ADHD and coping strategies. In other words, this study examined whether secure attachment (i.e., low levels of anxious and avoidance attachment patterns) would protect adults with ADHD from the negative effects of their inattentive or hyperactivity-impulsivity symptoms on their ability to implement adaptive, task-focused coping strategies rather than less adaptive ones.

Corresponding with these objectives, the present study sampled a group of Israeli adults with formally diagnosed ADHD and a matched comparison group of adults without disabilities, to test three general hypotheses. First, adults with ADHD were expected to report lower scores on task-oriented coping strategies and higher scores on emotion-oriented and avoidance-oriented coping strategies than adults from the control group. Second, adults with ADHD were expected to reveal higher scores on attachment avoidance and attachment anxiety compared to the control group. And, third, each of the two attachment insecurity measures (i.e., anxiety and avoidance) were expected to mediate the association between ADHD and each of the coping strategies.

2. Method

2.1. Participants

The sample comprised 62 adults (32 females, 30 males) ages 21–40 years ($M = 27.60$, $SD = 4.80$) in two groups: 31 adults with formally diagnosed ADHD and 31 adults without ADHD or other disabilities, who were matched to the ADHD group for sex, age, education, and occupational status. Thus, a set of *t*-test and chi-square analyses revealed no significant differences between the ADHD and non-ADHD groups regarding these demographic variables. Regarding education, 43 % of participants had completed higher education. Regarding socioeconomic status, 53 % reported average income or above. Regarding occupational status, 43 % were students, 39 % worked as salaried employees, 5% had an independent business, 5% were in the military, and 8% neither worked nor studied. All participants had normal or corrected-to-normal vision.

2.1.1. Adults with ADHD

All 31 adults (16 men, 15 women) in the ADHD group had previously received a diagnosis of ADHD according to self-report via a detailed demographic lifespan information checklist. Prior diagnostic psychiatric and/or neurological evaluations had included clinical interview, computerized testing, as well as widely utilized measures of ADHD symptoms based on the *DSM-IV-TR* (American Psychiatric Association, 2000) that was in use at the time of assessment. The *DSM-IV-TR* diagnostic criteria for ADHD comprised: (a) six or more items from one of two symptom groups – inattentiveness or hyperactivity-impulsivity; (b) impairment present in at least two settings; and (c) clear evidence of interference with developmentally appropriate social, academic, or occupational functioning. The ADHD diagnosis of adults in this group was confirmed in the current study by a score of 55+ on self-reported ADHD symptoms (see ADHD Self Report Scale – ASRS – below). Overall, participants in this group reported high rates of comorbidity with specific learning disorders ($n = 22$; 73 % of this group) such as reading, writing or mathematics disabilities.

2.1.2. Comparison group

This group comprised 31 adults (14 men, 17 women) without ADHD who were demographically matched to the ADHD group. Criteria for inclusion in the non-ADHD group, to verify nondisabled status based on the self-reported demographic checklist, comprised: (a) no difficulties in academic skills, specifically in reading, writing, or mathematics; (b) no diagnostic evaluation or special assistance from school staff or out-of-school resources during their educational history; (c) no testing accommodations from the school psycho-educational team over the years; and (d) an ASRS score of ADHD symptoms below 53.

2.2. Instruments

Research instruments consisted of a demographic questionnaire, two computerized neuropsychological tests of attention, and three self-report measures (ADHD, coping, attachment).

2.2.1. Demographic lifespan information checklist

This questionnaire collected information on participants' age, marital status, education, SES, ADHD diagnosis/treatment history, and indices of comorbid psychopathology (e.g., other previous diagnoses/treatments, academic and occupational histories).

2.2.2. Computerized tests of attention

The neuropsychological tasks measuring *sustained attention* and *executive attention* (Tsal, Shalev, & Mevorach, 2005) were grounded in Posner and Petersen's (1990) influential theory of attention networks. Prior studies pinpointed the sustained and executive attention functions as most consistently demonstrating cognitive difficulties among adults with ADHD (Hervey, Epstein, & Curry, 2004; Segal, Mashal, & Shalev, 2015).

2.2.2.1. Sustained attention. The Conjunctive Continuous Performance Test (CCPT; Shalev, Ben-simon, Mevorach, Cohen, & Tsal, 2011) assessed sustained attention – the ability to allocate attentional resources to a non-attractive task over time while maintaining a relatively consistent level of performance. This test, comprising a continuous block of 320 trials, was always administered as the first task. Participants were asked to respond (press the space bar) upon seeing a red square (appearing on screen in 30 % of trials) and to withhold responses to all other colored geometric shapes. Performance was measured by the standard deviation of reaction time (STD of RT; in msec), with higher scores indicating greater difficulty to stay on task (range: 35–158 msec).

2.2.2.2. Executive attention. To measure executive attention – the ability to resolve conflicts of information and/or responses – participants completed the Location Direction Stroop-like Test (LDST), which presented a series of white arrows above or below the center of the computer screen. In location subtasks, participants were asked to respond to each arrow's location while ignoring its direction. In direction subtasks, participants were asked to respond to the direction toward which the arrow was pointing, while ignoring its location. Half the trials within each subtask type were congruent (e.g., an arrow presented above the screen's center pointing upward), and half were incongruent (e.g., an arrow presented above the screen's center pointing downward). Hence, the LDST included four conditions: location-congruent, location-incongruent, direction-congruent, and direction-incongruent. Each subtask was comprised of two separate blocks of 40 trials each. Participants could take breaks between blocks as needed (which extended overall duration). Inverse efficiency scores were calculated by dividing mean response time (in msec) by the accuracy rate (in %) in each condition. To reflect executive attention – the ability to cope with conflicting information - in a single measure, a congruency score was computed comprising the difference between the incongruent and congruent conditions' inverse efficiency scores (Segal et al., 2015). Higher scores (range of 15–500) indicated greater difficulty to ignore an irrelevant aspect of the stimulus.

2.2.3. Self-reported ADHD symptoms

The study utilized the Hebrew adaptation (Zohar & Konfortes, 2010) of the 18-item ADHD Self Report Scale (ASRS-V1.1), a brief symptom checklist for ADHD manifestations in adults, developed by Adler et al. (2006) in conjunction with the World Health Organization (WHO) based on DSM-IV-TR diagnostic criteria. Participants rated each symptom's frequency on a 5-point scale ranging from *Never* (0) to *Very often* (4), with possible scores ranging from 0 to 72. The current Cronbach alpha for the total scale was .96. Prior research suggested the significant sensitivity of the raw sum of all 18 items, identifying a categorical cutoff point for assessing ADHD in adults (Zohar & Konfortes, 2010). Accordingly, ASRS scores were employed as an inclusion criterion for participation in the current study: Study candidates who reported a prior ADHD diagnosis were included in the ADHD study group only if they scored 55+ on the ASRS; likewise, candidates who reported no disabilities were included in the non-ADHD study group only if their ASRS scores were lower than 53.

2.2.4. Self-reported coping strategies

The 48-item Coping Inventory for Stressful Situations (Endler & Parker, 1990) assessed three types of coping strategies (16 items each): *task-oriented* coping (e.g., "I focus on the problem and see how I can solve it"), *emotion-oriented* coping (e.g., "I blame myself for procrastinating"), and *avoidance-oriented* coping (e.g., "I treat myself to a favorite food"). Participants rated the extent to which these self-reported items reflected their coping strategies for dealing with stressors, on a 5-point scale ranging from *Not at all* (1) to *Very much* (5), yielding a score range of 16–80 for each of the three strategy types. Higher scores indicated greater utilization of that strategy. The current Cronbach alphas were .93 for task-oriented, .93 for emotion-oriented, and .85 for avoidance-oriented strategies.

2.2.5. Self-reported attachment patterns

The 36-item Experiences in Close Relationships Scale (Brennan et al., 1998; Hebrew adaptation: Mikulincer & Florian, 2000) assessed two dimensions (18 items each): *attachment anxiety* (e.g., "I worry a lot about my relationships"), and *attachment avoidance* (e.g., "I prefer not to show a partner how I feel deep down"). Participants rated their feelings in close relationships on a 7-point scale ranging from *Not at all* (1) to *Very much* (7), with higher mean scores indicating greater attachment insecurity. The current Cronbach alphas were .95 for attachment anxiety and .93 for attachment avoidance.

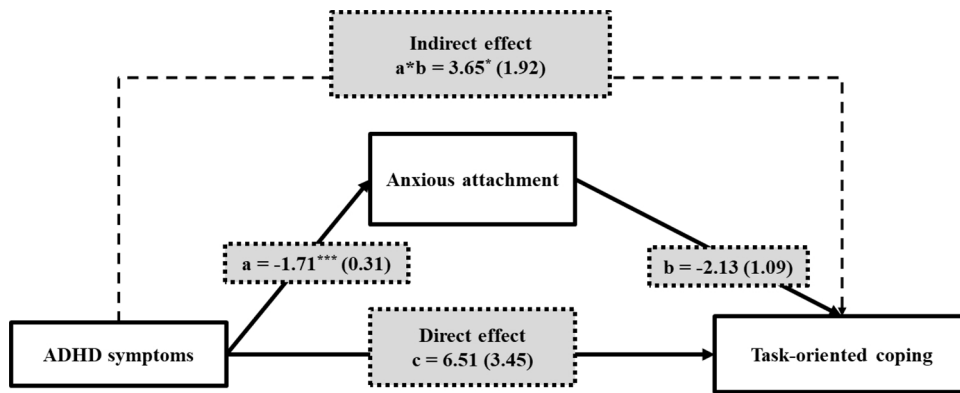


Fig. 1. Attachment anxiety as mediator between ADHD and task-oriented coping. Standard error is presented in parentheses. * $p < .05$. ** $p < .01$. *** $p < .001$.

2.3. Procedure

After obtaining approval from the Tel-Aviv University Ethics Committee, a research team member (graduate student in special education) recruited participants via social media and in-person appeals at higher education settings and psychometric test preparation courses, for a study seeking adults ages 21–40 either with or without formally diagnosed ADHD. After obtaining consent from 116 study candidates who responded to these appeals, the demographic questionnaire and ASRS screening checklist were sent and returned by email. Only 31 candidates met both inclusion criteria for the ADHD group (prior reported ADHD diagnosis and ASRS score of 55+). An additional 31 candidates were selected who met the non-ADHD group inclusion criteria: (a) no reported prior ADHD diagnosis, (b) ASRS score below 53, and (c) matching to the ADHD group for sex, age, education, and occupational status. Following final group assignment, each participant performed the computerized attention testing, administered on a laptop in a single session in a quiet room at the university. Finally, participants completed emailed attachment and coping self-report questionnaires.

2.4. Data analysis

The first set of analyses, focusing on descriptive statistics, investigated group differences in coping strategies and attachment between adults with and without ADHD to address the first two hypotheses. Second, to address the third hypothesis, analyses were conducted via Hayes's (2013) PROCESS bootstrapping command with 5000 iterations (model 4), operationalized in SPSS version 25. Overall, mediation refers to the independent variable's effect on the dependent variable, through the mediator variable. Accordingly, the estimate for this effect is the multiplication of slope "a" and slope "b," and the standard error is the result of multiple repeats of this model, utilizing the bootstrapping technique (see Fig. 1).

3. Results

3.1. Preliminary analysis: verification of participants' disorder status

As reported above (see *Participants* section), the present study utilized the ASRS checklist's categorical cutoff point of 54 for assessing ADHD symptoms in adults (Zohar & Konfortes, 2010) as a study participation criterion, excluding below-cutoff candidates who had reported an ADHD diagnosis and above-cutoff candidates who had reported no disabilities. As expected, univariate analysis of variance (ANOVA) yielded a significant group difference, $F(1, 60) = 267.10, p < .001, \eta^2 = .82$, where the ADHD group reported significantly more ADHD symptoms than the non-ADHD group (see Table 1).

To further confirm the ADHD diagnosis and the non-ADHD status of the two groups respectively, beyond self-reported past diagnosis and ADHD symptoms (ASRS), the two groups were compared on both computerized neuropsychological measures of attention (see Table 1). First, univariate ANOVA conducted for the sustained attention test revealed a significant group difference, $F(1, 60) = 18.23, p < .001, \eta^2 = .23$, where adults in the ADHD group scored significantly lower in sustained attention than adults in the non-ADHD group. Second, ANOVA with repeated measure was conducted to investigate group differences in executive attention, with location/direction sub-tasks and congruent/incongruent tasks as the within-subjects factor and group as the between-subjects factor. Results revealed a significant main effect for group, $F(1, 58) = 9.08, p = .01$, Cohen's $d = .64-.83$, where the ADHD group scored significantly lower in executive attention than the non-ADHD group. Additionally, a significant interaction between group and congruency was obtained, $F(1, 58) = 9.08, p < .05, \eta^2 = .08$, where adults in the ADHD group scored with larger congruency effect than the non-ADHD group. Thus, the ADHD and non-ADHD group assignments were confirmed both in terms of self-reported ADHD symptoms and in terms of performance on neuropsychological tests of attention.

Table 1
Means, Standard Deviations, F Scores, and Partial Eta Squared Values for Study Variables by Group.

Measures	Adults with ADHD (<i>n</i> = 31)		Adults without ADHD (<i>n</i> = 31)		<i>F</i> (1, 60)	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Verification of ADHD status	Self-reported ADHD symptoms	66.35	6.60	35.00	8.41	267.10*** .82
	Sustained attention test	85.34	37.70	55.40	10.30	18.24*** .23
	Executive attention congruency effect	160.15	111.23	107.05	64.47	5.02* .08
Attachment	Avoidant	3.90	1.34	3.03	0.87	9.04** .13
	Anxious	4.40	1.30	2.68	1.10	31.24*** .34
Coping	Task-oriented	56.16	13.30	66.32	8.50	12.85*** .18
	Emotion-oriented	57.30	12.76	38.71	10.07	40.34*** .40
	Avoidance-oriented	49.16	11.90	46.16	11.60	1.01 .02

* $p < .05$.

** $p < .01$.

*** $p < .001$.

3.2. Group and sex differences in coping strategies and attachment relationships

To examine group and sex differences in coping strategies, a multivariate analysis of variance (MANOVA) was conducted (Group: ADHD/non-ADHD X Sex: male/female), with the three types of coping (task-, emotion-, avoidance-oriented strategies) as the dependent variables. The MANOVA yielded a significant main effect for study group, $F(3, 56) = 14.95, p < .001, \eta^2 = .45$. Neither the main effect for sex nor the interaction between study group and sex was statistically significant. As seen in Table 1, the univariate ANOVAs revealed significant group differences for the task-oriented and emotion-oriented strategies. No significant differences emerged for the avoidance-oriented strategies. Thus, the ADHD group reported significantly lower use of adaptive task-oriented coping strategies, and significantly greater use of maladaptive emotion-focused strategies, than the non-ADHD group.

To examine group and sex differences in attachment relationships with significant others, a MANOVA (Group X Sex) was conducted with the two attachment subscales (anxious, avoidant) as the dependent variables. The MANOVA yielded a significant main effect for study group, $F(2, 57) = 19.16, p < .001, \eta^2 = .41$ and a significant main effect for sex, $F(2, 57) = 3.47, p < .05, \eta^2 = .11$. However, no significant interaction emerged between study group and sex. As seen in Table 1, the univariate ANOVAs revealed significant group differences for both attachment subscales, where the ADHD group reported significantly higher anxiety and avoidance in their attachment relationships than the non-ADHD group. In addition, men in the two groups ($M = 3.85, SD = 1.17$) reported significantly higher avoidant attachment than women ($M = 3.10, SD = 1.12$).

3.3. Correlations among study variables

Pearson correlations were examined among the study variables. Non-significant associations emerged between the two attachment scale dimensions ($r = .19, p > .05$) and between task-oriented and avoidance-oriented coping strategies ($r = -.01, p > .05$). However, emotional-oriented coping was significantly correlated both with task-oriented strategies ($r = .57, p = .001$) and with avoidance-oriented strategies ($r = .29, p = .02$).

3.4. The mediating role of attachment measures

To test the possible mediating role of the anxiety and avoidance subscales of attachment relationships with significant others in explaining the association between adults' ADHD symptoms and their coping strategies, the present study utilized Hayes's (2013) PROCESS bootstrapping command with 5000 iterations (model 4), operationalized in SPSS version 25, for each of the three types of coping strategies (task-, emotion-, and avoidance-oriented coping). Figs. 1–4 present illustrations of the significant mediation models, and Table 2 provides the models' estimates for both attachment measures.

3.4.1. Attachment anxiety as a mediator

As seen in Table 2 and Fig. 1, attachment anxiety was found to fully mediate task-oriented coping, as shown by the significant indirect effect of ADHD symptoms on this coping strategy (indirect = 3.65, $p < .05$) alongside the non-significant direct effect. Thus, ADHD symptomatology contributed to higher anxiety in attachment relationships ($b = -1.71, p < .001$), and higher anxiety explained the association between ADHD and lower tendency to use task-oriented coping strategies (see Fig. 1). Likewise, as seen in Table 2 and Fig. 2 attachment anxiety was found to fully mediate avoidance-oriented coping, as shown by the significant indirect effect of ADHD symptoms on this coping strategy (indirect = $-4.13, p < .05$) alongside the non-significant direct effect. Thus, ADHD symptomatology contributed to higher anxiety in attachment relationships ($b = -1.71, p < .001$), and higher anxiety explained the association between ADHD and higher avoidance-oriented coping (see Fig. 2).

Finally, as seen in Table 2 and Fig. 3, the analysis yielded a partial mediation effect of attachment anxiety on emotion-oriented

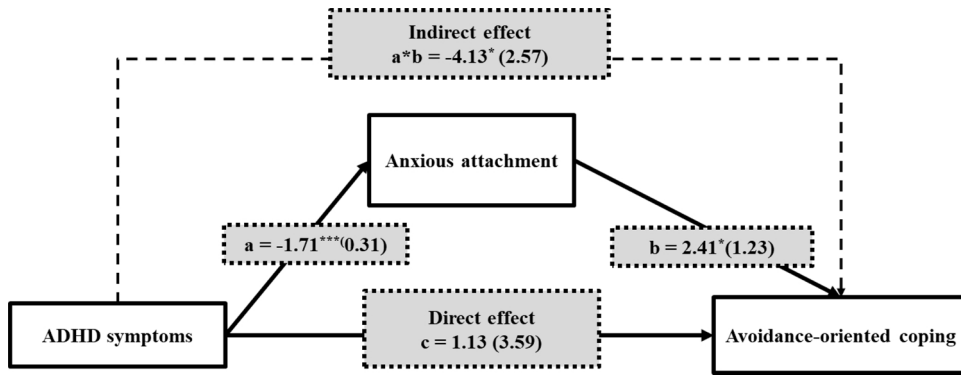


Fig. 2. Attachment anxiety as mediator between ADHD and avoidance-oriented coping. Standard error is presented in parentheses. * $p < .05$. ** $p < .01$. *** $p < .001$.

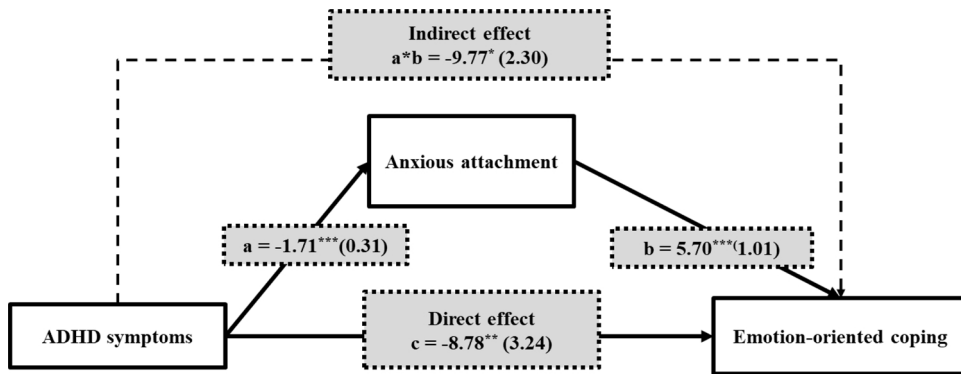


Fig. 3. Attachment anxiety as mediator between ADHD and emotion-oriented coping. Standard error is presented in parentheses. * $p < .05$. ** $p < .01$. *** $p < .001$.

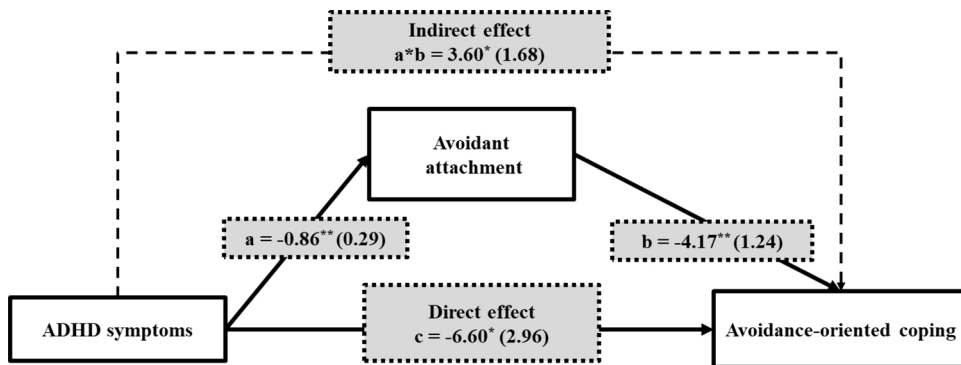


Fig. 4. Attachment avoidance as mediator between ADHD and avoidance-oriented coping. Standard error is presented in parentheses. * $p < .05$. ** $p < .01$. *** $p < .001$.

coping, as reflected by a significant indirect effect (indirect = $-9.77, p < .05$) as well as a significant direct effect ($c = -8.78, p < .01$). Thus, beyond the direct effect regarding the contribution of ADHD symptomatology to greater use of emotion-oriented coping strategies ($b = 5.70, p < .001$), the current results yielded an indirect effect as follows. Thus, ADHD symptomatology contributed to higher levels of anxiety in attachment relationships ($b = -1.71, p < .001$) and higher levels of emotion-oriented coping strategies; moreover, higher attachment anxiety explained the association between ADHD and higher emotion-oriented coping strategies (see Table 2 and Fig. 3).

3.4.2. Attachment avoidance as a mediator

As seen in Table 2, the analysis revealed no significant role for attachment avoidance in mediating either task-oriented coping or emotion-oriented coping. However, the analysis yielded a partial mediation effect of attachment avoidance on avoidance-oriented

Table 2

Direct and Indirect Effects within a Mediation Framework, with Group (ADHD vs. non-ADHD) as the Independent Variable.

Attachment (MV)	Coping (DV)	Direct effects			Indirect effects	95 % CI
		Group → Attachment (IV → MV) <i>Estimate (SE)</i>	Attachment → Coping (MV → DV) <i>Estimate (SE)</i>	Group → Coping (IV → DV) <i>Estimate (SE)</i>		
Anxious	Task-oriented	-1.71*** (0.31)	-2.13 (1.09)	6.51 (3.45)	3.65* (1.92)	[0.15, 7.66]
	Emotion-oriented		5.70*** (1.01)	-8.78** (3.24)	-9.77* (2.30)	[-14.90, -5.82]
	Avoidance-oriented		2.41* (1.23)	1.13 (3.59)	-4.13* (2.57)	[-10.63, -0.29]
Avoidant	Task-oriented	-0.86** (0.29)	-1.90 (1.50)	8.53** (3.06)	1.64 (1.40)	[-0.50, 5.20]
	Emotion-oriented		0.94 (1.47)	-17.74*** (3.42)	-0.81 (1.27)	[-3.77, 1.38]
	Avoidance-oriented		-4.17** (1.24)	-6.60* (2.96)	3.60* (1.68)	[1.11, 8.27]

Note. MV = mediator variable. DV = dependent variable. IV = independent variable.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

coping, as reflected by a significant indirect effect (indirect = 3.60, $p < .05$) as well as a significant direct effect ($b = -6.60$, $p < .05$; see Fig. 4). Thus, beyond the direct effect regarding the contribution of ADHD symptomatology to greater use of avoidance-oriented coping strategies, the current results yielded an indirect effect as follows. Thus, ADHD symptomatology contributed to higher levels of avoidance in attachment relationships and higher levels of avoidance-oriented coping strategies than adults without ADHD; moreover, higher attachment avoidance explained the association between ADHD and higher avoidance-oriented coping strategies. However, unexpectedly, higher attachment avoidance explained a lower tendency to use avoidance-oriented coping strategies ($b = -4.17$, $p < .01$).

4. Discussion

Overall, as hypothesized, the present results highlighted intergroup differences in both coping strategies and attachment measures, demonstrating significantly more maladaptive outcomes for the adults with ADHD than for their peers without ADHD. Findings also partially supported attachment relationships' hypothesized role in mediating the association between ADHD and coping strategies in adulthood. A unique strength of this study was its sample selection validity via triangulated verification of ADHD diagnosis and salient symptoms in adulthood as well as verification of the comparison group's non-ADHD status, based on reports of prior history, current self-reported symptomatology, and novel neuropsychological computerized measures.

4.1. Group differences: coping strategies and attachment relationships

The group differences that emerged for two of the three coping strategies and for both of the attachment subscales in this study contribute novel information to the empirical literature, which has rarely examined these dimensions specifically for adults with ADHD. Current findings indicated that, compared to their peers without disabilities, the adults with ADHD reported significantly less utilization of active, adaptive, task-oriented strategies when coping with stress, such as attempts to solve a problem or to minimize its effects through information seeking or reconceptualization. Furthermore, these adults with ADHD reported significantly more utilization of maladaptive emotion-oriented strategies such as reacting emotionally to stress or feeling preoccupied with problems, compared to adults without disabilities. This tendency for dysregulated coping seems to substantiate the high prevalence of self-regulation deficits found in ADHD in areas other than coping with stress (Shaw et al., 2014) and appears to correspond to the rare prior research that specifically examined coping in adults with ADHD (i.e., Young, 2005).

Regarding patterns of attachment, the present outcomes indicated that adults with ADHD reported higher anxiety attachment than nondisabled adults, referring to extreme worries and hyperactivating behaviors like ruminating about significant others' availability, actively seeking proximity and protection, and distress when such needs are not met. Adults with ADHD also reported greater avoidance in their attachment relationships compared to nondisabled adults, referring to greater discomfort with proximity and more deactivating behaviors like maintaining emotional distance or denying needs for closeness. Furthermore, sex differences also emerged in attachment avoidance, where men in both groups reported greater avoidance in close relationships than women. Prior studies showed inconsistent sex differences; the current results support some previous studies that reported males as more dismissive or insecure/avoidant in their attachments than females (Al-Yagon, 2015; Mikulincer & Shaver, 2007).

Overall, the current pattern of higher insecurity in adults' close relationships for the ADHD group than the non-ADHD group resembled that demonstrated previously for younger children and adolescents (Al-Yagon, 2009, 2016, 2018; Thorell et al., 2012). Accordingly, possible explanations based on previous data on youngsters with ADHD may be proposed as relevant to the current preliminary outcomes for adults. First, like at younger ages, the neurological difficulties characterizing adults with ADHD (e.g.,

information-processing disorders, impulsivity, and performance and production deficits) may be assumed to influence these adults' socioemotional perceptions and interpretations, which, in turn, may increase their vulnerability to insecure relationships with significant others (Al-Yagon & Margalit, 2013). Second, the more anxious and avoidant attachment patterns found for adults with ADHD may reflect these adults' early internalization of "working models of attachment" based on early difficulties experienced in their interactions with significant others due to their ADHD symptoms and the ensuing child-caregiver dynamics that emerged. In line with attachment theory, such experiences may have led to the development of patterns of anxious/avoidant cognitions and behaviors that appear across the lifespan in close relationships and social interactions (Waters & Cummings, 2000).

Prior studies on younger individuals with ADHD have highlighted the role of caregivers' quality of care in understanding differences in attachment patterns (Al-Yagon, 2016; Thorell et al., 2012). Considering the growing awareness about attachment relationships' potential contribution to well-adjusted functioning (Shaver & Mikulincer, 2010), the current initial findings should be followed by additional retrospective research on this rarely explored topic in adults with ADHD.

4.2. *The mediating role of attachment measures*

The present mediation findings offer a complementary perspective for investigating the possible pathways underlying adults' self-regulation deficits – specifically dysregulated coping strategies – beyond the more commonly investigated neurocognitive explanations such as those related to inattention or hyperactivity in individuals with ADHD (Nigg, 2013; Shaw et al., 2014). Overall, attachment anxiety was shown to mediate the association between ADHD and all three coping strategies, whereas attachment avoidance was found to only partially mediate the association between ADHD and coping (only one of the three strategies). Namely, greater anxiety in close attachments was found to explain these adults' lower tendency to cope actively and higher tendency to cope maladaptively by reacting emotionally or trying to avoid tasks. Unexpectedly, greater avoidance in close attachments was found to explain these adults' lower tendency to use avoidant coping. Together, the present outcomes highlighted the possible vulnerability or protective role of attachment relationships in understanding adults' strategies used for coping with stress, especially for adults facing ADHD.

The links found here between more insecure attachment relationships (i.e., high anxiety/avoidance attachment scores) and less adaptive coping behavior, especially for adults with ADHD, appear to support the arguments proposed by attachment theory for the general population (see Mikulincer & Shaver, 2007 for a review). This theory suggested that when encountering stressors, securely attached individuals tend to engage in problem-solving, planning, and cognitive reappraisal, while placing the negative event in perspective and seeking support from others in the form of additional resources or perspectives for solving the problem or reducing its stressful effects. Individuals with secure attachment are also more likely than insecure individuals to develop self-soothing skills, calming themselves with emotion-regulation techniques and maintaining attention on constructive alternatives rather than becoming a victim of rumination or catastrophizing.

The different salience found in the present study between the two forms of insecure attachments – the full mediational role played by attachment anxiety versus the partial role played by attachment avoidance – seemed to support both theoretical and empirical findings in the attachment literature. With regard to attachment anxiety, for example, prior studies in typical adults have strongly emphasized the role of anxious patterns of attachment in contributing to individuals' appraisals of possibly threatening situations and to their ability to cope with stressors (Berant, Mikulincer, & Florian, 2001; Berant, Mikulincer, & Florian, 2001; Moller, Fouladi, McCarthy, & Hatch, 2003). Likewise, Mikulincer and Shaver (2007) argued that individuals with anxious attachments tend to appraise threats as extreme and to evaluate their coping resources as deficient, whereas low self-reported attachment anxiety (i.e., secure attachment) appears to provide a protective resource affecting such appraisals. Mikulincer and Shaver suggested that chronic reliance on hyperactivating strategies may place anxious individuals at risk for maladjustment by impairing their ability to regulate negative emotions and thereby perpetuating their distress.

In contrast to the salient role found for attachment anxiety, with regard to attachment avoidance the present outcomes seem to resemble previous empirical comparisons showing less consistent or salient outcomes for individuals with avoidant attachment patterns. For example, in several prior studies, individuals with avoidant attachments were found to resemble individuals with secure attachments in appraising their own coping resources as adequate but were found to resemble those with anxious attachments in appraising stressful events as highly threatening (see Mikulincer & Shaver, 2007 for a review). Thus, the present stronger findings for the mediational role of attachment anxiety than that of attachment avoidance appears to correspond with available literature.

As for the unexpected results regarding the mediational role of attachment avoidance in explaining lower avoidance-oriented coping, methodological issues should be noted. Although the current study utilized the well-known Coping Inventory for Stressful Situations (Endler & Parker, 1990), deeper examination of its avoidance-oriented subscale revealed several items that may possibly conceptually contradict the concept of avoidant attachment (e.g., "Try to be with other people," "Visit a friend"). As argued by attachment theory, individuals with attachment avoidance manifest discomfort with closeness and express discomfort with dependence on relationship partners, along with a preference for emotional distance, tendency toward self-reliance, and use of deactivating strategies to deal with distress (Cassidy & Shaver, 2008). Taking these subscale items into account, future research may do well to include an additional coping measure.

4.3. *Implications, limitations, and directions for future study*

The current findings, especially when validated by further research, hold significant implications highlighting the possible protective role of adults' low anxiety and low avoidance in their patterns of attachment with significant others, as uniquely influencing

adults with ADHD. Results also underscored the need to design effective interpersonal interventions for these adults with ADHD. For example, although attachment-based interventions have seldom been examined in adulthood, a recent review of such interventions (Levy & Johnson, 2018) suggested the possible role of several psychotherapeutic approaches such as interpersonal psychotherapy (IPT) and emotion-focused therapy (EFT) to enhance individuals' attachment security and utilization of more "constructive ways of coping" such as seeking support, problem-solving and self-soothing skills (Epstein & Meier, 1989) in adulthood. And, regarding intervention targeting individuals' coping strategies, such programs may utilize the cognitive-behavioral therapy (CBT) approach while promoting adaptive cognitive appraisals, decreasing excessive avoidant coping, identifying dysfunctional thinking, and facilitating the use of social support and problem-solving skills (Ruocco, Freeman, & McLean, 2018).

Several limitations of this study call for further research. First, although the current study comprised both computer tasks and self-reports, the assessment of coping strategies and patterns of attachment focused exclusively on adults' self-perceptions. Thus, future research should collect information from additional sources such as family members' evaluations as well as direct observations, to provide a more comprehensive picture and to avoid the possible positive illusory bias that may appear among individuals with ADHD regarding their areas of deficit (Hoza et al., 2013). Second, the present findings were gathered at one point in time and did not indicate causality. To facilitate validation and generalization of these preliminary evidences, as well as to promote greater understanding of the possibly unique role of patterns of attachment relationships, future studies should examine the longevity of such perceptions over time and utilize qualitative interview methods to elaborate on these adults' structured self-reports.

Third, the present findings should be interpreted with caution due to several characteristics of the present sample. Although no significant differences emerged in the groups' distribution on level of education, the present findings manifested a higher prevalence of participants with postsecondary education than usually reported in ADHD. In addition, the present study consisted of a relatively small sample with a wide range of ages. And, although a unique strength of this study was its sample selection validity via triangulated verification of ADHD diagnosis (i.e., reports of prior history and symptomatology, and neuropsychological computerized measures), the original psychiatric/neurological diagnostic reports were unavailable, calling for future research targeting diverse adult samples with ADHD.

Finally, although the present results offer a complementary perspective for investigating the possible pathways underlying adults' self-regulation deficits – specifically dysregulated coping strategies – beyond the more commonly investigated neurocognitive explanations in individuals with ADHD (Nigg, 2013; Shaw et al., 2014), mediation findings merit an overall word of caution (Fiedler, Schott, & Meiser, 2011). As suggested by these researchers, "phenomena related to behavior are typically determined by multiple causes and several sensible levels of explanation" (Fiedler et al., 2011, p. 1235); therefore, significant mediation results should always be interpreted with caution.

CRedit authorship contribution statement

Michal Al-Yagon: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing, Supervision. **Michal Lachmi:** Investigation, Methodology, Writing - review & editing. **Lilach Shalev:** Conceptualization, Methodology, Investigation, Writing - review & editing, Supervision.

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