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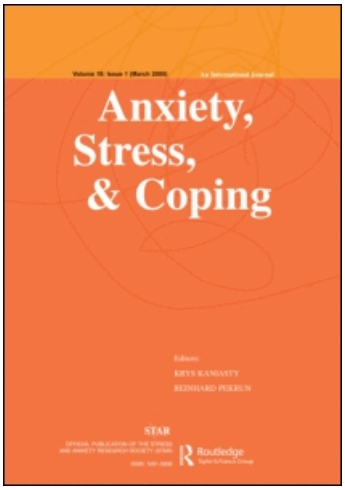

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Emotion regulation strategies as mediators of the association between level of attachment security and PTSD symptoms following trauma in adulthood

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Emotion regulation strategies as mediators of the association between level of attachment security and PTSD symptoms following trauma in adulthood

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Although, a link between attachment and posttraumatic stress disorder (PTSD) symptoms has been established, the mechanisms involved in this link have not yet been identified. Furthermore, attachment has been systematically measured by self-report questionnaires, which are prone to perceptual bias. The first goal of this study was to examine the link between PTSD symptoms and attachment security level, as measured with a security index created from the Adult Attachment Projective interview. The second goal was to test emotion regulation strategies as mediators of this link. Participants were recruited in hospital emergency rooms following trauma exposure in adulthood. The results showed that a higher level of attachment security was associated with fewer PTSD symptoms at one and three months posttrauma. The results also showed that substance use and emotion-focused strategies mediated the association between attachment and PTSD symptoms. Theoretical and clinical considerations that follow from these outcomes are discussed.

Keywords: attachment; developmental psychology; trauma; PTSD symptoms; emotion regulation strategies

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In the last decade, researchers seeking to better understand individual differences in posttraumatic emotional adaptation have identified several pre- and posttrauma risk and resiliency factors. Some suggest that Posttraumatic stress disorder (PTSD) may represent a failure to recover from a universal set of reactions and that the manifestation of symptoms is normal during a specific time period immediately following the traumatic event (Yehuda, 2002, 2004). Along the same lines, Horowitz's model (1986) postulates that the oscillation between intrusion and avoidance reactions is a necessary component of the accommodation and assimilation processes underlying the integration of emotional experience. With reference to this recovery model, the question that arises is what individual characteristics might be associated with failure to recover from acute symptoms in the aftermath of trauma exposure. McFarlane and Yehuda (1996) suggest that the ability to tolerate the emotional experience of suffering is a critical determinant of long-term

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adaptation. The way people interpret and regulate their peritraumatic and posttraumatic emotional reactions is likely to influence the differential development of chronic PTSD. In fact, several dimensions of emotional regulation during and after a traumatic event have been studied as predictors of prolonged distress. It should be noted that we are referring here to the concept of emotional regulation as defined by Thompson (1994), which includes emotional, cognitive, and behavioral strategies used to regulate emotional experience. The emotion regulation strategies associated with prolonged distress in the context of trauma are: dissociation at the time of the trauma and high avoidance during the acute phase (Carlson & Rosser-Hogan, 1991; Marmar et al., 1994); emotion-focused coping and blunting coping strategies (Solomon, Mikulincer, & Arad, 1991); substance use (Pfefferbaum & Doughty, 2001; Vlahov, Galea, Ahern, Resnick, & Kilpatrick, 2004); alexithymia, or difficulty acknowledging emotion (Naatanen, Kanninen, Qouta, & Punamaki, 2002); emotional expression and a person's ability to recruit his or her social network (Lutgendorf & Antoni, 1999; Solomon et al., 1991); and the interpretation of emotional reactions, of the event, and its consequences (Bryant & Panasetis, 2001; Ehlers & Clark, 2000).

The factors predisposing a person toward specific emotion regulation strategies are still unknown. Attachment theory offers a conceptual framework, from a developmental and relational perspective, for understanding individual differences in the choice of such strategies. According to this theory (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1980; Main & Solomon, 1990), emotion regulation strategies develop within the parent–child relationship. An infants' first strategy of emotional regulation is to seek proximity with the primary caregiver and to communicate its distress in order to get the caregiver's protection and comfort. The quality of the caregiver's responsiveness to the infant's affective signals will promote the development of specific communication and emotion regulation strategies adapted to the caregiver's behaviors. These strategies and the characteristics of the contingencies leading to their development determine the level of security of the infant's attachment with the caregiver and become mentally integrated in some form of internal working model (IWM) that remains relatively stable throughout the development (Hamilton, 2000; Moss, Cyr, Bureau, Tarabusky, & Dubois-comtois, 2005). A secure IWM is associated with a caregiver's consistent, attuned responsiveness to the infant's emotional state, and this responsiveness in turn reinforces the infant's direct, modulated displays of emotions and support-seeking aimed at reducing its distress. In contrast, an insecure IWM is associated either with consistent unresponsiveness or with inconsistent responsiveness from a caregiver. Under consistent unresponsiveness, the infant will adopt a *deactivation* strategy which inhibits expressions of distress and support-seeking behaviors; whereas under inconsistent responsiveness, it will develop a *hyperactivation* strategy, tending to exaggerate displays of distress to increase its chances of receiving support. These insecure strategies, corresponding respectively to the insecure-avoidant and insecure-preoccupied IWM, are initially adaptive, since they promote proximity to the caregivers. In the case of abuse or neglect, however, where the caregivers are a contradictory source of both comfort and danger, children are unable to develop an organized, efficient set of strategies, leading to a disorganized attachment (Main & Solomon, 1990).

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It has been theorized that initial secure or insecure attachment will subsequently influence several dimensions of emotional regulation that will come into play in stressful or threatening situations (Carlson & Sroufe, 1995; Sroufe, Carlson, Levy, & Egeland, 1999). Attachment theory postulates that the experience of vulnerability and the intensity of the emotional distress caused by a stressful attachment-related situation or traumatic event may reactivate early attachment experiences (IWM) as well as the emotion regulation strategies linked to them. The use of these strategies in turn influences emotional adjustment and psychopathology development in adulthood.

Growing interest in the long-term impact of early childhood attachment experiences on adult development has given rise to a broad range of studies exploring the association between emotion regulation strategies and adult attachment. These studies stem from two research traditions: the developmental psychology tradition and the social psychology tradition. Both traditions share the assumption that the establishment of an early IWM remains influential in adulthood. However, the two research perspectives make different assumptions about the nature of adults' IWM and, accordingly, use distinct methods for assessing them. Whereas, researchers from the social psychology tradition assume that adults' IWM can be assessed by means of self-reported perceptions of avoidant and anxious behaviors as well as expectations regarding adult attachment relationships, those from the developmental psychology tradition argue that adults' IWM should be inferred from the way people mentally organize their childhood attachment experiences and that this can be assessed by the level of coherence and type of defensive processes that characterize their narratives. There is an ongoing debate about adult attachment assessment and to what extent the instruments derived from the two traditions are measuring similar constructs or not (Crowell & Treboux, 1995; Shaver & Mikulincer, 2002, 2004). Although, it is not the purpose of this article to revisit this debate, it is important to note that the empirical review reported below deals with studies from both traditions.

The empirical findings show that attachment insecurity in adulthood is associated with the use of less optimal strategies to regulate emotions in different forms of attachment-related or attachment-unrelated stressful situations. The *deactivation* side of attachment insecurity seems to be more specifically associated with the use of emotionally distancing ways of coping (Cole-Detke & Kobak, 1996; Dozier & Kobak, 1992; Mikulincer, Florian, & Weller, 1993; Roisman, Tsai, & Chiang, 2004), a reduced capacity to acknowledge and express emotions, and the avoidance of social forms of affect regulation (Half & Slade, 1989; Priel & Shamai, 1995), while the *hyperactivation* side of attachment insecurity is more specifically associated with an over-attention to the emotional experience (Cole-Detke & Kobak, 1996; Mikulincer & Orbach, 1995), a tendency to exaggerate emotional expression and to report greater symptoms-related impairment (Dozier & Lee, 1995; Roisman et al., 2004), the use of emotion-focused coping strategies (Mikulincer et al., 1993), and indirect and ineffective ways of accessing social resources (Fitzpatrick, Fey, Segrin, & Schiff, 1993). Attachment insecurity is also related to a higher overall level of appraised threat and to self-blaming coping (Mikulincer & Florian, 1995; Radecki-Bush, Farrel, & Bush, 1993), substance use (Caspers, Cadoret, Langbehn, Yucuis, & Troutman, 2005; Golder, Gillmore, Spieker, & Morrison, 2005), pessimistic beliefs about people and the world (Bartholomew & Horowitz, 1991), negative perception of symptoms and emotional

reactions (Watt, McWilliams, & Campbell, 2005), and a limited repertoire of emotion regulation strategies (Zimmerman, 1999).

Recent advances in both research and theory suggest that attachment insecurity may constitute a risk factor for the development of psychopathology (Fonagy et al., 1996; van IJzendoorn & Bakermans-Kranenburg, 1996; West & George, 2002). In this connection, some studies have established a link between attachment and posttraumatic emotional adjustment, showing that attachment insecurity is related to greater distress and PTSD symptoms in the aftermath of trauma in adulthood (Declercq & Willemsen, 2006; Dieperink, Leskela, Thuras, & Engdahl, 2001; Fraley, Farrazi, Bonanno, & Dekel, 2006; Kanninen, Punamaki, & Qouta, 2003; Mikulincer et al., 1993; Solomon, Ginzburg, Mikulincer, Neria, & Ohry, 1998; Zakin, Solomon, & Neria, 2003). Considering that specific emotion regulation strategies seem to be associated with both PTSD symptoms and insecure attachment, a mediational model that would explain the process by which the level of attachment insecurity foreshadows distress and trauma-related outcomes can be inferred. To our knowledge, Mikulincer et al. (1993) are the only researchers who, as part of post hoc analyses, have assessed coping strategies (task-oriented, emotion focused, and avoidance) as mediators in the link between attachment and posttraumatic emotional distress. Although, their results did not support a mediational model, it would seem worthwhile to retest this hypothesis while measuring a broader repertoire of emotion regulation strategies. Furthermore, as in most of the studies referred to above, Mikulincer and his colleagues used self-report questionnaires derived from the social psychology tradition to assess romantic attachment. Researchers from the developmental psychology tradition object that this approach can lead to perceptual bias and to confusion between the secure and insecure dimensions, partly because of the difficulty in distinguishing insecure-avoidant people's stereotypical responses from secure people's responses (Jacobvitz, Curran, & Moller, 2002; Main, 1991).

The first objective of our study was to examine the association between PTSD symptoms and attachment security level, as measured by a security index created on the basis of an interview derived from the developmental psychology tradition. It was expected that the attachment security level would be negatively correlated to PTSD symptoms in the immediate aftermath of a traumatic event but positively correlated to a reduction in these symptoms over time. In other words, attachment security would act as a resilience factor both in the development and remission of PTSD symptoms. The second objective of the study was to examine the association between the attachment security level and emotion regulation strategies. It was expected that higher level of attachment security would be positively correlated to social support-seeking strategies but negatively correlated to different forms of emotional avoidance and emotion-focused strategies. Finally, the third objective of the study was to test whether emotion regulation strategies act as a mediating variable between attachment and PTSD symptoms.

Method

Participants

This research project was part of a larger longitudinal study evaluating the efficacy of brief, early intervention following a traumatic event (Brunet, Ruzek, & Cordova,

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2002, *CQRS*). In this larger study, 100 participants were recruited in the emergency rooms of two trauma centers in the Montreal area within 72 hours of an exposure to a traumatic event. An event was deemed traumatic if it met the DSM-IV-TR (Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revised) (American Psychiatric Association, 2004) criterion A for PTSD, i.e., an event which involves a death threat or serious injury, or a threat to physical integrity of self or others, and elicits an intense feeling of fear, helplessness, and horror. Individuals were included in the study if (1) their mental and physical condition allowed them to participate in a brief interview conducted shortly after the event; (2) they had no current diagnosis or history of organic mental disorder, schizophrenia, substance abuse or dependence, or bipolar disorder; and (3) the event did not result in the death of a loved one.

These 100 participants were randomly assigned to an experimental group (benefiting from intervention) or to a control group (not benefiting from intervention). In order to avoid a possible bias associated with the intervention, only the participants assigned to the control group were considered in the present study. From this pool of 50 participants, four were excluded because of inaudible Adult Attachment Projective (AAP) interview recordings and 10 participants dropped out during the course of the study, for a total of 36 participants (16 women and 20 men) in the final sample. The participants who dropped out did not differ overall from the other participants in terms of sociodemographic characteristics (gender, age, level of education, marital status).

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Instruments

The level of attachment security was assessed with a security score derived from the *AAP* interview (George, West, & Pettem, 1997). The AAP measures adult attachment based on an analysis of the narrative responses to a set of attachment-related drawings. Classification of individuals to groups is determined through the evaluation of a designated set of narrative dimensions, including (1) narrative coherency, which describes a quality of thinking and speaking that is logically connected, consistent, clearly articulated, and intelligible. The coherence of the narrative is evaluated based on the degree to which the individual is willing to cooperate with the interviewer and according to Grice's (1975) four conversational maxims (quality, quantity, relation, and manner); (2) agency of self, which assesses the degree to which the self is involved in moving psychologically or behaviorally in the direction of empowerment, integration, or understanding. Below, we shall consider three forms of expression of agency of self: capacity for self-reflection and thoughtfulness, representation or reparation of the relationship, and capacity to take a specific action; (3) defensive processes. Based on the scoring of these dimensions, one of four attachment classifications is assigned: secure, insecure-preoccupied, insecure-avoidant (labeled as dismissing), insecure-disorganized (labeled as unresolved). The reliability and validity of the AAP are adequate (Béliveau & Moss, 2005; George & West, 2001). Convergent validity was shown between the AAP and the Adult Attachment Interview, the most widely used measure of adult attachment derived from the developmental psychology tradition (George & West, 2001). Convergent validity for classifying individuals as secure versus insecure was 97% ($k = .80$, $p < .000$). Interrater reliability was examined in the present study between

two independent judges trained by the authors of the AAP. Reliability, established on the basis of 33% of the interviews, was 92% ($k = .87$, $p < .0001$). Considering the small sample size and the need to maximize statistical power, we chose to perform the analyses with the level of attachment security rather than with the dichotomized classifications. To do so, we created a security index based on the composite score of the two main AAP dimensions: agency of self and narrative coherency (George & West, 2001). This composite score provides a security index on a 0–4 Likert scale. Analyses of variance (ANOVA) were performed to test the index's validity, comparing it to the four attachment classifications. The results showed that individuals classified as having secure attachment score higher on the security index than individuals with insecure attachment classifications ($F(1, 35) = 9.82$, $p < .001$). These results confirm that the index we created does indeed represent the level of attachment security. PTSD symptoms were assessed with the French version of the *Impact of Event Scale-Revised* (IES-R) (Weiss & Marmar, 1997), a 22-item self-report questionnaire measuring intrusion, avoidance, and hypervigilance symptoms on a five-point Likert scale. A recent study using this translated version with a French-speaking population showed a satisfactory test-retest reliability with correlations ranging from .71 to .77 for the subscale and total scores ($p < .01$) (Brunet, St-Hilaire, Jehel, & King, 2003). In the present study, the internal consistency was satisfactory. Cronbach's alpha for the total score was .95, and intrusion, avoidance, and hypervigilance subscale scores were respectively .89, .88, and .91. The emotional regulation strategies examined in this study were chosen to represent some of the dimensions of emotional regulation described by Thompson (1994) and were assessed with the following instruments:

The Coping Inventory for Stressful Situations (CISS) (Endler & Parker, 1994), a 48-item self-report inventory designed to measure three basic coping styles: (1) task-oriented strategies (e.g., I focus on the problem and see how I can solve it); (2) emotion-oriented strategies (e.g., I blame myself for having gotten into this situation); and (3) avoidance-oriented strategies, including distraction (e.g., I treat myself to a favorite food or snack) and social diversion (e.g., I talk to someone whose advice I value) subscales. The data related to the task-oriented strategies subscale were not analyzed in the present paper because the study hypotheses did not pertain to those strategies. Items are rated on a five-point Likert scale. Test-retest reliability is satisfactory, with correlations ranging from .51 to .73 for the subscales. In this study, internal consistency was adequate. Cronbach's alpha was .76 for emotion-oriented strategies and .88 for avoidance strategies. Convergence validity with other measures of stress coping was good, and this instrument showed better psychometric properties than Folkman and Lazarus's (1988) Ways of Coping Checklist (Endler & Parker, 1999). This questionnaire has been translated and adapted into French (Lussier, 1999). The social diversion subscale was used in this study to measure social support-seeking strategies. The *Substance Use Questionnaire* (SUBS) (Brunet, 2000; unpublished) is a self-report questionnaire that measures drug and alcohol use as a way of coping with anxiety symptoms. The questions concern the use of tobacco, caffeine, alcohol, and psychotropic and other drugs to control anxiety, promote sleep, or raise energy levels. Respondents must indicate the daily amount of each substance used during the last month as well as their perception of any increase in their use of the substance since the event (e.g., Have you used any substance to keep your energy up in the past month? If yes, check which one(s): Amphetamine, Ritalin,

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cocaine, caffeine, diet pills, others. Did your use increase at any time after the event? If yes, are you still using it more than before the event?). Cronbach's alpha coefficient in the present study was .55 and the distribution was normal. The *Emotional Expressivity Scale* (EES) (Kring, Smith, & Neale, 1994) is a 17-item self-report measure of the extent to which people outwardly display their emotions. Each item is rated on a six-point Likert scale. Reliability studies have shown the EES to be an internally consistent and stable measure of differences between individuals. Validation studies have established initial convergent and discriminant validity, a moderate relationship between self-rated and other-rated expression, and correspondence between self-report and laboratory-measured expressiveness. Cronbach's alpha in the present study was .88.

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Procedure

Participants were recruited with the assistance of the nurses of the trauma center emergency rooms and were interviewed briefly by an experienced psychologist at the time of recruitment to establish their eligibility for the study, obtain their consent, and complete a short sociodemographic questionnaire. Self-report questionnaires assessing PTSD symptoms and emotion regulation strategies were completed and returned through the mail four and 12 weeks after trauma exposure. The AAP interview was performed at week 12.

Results

Descriptive statistics

The participants' descriptive characteristics showed that 78% were born in Canada, and their average age was 33 years old (SD = 9.28). The majority of them were married or lived with a significant other (61%), whereas the remainder were either single or divorced and lived alone. Most had been involved in road accidents ($n = 23$) or accidents at work ($n = 7$). A few had been victims of physical assaults ($n = 3$) or other traumatic incidents (burnings, falls) ($n = 3$). The majority of the participants had trauma-related physical injuries ($n = 33$) of varying severity.

Descriptive analyses were performed to examine possible associations between the main variables and sociodemographic data. Independent t tests showed no significant differences in level of attachment security, emotion regulation strategies, or level of PTSD symptoms with respect to sociodemographic data (gender, age, level of education, marital status). Although, the attachment classifications were not considered in the analyses, we examined the distribution of the AAP classifications: of the 36 participants, 28% were classified as having secure attachment ($n = 10$), 19% preoccupied attachment ($n = 7$), 11% avoidant attachment ($n = 4$), and 42% disorganized attachment ($n = 15$).

Since PTSD symptoms were assessed four and 12 weeks after trauma exposure, paired t tests were performed to compare PTSD mean symptom scores at four weeks ($M = 37.26$, SD = 20.32) and at 12 weeks ($M = 31.24$, SD = 21.96). The results showed that, overall, the PTSD symptoms declined between the two assessment intervals ($t(33) = 2.32$, $p = .03$), reflecting the typical course of posttrauma symptoms over time.

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Level of attachment security and posttraumatic stress disorder (PTSD) symptoms

Table 1 shows the correlation analysis results for the association between level of attachment security and PTSD symptoms measured four and 12 weeks after trauma exposure.

The significant negative correlation between the AAP index and the IES-R total score at 12 weeks shows that more securely attached individuals are likely to experience fewer PTSD symptoms three months following exposure to a traumatic event. Furthermore, the inverse association between the AAP index and the symptoms applies to all dimensions of the PTSD symptomatology, that is, the Intrusion, Avoidance, and Hypervigilance subscales. The negative correlations are also significant at four weeks posttrauma, with the exception of the Intrusion subscale. Analyses were also performed to examine the association between the level of attachment security and the change in symptoms between four and 12 weeks. Based on the recovery model, it was expected that a higher score on the security index would be positively related to a larger drop in PTSD symptoms over the measurement interval. Four new variables representing a change score were created by subtracting the four-week IES-R scores (Total Score, Intrusion, Avoidance, and Hypervigilance subscales) from the corresponding 12-week IES-R scores for each participant. These new variables indicated the extent to which each participant's PTSD symptoms decreased, increased, or stayed the same over the measurement interval. Correlation analyses were performed between these new variables and the AAP security index. However, as reported in Table 2, the correlations were not significant.

Level of attachment security and emotion regulation strategies

Table 3 shows the correlation analysis results for the association between level of attachment security and emotion regulation strategies.

The significant negative correlation between the AAP index and the CISS emotion-focused subscale ($r = -.47$, $p = .004$) suggests that more securely attached individuals are less likely to use emotion-focused strategies as a way of coping with traumatic experiences. Similarly, the significant negative correlations between the AAP index and the SUBS total score ($r = -.44$, $p = .009$) and between the AAP index and the SUBS increase score ($r = -.52$, $p = .001$) suggest that more securely attached individuals are less likely to use substances such as tobacco, caffeine,

Table 1. Correlations between level of attachment security and PTSD symptoms 4–12 weeks after trauma exposure.

	IES-R		IES-R		IES-R		IES-R	
	Total score		Intrusion		Avoidance		Hypervigilance	
$N = 36$	Four weeks	12 weeks	Four weeks	12 weeks	Four weeks	12 weeks	Four weeks	12 weeks
AAP index	−.39*	−.51**	−.30	−.47**	−.35*	−.44**	−.44**	−.51**

*$p < .05$; **$p < .01$.

Table 2. The 4–12 weeks change score correlations between level of attachment security and PTSD symptoms.

	IES-R*		IES-R*		IES-R*		IES-R*	
	Total score		Intrusion		Avoidance		Hypervigilance	
$N = 36$	r	p	r	p	r	p	r	p
AAP Index	−.17	−35		−.09	−.16	.36	−.21	.24

*New variable obtained by subtracting the four weeks IES-scores from the corresponding 12 weeks IES-R scores.

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alcohol, or drugs as coping strategies to alleviate the effects of trauma. However, contrary to expectations, there were no significant correlations between the AAP index and the capacity for emotional expressivity, social support seeking, and avoidance strategies other than substance use.

Test of a mediational model

According to Baron and Kenny (1986), four criteria are required for mediation: (a) the predictor variable (i.e., level of attachment security) must be related to the outcome variable (i.e., PTSD symptoms); (b) the predictor must be related to the hypothesized mediator (i.e., emotion regulation strategies); (c) the mediator must be related to the outcome variable; and (d) the relation between the predictor and the outcome variable must no longer be statistically significant after adjusting for the mediator.

As reported above, meeting Baron and Kenny's first criterion, the AAP index is negatively correlated with 12-week IES-R symptoms. Furthermore, significant negative correlations were also observed between the AAP index and the emotion-focused strategies as well as between the AAP index and the substance use increase score. The third Baron and Kenny condition was also assessed by means of correlation analyses, yielding a significant positive association between the symptoms and the emotion-focused strategies ($r = .61$, $p = .001$) as well as between the symptoms and the increase in substance use since the event ($r = .51$, $p = .001$). Given that the first three criteria for mediation were satisfied, we tested the final criterion

Table 3. Correlations between level of attachment security (AAP index) and emotion regulation strategies at 12 weeks after trauma exposure.

	CISS emotion-oriented	CISS avoidance-distraction	CISS avoidance-social diversion	SUBS total score	SUBS increase since the event	EES emotional expressivity
AAP attachment security index	−.46**	−.010	−.05	−.44**	−.52**	−.09

*$p < .05$; **$p < .01$.

Table 4. Hierarchical linear regression analysis showing mediational effect of emotion regulation strategies on relation between attachment and PTSD symptoms at 12 weeks after trauma exposure.

Model	Predictor	β	r	p
1	CISS emotion	.49	.45	.001
	SUBS increase	.34	.32	.017
2	CISS emotion	.44	.39	.004
	SUBS increase	.27	.23	.080
	AAP index	−.16	−.13	.328

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by means of a hierarchical regression analysis. The aim was to examine whether the strength of association between attachment and PTSD symptoms would decline when controlled for shared variance with the potential mediators (i.e., substance use and emotion-focused strategies). The symptoms and the emotion regulation strategies were first entered together in the model, and the level of attachment security was added in a second step. Table 4 shows the results of the hierarchical regression analysis.

The results indicate that emotion-focused strategies and the perception of an increase in substance use since the event are reliable predictors of PTSD symptoms, with the model accounting for 47.5% of the variance in PTSD symptoms ($R^2 = .475$, $p = .001$) (Sobel test for indirect effect $= -2.21$, $p = 0.03$). When added to the model, the AAP index accounts for only another 1.6% of the variance in PTSD symptoms. In addition, the previously significant relation between level of attachment security and symptoms was no longer significant ($r = -.13$, $p = .33$) Consequently, the mediational model hypothesis is confirmed. While the level of attachment security does indeed predict PTSD symptoms, the relationship is mediated by an individual's emotion regulation strategies.

Discussion

The goal of this study was to examine the association between level of attachment security, emotion regulation strategies, and PTSD symptoms of adults recently exposed to trauma, as well as to test a mediational model that could contribute to our understanding of the psychological processes underlying the relation between attachment and PTSD symptoms. Our hypotheses were based on the theoretical premise that attachment security, developed through the relationship with the primary caregiver, is associated with the internalization of specific emotion regulation strategies that the individual will use in later life for coping with adverse experiences.

The first thing to note is that our results support previous findings on the association between attachment security and posttrauma adaptation, even though we did not assess attachment with a self-report questionnaire, as is usually the case in PTSD studies of this kind, but instead by means of an interview derived from the developmental psychology tradition. In our study, the level of attachment security was negatively associated with all dimensions of PTSD symptoms at 12 weeks

posttrauma. Furthermore, although, the correlations were lower, these associations were also observed at four weeks posttrauma, except for the intrusion symptoms.

From the standpoint of the recovery model, attachment security would appear to have little or no impact on the initial posttrauma reactions per se, since they are regarded as normal, but would influence the gradual decrease in symptoms over time. However, the study results did not support our hypothesis on the association between the level of attachment security and the degree to which the symptoms would decline over the interval between the two measurements. There could be several explanations for this. First, we may not have allowed enough time between the two measurements. We might have found a positive significant association between the level of attachment security and the magnitude of the difference between the two measurements had the second assessment been performed six months later. Second, there could be other symptom trajectories than the recovery one, but the design of our study did not allow us to examine them. For instance, some people could have no or very few symptoms immediately after the trauma and show no increase or decrease in symptoms over time. A higher level of attachment security would then be associated with one of these models, since the related emotion regulation strategies could have been at play at the time of the trauma, in coping with peritraumatic reactions, and/or in the immediate aftermath of the event, in coping with potential posttraumatic reactions.

In our study, the two emotion regulation strategies that were associated with PTSD symptoms and level of attachment security were emotion-focused strategies and substance use. The mediational test showed that these strategies mediate the association between attachment and PTSD symptoms, accounting for 47.5% of the variance in symptoms. This implies that other variables and possibly other emotion regulation strategies could also be playing a role in the relationship. Of course, the correlational nature of our study and the lack of any pretraumatic data for attachment and emotion regulation strategies mean that we are unable to give a direction to the associations observed. Thus, it could be the exposure to the traumatic event and/or the symptoms per se that influence the attachment security level and the use of specific emotion regulation strategies. Even though we cannot exclude the possibility of a recursive relation between these variables, our findings partly support the theoretical model in which a lower level of attachment security would appear to be linked to less optimal emotion regulation strategies, which, in turn, would affect regulation of the initial trauma reaction and contribute to the development of chronic PTSD. As part of the effort to contain the intense emotions triggered by the re-experiencing of the trauma, these strategies would appear to block the integration process, causing an intensification of the distress and the emotional experience and leading to greater use of the maladaptive strategy, as shown by the results on the increase in substance use over time.

Surprisingly, in light of recent theoretical and research work in both the attachment and PTSD fields, the other avoidant emotion regulation strategy measured by the CISS Distraction subscale was not correlated with either level of attachment security or with PTSD symptoms. Furthermore, contrary to expectations, a higher level of attachment security was not correlated with social support seeking or capacity for emotional expressivity. These results may be attributable to the fact that the instruments used to assess the variables were not refined enough to capture the adaptive versus maladaptive quality of some strategies. Indeed, some

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distraction might be quite adaptive in containing the emotional distress triggered by the intrusive re-experiencing of the trauma. What may make more of a difference is the degree to which a person uses or combines distraction with other strategies. Similarly, it may not be the social support-seeking behaviors per se that are adaptive, but the way in which a person actually asks for, perceives, and uses support. Individuals classified as having a preoccupied attachment do express their emotions and seek social support, but in an indirect and hostile manner. The instruments used in our study did not allow us to capture these subtleties.

The study results may also have been influenced by the attachment distribution of our sample in which insecure attachment is chiefly represented by individuals classified as having preoccupied ($n = 7$) or disorganized ($n = 17$) attachment. With only four participants classified as having an avoidant attachment, it would be surprising then to find high correlations between what, in theory, are the corresponding avoidant strategies and the level of attachment security. As a matter of fact, the predominance of individuals with a disorganized attachment in our sample is quite striking. This distribution is closer to a clinical than to a normative sample distribution (van IJzendoorn & Bakermans-Kranenburg, 1996), even though recruitment was performed in the immediate aftermath of trauma and on the basis of the DSM-IV criterion A for PTSD rather than based on a clinical diagnosis. Without any pretrauma attachment data, we cannot exclude the possibility that exposure to a traumatic event could have an impact on attachment assessment or result in a temporary attachment disorganization. However, the sample distribution may also reflect a selection bias, with individuals having a disorganized attachment being more likely to experience acute posttraumatic stress reactions and consequently more willing to take part in a study on trauma. Recent theoretical and empirical work suggests that attachment disorganization is often associated with childhood-trauma-related PTSD (Kobak, Cassidy, & Zir, 2004; Schore, 2001, 2002; Stovall-McClough & Cloitre, 2006; Zulueta, 2006), which would increase the risk of emotional deregulation during or immediately after a traumatic event in adulthood, as the trauma arouses intense feelings of fear, horror, or helplessness that could re-trigger previous symptoms and emotional distress. But even without childhood-related PTSD, the less organized emotion regulation pattern associated with disorganized attachment may well be less efficient in coping with peritraumatic and posttraumatic reactions than the more organized *deactivation* or *hyperactivation* emotion regulation patterns associated with avoidant and preoccupied attachment. Finally, another way to explain the strong representation of disorganized attachment in our sample comes from the literature on risk-taking behaviors and accident proneness, which suggests that certain types of individuals are more at risk of having accidents. Accordingly, one can formulate the hypothesis that individuals with disorganized attachment could be more prone to suffer traumatic experiences, including accidents, because they tend to be more impulsive and to put themselves in riskier situations.

Owing to the fact that previous studies on attachment, emotion regulation strategies, and adjustment following a traumatic event in adulthood have not included the disorganized attachment classification, data from individuals corresponding to this classification have been distributed across the other insecure classifications, thus, biasing the results. Unfortunately, the small sample size and study design did not allow us to examine the association between PTSD symptoms and the emotion regulation strategies specifically related to each attachment

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classification. Further studies are therefore, needed to compare disorganized attachment with the other insecure classifications in terms of emotion regulation strategies and PTSD symptoms.

Beside the fact that we were unable to examine the emotion regulation strategies used to deal with posttrauma reactions specifically for each attachment classification, the use of an attachment security index involved another major limitation. In assessing the security dimension, the hyperactivated (preoccupied) and deactivated (avoidant) groups of people were lumped together, which meant there was a risk that their theoretically contrasting emotion regulation strategies might bias the correlations between the strategies and the attachment security level. In our study, the fact that there were only four participants classified as having an avoidant attachment reduced this potential risk. Nonetheless, the risk associated with combining insecure attachment classifications should be considered in further studies assessing emotion regulation strategies and attachment.

Finally, another limitation of the study is that the use of self-report questionnaires for assessing PTSD symptoms and emotion regulation strategies can create a potential for shared method variance contributing to their high correlations.

In spite of the above-mentioned limitations – i.e., small sample size, correlational nature of the study design, the use of a security scale instead of the attachment classifications, no pretraumatic attachment data, possible lack of sensitivity of the emotion regulation measuring instruments used, and potential for shared method variance as a result of using self-report questionnaires for PTSD symptoms and emotion regulation strategies – our study does contribute in a number of ways to our understanding of how individual differences in level of attachment security and emotion regulation strategies may operate following a traumatic event. First, it allows us to extend previous observations made in PTSD studies conducted in military settings or war contexts to civilians who were, except for three individuals, involved in road accidents or other traumatic events in which there was no intentional human threat or violence. Thus, it can be inferred that the relationship between attachment and posttrauma adaptation is not limited to cases of willful human-induced trauma, but can be extended to other kinds of adverse experiences arousing intense feelings of fear or helplessness. Second, attachment was assessed by means of a coded interview, which meant that we avoided the possibility of perceptual bias inherent in self-reports. Third, our study broadens the repertoire of emotion regulation strategies traditionally examined by including measurements of emotional expressivity and substance use.

Further studies examining the association between attachment, emotion regulation strategies, and posttraumatic adaptation should also explore other dimensions of emotion regulation, such as dissociation, attribution and interpretation of the event, and perception of the emotional reactions. They should also include the disorganized attachment classification, which can be assessed with the Adult Attachment Interview (AAI) (George, Kaplan, & Main, 1985) or the AAP interview derived from the developmental psychology tradition. Our results also reveal a need to develop more refined measurement instruments capable of capturing the subtleties involved in the adaptive versus maladaptive nature of a strategy. In view of self-report bias, questionnaires could also be combined with physiological and/or observational measures of emotion regulation. Finally, longitudinal studies with pre- and posttrauma measurements of attachment and emotion regulation strategies

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are needed in order to determine the direction of the association between the variables and to examine the fundamental question of the stability of attachment following trauma in adulthood.

A better understanding of the use of specific emotion regulation strategies and their developmental and relational roots is not only important for theoretical considerations concerning posttrauma adaptation and psychopathology, but also has a number of clinical implications in terms of therapeutic alliance and treatment efficacy. For instance, the attachment IWMs and their respective emotion regulation strategies may influence the way an individual relates to the therapist, his involvement in the treatment, and his capacity to benefit from the relationship (Fonagy, Gergely, Jurist, & Target, 2002). They may also influence the individual's response and willingness to take part in a specific therapeutic modality as, for example, participation in trauma-focused treatment for people with avoidant attachment representations. Taking into account attachment theory and past relational experiences could help therapists to orient their clinical treatment by identifying and tackling specific maladaptive emotion regulation strategies. Recognizing the initially adaptive role of these strategies in the context of the primary caregiving relationship could reduce the shame often associated with the use of these strategies and with the difficulty in coping with the symptoms, and could enhance an individual's commitment to emotion regulation skills training. Further research is needed to enable us to better understand the role of attachment processes in resilience and adaptation following trauma during adulthood as well as in treatment efficacy.

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