

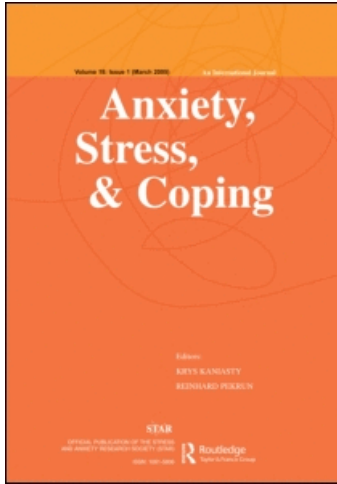
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On: 24 June 2010

Access details: Access Details: [subscription number 923367046]

Publisher Routledge

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Anxiety, Stress & Coping

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713454398>

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First published on: 24 June 2010

To cite this Article Braun-Lewensohn, Orna , Sagy, Shifra and Roth, Guy(2010) 'Coping strategies as mediators of the relationship between sense of coherence and stress reactions: Israeli adolescents under missile attacks', *Anxiety, Stress & Coping*, First published on: 24 June 2010 (iFirst)

To link to this Article: DOI: 10.1080/10615806.2010.494329

URL: <http://dx.doi.org/10.1080/10615806.2010.494329>

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Coping strategies as mediators of the relationship between sense of coherence and stress reactions: Israeli adolescents under missile attacks

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(Received 9 February 2010; final version received 16 May 2010)

This study aimed to explore the relationships between sense of coherence (SOC) and stress reactions as mediated by cognitive appraisal and coping strategies among adolescents facing the acute stressful situation of missile attacks. Employing the Salutogenic Model and the interactionist approach to coping, we asked what the roles of situational factors such as coping strategies and cognitive appraisal were in mediating the relationship between SOC and stress reactions. Data were gathered during January 2009 when hundreds of missiles fell in southern Israel. One hundred and thirty eight adolescents filled out questionnaires dealing with SOC, cognitive appraisal (endangerment feelings), Adolescent Coping Scale, state anxiety, state anger, and psychological distress. Overall, our model explained 55% of the variance in stress reactions. SOC had the strongest total direct and indirect effects. Previous findings have indicated SOC as playing only a limited role in explaining stress reactions in acute stress situations. The results of this study highlight the potential of SOC as a powerful resilience factor even in an acute situation, through mediation of situational factors.

Keywords: coping strategies; sense of coherence; cognitive appraisal; stress reactions

The aim of this study was to explore sense of coherence (SOC) as a resilience factor among adolescents facing an acute stressful situation of missiles attacks. We examined two mediating factors, coping strategies and cognitive appraisal (feelings of danger) between SOC and the stress reactions.

We employed two main theoretical models. One was Antonovsky's (1987) Salutogenic Model and the other was the Interactionist Cognitive Theory of psychological stress and coping (Lazarus & Folkman, 1984) which views the person and the environment as dynamic and as having a bidirectional relationship.

The Salutogenic Model and sense of coherence

Approximately 30 years ago, Antonovsky (1979) suggested a new model and conceptualization in stress research: "salutogenesis," which means the "origin of health." This is a continuum model so that, rather than classifying health/illness dichotomously, each individual at any given moment is somewhere on the line of the

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ease/dis-ease continuum (Antonovsky, 1987). According to this model, people have general resilience resources which can help them conceptualize the world as organized and understandable. The general resilience resources represent the motivation and the internal and external resources one can use to cope with stressors. General resilience resources play an important role in the way one perceives challenges throughout life. The ability to use these resources has been termed SOC and it differs among people, thus resulting in successful/unsuccessful coping (Antonovsky, 1987).

Almedon (2005) reviewed several theories such as resiliency, hardiness, post-traumatic growth, which also tried to look at potential traumas from a non-pathological point of view. He concluded by stating that "Antonovsky's work has had a profound impact on our understanding the mystery of health" (Almedon, 2005, p. 262).

The theoretical Salutogenic Model formulated by Antonovsky (1987) suggests cognitive SOC as a central concept in understanding coping with stress and health outcomes. SOC is a global orientation, an enduring tendency to see the world as more or less comprehensible, manageable, and meaningful. The SOC, according to the Salutogenic Model, has implications for individual responses in life, including various kinds of stressful situations. SOC reflects how individuals perceive the world and the events that happen to them, as well as the extent to which they perceive these events as manageable and meaningful (Antonovsky, 1987). Following the salutogenic approach, SOC is assumed to explain the variance of stress reactions in different stress situations including political violence (e.g., Kimhi, Eshel, Zysberg, Hantman, & Enosh, 2010; Sagy & Braun-Lewensohn, 2009). Given their tendency to perceive the world as meaningful and manageable, individuals with a strong SOC will be less likely to feel threatened by events of war and missile attacks and less vulnerable after these have occurred. They perceive themselves as having both internal and external resources to deal with the situation (Hogh & Mikkelsen, 2005).

Studies on adolescents have indicated that during adolescence SOC may contribute to moderating and mediating stress experiences and may also play a protective role even at a young age, similar to that of the mature adult SOC (e.g., Ristkari, Sourander, Ronning, & Helenius, 2006; Ristkari, Sourander, Ronning, Nikolakaros, & Helenius, 2008; Simonsson, Nilsson, Leppert, & Diwan, 2008; Torsheim, Aaroe, & Wold, 2001). However, in several studies conducted during acute stress situations (such as wars, terror, and evacuations), SOC was found to have much less effect of explanation of the variance of stress reactions than in chronic stress situations (Sagy & Antonovsky, 1986; Sagy, 1998; Sagy & Braun-Lewensohn, 2009). These repeated findings have raised questions with regard to the role of SOC during acute stressful situations. For example, in a longitudinal study (Antonovsky & Sagy, 1986) among Israeli adolescents who were confronting an acute stress situation preceding the evacuation of Sinai settlements, SOC was not a significant factor in explaining the emotional reactions of state anxiety. However, after the evacuation, when the acuteness of the stress decreased and became more similar to a normal or chronic stress situation, SOC increased its explanation of the variance from 0 (acute state) to 38% (chronic situation). In another study (Sagy, 2002), SOC had a relatively high explanatory effect of variance of state anxiety (30%) and psychological distress (21%) in the chronic situation of the Intifada¹ but not in the acute stress state (9%) immediately after Prime Minister Rabin's assassination. The explanation of these

results could lie in the relatively stronger effect of situational factors in the acute state stress (Sagy, 1998).

In the present study, we sought to explore the contribution of SOC in an acute stress situation by trying to find situational mediating factors which could explain the outcomes of stress reactions. Employing the interactionist cognitive approach (Lazarus & Folkman, 1984), we considered two measures that could be significant in mediating the relationship between the personal SOC and the situational environment: cognitive appraisal and coping strategies (Folkman, Lazarus, Gruen, & DeLongis, 1986).

Mediating factors

Cognitive appraisal

Cognitive appraisal is a process through which the person evaluates whether a particular encounter with the environment is relevant to his/her well-being and, if so, in what way. In the appraisal process, the person evaluates whether s/he has anything at stake in this encounter: is there potential harm or benefit? Is the health or well-being of a loved one at risk? And what are the resources available to deal with the threat or the challenge (Folkman et al., 1986)?

Several studies have explored cognitive appraisal in the context of political violence. In the context of single terrorist attacks, it has been examined by collecting individuals' reports of peri-traumatic reactions (e.g., initial fears) and worries for the safety of family members and friends after the Oklahoma City (Pfefferbaum et al., 2002) and Nairobi bombings (Pfefferbaum et al., 2003). Both studies found worries to be significant predictors of post-traumatic stress.

In the context of ongoing political violence, cognitive appraisal has been defined as subjective exposure (Laufer & Solomon, 2003) and has been operationalized in several ways (Solomon, Laufer, & Lavi, 2005). In one study, the number of events to which Jewish youths in the disputed territories held by Israel were exposed increased their reported fear, whereas those who were most exposed reported more fear and more post-traumatic stress symptoms (Solomon et al., 2005). However, when calculating fear as an average sense of fear concerning exposure to attacks, it did not always correlate with the number of objective events (Solomon et al., 2005). Thus, adolescents who were less objectively exposed may have experienced a higher sense of fear.

In a different study, Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, & Ponjaert-Kristoffersen's (2009) findings illuminated the predominant impact of feelings of endangerment regardless of objective exposure. Overall, feelings of endangerment remarkably appeared to explain the largest amount of variance in adolescents' stress reaction outcomes. Such findings underscore the importance of recognizing the impact of the individual's perceived sense of danger. It appears that addressing subjective experiences along with more dynamic personal characteristics may be fundamental in grasping the impact of acute stressful contexts (Braun-Lewensohn, Celestin-Westreich, Celestin et al., 2009).

Following these studies, the present study considered cognitive appraisal as a mediating factor. It was examined by evaluating endangerment to self, family, friends, and the community, which adolescents reported that they had felt during the

situation. We hypothesized that feelings of danger would mediate the relationships between SOC and stress reactions. Furthermore, we hypothesized that coping strategies would mediate the effects of feelings of danger on stress reactions.

Coping strategies

The second mediating factor in our study involved coping strategies. The importance of coping has been stressed throughout research in recent years. Coping strategies have been generally found to mediate and/or moderate the relationship between exposure to stress and mental health outcomes. Coping can be defined as the actual effort that is made in the attempt to render a perceived stressor more tolerable and minimize the distress induced by the situation (Folkman et al., 1986). Most models of coping assume that individuals who cope more effectively with stressful life events show lower levels of anxiety or depression (Lazarus & Folkman, 1984). Coping consists of the particular thoughts and behaviors a person uses to manage the demands of a particular person–environment transaction that has relevance to his/her well-being. Coping has two major functions: dealing with the problem that is causing the distress (problem-focused coping) and regulating emotion (emotion-focused coping) (Lazarus & Folkman, 1984).

The period of adolescence is crucial to the development of coping skills. Adolescents tend more readily to engage in experiences or encounter situations that are associated with increased risk for developing emotional and behavioral problems. Teenagers are also at the stage of developing their personal styles of coping. It is during these years that, from one experience of using certain mechanisms of coping to another, coping strategies can be reviewed, modified as needed, and crystallized (Frydenberg, 1997). From puberty on, youth also develop more advanced cognitive and emotional mastery, enabling them to take perspective of others, plan ahead to see future consequences of an action and manage emotions more effectively, which will facilitate their abilities to deal with sources of conflict, threatening, or stressful events in a variety of contexts (Garnefski, Legerstee, Kraaij, Van den Kommer, & Teerds, 2002; Liu, Tein, & Zaho, 2004).

Research in different domains of exposure to potentially traumatic experiences has repeatedly demonstrated that dynamic processes such as coping tend to function as strong mediators between stressors and their mental health outcomes (Braun-Lewensohn, Celestin-Westreich, Verlye, et al., 2009). During or following violent political events such as war and terrorism, research has found emotion-focused strategies of coping (such as self-blame, venting emotions, behavioral disengagement, and avoidance) as meaningful predictors of maladaptive outcomes, while problem-focused strategies have been found to be associated with fewer psychological problems (Braun-Lewensohn, Celestin-Westreich, Verlye, et al., 2009; Braun-Lewensohn, Sagy, & Roth, 2010b; Zeidner, 1993, 2005). On the other hand, earlier studies in the context of war sometimes indicated avoidance and denial as effective strategies (Muldoon & Cairns, 1999; Weisenberg, Schwarzwald, Waysman, Solomon, & Klingman, 1993). These inconsistencies across studies call for further research with the aim of identifying what type of coping strategies both characterize an individual who copes successfully (with strong SOC) and are linked to adaptive outcomes in conflictual areas.

Stress reactions during political violence

When considering the literature on the psychological and behavioral effects of terrorism and wars on adolescents, a wide spectrum of outcomes has been found, ranging from mild stress reactions to a variety of problems such as anxiety, depression, somatic complaints, aggressive behavior, and anger (e.g., Braun-Lewensohn, Celestin-Westreich, Celestin, Verté, & Ponjaert-Kristoffersen, *in press*; Hoven et al., 2002; Solomon et al., 2005). It should be noted, however, that although part of the population has suffered from different psychological difficulties, the majority of children and adolescents have exhibited resilience, have coped well independently, and have not suffered major emotional problems as result of these events (Braun-Lewensohn et al., 2010b; Zeidner, 2005).

In the stress literature, age is considered to be a protective factor for maladaptive outcomes. However, contrary to the general literature, during long periods of political violence, older adolescents have been found to report more stress reactions compared to younger ones (Braun-Lewensohn et al., *in press*; Solomon et al., 2005). Regarding gender, girls seem to be vulnerable to internalizing problems while boys to externalizing ones (Braun-Lewensohn et al., *in press*).

Research background

This study was conducted for 1 month, January 2009, during a period of violent hostilities. Operation Cast Lead came in the wake of 8 years of ongoing missile attacks on different communities in southern Israel (e.g., Sderot). During January 2009, southern Israel was under missile attack on a daily basis. Adolescents from communities which had not experienced the attacks before (e.g., Beer-Sheva, Ofakim, and Lehavim) and had never before been exposed to such experiences, for the first time in their lives heard sirens and experienced missiles barrages several times a day for about a month. Hundreds of missiles fell on private homes, residential buildings, schools, kindergartens, and in open spaces. Three civilians were killed and about 700 injured during these attacks, among them children and adolescents (Brown, 2009).

To summarize, in this study we sought to explore the personal cognitive orientation of SOC as mediated by two situational factors, cognitive appraisal and coping strategies, in explaining stress reactions among adolescents during an acute violent event of missile attack. Based on the Salutogenic Model (Antonovsky, 1987) and the psychological stress and coping theory (Lazarus & Folkman, 1984), we hypothesized the relationships among our variables as follows: adolescents with strong SOC would evaluate the situation as less dangerous and/or less stressful (comprehensibility), since they would see the world as manageable and view themselves as having resources to deal with the challenge (Antonovsky, 1987). Moreover, those who had strong SOC and perceived the situation as less dangerous would choose effective coping strategies (problem solving) to deal with the acute stressful state. As a result, they would react with less anxiety, anger, and psychological distress (Braun-Lewensohn, Sagy, & Roth, 2010a; Tomotsune et al., 2009). We further hypothesized that the different coping strategies would also mediate the relationship between cognitive appraisal and stress reactions (Lazarus & Folkman, 1984).

Method

Participants

One hundred and thirty eight teenagers living in southern Israel participated in the study. No inclusion or exclusion criteria were used apart from age (12–18). The mean age of the sample was 15.39 (SD = 1.23). Adolescents lived mainly in cities (80%) and community villages (14%). Females accounted for 63% of the sample.

Procedures

Data were collected by questionnaires during January 2009, when hundreds of missiles were fired on southern cities and communities. Adolescent research assistants (living in the attacked area) were recruited and were supervised by the researchers to administer self-reported questionnaires to their peers in their homes or shelters. The assistants approached their peers and asked them to participate in the study. The involvement of the administrators of the questionnaires was minimal and included only explanations of words which participants did not understand.

All participants were informed that the researchers were interested in their experiences and anonymity was emphasized. Participation was voluntary and permission from parents was received. For each scale, those who did not fully complete the questions which were part of the scale were removed from the analysis.

Measures

Sense of coherence (SOC)

SOC (Antonovsky, 1987) was measured using a series of semantic differential items on a seven-point Likert type scale, with anchoring phrases at each end. High scores indicated a strong SOC. An account of the development of the SOC scale and its psychometric properties, showing it to be reliable and reasonably valid, appears in Antonovsky's (1987, 1993) writings. In this study, SOC was measured by the short-form scale consisting of 13 items, which was found highly correlated to the original long version (Antonovsky, 1993). The scale includes such items as "Doing the things you do every day is" with answers ranging from 1 (*a source of pain and boredom*) to 7 (*a source of deep pleasure and satisfaction*). In the present study, Cronbach's α reliability was .65.

Cognitive appraisal

Cognitive appraisal was measured as feelings of danger and included four items on a five-point Likert scale from 1 (*not at all dangerous*) to 5 (*very dangerous*). Adolescents reported the extent to which they felt that the situation was dangerous for them, for their family, for their friends, or for their community. The scale has been used previously in studies examining adolescents and political violence (e.g., Braun-Lewensohn, Celestin-Wesreich, Celestin, et al., 2009). In the present study, Cronbach's α for the four items was .86.

Coping

Coping was measured with the shortened version of the Adolescent Coping Scale (ACS; Frydenberg & Lewis, 1993) which enables responses to a particular administrator nominated concern (e.g., missile attacks). This is an age appropriate instrument for measuring coping. It is comprised of 18 items on a five-point Likert scale from 1 (*not at all used*) to 5 (*used a great deal*). Each of the 18 items represents a coping strategy. Oblique factor analysis was performed and three factors appeared to correlate to those in the long form “problem-focused coping,” “coping by reference to others,” and “non-productive coping.” According to the manual, the three scales have sufficient internal consistency to justify the separate use of these scales. These three global scales discriminate quite satisfactorily and show moderate reliability as well as high correlations with the three global scales from the long version (Frydenberg & Lewis, 1993). Cronbach’s α for the different scales in our sample was: “problem solving” .70; “reference to others” .33; and “non-productive coping” .57. Since the reliability of the two scales, “reference to others” and “non-productive coping” was low, we decided to create a new “emotional coping scale.” Conceptual similarities between two items of the “reference to others” scale (pray for help; ask for professional help) and the items of “non-productive coping scale” allowed us to combine them in order to create the new “emotional coping” scale. The Cronbach’s α improved and was sufficient ($\alpha = .60$). Table 1 presents the items included in each scale. This questionnaire was translated into Hebrew and was back-translated into English in order to assure accuracy.

State anxiety

State anxiety was measured with the State–Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushen, 1970; Hebrew translation: Teichman, 1978). The Hebrew translation proved to be reliable, valid, and equivalent to the English State Anxiety Inventory (Teichman, 1978). This scale consists of 11 items on a four-point Likert scale from 1 (*almost never*) to 4 (*almost always*). Examples of items are: “I feel peaceful,” “I am afraid of disasters,” and “I am worried.” The mean score was used and Cronbach’s α was .86.

State anger

State anger was measured with the State–Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushen, 1970; Hebrew translation Teichman, 1978). The Hebrew

Table 1. The different coping strategies according to the coping scales.

Problem-solving coping	Emotional coping
Focus on problem solving, work hard to achieve, seek to belong, focus on the positive, seek relaxing diversion, and physical recreation.	Worry, invest in close friends, seek to belong, wishful thinking, not coping, tension reduction, ignore the problem, self-blame, keep to oneself, seek spiritual support, and seek professional help.

Note: The items are abbreviated.

translation proved to be reliable, valid, and equivalent to the English State Anger Inventory (Teichman, 1978). This scale consists of six items on four-point Likert scale from 1 (*almost never*) to 4 (*almost always*). Examples of items are: "I am angry," "I want to scream at someone," and "I feel frustrated." The mean score was used and Cronbach's α was .85.

Psychological distress

Psychological distress (Ben-Sira, 1979) was measured by occurrence of psychosomatic symptom. This is a four-point Likert scale from 1 (*never*) to 4 (*very frequently*). The scale was developed in Hebrew and has been used in a number of studies with satisfactory psychometric properties (Ben-Sira, 1988). Five of the items were culled from Langer's psychological-equilibrium index (Langer, 1962): pounding heart, fainting, insomnia, headache, and sore hands. The scale was adapted by Sagy for use in a population of children (Sagy & Dotan, 2001). Some of the symptoms were modified (e.g., stomach ache instead of sore hands), and one item (nervous breakdown) was deleted. In this format, the questionnaire included five items. In the present study, Cronbach's α was .74.

Results

Between groups, analysis of variance was conducted to explore the impact of gender and age and interaction of gender \times age on the different study variables. For SOC, feelings of danger, emotional coping, and stress reactions there was no significant effect to the different variables or to the interactions. SOC: gender [$F(1, 87) = .23, p = .13$]; age [$F(1, 87) = .84, p = .36$]; gender \times age [$F(1, 87) = .90, p = .34$]. Feelings of danger: gender [$F(1, 87) = 1.66, p = .20$]; age [$F(1, 87) = 1.58, p = .21$]; gender \times age [$F(1, 87) = .96, p = .33$]. Emotional coping: gender [$F(1, 87) = 1.69, p = .19$]; age [$F(1, 87) = .53, p = .47$]; gender \times age [$F(1, 87) = .00, p = .97$]. Stress reactions: gender [$F(1, 87) = .11, p = .74$]; age [$F(1, 87) = 1.08, p = .30$]; gender \times age [$F(1, 87) = .03, p = .88$].

The only significant main effect appeared on gender and problem-solving coping strategies: gender [$F(1, 87) = 5.47, p = .02$], partial eta squared = .06. However, the other main effects, age or interaction gender \times age did not have significant effect: age [$F(1, 87) = 1.27, p = .19$]; gender \times age [$F(1, 87) = .78, p = .38$].

The role of sense of coherence (SOC), cognitive appraisal, and coping strategies in explaining stress reactions

Prior to assessing the entire model (Figure 1), we computed Pearson correlations between all study variables. Results are presented in Table 2. We then used AMOS 5.0 (Arbuckle & Wothke, 1999) with maximum likelihood estimation to test the hypotheses that SOC, feelings of danger, along with the different coping strategies would directly and indirectly predict stress reactions. For each scale, the mean was computed separately and used as a manifest variable. For stress reactions (the dependent variable), a latent variable was created using the three dimensions of stress reactions as indicators (i.e., state anxiety, state anger, and psychological distress). Model fit to the data was assessed using the ratio of chi-square to degrees of freedom (χ^2/df), incremental fit index (IFI; Bollen, 1989), and comparative fit index (CFI;

Table 2. Correlation among the key variables: sense of coherence, cognitive appraisal, coping scales, and stress reactions.

	1	2	3	4	5	6	7
1. Sense of coherence	–						
2. Cognitive appraisal	–.05	–					
3. Problem-solving coping	.26***	.04	–				
4. Emotional coping	–.40***	.32***	.08	–			
5. State anxiety	–.21*	.33***	–.33***	.25***	–		
6. State anger	–.36***	.29***	–.20*	.48***	.56***	–	
7. Psychological distress	–.39***	.11	–.29**	.28***	.37***	.38***	–
8. Stress reactions	–.38***	.31**	–.34**	.41***	.84***	.82***	.72***

Note: $N = 135$.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Bentler, 1990). Acceptable fit is indicated by a χ^2/df ratio three or less (Carmines & McIver, 1981), IFI and CFI equal to or greater than .90, and RMSEA less than .08 (Browne & Cudeck, 1993; Hoyle, 1995). The indices were adequate for the overall model, $\chi^2_{(11)} = 24.1$, $p < .01$; $\chi^2/df = 2.18$; CFI = .92; IFI = .93, and marginal for RMSEA = .09.

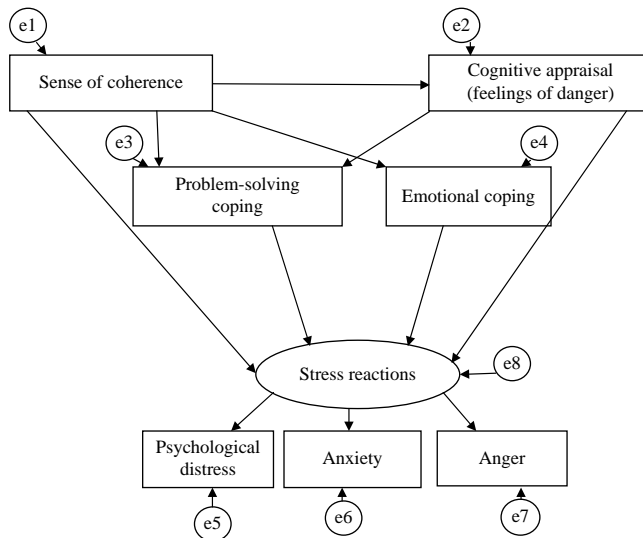


Figure 1. The hypothesized relationships between sense of coherence, cognitive appraisal, coping strategies, and stress reactions.

Note: e1, e2, e3, e4, e5, e6, e7, and e8 are errors.

The overall model (Figure 2) explained 55% of stress reactions. We further examined the significant direct and indirect paths. Out of the different variables, while emotional coping had the greatest direct effect (.39), SOC had the smallest direct effect ($-.21$) on stress reactions. However, SOC as well as cognitive appraisal were also found to have significant indirect effects on stress reactions. SOC had an indirect effect through problem-solving and emotional coping ($-.25$) while cognitive appraisal had an indirect effect only through emotional coping (.12). Sobel's z -test (Preacher & Hayes, 2004) showed significant mediations: SOC and emotional coping ($z = 3.23, p < .001$); SOC and problem solving ($z = 2.30, p < .01$); and cognitive appraisal and emotional coping ($z = 2.57, p < .01$).

Contrary to our hypotheses, cognitive appraisal of feeling of endangerment did not mediate the relationship between SOC and stress reactions and problem solving did not mediate cognitive appraisal. When looking at the total effect of each variable including its direct and indirect effect, however, a meaningful picture arose. SOC, the weakest direct factor, increased its power and became the most powerful resilience factor of the different variables with a total effect of ($-.45$).

To summarize, our hypotheses were partially confirmed. While coping strategies mediated the relationships between SOC or cognitive appraisal and stress reactions, cognitive appraisal did not mediate the relationship between SOC and stress reactions. Furthermore, we hypothesized that while SOC and problem solving would be linked to fewer stress reactions, feelings of endangerment, and emotional coping would be associated with more stress reactions. This hypothesis was confirmed as well.

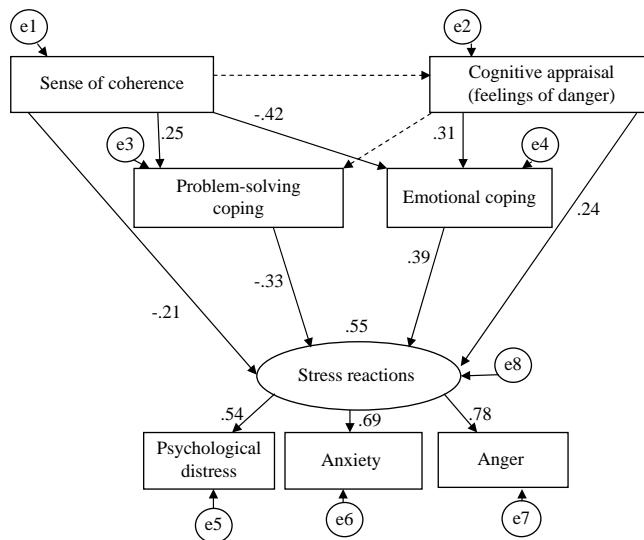


Figure 2. The empirical relationships between sense of coherence, cognitive appraisal, coping strategies, and stress reactions: results of path analysis for adolescents exposed to missile attacks.

Note: $e_1, e_2, e_3, e_4, e_5, e_6, e_7,$ and e_8 are errors.

\rightarrow , Significant path; $-----\rightarrow$, Nonsignificant path.

Discussion

This study aimed to explore the mediating role of coping strategies and cognitive appraisal in the relationship between SOC and stress reactions among adolescents facing an acute stress situation. We further explored the mediating role of the coping strategies between cognitive appraisal and stress reactions. The study took place during the violent political events in southern Israel in January 2009.

Our main question related to a model, which included SOC as the main explanatory resilient factor in stress situations, while cognitive appraisal and coping strategies were mediators of the stress reactions. As suggested by our model, SOC was found to be the highest explanatory factor on stress reactions. However, when considering its direct effect only, it had the lowest explanatory effect among the variables in the model. This finding is in accordance with other acute stress studies (Sagy, 1998, 2002; Sagy & Braun-Lewensohn, 2009) in which SOC had low explanatory effect compared to chronic stress states in which SOC had a strong effect in explaining stress reactions. Our model, however, considered two situational factors as mediators.

Thus, in accordance with our hypotheses, SOC increased its explanatory effect through the indirect effect of the coping strategies. While it was positively related to problem-solving coping strategies, it was found to be negatively related to emotional coping strategies. This pattern strengthens Antonovsky (1987) Salutogenic Model, in which people who perceive the world as comprehensible, manageable, and meaningful tend to use a relevant and suitable strategy in stressful situations. It seems that in the acute stressful state, which was investigated in our study, the strategies of problem solving were more suitable than the emotional coping strategies in aiming for adjustment and well-being. Hence, when looking at SOC as part of a more comprehensive model, its explanatory power increases significantly. SOC as a consistent personal characteristic seems to articulate its resiliency through the situational factors of coping strategies.

The use of problem-solving coping strategies was found to also have direct resilience effect. Consistent with previous findings in the Israeli context, problem solving was supported once again as a protective factor when facing violent political events (Braun-Lewensohn, Celestin-Westreich, Verleye, et al., 2009; Cohen & Eid, 2007; Zeidner, 1993, 2005).

Contrary to these resiliency factors, the other variables in this study, cognitive appraisal of endangerment feelings and emotional coping, were found to have negative effects by elevating levels of stress reactions. Among the two variables, emotional coping was the stronger one. It seems that adolescents who tend to hope for a miracle, report that they cannot deal with the situation, or use tension reduction also report higher levels of stress reaction symptoms. Thus, it seems that emotional coping during an acute stressful situation of missile attack is maladaptive. These findings strengthen recent findings in the context of political violence in Israel (Braun-Lewensohn, Celestin-Westreich, Verleye, et al., 2009; Braun-Lewensohn et al., 2010b) but at the same time contradict earlier findings from other contexts of political violence in Ireland and in Israel during the Gulf War (Muldoon & Cairns, 1999; Weisenberg et al., 1993). It appears that during the stressful situation which was examined, gaining control rather than avoidance or denial led adolescents to feel better and to suffer less psychological distress.

Although cognitive appraisal did not mediate the relationship between SOC and stress reactions, thoughts and feelings of endangerment during the events were found to be salient direct and indirect predictors of adolescents' stress reaction outcomes. These findings are in line with the other studies which explored this dimension explicitly, and which demonstrated the role of fears and worries when exposed to violent political events (e.g., Braun-Lewensohn, Celestin-Westreich, Celestin, et al., 2009; Solomon et al., 2005). Feelings of danger precede such responses by referring to the initial reciprocal effects between cognitive control and emotion regulation when confronted with terror events (Pfefferbaum et al., 2003). The current findings imply that during an acute stress situation this specific factor of endangerment feelings had affected only emotional regulation and thus, had a negative effect on the well-being of the adolescents. The dynamics and relations to psychological responses as shown in the present investigation are fundamental to the insight into how potentially traumatizing experiences result in varying degrees of stress reaction outcomes.

Study limitations

Beyond these suggestions, we have to consider the limitation of this small study. The research is clearly exploratory in nature and the findings should be considered with appropriate reservations. First, the study is cross-sectional and thus we cannot make claims about the causal direction of effects of the tested model. Second, our data were collected in the midst of a war and during missile attacks. Therefore, the samples are neither representative nor random but rather consist of youngsters whom we were able to reach during such a difficult time. Thus, some degree of potential sample bias should be taken into account. In addition, the distribution according to socio-demographic criteria was not sufficient. For example, the samples included a higher percentage of girls than boys. Moreover, although young people's self-reports are generally a reliable source of information about their stress experiences, a multi-informant paradigm could enhance the data. Finally, in the absence of a base rate for the participants' psychological distress prior to the study period, we cannot state with certainty whether or not the observed outcomes are due solely to the impact of the war.

Conclusion

The importance of this study is in its being a field research carried out in the midst of the stressful situation of war and severe missile attacks. The unfortunate conflictual violent situation in the area serves as a natural laboratory for investigation which is essential for studying human behavior (Lazarus, 1982). This study has also drawn attention to the importance of SOC as a resilience factor during an acute stressful situation. Although previous studies indicated SOC as a weak factor in explaining stress reactions during acute stressful situations (Sagy & Braun-Lewensohn, 2009), the present study highlights the possibility that, through the mediating process of situational factors such as coping strategies, SOC could still have high explanatory effect not only in chronic states. Future designs should include other situational factors in order to better understand the coping process in acute stressful situations. Such designs can contribute not only just to the research base but also to prevention

and intervention programs for youths who must cope with the political violence of terror and wars.

Note

1. The first Palestinian uprising (1987).

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