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Coping Strategies as Mediators of the Relationship between Chronic Exposure to Missile Attacks and Stress Reactions

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The aim of this study was to investigate the role of coping strategies as mediators of the relationships between exposure and stress reactions after exposure to missile attacks. Data were gathered from 145 adolescents during several months in 2008, after seven years of ongoing missile attacks. Adolescents filled out self-reported questionnaires that included demographics, level of exposure to missile attacks, Adolescent Coping Scale, and stress reactions of state anxiety, state anger, and psychological distress. Results show that the different types of exposure as well as the coping strategies contributed 33% to the explained variance of stress reactions. Only emotional coping strategies mediated the relationships between objective and subjective exposure to missile attacks and stress reactions.

Keywords adolescents, political violence, anxiety, anger, psychological distress

In recent years, the worldwide risks of exposure to political violent events have stimulated research into adolescents' adjustments to such potentially traumatizing contexts. The exposure of youth to such violence raises questions regarding its developmental impact. Since the withdrawal from the Gaza strip, Israeli communities close to the border have been confronted with waves of missile attacks. By 2008, when the present study was conducted, numerous children and adolescents had witnessed such attacks directly or indirectly, thus raising questions about the psychological impact of these experiences. The aim of this study was to examine different types of exposure, namely objective and subjective exposure as well as coping strategies as explanatory factors of stress reactions of state anxiety, state anger, and psychological distress.

Emotional Reactions to Political Violent Events

When considering the literature on the psychological and behavioral effects of terrorism and war on adolescents, a wide spectrum of outcomes is 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, Verte, Ponjaert-Kristoffersen, 2010; Hoven et al., 2002; Solomon, Laufer, & Lavi, 2005). However, although some of those exposed to violent events suffer from different psychological

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difficulties, the majority of children and adolescents exhibit resilience, cope well independently, and do not suffer major emotional problems as a result of these events (Sagy & Braun-Lewensohn, 2009; 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, Sagy, & Roth, 2010; Solomon et al., 2005). Girls seem to be more vulnerable to internalizing problems, while boys report more externalization (e.g., Braun-Lewensohn, Sagy, & Roth, 2010; Hoven et al., 2004; Pat-Horenczyk, 2003).

Different Types of Exposure to Political Violence

Physical Exposure

Exposure to violent events is expected to increase risks for both short term and long term emotional problems. When investigating mental health outcomes in the context of political violent events, most research to date has quite naturally considered direct, physical exposure to the events as being an important factor in determining youth's subsequent emotional and behavioral problems. Several studies have demonstrated that higher levels of physical exposure to political violent events elicit more adverse psychological reactions, such as higher rates of anxiety, functional impairment, and other emotional problems (e.g., Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, Ponjaert-Kristoffersen, 2009; Giacaman, Shanon, Saab, Arya, & Boyce 2007; Thabet, Tawahina, El Sarraj, & Vostanis, 2008). However, this type of exposure appears to explain a limited amount of variance in youths' mental health problems following political violent events (Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, et al., 2009; Laufer & Solomon, 2010; Pfefferbaum et al., 2001).

Relational Exposure

An additional conceptualization of exposure relates to indirect exposure via relationship with a victim. This type of exposure has been postulated as a significant moderating variable, especially when focusing on children or adolescents. The developmental status of youth may render them more vulnerable to the loss of loved ones (Pynoos & Eth 1985). Outcome studies on both acute and chronic exposure to political violent events have shown that children and adolescents who knew a victim experienced more stress related symptoms than those who did not know a victim. It is apparent from these investigations that the closer the relationship with the victim, the worse the mental health outcomes (Hoven et al., 2002; Pat-Horenczyck & Doppelt, 2005; Pfefferbaum et al., 2003; Ronen, Rahav, & Appel, 2003; Solomon et al., 2005). Consequently, both direct physical exposure and relational exposure via a victim of political violent event can be seen as "objective exposure" because these types of experiences are the closest to be perceived without distortion (Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, et al., 2009).

Subjective Experiences of Exposure

Subjective exposure has been studied mostly in the context of terror events. In the context of single terrorist attacks, it was investigated by collecting reports of peritraumatic reactions (i.e., initial fears) and worries for safety of family members and friends after the Oklahoma

City and Nairobi bombings. Both studies found peritraumatic reactions and "worries" to be significant predictors of Posttraumatic Stress Disorder (PTSD) (Pfefferbaum et al., 2002, 2003). In the context of ongoing terrorist attacks, exposure was defined mostly as an average fear that was calculated by taking into account the average fear connected to all the events to which one had been exposed (e.g., Laufer & Solomon, 2010; Solomon & Lavi, 2005). The number of events that youth were exposed to increased their reported fear, whereby those who were most exposed in the disputed territories reported more fear and more posttraumatic stress symptoms (Laufer & Solomon, 2003; Solomon & Lavi, 2005). However, when analyzed differently, by calculating "fear" as an average sense of fear concerning exposure to attacks, fear did not always correlate with the amount of objective events (Solomon et al., 2005). Thus, adolescents who may be less "objectively" exposed may experience a higher sense of fear. A different study defined subjective exposure as fear for personal safety and safety of significant others during ongoing political violence and found this variable to be most significant among the different types of exposure in explaining psychological difficulties (Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, et al., 2009).

Coping Strategies as Explanatory Variables

The importance of coping has been stressed throughout research in recent years. Coping strategies have been generally found to moderate the relationship between exposure to stress and psychological 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. 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). Thus different studies in the domains of adolescents' coping with stressful situation show that emotion-focused strategies tend to be associated with more psychological problems while problem-solving strategies or active coping tend to be linked more to well being (Frydenberg & Lewis, 1999; Lewis & Frydenberg, 2002).

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 risks 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. All this helps facilitate their abilities to deal with sources of conflict or 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 shown that similar exposure does not necessarily lead to similar psychological problems among individuals. Research repeatedly demonstrates that dynamic processes such as coping tend to function as strong mediators between stressors and the individual's mental health outcomes (Aldwin, 1994; Celestin & Celestin-Westreich, 2006; Dempsy, 2002). When attempting to understand the psychological implications of adolescents' exposure to political violence, studies suggest similar relevance of a coping perspective for our insight into the dynamics through which experiences of political violence affect youth's well being (Cardena, Dennis, Winkel, & Skitka, 2005; Gill & Caspi, 2006; Lengua, Long, Smith, & Meltzoff, 2005; Zeidner, 2005).

Thus, several studies in the last decade indicated the cross-cultural importance of coping strategies during or following political violent events. It seems that the implementation of problem solving strategies serve as a protective factor while implementation of emotional coping strategies seem to be maladaptive (Braun-Lewensohn, Celestin-Westreich, Celestin, Verlye, Verte, & Ponjaert-Kristofersen, 2009; Braun-Lewensohn, Sagy, & Roth, 2010; Cohen & Eid, 2007). Some researchers called for further research to investigate the mediating role of different coping strategies between exposure to political violent events and symptoms of distress (Pat-Horenczyk et al., 2009).

Research Background

This study was conducted during 2008 in southern Israel in the area of Sderot and communities near the Gaza border. The study took place after seven years of ongoing missile attacks. Since the withdrawal from Gaza, in July 2005, the attacks had worsened. During the months of the study, there were days of intensive attacks while other days were quieter. We wanted to investigate the way in which Israeli adolescents cope with this ongoing stressful and unpredictable situation. We asked and hypothesized:

1. *Are there differences in stress reactions by gender and among the different age groups?* We hypothesized that while girls will report more internalized problems such as anxiety and psychological distress, boys will report more externalizing problems such as anger (Braun-Lewensohn, Celestin-Westreich et al., 2010; Braun-Lewensohn, Sagy, & Roth, 2010). We also hypothesized older adolescents to reveal more stress related symptoms (Braun-Lewensohn, Sagy, & Roth, 2010; Solomon et al., 2005).
2. *What is the role of objective and subjective exposure as well as the different coping strategies in explaining stress reactions?* Based on previous studies, we hypothesized significant relationships between the different exposure and/or coping variables and stress reactions (Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, et al., 2009; Braun-Lewensohn, Celestin-Westreich, Celestin, Verlye, et al., 2009). We hypothesized that both objective and subjective exposure will have a significant role in explaining stress reactions (Pat-Horenczyk et al., 2007; Thabet et al., 2008). However, subjective exposure is assumed to be more powerful compared to objective exposure (Braun-Lewensohn, Celestin-Westreich, Celestin, Verte, et al., 2009). We hypothesized that while problem solving will hint for adaptation, emotional coping will be maladaptive in this chronic politically violent context (Braun-Lewensohn, Celestin-Westreich, Celestin, Verlye, et al., 2009; Zeidner, 2005).

Method

Participants

One hundred forty five 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 15.59 ($SD = 1.76$). Adolescents lived mainly in the city of Sderot (50%) and in kibbutz communities (28%). Females accounted for 68% of the sample. Socioeconomic status was measured by parents' education with a scale ranging from high school education to academic degree; 36% of the sample reported both parents had academic degrees and 25% reported that both their parents had only high school education. No significant differences were reported between the different communities on level of parents' education.

Procedures

Data were collected by questionnaires during January–June 2008, 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 that 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 that were part of the scale were removed from the analysis.

Measures

Exposure to Missile Attacks. Objective exposure to missile attacks was assessed by six yes/no questions including questions regarding physical and relational exposure. Examples of items are: whether a missile had fallen on one's home, school, or in one's neighborhood and whether one had been hurt by a missile or knows someone who was hurt. Subjective exposure included three items on a 5-point Likert scale ranging 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 friends, or for their community. Cronbachs alpha for the three items was .79.

Adolescent Coping Scale (ACS, Frydenberg & Lewis, 1993). This is an age-appropriate instrument for measuring coping. The shortened version that was used in the current research allows for the measurement of responses to a particular nominated concern. The measure is comprised of 18 items on a 5-point scale, drawn from the 79 items that compose the original long version. 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 "nonproductive 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). Based on previous studies (Braun-Lewensohn, Sagy, & Roth, 2011) we combined the two scales of "reference to others" and "nonproductive coping" into one scale named "emotional coping." Cronbachs alpha for the different scales in our sample was .67 for "problem solving" and .70 for "emotional coping." This questionnaire was translated into Hebrew and back translated into English to assure accuracy.

State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushen, 1970). The STAI was used to assess both adolescents' anxiety and anger. The Hebrew translation proved to be reliable, valid, and equivalent to the English State Anxiety Inventory (Teichman, 1978). The anxiety scale consists of 11 items on a 4-point Likert scale ranging from 1 (*almost never*) to 4 (*almost always*). Examples of questions are: I feel peaceful, I am afraid of disasters, and I am worried. The mean anxiety score was used and Cronbach alpha reliability was .86. The anger scale consists of six items on the same 4-point Likert scale. Examples of questions

are: I am angry, I want to scream at someone, and I feel frustrated. The mean anger score was used and Cronbach's alpha reliability was .87.

Psychological Distress. Psychological distress was assessed via a five-item psychosomatic symptom scale. Items were rated on a 4-point Likert scale ranging from 1 (*never*) to 4 (*frequently*), referring to frequency of occurrence of familiar psychological symptoms. The scale was based on a six-item measure developed in Hebrew (Ben-Sira, 1979) that has been used in a number of studies with satisfactory psychometric properties (Ben-Sira, 1988). Five of the original items are culled from Langer's psychological-equilibrium index (Langer, 1962): pounding heart, fainting, insomnia, headache, and sore hands. The scale was elaborated by Sagy and Dotan (2001) for use in a population of children, with some of the symptoms modified (e.g., stomach ache instead of sore hands) and one item (nervous breakdown) deleted. In the present study, Cronbach's alpha for the five-item scale was .75.

Results

Table 1 shows the means and standard deviations for all the key variables according to gender and age. Examining the differences in coping strategies, the data suggest that girls tend to cope with more social support. For example, significant differences were revealed on seeking social support (boys: $M = 2.00$, $SD = 1.05$; girls: $M = 2.80$, $SD = 1.13$; $t(133) = -3.79$, $p < .001$) and on social action (boys: $M = 1.87$, $SD = 1.05$; girls: $M = 2.44$, $SD = 1.22$; $t(132) = -2.70$, $p < .01$).

We performed factor analysis to create a "stress reactions" variable out of the three outcome scales: state anxiety, state anger, and psychological distress. One factor emerged

Table 1
Objective and subjective exposure, coping strategies and stress reactions according to gender and age

	Gender					Age				
	Male ($n = 40$)		Female ($n = 99$)			Younger ($n = 56$)		Older ($n = 89$)		
Variables	*M*	*SD*	*M*	*SD*	*t*	*M*	*SD*	*M*	*SD*	*t*
Objective exposure (Range 0–5)	3.37	.75	3.18	1.04	1.04	3.21	1.02	3.23	.94	−.09
Subjective exposure (Range 1–5)	3.26	1.16	3.77	.94	−2.61**	3.78	1.03	3.53	1.00	1.38
Problem Solving (Range 1–5)	2.97	.75	3.07	.80	−.67	3.23	.76	2.98	.80	1.84
Emotional coping (Range 1–5)	2.32	.49	2.64	.59	−2.99**	2.72	.60	2.46	.43	2.72**
State Anxiety (Range 1–4)	2.25	.65	2.71	.63	−3.80***	2.51	.64	2.61	.66	−.84
State Anger (Range 1–4)	1.82	.62	2.12	.76	−2.12*	2.07	.77	2.00	.69	.49
Psychological distress (Range 1–4)	1.81	.69	2.10	.64	−2.28*	2.18	.69	1.93	.61	2.19*

Note. $N = 139$ (gender); $N = 145$ (age).
*$p < .05$. **$p < .01$. ***$p < .001$.

with an explained variance of 63%. Between groups analysis of variance was conducted to explore the impact of gender and age and interaction of genderXage on the new stress reaction variable. The only significant effect was revealed for gender [$F(1, 126) = 8.52$, $p = .004$] partial eta squared = .06. Neither age [$F(1, 126) = .62$, $p = .43$] nor the interaction of genderXage [$F = (1, 126) = 1.01$, $p = .32$] revealed significant effects.

Following Baron and Kenny's approach (1986), the mediating role of the different coping strategies was assessed as follows: (a) Does objective and subjective exposure significantly predict stress reactions? and (b) Does the inclusion of problem solving coping and emotional coping significantly reduce the predictive power of exposure, thereby establishing one or both coping strategies as the mediator? Each of the predictor variables had a significant zero-order correlation with stress reactions. While objective and subjective exposure as well as emotional coping were significantly and positively linked to stress reactions, problem solving was negatively linked to stress reactions (see Table 2).

Finally, we examined the role of the different exposure variables—objective and subjective exposure—as well as the role of the coping strategies in explaining stress reactions. We used hierarchical multiple regression analysis and results are presented in Table 3. Results show that both objective and subjective exposure have a significant role in explaining the variance of stress reactions, with 11% of the total variance explained. However, it

Table 2
Correlation matrix among the key variables: Objective, subjective exposure, coping strategies and stress reactions

	1	2	3	4
Objective exposure	—			
Subjective exposure	.25**	—		
Problem solving	.02	.22*	—	
Emotional coping	.18*	.34**	.36**	—
Stress reactions	.24**	.28**	−.17*	.36**

Note. $N = 145$.
$^{*}p < .05$. $^{**}p < .01$.

Table 3
Regression analysis for objective and subjective exposure as well as coping strategies predicting adolescents' stress reactions

Variable	R^2	B	β	SE	t
Step 1					
Objective exposure	.06	.18	.18	.09	2.12*
Subjective exposure	.05	.23	.23	.09	2.62**
Step 2					
Objective exposure		.12	.12	.08	1.51
Subjective exposure		.19	.20	.08	2.48*
Problem solving	.05	−.51	−.41	.10	−4.97***
Emotional coping	.17	−.83	.47	.15	5.59***

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

seems that the different coping strategies have a more powerful explanation, with 22% of the explained variance in "stress reactions."

We further checked the mediating role of problem solving coping and emotion coping on the relationships between exposure and stress reactions by running a Sobel test. While problem solving had no mediating role on either exposure variables, emotion coping mediated the relationships between objective exposure and stress reactions ($z = 2.36$, $p < .01$) and the relationships between subjective exposure and stress reactions ($z = 2.45$, $p < .01$).

Discussion

The aim of this study was to explore stress reactions, exposure, and coping strategies among adolescents facing chronic stress of years of missile attacks. More specifically, we wanted to find out if objective and subjective exposures are mediated by coping strategies and explain stress reactions of state anxiety, state anger, and psychological distress. By the time of this study, 99% of the sample experienced some kind of "objective exposure," meaning being physically close to an attack or knowing someone who was hurt in an attack. These exposure rates are much higher than other studies conducted during ongoing terrorist attacks in Israel (e.g., Braun-Lewensohn, Celestin-Westreich et al., 2010; Pat-Horenczyk et al., 2007, 2009).

Girls reported more state anxiety, state anger, and psychological distress. Regarding state anxiety and psychological distress, these results corroborate previous studies and literature in which girls seem to be more vulnerable to internalizing symptoms (Braun-Lewensohn, Celestin-Westreich et al., 2010; Pat-Horenczyk et al., 2009). However, the results regarding state anger are surprising since usually boys report more externalizing symptoms and anger (Zhou, Eisenberg, Wang, & Resier, 2004). Anger could have internalizing as well as externalizing consequences. High anger rates among girls seem to be a more complex phenomenon. It could be that displaying higher rates of anger is a way of maintaining social relationships during such a complex period (Kerr & Schneider, 2008). Girls also felt they were more in danger and used more emotion coping, especially relating to social support. These results are congruent with other studies on coping during political violent events that indicated that girls more than boys cope by seeking to relate socially. More specifically, girls react and report more stress reactions when facing life threatening events, which lead them to seek more social support (Tatar & Amram, 2007; Zeidner, 2006). This type of behavior is shaped by cultural stereotypes that reflect permission for girls to rely more on others (Addis & Mahalik, 2003). It should be noted that overall both genders used mostly problem solving such as focusing on the positive and seeking relaxing diversion. This result is congruent with previous studies that show Israelis to be active copers even in situations that are hard to control (Zeidner, 2006).

Regarding age, the only difference reported on stress reactions among the two age groups was on psychological distress. This finding is congruent with other studies undertaken in the context of ongoing violence, in which older adolescents report more psychological symptoms (Braun-Lewensohn, Celestin-Westreich et al., 2010; Solomon et al., 2005). These results could be explained by the fact that in spite of their more advanced developmental stage that enables them to cope better and stay healthier, the ongoing continuous stress and violence that older adolescents have experienced put them in danger and in a vague condition for a longer time and thus their vulnerability for more stress related symptoms increases. An additional difference has been revealed on emotion coping, with younger adolescents using this more often. The general coping literature indicates

that problem solving coping develops during adolescence (Frydenberg, 1997). Therefore, it seems that in the early stages of adolescents' development, the more prevalent coping strategies are emotional. Those were used mostly among the younger adolescents of our sample.

Our main research question related to the role of the different types of exposure as well as to the different coping strategies in explaining stress reactions. Our results show that all of our different variables had a significant role in explaining stress reactions. The main contributor to the explained variance was emotion coping, a variable that mediated both objective and subjective exposure. Once emotion coping entered the equation, objective exposure became insignificant. Another important point to emphasize is the stronger power of the different coping strategies in explaining stress reactions compared to the exposure variables. Once again it seems that the exposure per se is not the most important contributor to stress reactions after or during political violent events. These results have been shown in previous studies, especially in the context of one or sporadic violent events (Hoven et al., 2002; Pfefferbaum et al., 1999, 2001). This study supports the previous ones, and suggests that exposure to political violent events have only a limited role in explaining chronic political violent events. The use of coping strategies, on the other hand, seems to have a significant and powerful explanation role. While problem solving strategies have a protective role, emotion coping seems to be related to maladjustment and more symptoms of distress. Between the two strategies, emotion coping is more powerful in its explanation. These results regarding the different coping strategies are similar to other less chronic violent situations in which problem solving strategies were related to better adjustment, while emotion coping strategies seem to be linked to maladjustment (e.g., Braun-Lewensohn, Celstin-Westreich, Celestin, Verleye, et al., 2009; Braun-Lewensohn, Sagy, & Roth, 2010; Cohen & Eid, 2007; Zeidner, 2005). It seems that not only coping strategies are important in explaining stress during chronic political violent events, emotional coping strategies also have an important role in mediating the relationships between objective or subjective exposure and stress reactions during such periods of potentially traumatic experiences.

Study Limitations

This research is clearly exploratory in nature, and the findings should be considered with appropriate reservations. Our data were collected during the situation of continuous missile attacks. The sample is neither representative nor random, but rather consists of youngsters we were able to reach during this time. Thus, some degree of potential sample bias should be taken into account.

An equal distribution according to sociodemographic criteria was not achieved; for example, the sample 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 attacks.

The importance of this study is in its being a field research carried out in the midst of the stressful situation of severe missile attacks. The unfortunate conflictual violent situation in the area serves as a "natural laboratory" for investigation that is essential for studying human behavior (Lazarus, 1982). This study also presents the importance of coping strategies when facing chronic political violent events. It seems that the different types of exposure are mediated by emotional coping strategies that have a more powerful explanation of stress reactions. Therefore, our results can contribute to the development of gender

and age appropriate prevention and intervention programs focusing on implementing protective coping strategies to help youths who must cope with the political violence of terror and wars.

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