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POSITIVE LIFE EVENTS AND ADOLESCENT EMOTIONAL DISTRESS: IN SEARCH OF PROTECTIVE-INTERACTIVE PROCESSES

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Two hypotheses were examined regarding the protective effect of positive life events on emotional distress in adolescence. The first hypothesis was that positive events include a valence-related aspect and an event-related aspect. The event-related aspect is shared with negative events, and hence suppresses the protective effect of positive events on emotional distress. The second hypothesis was that positive events buffer the effect of negative events on distress, but that this stress buffering effect is difficult to detect because it is relatively small. These hypotheses were tested in a sample of 603 adolescents in their freshmen year of high school. During the first week of school, we assessed participants' levels of depression and anxiety. Sixteen weeks later, we again assessed their depression and anxiety, as well as the number of positive and negative events they experienced since the beginning of school. Structural Equation Modeling analyses yielded support for the suppressed/direct effect of positive events, and for a small but statistically significant stress buffering effect of positive interpersonal, but not success-related, events. Results suggest that positive events are comprised of both elements of risk and resilience, and encourage the introduction of "dosage considerations" into stress buffering research.

Positive life events such as satisfying social interactions, pleasant activities, and successful performances were conceptualized in the stress liter-

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ature as exerting a protective effect on emotional distress (L. H. Cohen, McGowan, Fooskas, & Rose, 1984; S. Cohen & Hoberman, 1983). This protective effect of positive events was hypothesized to operate in two ways, namely, directly (such that the more positive events experienced by individuals, the less distress they experience), and indirectly, by "buffering" the effects of negative events on distress (S. Cohen & Hoberman, 1983).

Despite the sound theoretical basis underlying these conceptualizations, the empirical evidence of both the direct and stress buffering effects of positive events is inconclusive. As acknowledged by several authors (Needles and Abramson, 1990; Zautra & Reich, 1983a), the influence of positive events on distress has been relatively under-researched, whereas the influence on negative events on distress has been well-established (Coyne & Whiffen, 1995). Nevertheless, of the relatively few studies conducted thus far, most findings are consistent with the above-described protective effects described above. Thus, support was obtained for either the direct or the stress buffering effects of positive events on symptoms of depression and/or anxiety, or on distress-related outcomes among varied populations. These populations include patients suffering from anxiety disorders (Lteif & Mavissakalian, 1995), from chronic fatigue syndrome (Ray, Jefferies, & Weir, 1995), community-sample adolescents (Caputo, Rudolph, & Morgan, 1998; Kanner, Feldman, Weinberger, & Ford, 1991; Wills, Sandy, Shinar, & Yaeger, 1999; Wills, Vaccaro, & McNamara, 1992), young adults (L. H. Cohen et al., 1984; S. Cohen & Hoberman, 1983), and the elderly (Krause, 1988). Reich and Zautra (1981) provided particularly compelling evidence. The authors encouraged college students to engage in either two or 12 enjoyable events during a one-month period and compared them to control students. Participants in the two experimental groups reported greater quality of life than did control students. Moreover, participants who reported more initial negative events exhibited lower distress when instructed to engage in 12 activities rather than two or none.

Nevertheless, these findings can be compared to other studies, in which the benefit of positive events was not demonstrated (Johnson, Crofton, & Feinstein, 1996; Johnson, Han, Douglas, Johannet, & Russell, 1998; Sarason, Sarason, Potter, & Antoni, 1985; Zautra & Reich, 1983b). Interestingly, studies that are consistent with the protective effect of positive events are similar with studies that are inconsistent with this effect with respect to the samples selected, the design utilized, and the analytic procedures performed (e.g., S. Cohen & Hoberman, 1983 vs. Sarason et al., 1985). Indeed, in one study (L. H. Cohen, et al., 1984) both confirming and disconfirming findings were obtained. The authors assessed depressive symptoms and positive and negative events of undergraduates at two points in time. Analyses of Time 1

data revealed statistically significant direct and stress buffering effects of positive events. Analyses of Time 2 data replicated the direct effect, but the stress buffering effect only approached significance. In longitudinal analyses, both effects were non-significant. In other studies, positive events were shown to exert an *adverse effect on adaptation* (Brown & McGill, 1989; Hirsch, Moos, & Reischl, 1985). For example, among children of depressed or rheumatoid arthritis patients, positive events were shown to predict *elevated*, rather than reduced, distress (Hirsch et al., 1985).

Our objective in the present study was to clarify this seemingly inconsistent pattern. We hypothesized that the direct effect of positive events on emotional distress is suppressed by negative events, and can only emerge when these latter events are taken into account. We further hypothesized that the stress buffering effect of positive events, while statistically significant, is relatively small. We shall elaborate on these hypotheses in turn.

HYPOTHESIS 1: NEGATIVE EVENTS SUPPRESS THE DIRECT PROTECTIVE EFFECT OF POSITIVE EVENTS

Suppressors are variables that enhance the effect of a predictor, X, on a criterion, Y (Tzelgov & Henik, 1991). As postulated by Tzelgov and Henik (1991), the variance of variable X may be comprised of two aspects. One aspect is correlated with Y and hence is "relevant" to its prediction. Another aspect is "irrelevant," either because it is unrelated, or because it is inversely related, to Y. The two aspects of the variance of variable X may cancel each other out, resulting in a reduced and possibly non-significant correlation between X and Y. However, the irrelevant variance aspect may be in turn correlated with a third variable, S. Accordingly, when X and S are used simultaneously to predict Y, the irrelevant variance of X is suppressed, consequently releasing the relevant variance and improving the predictive validity of X (see Tzelgov & Henik, 1991, for an elaborate discussion of this process).

It is possible that positive events are comprised of two aspects as well: a valence-related aspect and an event-related one. The valence-related aspect refers to the positive nature of the events, and is thus relevant to the prediction of diminished distress (i.e., more positive experiences bring about less distress). The event-related aspect refers to the occurrence of changes in participants' lives. This aspect may be irrelevant to the prediction of diminished distress, either because it is unrelated to distress, or because it is inversely related to it (i.e., regardless of the valence of the events, its occurrence leads to increased distress; cf. Hirsh, et al., 1985; Newcomb, Huba, & Bentler,

1981). The valence-related aspect and the event-related aspect may cancel each other out, resulting in a reduced effect of positive events on distress. Yet when positive and negative events are both taken into account, the event-related aspect is suppressed, and the valence-related aspect is released, resulting in an increased effect of positive events on distress.

HYPOTHESIS 2: THE STRESS-BUFFERING EFFECT OF POSITIVE EVENTS IS SIGNIFICANT BUT SMALL

As argued by L. H. Cohen et al. (1984), positive events may serve as a "breather" in the face of negative life events, because they produce positive affect, sustain coping efforts, and restore depleted resources (Cohen et al., 1984). However, detection of this buffering effect may be difficult, because enhanced methodological conditions are required to demonstrate such effects. The most common practice for demonstrating a stress buffering effect is via a statistically significant interaction between levels of stress and levels of the target buffer (cf. Baron & Kenny, 1986; S. Cohen & Wills, 1985). However, such interactions are susceptible to Type II error (i.e., they may be falsely deemed non-significant). Various other methodological limitations may impede the detection of existing buffering effects, including, but not limited to, a low reliability of the interaction term, low statistical power stemming from a small sample size, and a less than optimal selection of the relevant outcome (Chaplin, 1991; Kobasa, 1987; McClelland & Judd, 1993).

A related but somewhat different issue complicating the detection of a buffering effect is that of the "dosage" of the target buffer required to ameliorate the effect of negative events on distress. While several factors may share a common characteristic of being protective, they may differ in their protective potency. Some factors may produce moderate levels of stress buffering, while others require particularly high levels of the target buffer to produce a stress buffering effect (cf. Wills et al., 1992, demonstrating these differential buffering effects with social support and competence).

The study conducted by Reich and Zautra (1981) suggests that positive life events represent a relatively low-potency stress buffer. As shown by the authors, as many as 12 positive events were required to produce a stress buffering effect, which is six times as large as the dosage required to produce a direct protective effect (i.e., two events). To the extent that this is the case, studies that focus not only on to the presence or absence of this effect, but also on its magnitude, are potentially instrumental in clarifying the inconsistent pattern of results described above.

THE PRESENT STUDY

This study constituted a part of a longitudinal project aimed at examining risk and protective factors implicated in emotional distress among Israeli adolescents during their freshmen high school year. Adolescents in general (Compas, Eye, & Grant, 1994), and Israeli adolescents in particular (Brook & Katzir, 1993; Raviv, Sadeh, Raviv, & Silberstein, 1998) were shown to report elevated levels of distress. Such emotional distress may be exacerbated during the freshmen high school year, which is a time of considerable social and academic transition-related stress (Seidman, Allen, Aber, Mitchell, & Feinman, 1994).

Data pertinent to this investigation included the level of depression and anxiety experienced by the participants during the first week of school (Time 1) and 16 weeks later (Time 2). Time 2 assessment also included negative and positive events the participants experienced during this 16-week period. Consistent with the hypothesized direct/suppressed effect, we predicted that higher levels of positive events would predict a decrease in adolescent distress, but that this effect could only emerge when both negative and positive events were taken into account. Consistent with the hypothesized stress buffering effect, we predicted that the impact of negative events on distress would decrease as a function of the level of positive events. Additionally, we expected this stress buffering effect to be relatively small, such that even under high levels of positive events, negative events would still predict distress.

METHOD

PARTICIPANTS

Participants were 603 Jewish Israeli adolescents (325 girls and 278 boys, age range = 14-16, mode = 15) in their freshmen year in high school. These adolescents were sampled from four schools. School A (N = 271) and School B (N = 90) were located in affluent suburbs, whereas School C (N = 99) and School D (N = 143) were located in disadvantaged areas. This convenience sampling was conducted because we explored the moderating effect of socio-economic status (SES) on the results obtained.[1] However,

1. Further analyses confirmed that Schools C and D, which were located in disadvantaged areas, include more economically disadvantaged students than Schools A and B. Specifically, Schools C and D included more immigrant students than Schools A and B (14% vs. 4%, differences are significant at $p < .001$). Students in Schools C and D lived in denser households (i.e., number of siblings, ($t[601] = 7.90$, $p < .001$) and had lower parental educational level ($t[601] = -8.11$, $p < .001$ and $t[601] = -6.92$, $p < .001$ for mothers and fathers, respectively).

we found that neither participants' gender nor their SES moderated these results.

MEASURES

Center for Epidemiological Studies - Child Depression Scale, (CES-CD: Weissman, Orvaschel, & Padian, 1980). Weissman et al. (1980) adapted the Center for Epidemiological Studies - Depression Scale (CES-D; Radloff, 1977) to a population of children and adolescents. The scale includes 20 items representing symptoms of depression (e.g., depressed mood, crying, anhedonia). Respondents were requested to rank their endorsement of each item on a four-point scale. The scale's adequate reliability (Faulstich, Carey, Ruggiero, Enyart, & Gresham, 1986) was replicated in the present study (Cronbach's $\alpha = .86$ and .87, for Times 1 and 2, respectively).

State Anxiety Inventory (SAI: Spielberger, 1972). The SAI is one of the two subscales comprising the State-Trait Anxiety Inventory (STAI; Spielberger, 1972). It is a 20-item measure of symptoms of anxiety (e.g., nervousness, concern regarding the future). Respondents rated their endorsement of each item on a four-point scale. Teichman and Melnik (1968) established norms of this scale for Israeli adolescents and adults. The adequate reliability of the scale was replicated in the present study (Cronbach's $\alpha = .90$ and .91, for Times 1 and 2, respectively).

Life Events Scale. The scale includes 46 life events that were selected from several child and adolescent life event scales. These items were selected based on our interest in investigating events that may be influenced by the actions of individuals (Hammen, 1991). Moreover, we sought to compare the positive or negative events (S. Cohen & Hoberman, 1983), and interpersonal and self-related failure/success events (Rude & Burnham, 1993). Thirty-eight items were drawn from the Life Events Checklist (LEC; J. H. Johnson & McCutcheon, 1980), or the Children's Hassles/Uplifts Scale (CHS; CUS; Kanner et al., 1991). Eight additional items that tap romantic activity were selected from the College Student Life Events Scale (CSLES: Levine & Perkins, 1980). These items were categorized as follows: 16 items described negative interpersonal events (e.g., rejections and confrontations), nine items described negative failure-related events (e.g., exam failure), 15 items described positive interpersonal events (e.g., participating in enjoyable social activities), and six items described positive success-related events (e.g. exam success). These events are presented in Appendix A.

Respondents were asked to indicate whether they experienced each event during the first 16 weeks of school. Four indices were derived: number of negative interpersonal events (NIE), number of

negative failure-related events (NFRE), number of positive interpersonal events (PIE), and number of positive success-related events (PSRE).

Demographic Questionnaire. Respondents were asked to indicate their gender, place of birth, number of siblings, and parental educational level.

PROCEDURE

Data were collected in Israel during the 1998 academic year. We requested and obtained permission for conducting this study from branches of the Israeli Ministry of Education in the respective school districts. Subsequently, we obtained permission from principals from the four schools. Release forms were sent to parents, describing the study and informing parents of their right to prevent their children's participation. None did so. A special procedure was implemented to ensure participants' anonymity and confidentially. Namely, we instructed participants to refrain from providing identifying information (i.e., names, IDs), and identified them at the second wave of measurement via code numbers (see Linville, 1987, for a similar procedure).

During the first week of school, our research group, comprised of a graduate student in clinical psychology and three undergraduate research assistants, approached the participants in their school classrooms. Students were informed that the purpose of the study is to better understand their experiences during the first year in high school. Participants were strongly requested to refrain from providing identifying information, and were given code numbers. It was emphasized that students were free to quit the study at any time. Next, we administered a booklet of questionnaires for all students present. The booklets contained the CES-CD, SAI, a demographic questionnaire, and several measures of personality constructs (i.e., dependency and self-criticism; Blatt & Blass, 1996) that were not pertinent to the present report. These scales were randomly ordered across the different booklets. Overall, 753 students (383 girls and 370 boys) completed this booklet in the first data collection phase.[2]

The second data collection phase took place 16 weeks later, at approximately the end of the first semester. Our research group re-ap-

2. Although none of the students overtly expressed his or her refusal to participate, covert refusals may have been expressed in the form of approximately 30 booklets that were only half-completed, or whose pattern clearly indicated unreliable responses (e.g., circling only one of the multiple choices in all questionnaires). We disregarded data from these booklets.

proached the participants at school. Using the code numbers, we identified 603 of the participants (325 girls and 278 boys) who were then administered a booklet including the CES-CD, the SAI, the Life Events Scale, and a measure of perceived social support from friends, family, and school personnel (Procidano & Heller, 1983).[3] These scales were randomly ordered across the different booklets. At the second wave of measurement, students were rewarded with a snack for their participation. Some of the participants spontaneously indicated their enjoyment during the completion of the questionnaires and their appreciation of the effort taken to protect their anonymity and confidentiality, even at the expense of possible attrition. No adverse events were documented.

Retention rate in this study was 80% (i.e., 603/753). Analyses were conducted only on data provided by adolescents participating in the two data collection phases (N = 603). Attrition analyses were conducted in order to compare this latter group with the adolescents who participated in the first, but not the second, phase (N = 150). The analysis and attrition groups did not differ significantly on Time 1 variables. However, 25% of the boys (N = 92) versus 15% of the girls (N = 58) dropped out from the study at the second wave of measurement. A chi-square analysis with the Yates correction for continuation suggested that this difference in the proportion of boys and girls' dropping out is statistically significant (Yates $\chi^2[1, N = 753] = 10.55$, $p = .001$).[4]

RESULTS

ANALYTIC STRATEGY

Our hypotheses were tested via Structural Equation Modeling (SEM; cf. Hoyle & Smith, 1994). The hypothesis regarding the direct/suppressed effect of positive events was examined by comparing two nested SEM models. In both models, a dependent latent variable labeled "Distress 2" (indicated by Time 2 CES-CD and SAI), was predicted by three other la-

3. Correlations between the two measures of positive events and the three measures of perceived support were in the low to modest range (i.e., between .10 to .47). Introducing perceived support as a control variable yielded the same pattern of results.

4. Two factors contributed to participants' attrition (20%) in this study. First, several students did not bring their code numbers to the second wave of measurement, and hence could not receive the second booklet of questionnaires. This may represent a covert refusal on the part of these students. Secondly, several students were absent from school at the second day of measurement. Since this pattern is usually more noticeable among Israeli boys than among Israeli girls, it may account for the stronger tendency of boys, compared with girls, to drop out of the study.

tent variables: "Distress 1" (indicated by Time 1 CES-CD and SAI), "Negative Events" (indicated via NIE and NFRE), and "Positive Events" (indicated by PIE and PSRE).

In the first model, the correlation between Negative Events and Positive Events and the path leading from Negative Events to Distress 2 were fixed at zero. This entails estimating the effect of Positive events on Distress 2 without taking into account the contribution of Negative Events. In the second model, the two fixed parameters were relaxed, thus taking into account the contribution of negative life events. Consistent with the suppression hypothesis, we predicted that in the fixed model, in which the contribution of Negative Events was not taken into account, Positive Events would have a small and non-significant effect on Distress 2. Conversely, we predicted that in the relaxed model, in which the contribution of Negative Events was taken into account, Positive Events would have a strong and statistically significant effect on Distress 2.

In adherence to the "two-step approach" (Anderson & Gerbing, 1988) we established the measurement model of the independent variables prior to conducting the above-mentioned nested-model comparison. This was done by conducting Confirmatory Factor Analysis (CFA) in which Distress 1, Positive Events and Negative Events served as latent variables. The criteria selected for the establishment of this measurement model were (a) an adequate fit of the CFA model and (b) statistically significant loading of indicators on their respective latent variables.

To test the hypothesis regarding the stress buffering effect of positive events, we applied Jaccard and Wan's (1996) method for constructing a single-indicator product term. Distress 2 was regressed onto this single-indicator product term, as well as onto the latent variables Distress 1, Negative Events, and Positive Events. We expected a statistically significant but relatively small effect of the single-indicator product term on Distress 2.

All SEM analyses were conducted using the LISREL 8.30 software (Joreskog & Sorbom, 1999) based on the Maximum Likelihood (ML) estimation procedure. We relied on recent recommendations of Hu and Bentler (1999) and evaluated model fit using the following four fit indices: (a) the χ^2 index (a statistically non-significant χ^2 index [$p > .05$] represents good model fit); (b) the Tucker-Lewis Index (TLI), which is equivalent to the Non-Normed Fit Index (NNFI; Bentler & Bonett, 1980); (c) the Comparative Fit Index (CFI; Bentler, 1990), and (d) the Root Mean Square of Approximation (RMSEA; Steiger, 1980). According to Hu and Bentler (1999), values of .95 and higher for the NNFI and CFI, and values below .06 for the RMSEA represent good model fit.

An issue pertinent to the analyses is the clustered nature of these data, namely, the fact that they were derived from four schools. Preliminary

analyses revealed that the four schools did not differ with respect to the mean levels of the study variables. However, as researchers in school settings attest (e.g., Madon et al., 2001), even small differences among schools can produce substantial biases in the standard errors of statistical tests of the SEM and regression analyses. To address this potential bias, we conducted a one-way Multiple Analysis of Variance (MANOVA) with school identity as the independent variable and the study variables as dependent variables. This MANOVA yielded a pooled within-subject variance/covariance matrix for the study variables across the four schools. We then conducted the analyses using this pooled within-subject variance/covariance matrix, and repeated the analyses with the variance/covariance matrix derived from the sample as a whole (see similar procedure in Madon et al., 2001; L. H. Muthe'n & B. O. Muthe'n, 1998; and L. H. Muthe'n & Satorra, 1995). The patterns of results obtained in both sets of analyses were identical, suggesting that our results were not influenced by the clustered nature of the data. In this article, we present SEM results that are based on the across-school pooled within-subject variance/covariance matrix.

TESTING THE SUPPRESSION HYPOTHESIS

The means and standard deviations of the study variables in the sample as a whole, as well as the across-school pooled within-subject correlation matrix, are presented in Table 1. As shown in Table 1, depression and anxiety appear to represent a higher order construct of emotional distress, in that they are strongly correlated at each time point ($r = .73$ and $r = .78$, for Times 1 and 2, respectively), and the cross-measure correlations between depression and anxiety over time ($r = .50$ and $r = .48$, respectively) are nearly identical to the test-retest correlations ($r = .54$ and $r = .58$, respectively).

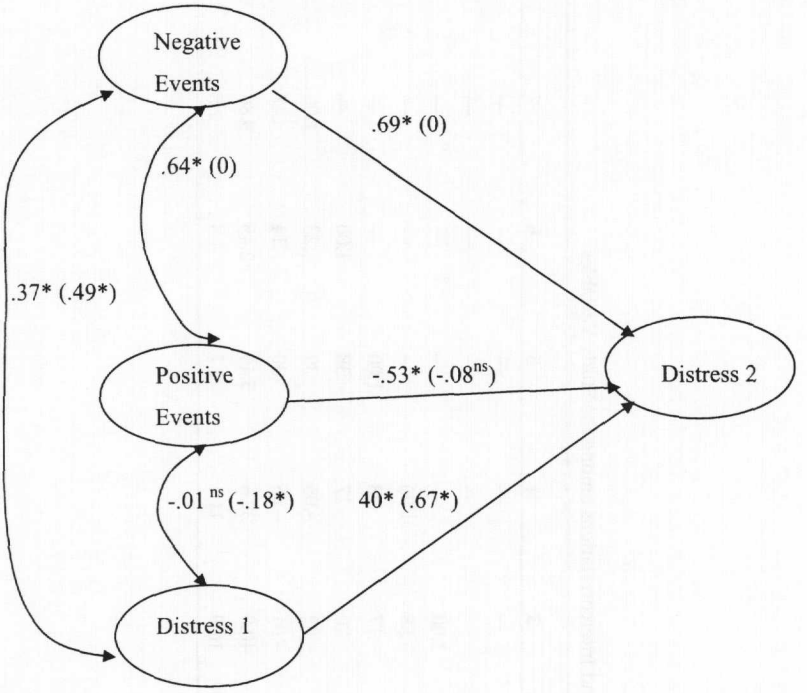
Inspection of the sample means of depression and anxiety suggests that the overall level of distress in this sample was higher than those previously reported for the same age group in the United States (Windle, 1992) and in Israel (Teichman & Melnik, 1968). Distress was comparable across the two measurement occasions, as indicated by non-significant differences between Times 1 and 2 levels ($t[602] = .35$, $p > .05$; $t[602] = 1.00$, $p > .05$, for depression and anxiety, respectively).

A CFA was conducted on the across-school pooled within-subject variance/covariance matrix in order to establish the measurement model of Distress 1, Positive Events, and Negative Events. In this analysis, CES-CD, NIE, and PIE served as reference variables, in that their loadings on their respective latent variables were fixed at 1.00, to provide the metric for the latent variables. This CFA model yielded a good

TABLE 1. Means, Standard Deviations and Intercorrelations among the Study Variables

Variable	1	2	3	4	5	6	7	8
1. Time 1 Depression	1.00	—	—	—	—	—	—	—
2. Time 2 Depression	.54	1.00	—	—	—	—	—	—
3. Time 1 Anxiety	.73	.48	1.00	—	—	—	—	—
4. Time 2 Anxiety	.50	.78	.58	1.00	—	—	—	—
5. Negative Interpersonal Events	.22	.29	.17	.28	1.00	—	—	—
6. Negative Failure–related Events	.22	.30	.20	.27	.38	1.00	—	—
7. Positive Interpersonal Events	.00	−.07	−.02	−.05	.39	.23	1.00	—
8. Positive Success–related Events	−.01	−.07	−.01	−.06	.30	.14	.47	1.00
M	19.0	18.9	40.0	39.6	5.40	2.45	9.86	3.52
SD	10.2	10.2	10.9	11.1	2.7	1.4	2.5	1.3

Note. $N = 603$.



Notes. *$p < .05$; ns = Non-significant; $N = 603$.

FIGURE 1.

model fit ($\chi^2[6] = 9.24$, $p = .16$, NNFI = .99; CFI = 1.00; RMSEA = .03). The CES-CD1 and SAI1 scales loaded significantly on Distress 1 (standardized β's = .93 and .78, respectively, $p < .05$). The PIE and PSRE scales loaded significantly on Positive Events (standardized β's = .79 and .59, respectively, $p < .05$). Finally, the NIE and NFRE scales loaded significantly on Negative Events (standardized β's = .74 and .51, respectively, $p < .05$).

Next, we compared the two nested structural models. Figure 1 includes the standardized estimates of the fixed model, in which the contribution of Negative Events is not taken into account, and the relaxed model, in which the contribution of Negative Events is taken into account. Parameters of the fixed model are in parentheses. In both the fixed and relaxed models, we ensured measurement invariance of distress across time by constraining to equality the loadings of SAI across time. Furthermore, autocorrelations were specified between the unique variance of CESCD and SAI at Times 1 and 2 (Hoyle & Smith, 1994).

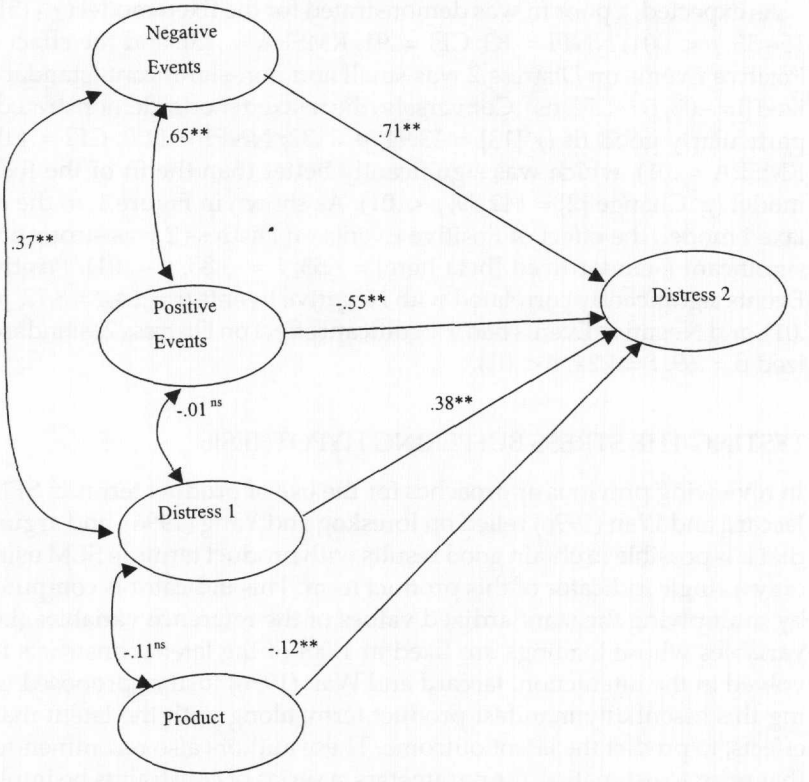
As expected, a poor fit was demonstrated for the fixed model (χ^2[15] = 156.83, $p < .001$; NNFI = .83; CFI = .91; RMSEA = .13), and the effect of Positive Events on Distress 2 was small and non-significant (standardized $\beta = -.08$, $t = -1.72$, ns). Conversely, the relaxed model demonstrated a particularly good fit (χ^2[13] = 13.94, $p = .37$; NNFI = 1.00; CFI = 1.00; RMSEA = .01), which was significantly better than the fit of the fixed model (χ^2 Change [2] = 142.89, $p < .01$). As shown in Figure 1, in the relaxed model, the effect of Positive Events on Distress 2 was strong and significant (standardized [beta here] = -.53; $t = -3.85$, $p < .01$). Positive Events significantly correlated with Negative Events ($r = .64$, $t = 8.72$, $p < .01$), and Negative Events had a significant effect on Distress 2 (standardized $\beta = .69$, $t = 4.24$, $p < .01$).

TESTING THE STRESS BUFFERING HYPOTHESIS

In reviewing previous approaches for the use of product terms in SEM, Jaccard and Wan (1996) relied on Joreskog and Yang (1996), and argued that it is possible to obtain good results with product terms in SEM using only a single indicator of this product term. This indicator is computed by multiplying the standardized values of the reference variables (i.e., variables whose loadings are fixed at 1.00) of the latent constructs involved in the interaction. Jaccard and Wan (1996) further proposed using this essentially manifest product term, along with the latent main effects, to predict the latent outcome. These authors also recommended that prior to estimating the parameters, a series of constraints be implemented. The purpose of these constraints is to center the means of all the latent variables, and to account for the association between the latent product term and its latent components via correlated errors of the indicators (see Jaccard & Wan, 1996, pp. 56-57).

In the present study, the reference variables PIE and NIE were standardized and multiplied, and this multiplicative term served as a single indicator of a product term. A SEM model was then specified in which Distress 2 was regressed onto Distress 1, Negative Events, Positive Events, and Product. Results of this analysis are summarized in Figure 2, which includes the standardized parameters of the analysis.

As shown in Figure 2, results were consistent with our hypothesis. Namely, the single-indicator variable Product had a significant effect on Distress 2 (standardized $\beta = -.12$, $t = -2.21$, $p < .05$), over and above the significant effects of Distress 1 (standardized $\beta = .38$, $t = 4.804$, $p < .05$), Positive Events (standardized $\beta = -.55$, $t = -3.89$, $p < .05$), and Negative Events (standardized $\beta = .71$, $t = 4.26$, $p < .05$). A very good fit was demonstrated for this model (χ^2[21] = 19.21; $p = .57$; NNFI = 1.00; CFI = 1.00; RMSEA = .00).



Notes. *p = .05, one tail test; **p < .05, two tails tests; ns = Non-significant; N = 603.

FIGURE 2.

To gain further appreciation of the magnitude of this interaction effect, we applied a procedure described in Jaccard and Wan (1996). The authors recommend computing the non-standardized value of the slope of Negative Events on Distress 2 at different levels of Positive Events. Specifically, this slope is estimated at the mean level of Positive Events, as well as at one standard deviation above and below this mean.

The slope of Negative Events at a given value of Positive Events is

$$b \text{ at } Vz = b_1 + b_3 Vz \quad (1)$$

where b is a certain slope of Negative Events, z is Positive Events, Vz is a specific value of Positive Events, b_1 is the non-standardized estimate of the slope of Negative Events on Distress 2 (which is .91, as derived from the LISREL 8.30 GAMMA matrix), and b_3 is the non-standard estimate of the slope of Product on Distress 2 (in the present case it was -.16). Since

the latent variances were mean-centered, a score of 0 on z corresponded to the mean of the latent variable Positive Events. Hence, based on equation (1), when Positive Events is at its mean, the non-standardized value of the slope of Negative Events was .91.

What are the non-standardized values of this slope at low and high values of Positive Events? The standard deviation of Positive Events that was derived from the PHI matrix in the LISREL 8.30 was .79. Applying eq. (1), we found that when Positive Events was low (i.e., one standard deviation below the mean), the non-standardized value of the slope of Negative Events was 1.04. When it was high (i.e., one standard deviation above the mean), the non-standardized value of the slope was .78 (a value that would still be statistically significant under the same standard error found in the above SEM model; $SE = .21$, $t = .78/21 = .3.71$, $p < .05$). Thus, fluctuation of one standard deviation around the mean of Positive Events resulted in fluctuations of .13 increase or decrease of the slope of Negative Events (i.e., .91 - .78 = 1.04 - .91 = .13). In other words, only 14% of the adverse effect of Negative Events was changed by a change of one standard deviation of the buffer, Positive Events (.13 / .91 = .14).

Because in above analyses the PIE index was arbitrarily selected as an indicator of the product variable, we repeated the analysis using the PSRE indicator. In this analysis, the effect of Product was not statistically significant, suggesting that the stress buffering effect reported above applies primarily to events that are of an interpersonal nature.

DISCUSSION

In the context of a large sample of Israeli adolescents, who reported elevated levels of depression and anxiety, we found support for a direct/suppressed effect of positive events on adolescent distress. We also found support for a statistically significant, albeit small, stress buffering effect of positive interpersonal events. These two findings are discussed in turn, followed by qualifications and suggestions for further research.

THE DIRECT/SUPPRESSED EFFECT OF POSITIVE EVENTS

Conducting nested-model SEM analyses, we found that in a fixed model, in which the contribution of negative events to emotional distress was not taken into account, a non-significant effect of positive events on distress emerged (standardized coefficient = -.08, ns). In contrast, in a relaxed model, in which the contribution of negative events to emotional distress was taken into account, the effect of positive events on emotional distress was statistically significant and relatively strong

(standardized coefficient = -.53, $p < .05$). This nested-model procedure enabled us not only to demonstrate the suppression hypothesis (i.e., positive events predict distress only in the presence of negative events), but also to gain appreciation of the discrepancy between the *magnitude* of the suppressed and non-suppressed effects (standardized coefficients = -.08 vs. -.53, respectively). This discrepancy suggests that the effect of positive events on distress can be highly underestimated if it is assessed without controlling for the variance of positive events that is shared with negative events.

As found in the present study, negative and positive events were strongly correlated, sharing a considerable amount of the variance of each construct ($r = .64$, 41% of shared variance). This correlation is stronger than those previously reported in the literature (e.g., L. H. Cohen et al., 1984, p. 573). One possibility for this strong correlation is the fact that negative and positive events were assessed as latent variables. Since latent variables are assessed without measurement error, they provide a disattenuated estimate of the relationship between these two constructs (Nunnally, 1978). Moreover, this strong correlation is consistent with our hypothesis as to the event-related aspect, which is shared by positive and negative events. However, alternative explanations for the shared variance between positive and negative events exist as well. For instance, these two types of events may share method variance, in that they are usually assessed by the same self-report measure. Another possibility is that a causal relation exists between these events: negative events (e.g., exam failure) may bring about behaviors (e.g., more diligent studying) that are instrumental in eliciting positive events (e.g., exam success). Personality may also contribute to this shared variance between negative and positive events. Thus, individuals with elevated levels of sensation seeking (L. H. Cohen, 1982) lead an active life style, thereby exposing themselves to both negative events (i.e., failures, rejections) and positive events (triumphs, exciting interpersonal exchanges). Finally, the possibility that this strong correlation between negative and positive events reflects the distinct age or national identity of this sample could not be ruled out.

However, regardless of its source, the presence of this shared variance suggests that describing positive events as exclusively protective may not be accurate, in that positive events include both elements of risk and resilience. Whereas positive events ameliorate distress (via aspects that are not shared by negative events), they might also exacerbate distress (via aspects that are shared with negative events). Arguably, this multifaceted description of positive events also applies to other risk and protective psychosocial factors. A multifaceted approach to risk and resil-

ience and a utilization of the suppression paradigm (Tzelgov and Henik, 1991) may uncover risk elements in previously defined protective factors, and resilience elements in previously defined risk factors. For instance, as shown by Priel and Shahar (2000), the construct of dependency, which has been traditionally implicated in personality vulnerability to emotional distress (Blatt & Blass, 1996), includes both elements of vulnerability and resilience.

THE STRESS BUFFERING EFFECT OF POSITIVE INTERPERSONAL EVENTS

The resilience-related aspect of positive life events involves a dual mechanism. Alongside the direct/suppressed effect (more positive events—less distress), we also found that positive interpersonal events, but not successes-related events, served as a stress buffer: the effect of negative events on distress decreased as the level of positive events increased. This dual mechanism is not uncommon among other protective factors. In their seminal review, S. Cohen and Wills (1985) discussed at length the direct and stress buffering effect of social support on psychological and physical distress. In that review, S. Cohen and Wills (1985) were able to point out fine grained distinctions between the direct and stress buffering effects of social support. As postulated by the authors, the direct effect is associated with actual social support, whereas the stress buffering effect is related to perceived support. It is incumbent on future studies to explore similar distinctions in the protective mechanisms of positive life events.

We did not predict the pattern whereby positive interpersonal events, but not positive success-related events, exert a stress buffering effect on adolescent distress. Hence, it is difficult to explain this discrepancy between the two types of positive events. Nevertheless, an examination of the list of events used in the present study (see Appendix A) suggests that this list is biased toward interpersonal events, both positive and negative. Whereas 31 of the 46 events listed are interpersonal, only 15 are failure/success-related. It is possible that in the present study we were more successful in sampling the interpersonal domain of Israeli adolescents, in comparison to their achievement domain. Interestingly, a similar bias was presented in other studies in which the distinction between interpersonal and failure/success-related events was made (e.g., Rude & Burnham, 1993). This may reflect the limitation of the field as a whole. To the extent that this bias exists, it may be shared by participants and researchers alike. In a study conducted by Zuroff, Igreja, and Mongrain (1990), 46 undergraduates were followed-up over a 12-month period. At the follow-up assessment, participants were requested to rate the sever-

ity of their worst period of depressed mood during the 12-month follow-up, and to report the events precipitating this worst period. Zuroff et al. (1990) found that most (64%) of the events implicated in the worst period of depressed mood were interpersonal events. Moreover, even participants whose personality was characterized by strong achievement needs reported more interpersonal events than achievement ones. To the extent that interpersonal events (both positive and negative) are more salient than failure/success-related ones, their adverse and protective effects may be stronger. Clearly, more research into this hypothetical pattern is needed.

In the present study, we tested the stress buffering effect of positive events under enhanced methodological conditions. Specifically, we selected a large sample size of adolescents, utilized conceptually relevant outcomes, and applied an analytic approach that relies mostly on latent variables. Despite these enhanced methodological conditions, we found that the stress buffering effect of positive interpersonal events, albeit statistically significant, was relatively small. Follow-up analyses revealed that even though the effect of negative events on distress decreases as the level of positive events increases, this effect was still pronounced in high levels of positive events. It therefore follows that to ameliorate the adverse effect of negative events completely, particularly high levels of positive interpersonal events are needed. This finding is consistent with Reich and Zautra's (1981) experimental study that found that 12 positive events were needed to induce a stress buffering effect, but only two positive events were needed to induce a direct effect.

The examination of the stress buffering effect of positive events in terms of dosage helps to clarify the mixed pattern that was previously obtained in the literature. Namely, small effects tend to disappear when more restrictive analyses are conducted (e.g., L. H. Cohen et al., 1984), and enhanced methodological conditions are needed for their detection. Yet a dosage approach may have additional advantages over a dichotomous, all-or-none approach. Specifically, a dosage approach may enable the comparison of the differential ways in which various stress buffers ameliorate negative events. Thus, while some stress buffers only slightly attenuate the effect of stress (as was in the case of the present study, but see also Wills et al., 1992), other buffers attenuate this effect more potently and rapidly. Still other factors evidence a complex cross-over pattern. Lower levels of these stress buffers are associated with *positive* stress-distress relations (i.e., more stress—more distress), but higher levels of these stress buffers are related to *negative* stress-distress relations (i.e., more stress—less distress; see Linville, 1987, for an example of the stress buffering effect of self-complexity).

Finally, a dosage perspective on stress buffering can inform practitio-

ners and policymakers as to the cost-effectiveness of interventions aimed at increasing clients' adaptation. Thus, findings of the present study are consistent with the claim that interventions targeting patients' experience of positive events are effective in reducing distress (Reich & Zautra, 1981; Zautra & Reich, 1983a). However, our findings suggest that in implementing such interventions, it is important to focus on those aspects of positive events that are not shared by negative events. Our findings also imply that such interventions will ameliorate clients' distress mainly directly, and only slightly (although not necessarily unimportantly) by buffering the adverse effects of negative events.

ADDITIONAL QUALIFICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The present study is limited in using a self-report measure of life events. Such measures have been previously criticized as to their potential for inflating the effect of life events on distress (Coyne & Whiffen, 1995). Hence, the present results should be replicated with semi-structured interviews of life events that are increasingly used in stress research (cf. Hammen, 1991). Furthermore, while we demonstrated the effect of life events on changes in distress over time, we did not assess life events at Time 1, and so were not able to examine the prospective effect of negative and positive events on distress.

Future studies may address the contribution of individual difference variables to the protective effect of positive events. The possibility of personality and individual differences accounting for the overlap between positive and negative events was discussed above. Additionally, it is possible that personality moderates the effect of positive events on distress. Findings obtained by Needles and Abramson (1990), and by J. G. Johnson et al., (1996, 1998) are particularly relevant here. Obtaining non-significant zero order correlations between positive events and distress, these authors also found that individuals with an enhancing attribution style (i.e., internal, stable, and global attributions for positive events) reported decreased hopelessness and depressive symptoms after experiencing positive events. A conceivable next step would be to explore whether this cognitive style moderates the stress buffering effect of positive interpersonal events. Namely, the stress buffering effect of positive events, which was relatively small in the present study, might be considerably stronger among individuals with an enhancing attributional style.

APPENDIX A: LIST OF LIFE EVENTS USED IN THE PRESENT STUDY

NEGATIVE INTERPERSONAL EVENTS (NIE)

1. You quarreled with your brothers/sisters
2. A friendship of yours ended
3. You quarreled with your parent/s
4. You quarreled with your romantic boyfriend/girlfriend
5. You experienced a romantic breakup
6. You were confronted by school personnel
7. You were confronted by classmates
8. You were insulted by classmates
9. You were not included in a group activity
10. You had altercations with others
11. You were attracted to someone who was not interested in you
12. You asked someone out and were not reciprocated
13. You were not asked out on a romantic date
14. You had a disappointing romantic date
15. You were asked out by someone you were not interested in
16. You contemplated breaking up with a boyfriend or girlfriend

NEGATIVE FAILURE-RELATED EVENTS (NFRE)

1. You failed an examination
2. You lost your job
3. You had an encounter with the law
4. You were injured due to your careless behavior
5. You failed to join an extracurricular activity
6. You experienced undesirable changes in your appearance (unwanted weight gain/loss, acne)
7. You experienced academic difficulties
8. You failed in an extracurricular activity (e.g., sports)
9. Someone was able to do things you were not able to

POSITIVE INTERPERSONAL EVENTS (PIE)

1. You joined a new social extracurricular activity
2. You had a new romantic partner
3. You participated in an enjoyable recreational activity with friends (e.g., party, movies)
4. You received a letter or a telephone call from a distant friend
5. You were invited to join an activity by friends
6. You received a present from someone
7. You helped your brother/s or sister/s
8. You formed a new friendship

9. You received help from school personnel
10. You spent enjoyable time with your parents
11. You were helped by your brother or sister
12. You were helped by friends
13. You were asked out by someone you were interested in
14. You helped friends
15. You made up with a romantic boyfriend/girlfriend after a fight

POSITIVE SUCCESS-RELATED EVENTS (PSRE)

1. You obtained a new job
2. You succeeded in an examination
3. You succeeded in an extracurricular activity
4. You experienced desirable changes in your appearance (e.g., weight gain/loss)
5. You were complimented on your appearance
6. You were complimented on your academic performance

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