Journal of Youth and Adolescence, Vol. 15, No. 5, 1986

Cognitive Appraisal of Major and Daily Stressful Events During Adolescence: A Multidimensional Scaling Analysis

Glen E. Davis[1] and Bruce E. Compas[2,3]

Received April 30, 1986; accepted July 3, 1986

Multidimensional scaling analysis was used to examine adolescents' cognitive appraisals of major and daily stressful events. The desirability of events was the only salient feature for early adolescents. Middle and late adolescents also appraised events in terms of their desirability; in addition, the amount of impact that events exerted on their lives and the generality of the causes of events were salient dimensions for these age groups. These results suggest increased complexity with age in adolescents' cognitive appraisals of stressful events. Correlational analyses also indicated that perceptions of personal coping capabilities are associated with high event desirability, high frequency of occurrence, stable causes, and decreased ability of others to be of help in coping.

INTRODUCTION

One of the most striking findings to emerge from the study of psychosocial stress is the considerable variability in the responses of in-

This research served as a portion of the doctoral dissertation of the first author and was supported in part by an institutional award from the University of Vermont to the second author.

[1]Staff psychologist at Kennebec Valley Mental Health Center in Waterville, Maine. Received his Ph.D. from University of Vermont. Research interests include stressful events during adolescence.

[2]Assistant Professor of Psychology at the University of Vermont where he is investigating stress and coping among children and adolescents. Received his Ph.D from UCLA in 1980.

[3]To whom correspondence should be addressed at Department of Psychology, University of Vermont, Burlington, Vermont 05405.

0047-2891/86/1000-0377$05.00/0

dividuals exposed to the same stressful circumstances. Major life changes (e.g., death of a loved one, divorce), and the chronic stresses and strains of daily living, are associated with increased psychological and/or somatic disturbance in some individuals; others display no indications of significant distress, and still others experience increased mastery and competence (see reviews by Compas, in press, and Thoits, 1983). Cognitive appraisals of stressful events, the environment, and one's resources available for coping with stress have been hypothesized to play a central role in producing these varied relationships (Lazarus and Folkman, 1984).

Examination of developmental changes in cognitive appraisal processes is of potentially great importance for understanding stress during adolescence. Both stage theories and information processing models characterize cognitive development during adolescence as increasing in complexity, including changes in the ways adolescents perceive their social world (e.g., Gross, 1985; Keating, 1980). Thus, it is reasonable to expect that appraisals of stressful events and circumstances would be similarly affected. However, prior studies of stress in adolescence have not addressed this possibility.

The study of cognitive appraisals of stressful events during adolescence needs to focus on several appraisal dimensions. First, the salience of the perceived impact and desirability of stressors should be examined empirically. Prior studies of these dimensions (e.g., Johnson and McCutcheon, 1980; Newcomb *et al.,* 1981) have elicited responses on Likert scales and it remains unclear if adolescents spontaneously attend to these features of stressful experiences. Second, the perceived frequency of events may be important in distinguishing major life events from daily hassles and pleasures. While major and daily stressors have been examined in studies involving adults (e.g., Kanner *et al.,* 1981) and adolescents (Compas *et al.,* 1985), no effort has been made to examine differences in the ways these types of stress are perceived. Third, attributional analyses of stressful life events in adulthood have focused on the perceived locus (internal vs external), stability, generality, and controllability of the causes of events (see Hammen, 1985, for a review). The salience of these various dimensions of attributions of cause for stressful events needs to be examined with adolescents. Finally, cognitive-transactional models of stress and coping emphasize appraisals of personal and social resources for coping with a stressor. These perceptions are particularly noteworthy, as they are seen as critical determinants of whether an event is experienced as stressful. That is, *stress* is defined by Lazarus and Folkman (1984) as a relationship between the individual and the environment that is appraised as taxing or exceeding one's ability to cope. Thus, the salience of appraisals of the ability to cope and the relationships of these appraisals to other perceived dimensions of stressful events is of interest.

The present study examined adolescents' cognitive appraisals of major and daily stressful events. A type of multidimensional scaling (MDS) analysis (ALSCAL) was used to identify the salient features of adolescents' appraisals of stressful events. MDS analysis is similar to factor analysis in that both empirically identify relationships among elements when the underlying organization is unknown (Schiffman *et al.*, 1981). However, MDS has certain features (e.g., interpretation of distance between points rather than angles between vectors and generating interpretable solutions containing fewer dimensions) that make it particularly well suited to the study of perceptual judgments (Schiffman *et al.*, 1981). In this case adolescents' judgments of the similarity of experience of pairs of stressful events were obtained. The dimensions on which events are perceived as similar or dissimilar were then identified. In a second step in MDS analysis, these dimensions were then correlated with subjects' independent ratings of each event on the cognitive appraisals that are of interest (ability to cope, attributions of cause, etc.). Specific hypotheses were not made regarding the cognitive appraisals that would be most salient. However, it was expected that the appraisals made by older adolescents would be more complex (i.e., involve more dimensions) than those made by younger adolescents.

METHOD

Subjects

A total of 36 subjects, two males and two females of each age between 12 and 20 inclusive, participated in the study. (This sample is sufficiently large for the use of MDS procedures to analyze perceptual judgment data; cf. Schiffman and Dackis, 1976; Schiffman and Pasternak, 1978). Subjects 12 through 17 years old were volunteers recruited from junior high schools and high schools in Vermont, and 18- to 20-year-old subjects were drawn from undergraduate psychology courses at the University of Vermont, in which they received extra credit for participating in the study. Reflective of the population of Vermont, the subjects were white and ranged from lower-middle to upper-middle socioeconomic status.

Procedure

A sample of 20 life events was selected from a list of 210 major and daily events generated from adolescents' open-ended reports in a prior study

(Compas *et al.*, 1985). These 20 items were selected in an attempt to sample events from each of the following domains: death–illness–accident, family, living situation, personal health and appearance, recreation, romance, school, social–friendship, and work. The following events were selected: problems with boyfriend or girlfriend, trouble with the law, friend having emotional problems, spending time with friends, major failure at sports, flunking a class, falling in love, arguments with family members, listening to music, personal achievement at work, doing well on an assignment or test, brother or sister getting married, getting complimented, sleeping late, moving away from parents' home, stopping smoking, work hassles, entering the hospital, minor physical ailments, and doing household chores.

After supplying basic demographic information, subjects were asked to rate the degree of similarity of the experience of each event paired with every other item, yielding 190 such comparisons. Thus, 6840 similarity judgments of paired events were generated by the sample. Data were recorded by having subjects place a vertical mark on a 5-inch horizontal line, with one end indicating *Exact same* experiences and the other end indicating *Most different* pairings. In the second portion of the procedure, subjects rated each of the 20 individual events on 10 scales. These scales were selected on the basis of findings in prior studies indicating that they may represent characteristics of events or attributions of cause that affect the relationship between life events and disturbance. The 10 scales were (a) impact, (b) desirability, (c) frequency, (d) ability to cope, (e) the degree to which others could be of help in coping with this event, (f) locus of cause (the degree to which an event is caused by an individual vs external factors), (g) controllability of cause (the amount of control a person has over the cause of an event), (h) stability of cause (whether the cause of an event is enduring or transient), (i) generality of cause (the degree to which the cause of an event precipitates other events), and (j) predictability. Subjects' ratings for each of these 10 scales were recorded by placing a mark on a 5-inch line as was done in recording similarity judgments.

RESULTS

MDS Analyses for Total Sample

As with factor analysis, MDS can generate solutions with differing numbers of dimensions. Both the replicability and interpretability of the various solutions must be examined to determine which is most valid and useful. For the sample as a whole, MDS analyses of similarity ratings that result in one- to four-dimensional solutions were examined. It was found that a three-dimensional solution was the most complex solution in which similar dimensions were obtained between the separate halves of the sam-

ple. The first through third dimensions of this solution for half the sample correlated .99 ($p < .001$), .75 ($p < .001$), and .82 ($p < .001$), respectively, with the first through third dimensions of the three-dimensional solution for the second half of the sample. The geometric configuration representing the three-dimensional solution is presented in Figs. 1 and 2. This solution accounts for 43.8% of the variability in subjects' similarity ratings. Although there are no established guidelines for evaluating this finding, it compares favorably with the results of MDS analyses reviewed by Schiffman *et al.* (1981).

In order to determine what these dimensions represent, a series of multiple regressions were performed using coordinates of items on each of the three dimensions derived from the similarity ratings as the dependent variable and subjects' averaged ratings of each event on the 10 appraisal scales as the independent variables. Subjects' ratings of the desirability of events correlated .98 ($p < .001$) with the first dimension and accounted for 96% of the variance in the placement of items along this axis. Figure 1 displays the

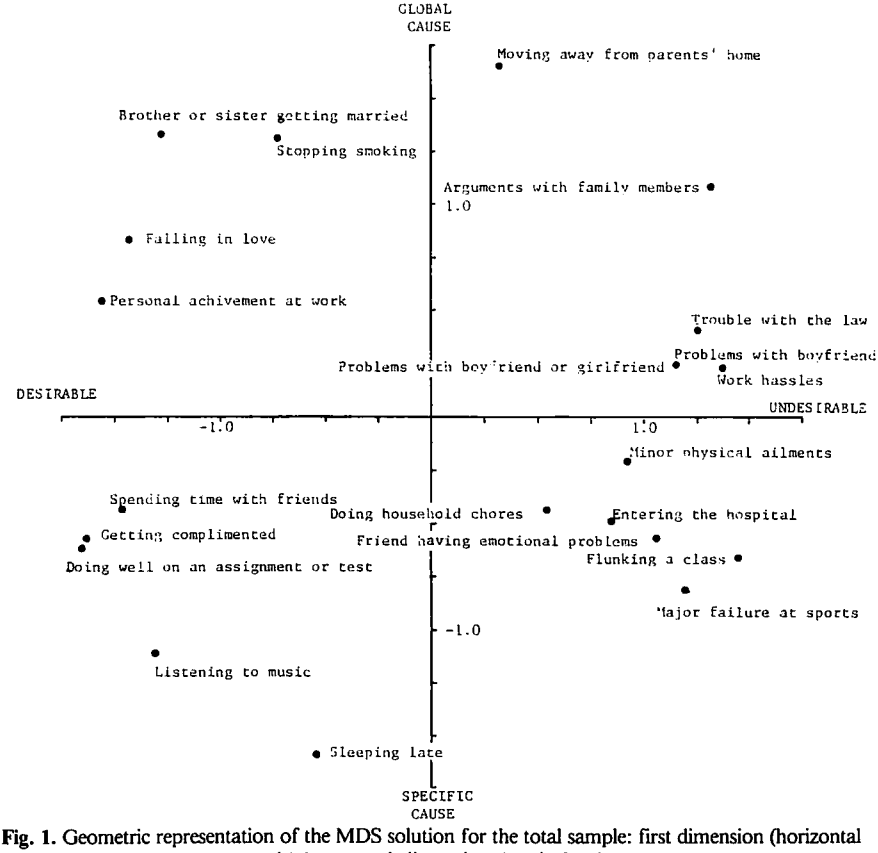

Fig. 1. Geometric representation of the MDS solution for the total sample: first dimension (horizontal axis) by second dimension (vertical axis).

placement of items along the first dimension on the horizontal axis, with desirable items placed to the left and undesirable items to the right. Subjects' perceptions of the degree to which others could be of help were also significantly correlated with item positions on the first dimension after partialing out the variance accounted for by desirability, but this correlation explained only an additional 1% of the variance [$R = .99, F(2, 17) = 289.85$ $p < .001$]. The multiple-regression analysis using coordinates of items along the second dimension as the dependent variable yielded a significant correlation with the generality of cause of events [$R = .60, F(1, 18) = 7.96, p < .01$]. Subjects' appraisals of the generality of cause explained 36% of the variance in item placement along the second dimension. The vertical axis in Fig. 1 represents the second dimension of this MDS solution, with events having causes that precipitate many other events placed toward the top of the figure. Finally, appraisals of the impact of events correlated .55 [$F(1, 18) = 7.96, p < .02$] with item coordinates along the third axis. Figure 2 displays the placement of items along the third dimension (vertical axis), with low-impact events placed toward the bottom and high-impact events to the top of the figure. In summary, the adolescent sample as a whole distinguished between life events primarily on the basis of differences in (a) the desirability of events, (b) the generality of cause of events, (c) perceptions of impact and, to a lesser extent, (d) the degree to which others could be of assistance if the event occurred.

MDS Analyses by Age

A series of three MDS analyses were performed to examine differences in the appraisal of life events between the early (12- to 14-year-old), middle (15- to 17-year-old) and late (18- to 20-year-old) adolescent groups. Correlations between halved samples of the early adolescent group revealed that the one-dimensional solution was the most complex replicable solution. This dimension correlated .70 ($p < .001$) between the separate halves of the sample. The one-dimensional solution accounted for 43% of the variance in subjects' ratings of the similarity of events. Results of a multiple-regression analysis indicate that 92% of the variance in item placement along this dimension is accounted for by early adolescents' appraisal of the desirability of events [$R = .96, F(1, 18) = 214.08, p < .001$]. Thus, the 12- to 14-year-old adolescents consistently used only the appraisal of desirability to distinguish between life events.

Data from the middle adolescent group yielded a three-dimensional solution that accounted for 47% of the variance in similarity judgments. These dimensions from the MDS solution for half the sample correlated .97 ($p < .001$), .63 ($p < .01$), and .72 ($p < .001$), respectively, with the first through

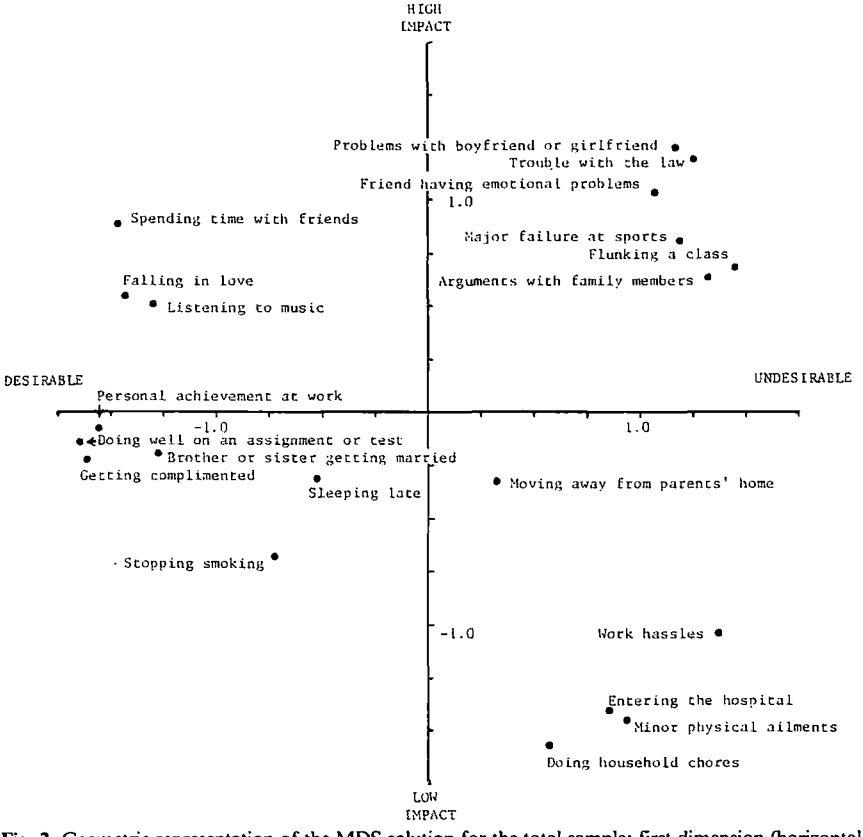

Fig. 2. Geometric representation of the MDS solution for the total sample: first dimension (horizontal axis) by third dimension (vertical axis).

third dimensions from the solution for the second half of the sample. A multiple regression indicates that ratings of desirability and the degree to which other persons are of help explain 95% of the variance in placement of items along the first dimension [$R = .98$, $F(2, 17) = 165.09$, $p < .001$]. The desirability appraisal alone accounts for 93% of the variance in this dimension, with the ratings of the degree to which others are of help explaining an additional 2% of the variance. Generality of cause was the only scale that explained a significant portion of the variance (30%) in the multiple regression with the second dimension coordinates as the dependent variable [$R = .55$, $F(1, 18) = 7.92$, $p < .02$]. Coordinates along the third dimension correlated [$R = .68$, $F(1, 18) = 15.51$, $p = .001$] with middle adolescents' appraisal of the impact of events and accounted for 46%

of the variance. As with the total sample, 15- to 17-year-old subjects distinguished between events primarily on the basis of their desirability. The second dimension used by adolescents in differentiating between life events is represented by generality of cause of events. Finally, the impact of events is a salient dimension reliably used by middle adolescents to distinguish between events.

Results of the older adolescent subjects are similar to those of the middle adolescent sample. Once again the three-dimensional solution was the most complex solution replicable between separate halves of the sample. The three dimensions arising from the solutions for separate halves of the sample correlated .98 ($p < .001$), .46 ($p < .05$), and .48 ($p < .05$) with one another, respectively. The solution accounted for 58% of the variance in subjects' similarity judgments. Desirability ratings were the only independent variable entered into the multiple regression of the first dimension, yielding a correlation of $R = .99$, $F(1, 18) = 771.58$ ($p < .001$). Coordinates of items along the second axis correlated significantly with older adolescents' appraisal of the impact of events [$R = .66$, $F(1, 18) = 13.69$, $p < .01$], which accounts for 43% of the variance in this dimension. Finally, averaged ratings of generality of cause of events account for 23% of the variance in coordinates along the third axis [$R = .48$, $F(1, 18) = 5.46$, $p < .04$]. Although the order of the three dimensions differs for middle and late adolescents, this analysis reveals that these two groups use the same appraisals to distinguish between life events—namely, desirability, generality of cause, and impact. Younger adolescents, on the other hand, consistently use only the appraisal of desirability to differentiate life events.

Correlations Among Appraisal Dimensions

Further information on adolescents' perceptions of life events is provided by examining the correlations among the various appraisal dimensions, with particular attention given to those dimensions related to perceived ability to cope. The intercorrelation matrix of the appraisal scales obtained from the MDS analyses for the whole sample is presented in Table I. Since the present analysis focuses on the relationship between appraisals of each event, the units of analysis consist of mean ratings of each event across all subjects. Hence, for all correlations the number of cases is equal to the number of events: 20. Given the large number of correlations calculated (45), a two-tailed probability level of .01 was established. Twelve of the 45 correlations were significant for the entire sample, nine of which were significant for all three of the age groups when they were analyzed separately.

Several patterns can be identified among the significant correlations in Table I. First, eight of the significant correlations involve a cluster of ap-

Table I. Correlations Among Cognitive Appraisals of Stressful Events

	I	II	III	IV	V	VI	VII	VIII	IX
I. Impact									
II. Desirability	.17								
III. Frequency	−.38	.59[b]							
IV. Ability to cope	−.25	.84[b]	.75[b]						
V. Others of help	.34	−.50	−.52	−.61[b]					
VI. Locus of cause	−.20	−.37	−.47	−.10	.01				
VII. Controllability of cause	−.24	−.44	−.36	−.13	.10	.93[b]			
VIII. Stability of cause	.04	−.84[b]	−.68[b]	−.74[b]	.41	.51	.52		
IX. Generality of cause	.92[b]	.03	−.50	−.33	.47	−.18	−.22	.10	
X. Predictability	.04	−.46	−.57[a]	−.37	.15	.67[b]	.54	.80[b]	.05

[a] $p < .01$.
[b] $p < .001$.

praisals including frequency of occurrence, desirability, ability to cope, stability of cause, and predictability. For example, high-frequency events are perceived as more desirable, easier to cope with, having more stable causes, and being more predictable. Similarly, desirable events are seen as easier to cope with and caused by stable factors. Second, controllability of the cause of events is related to events perceived as caused by internal factors and higher predictability of occurrence. Finally, isolated correlations occurred between high impact and generality of cause, and an inverse relationship between perceived personal ability to cope with an event and the ability of others to be of help in coping.

Perceived ability to cope with events was significantly related to four other factors. Higher estimates of personal coping capability were related to higher desirability of events, greater frequency of occurrence, and more stable causes of events. Thus, negative events that occurred rarely and whose causes were unstable were appraised as presenting more of a challenge or threat to the personal coping abilities of this sample of adolescents. However, those events that were appraised as taxing or exceeding one's personal coping skills were appraised as more amenable to help from others.

DISCUSSION

The findings of this study provide descriptive information on the nature of cognitive appraisals of stressful events during adolescence. First, the present sample of adolescents appears to have spontaneously appraised major and daily events in a systematic fashion, attending to and organizing events on the basis of a limited number of features. Specifically, desirability was the most prominent aspect of events for the entire sample. Middle and older adolescents (ages 15 to 20) also distinguished events on the basis of the amount of impact these events would exert on their lives and the generality/specificity of cause of events.

The aspects of events that are most salient to adolescents may change with age. Specifically, appraisals increased in complexity from early to middle adolescence in this sample. Early adolescents distinguished events only on the basis of a single dimension, i.e., desirability. Middle and older adolescents made judgments about events on the basis of three dimensions, i.e., desirability, impact, and generality of cause. This increase in the number of appraisal dimensions parallels developmental studies of person perception that have shown that the number of dimensions used in making judgments of others increases with age (e.g., Peevers and Secord, 1973; Saltz *et al.*, 1975). Further, the findings are similar to those of Peevers and Secord

(1973) in that judgments of good and bad (desirability) are primary in social perception.

These findings are consistent with prior studies of adolescent stressful events that have shown perceived desirability and impact of stressors to mediate the relationship between events and symptomatology (e.g., Compas *et al.*, 1986; Johnson and McCutcheon, 1980). In these earlier studies, adolescents were instructed to rate the desirability and impact of life events without assessing whether the subjects would have naturally attended to these qualities. In the present study, adolescents used perceptions of desirability and impact to distinguish events without prompting from researchers. Thus, the selection of these two dimensions for earlier measures appears to have been appropriate. The present data also indicate that at least one attributional dimension, generality of cause, is a salient feature for adolescents. However, the strong correlation ($r = .92$) between perceived impact and generality of cause suggests that the two dimensions may represent very similar information for adolescents. That is, events with far-reaching impact may also be perceived as having causes that affect many aspects of one's life.

Perceptions of personal coping capabilities represent a critical appraisal dimension in cognitive theories of stress and coping (Lazarus and Folkman, 1984). The findings of the present study indicate that these judgments are closely related to several other appraisals. Specifically, there is strong correlation between perceived ability to cope with an event and desirability ($r = .84$). This suggests that the degree to which an event taxes or exceeds one's coping resources (i.e., that it is perceived as stressful) is reflected, to a great extent, in appraisals of desirability. Further, perceived ability to cope is related to the frequency of events, with rare events appraised as more difficult to cope with than more frequent events. This suggests that "major life events" (infrequent in occurrence and highly undesirable) may be appraised as the most challenging to personal coping resources.

In summary, these results suggest that cognitive appraisals may be an important area of research in studying psychosocial stress during adolescence. Future research needs to expand on the present study in several ways. First, while the sample was sufficient for the purposes of the data analyses reported here, subsequent studies should examine cognitive appraisals of stress in a larger, more diverse sample of adolescents. Variability as a function of social factors (e.g., SES) or individual differences (e.g., IQ) could not be examined in the current sample. Second, cognitive appraisals may be influenced by the stressful events selected for study. Thus, these findings need to be replicated on other samples of life events to determine the influences of events on appraisal processes. Finally, other appraisal dimensions not included here may be important in understanding adolescents' perceptions of stress. While the

first dimension identified in the whole sample may not be a result of other factors (i.e., 96% of the variance was explained by perceived desirability), the fact that only 36% and 30% of the variance in the second and third dimensions, respectively, was explained suggests that other appraisals may be important.

ACKNOWLEDGMENTS

The authors are grateful to Harold Leitenberg for his comments on an earlier version of this paper.

REFERENCES

Compas, B. E. (in press). Stress and life events during childhood and adolescence. *Clin. Psychol. Rev.*

Compas, B. E., Davis, G. E., and Forsythe, C. J. (1985). Characteristics of life events during adolescence. *Amer. J. Commun. Psychol.* 13: 677-692.

Compas, B. E., Slavin, L. A., Wagner, B. M., and Vannatta, K. (1986). Relationship of life events and social support with psychological dysfunction among adolescents. *J. Youth Adoles.* 15: 205-221.

Gross, T. F. (1985). *Cognitive Development,* Brooks/Cole, Monterey, CA.

Hammen, C. L. (1985). Predicting depression: A cognitive-behavioral perspective. In Kendall, P. C. (ed.) *Advances in Cognitive-Behavioral Research and Therapy* (vol. 4), Academic Press, New York.

Johnson, J. H., and McCutcheon, S. M. (1980). Assessing life stress in older children and adolescents: Preliminary findings with the Life Events Checklist. In Sarason, I. G., and Spielberger, C. D. (eds.), *Stress and Anxiety* (vol. 7), Hemisphere, Washington, D.C.:

Kanner, A. D., Coyne, J. C. Schaefer, C., and Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *J. Behav. Med.* 4: 1-19.

Keating, D. P. (1980). Thinking processes in adolescence. In Adelson, J. (ed.), *Handbook of Adolescence,* Wiley—Interscience, New York.

Lazarus, R. S., and Folkman, S. (1984). *Stress, Appraisal and Coping,* Springer, New York.

Newcomb, M. D., Huba, G. J., and Bentler, P. M. (1981). A multidimensional assessment of stressful life events among adolescents: Derivation and correlates. *J. Hlth. Social Behav.* 22: 400-415.

Peevers, B. H., and Secord, P. F. (1973). Developmental changes in attribution of descriptive concepts to persons. *J. Person. Soc. Psychol.* 27: 120-128.

Salz, E., Dunin-Markiewicz, A., and Rourke, D. (1975). The development of natural language concepts. II. Developmental changes in attribute structure. *Child Develop.* 46: 913-921.

Schiffman, S. S., and Dackis, C. (1976). Multidimensional scaling of musks. *Physiol. Behav.* 17: 823-829.

Schiffman, S. S., and Pasternak, M. (1978). Decreased discrimination of food odors in the elderly. *J. Gerontol.* 34: 73-79.

Schiffman, S. S., Reynolds, M. L., and Young, F. W. (1981). *Introduction to Multidimensional Scaling,* Academic Press, New York.

Thoits, P. A. (1983). Dimensions of life events as influences upon the genesis of psychological distress and associated conditions: An evaluation and synthesis of the literature. In Kaplan, H. B. (ed.), *Psychosocial Stress: Trends in Theory and Research,* Academic Press, New York.