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Learned Helplessness in Diabetic Youths

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Determined the relationships among the learned helplessness attributional style, depression, regimen adherence, and metabolic control in a sample of diabetic youth. Fifty children (20 male and 30 female) between the ages of 10 and 16 completed the Children's Attributional Style Questionnaire and the Children's Depression Inventory. Regimen adherence was assessed with three 24-hr recall interviews conducted separately with patients and their mothers over a 1-week period. Metabolic control was measured by glycosylated hemoglobin A1 (HbA1). Learned helplessness was significantly associated with depression ($p < .001$) and HbA1 ($p < .02$), but was not associated with regimen adherence. Depression was unrelated to regimen adherence and metabolic control. The adherence measures together accounted for 24% of the variance of HbA1. Significant correlations were obtained between HbA1 and the exercise ($p < .05$) and eating/testing frequency ($p < .05$) adherence factors, indicating that lower levels of adherence were associated with worse metabolic control. Age, pubertal status, sex, disease duration, and SES were unrelated to regimen adherence and metabolic control. These results support the notion that the learned helplessness attributional style for negative

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events is related to both depression and long-term metabolic control problems in diabetic youths.

KEY WORDS: learned helplessness; depression; regimen adherence; metabolic control; diabetes; youth.

Insulin-dependent diabetes mellitus is a chronic metabolic disease requiring adherence to a complex regimen. Regimen adherence is an important determinant of metabolic control, which is recognized as crucial to disease management. Considerable research in recent years has sought to identify psychosocial correlates and predictors of regimen adherence and metabolic control of children with diabetes (Delamater, 1986). For example, findings indicate that children in poor metabolic control have greater anxiety and less positive self-concept (Anderson, Miller, Auslander, & Santiago, 1981) as well as more depression and problems in peer relationships (Simonds, 1977) than children in good metabolic control. Increased stress (Brand, Johnson, & Johnson, 1986; Chase & Jackson, 1981; Delamater, Smith, Lankester, & Santiago, 1988) and family conflict (Anderson et al., 1981) have been associated with poor metabolic control, and this association appears to be buffered by social competence (Hanson, Henggeler, & Burghen, 1987).

Psychosocial variables may impact on metabolic control directly through physiological mechanisms or indirectly through effects on regimen adherence. The relationship between adherence and metabolic control, however, is not always clear. Some studies have shown adherence to be significantly correlated with glycosylated hemoglobin (Brownlee-Duffeck et al., 1987; Schafer, Glasgow, McCaul, & Dreher, 1983). Clinical observations, however, suggest that some patients may adhere well to their regimen prescriptions and still be in poor metabolic control, while others adhere poorly and maintain good control. There may be several explanations for this inconsistency, including endogenous hormonal factors, inappropriate or ineffective regimen prescriptions, and measurement errors.

Cognitive beliefs and attributions are of particular interest for their role in regimen adherence and metabolic control; few studies have investigated these variables, however. Adult diabetics who believed that their self-care behaviors could result in decreased chance of long-term complications were more likely to engage in those behaviors; however, only 23% of the patients believed that they could prevent complications (Sanders, Mills, Martin, & Horne, 1975). Health beliefs have been shown to predict regimen adherence and glycosylated hemoglobin in adolescent patients (Brownlee-Duffeck et al., 1987). In a recent study self-efficacy was significantly associated with short-term metabolic control in adolescent patients (Grossman, Brink, & Hauser, 1987).

One model that may be helpful in conceptualizing regimen adherence and metabolic control problems in diabetes is learned helplessness (Seligman, 1975). According to the reformulated learned helplessness theory (Abramson, Seligman, & Teasdale, 1978), individuals who attribute negative events to internal, global, and stable causes will be susceptible to helplessness and depression. Studies with children have shown that the learned helplessness attributional style can be measured reliably (Kaslow, Tannenbaum, & Seligman, 1978) and is associated with depression (Seligman et al., 1984). In analog studies conducted with nondiabetic children, Dweck and Repucci (1973) and Diener and Dweck (1978, 1980) showed that children whose performance deteriorated after task failure attributed these outcomes to their own lack of ability (i.e., internal, global, and stable attributions). Children who persisted in the face of failure, and eventually mastered the task, attributed their initial failure to their own lack of effort (i.e., internal, unstable, and specific attributions). Thus, "mastery" children engaged in thought and behavior that changed the situation and prevented deteriorated performance. Helpless children demonstrated deteriorated performance, displayed negative affect (depression), and had negative expectations for future performance and beliefs that other children would perform better than they would.

A similar process could occur for diabetic patients who repeatedly experience a lack of association between their self-care efforts and metabolic outcomes. Eventually, if they attribute their failures to attain good metabolic control as due to internal, global, and stable causes, their self-care performance would be expected to deteriorate along with their metabolic control; feelings of helplessness and depression may in turn facilitate lack of future self-care efforts, and patients could get caught in a self-perpetuating cycle. The purpose of the present study was to determine the relationships among the learned helplessness attributional style, depression, regimen adherence, and metabolic control in a sample of diabetic youth. We predicted that learned helplessness would be associated with depression, lower levels of regimen adherence, and poor metabolic control.

METHOD

Subjects

The subjects for the study were children with Type 1 insulin-dependent diabetes mellitus of at least 1-year duration who were attending the Outpatient Endocrine Clinic at Children's Hospital, Washington University Medical Center, St. Louis, MO. Potential participants were required to be between the ages of 10 and 16, free of psychiatric diagnoses and psychotropic medication, of at least normal intelligence, and willing to give informed consent to participation in the study and have parental consent to do so. All patients who met these criteria and who were scheduled for outpatient visits were recruited until a sample of 50 was reached. Of 59 consecutive patients approached for the study, 50 agreed to participate. There was no difference between those who did and did not participate in terms of age, sex, race, illness duration, and last recorded glycosylated hemoglobin A1 (HbA1), as indicated by multivariate analysis of variance (approx. $F(5, 53) = 1.69$, $p < .2$, Wilks' criterion). The sample characteristics are shown in Table I.

Measures

Learned Helplessness. The Children's Attributional Style Questionnaire (CASQ; Kaslow et al., 1978) was used to measure the learned helplessness attributional style. Satisfactory reliability and validity have been reported (Seligman et al., 1984). This 48-item questionnaire assesses how children attribute causality for good and bad events. Each question consists of a hypothetical good or bad event and two possible causes for the event; subjects choose the cause from the pair in each item that best describes why the event occurred. The two choices for causes hold constant two of the attributional dimensions while varying the third. There are 16 questions which pertain to each of three attributional dimensions: internality, stability, and globality. Scoring assigns 1 to internal, stable, or global responses and 0 to external, unstable, or specific responses. For this study, scores obtained from negative events were summed to provide the measure of learned helplessness.

Table I. Sample Characteristics (n = 50)

	n	%
Male	20	40
White	46	92
Two parents in home	42	84
	M	SD
Age (years)	13.8	2.1
Duration of diabetes (years)	7.0	3.5
Tanner stage	3.2	1.6
Socioeconomic status[a]	3.1	1.0
Mean HbA1 (%)	9.9	1.8
Children's Depression Inventory	6.6	5.0
Children's Attributional Style Questionnaire	9.0	5.9

[a]Hollingshead (1957).

Higher scores thus indicate greater learned helplessness. We utilized only scores for negative events because this reflects the learned helplessness construct more clearly than attributions for positive events; furthermore, we had no specific hypotheses concerning attributions for positive events.

Depression. The Children's Depression Inventory (CDI; Kovacs, 1985) is a widely used 27-item self-report measure of depression for use with children aged 8 to 17 years. Each item consists of three statements graded in severity from 0 to 2. A total score is derived by summing individual items, with higher scores indicating greater depression. The CDI is considered a reliable and valid measure (Finch, Saylor, & Edwards, 1985; Kazdin, 1981; Smucker, Craighead, Craighead, & Green, 1986).

Regimen Adherence. Regimen adherence was assessed with 24-hr recall interviews administered independently to patients and their mothers on three separate occasions, following the procedures of Johnson, Silverstein, Rosenbloom, Carter, and Cunningham (1986). The data from patients and mothers were combined to form typical data for each patient. This method yields measures of 13 discrete regimen-related behaviors, as shown in Table II. The scor-

Table II. Mean Adherence Behaviors

Adherence measure	*M*[a] (Interpretation)	*SD*
Injection interval (min)	6.3	29.3
Injection regularity (min)	55.1	35.2
Injection-meal timing: BG test (min)	12.2	20.6
Regularity of injection-meal timing (min)	20.5	16.3
Calories consumed (Cal)	35.5 (more than ideal)	710
% Calories: Fat (% Total intake)	17.1 (42.1)	4.9 (5.0)
% Calories: Carbohydrate (% Total intake)	21.6 (39.1)	6.9 (5.7)
Concentrated sweets	7.7 exchanges (9.5% of carbohydrates)	7.9 (8.3)
Exercise frequency (%)	42 (1.7 periods/day)	19
Exercise duration	0.6 (15.7 min)	0.12 (7.3 min)
Exercise type	0.201 (0.110 kcal/min)	0.149
Glucose test frequency (%)	46 (2.2/day)	0.19
Eating frequency (%)	28.1 (4.3 meals/day)	30.6

[a] 0 = perfect adherence; > 0 or < 0 = nonadherence.

ing procedure assigns a score of zero for perfect adherence; scores greater or less than zero indicate direction and magnitude of nonadherence. We modified the injection–meal timing measure so that it was relative to a preprandial blood glucose test result, rather than not considering the blood glucose test. This also affected the measure of regularity of injection–meal timing. This modification was made because patients at our clinic are taught to modify injection–meal time intervals based on preprandial blood glucose levels. Thus the modified measure more accurately determines adherence in this sample than would be the case using the Johnson et al. (1986) procedure for this particular measure. Otherwise, the procedures used in this study were identical to those described by Johnson et al. (1986). The typical adherence data were grouped according to the five adherence factors derived with factor analysis by Johnson et al. (1986): injection, diet type, diet amount, testing/eating frequency, and exercise. The variables in each factor were converted to z scores and then summed, resulting in a single score for each factor.

Metabolic Control. Long-term metabolic control was determined by glycosylated hemoglobin A1 (HbA1), providing average blood glucose levels for the preceding 10 weeks (Gonen, Rachman, Rubenstein, Tanega, & Horowitz, 1977). The HbA1 measure was obtained from a blood sample taken from patients at the time of their outpatient visit. In addition, two previous HbA1 measures (approximately 4 and 8 months antecedent to the study) were obtained from the medical charts. The current and two past HbA1 measures were used to create a mean HbA1 measure. This method was utilized because it reflected a longer term, more stable measure of metabolic control than could be provided by one sample. Using the mean of multiple HbA1 determinations may be a more meaningful way to characterize metabolic control in studies relating relatively stable psychological factors such as attributional style. However, when determining relationships among less stable factors such as regimen-related behaviors and metabolic control, the use of current HbA1 would be expected to be more sensitive. Therefore, both measures of metabolic control were considered in analyses. The HbA1 assay was performed using saline-incubated red cells with the minicolumn method (Isolab, Inc., Akron, Ohio) at the Clinical Chemistry Laboratory of Barnes Hospital, Washington University Medical Center. The normal, nondiabetic mean ± *SD* value for this assay is 6.0 ± 0.6%. The means for the study patients, from past to present, were 9.8 ± 2.2%, 9.9 ± 2.2%, and 10.1 ± 1.9%. Higher scores indicate worse metabolic control.

Procedure

All subjects were contacted by telephone prior to their regularly scheduled outpatient appointment. The study was presented as an investigation of lifestyles of diabetic youth, with a focus on what children think about and how they feel. The confidential nature of the study was emphasized, as well as the fact that individual results would not be shared with the health care team. Formal consent was obtained on the day of the clinic visit, according to procedures approved by the Institutional Review Board of the Washington University School of Medicine. At the clinic visit, pubertal status (Tanner, 1962) was determined by the examining physician and blood samples were obtained for HbA1.

Testing took place in a separate room at the clinic, prior to the patient's medical examination. After informed consent was obtained, the paper and pencil tests were administered to the patient. Relevant demographic information was obtained from the mother. The information for the initial 24-hr recall was obtained at the clinic visit, with mothers interviewed separately from children. The other two interviews were conducted by telephone, one on a weekday and the other on a weekend day during the week following the outpatient visit. Thus the three-day sample included two weekdays and one weekend day.

Data Analyses

Correlation analyses were first used to determine the relationship of patient classification variables (i.e., age, sex, duration of diabetes, pubertal status, and SES) with the measures of interest in this study. If found to be significant, these variables would need to be controlled for in the primary data analyses of the study. Pearson product-moment correlations were then calculated to assess the relationships among the measures of learned helplessness, depression, regimen adherence, and metabolic control. Only the regimen adherence factor scores were used in the analyses. Both the current HbA1 and mean HbA1 were utilized in data analyses. Finally, multiple regression analyses were used to determine the level of contribution that psychological and regimen adherence variables made to the prediction of metabolic control.

RESULTS

Preliminary Analyses: Relationship of Classification Variables to Variables of Interest

The results of correlational analyses, as shown in Table III, indicated that learned helplessness, depression, regimen adherence, and metabolic control were not related to age, sex, duration of diabetes, pubertal status, or

Table III. Correlations of Classification Variables with Psychological, Behavioral, and Metabolic Variables

	CDI	CASQN	INJ	D-TYPE	D-AMT	FREQ	EXER	C-A1	M-A1
Age	.07	.26	−.09	−.06	−.05	−.01	.20	.24	.20
Sex	.03	.15	.02	.00	.06	.20	.09	.15	.17
Duration	.03	−.03	−.10	−.14	−.06	.08	.24	.17	.09
Tanner	−.14	.15	−.04	−.03	−.01	−.04	.24	.09	−.27
SES	−.16	−.07	−.17	−.25	.01	−.10	.23	.18	.26

[a]CDI = Children's Depression Inventory; CASQN = Children's Attributional Style Questionnaire-Negative; INJ = Injection Factor; D-TYPE = Diet Type Factor; D-AMT = Diet Amount Factor; FREQ = Eating/Testing Frequency Factor; EXER = Exercise Factor; C−A1 = Current HbA1; M−A1 = Mean HbA1.

SES (all *ps* > .05). Thus the classification variables were not considered in further analyses.

Learned Helplessness and Depression

Mean scores for learned helplessness and depression are shown in Table I. The mean CDI score for the sample was 6.6, with a range of 0-19. Ten patients (20% of the sample) had CDI scores greater than 11; however, only 5 patients (10%) had scores greater than 14, indicating a moderate degree of depression (Kovacs & Beck, 1977). Mean learned helplessness scores were similar to though slightly higher than normative data (Seligman et al., 1984). There was a significant relationship betwen learned helplessness and depression ($r = .44, p < .001$). As expected, the learned helplessness attributional style was associated with greater levels of depression.

Relationship of Learned Helplessness and Depression to Regimen Adherence and Metabolic Control

Table IV presents the results of correlational analyses. Learned helplessness and depression were unrelated to measures of regimen adherence. However, a significant correlation was obtained between learned helplessness and mean HbA1 ($r = .31, p < .02$). As predicted, the more helpless the patient felt, the worse their metabolic control was over the preceding year. This relationship was not observed, however, when using current HbA1 ($r = .20$, ns). Self-reports of depression were not found to correlate significantly with mean HbA1 ($r = .23$, ns) or current HbA1 ($r = .13$, ns).

Table IV. Correlations Among Psychological, Behavioral, and Metabolic Variables[a]

	CASQN	INJ	D-TYPE	D-AMT	FREQ	EXER	C-A1	M-A1
CDI	.44[b]	−.01	.26	.01	.26	.15	.13	.23
CASQN	—	.05	.27	−.05	.25	−.01	.20	.31[b]
INJ		—	−.19	.19	.01	.25	−.07	−.20
D-TYPE			—	−.29[b]	−.01	.12	−.07	−.04
D-AMT				—	.19	.00	.22	.20
FREQ					—	−.02	.29[b]	.32[c]
EXER						—	.29[b]	.07
C-A1							—	.80[c]

[a]CDI = Children's Depression Inventory; CASQN = Children's Attributional Style Questionnaire-Negative; INJ = Injection Factor; D-TYPE = Diet Type Factor; D-AMT = Diet Amount Factor; FREQ = Eating/Testing Frequency Factor; EXER = Exercise Factor; C−A1 = Current HbA1; M−A1 = Mean HbA1.
[b]$p < .05$.
[c]$p < .01$.

Regimen Adherence and Metabolic Control

The results of correlations performed among the adherence factors and measures of metabolic control are shown in Table IV. Regimen adherence factors were unrelated to each other. There were no significant relationships between current or mean HbA1 and the injection, diet type, and diet amount factors. However, significant relationships were observed between the eating/testing frequency factor and current HbA1 ($r = .29, p < .05$) and mean HbA1 ($r = .32, p < .01$). These indicate that poor adherence to these regimen behaviors are associated with worse metabolic control. In addition, a significant relationship was observed between the exercise factor and current HbA1 ($r = .29, p < .05$), indicating that low levels of exercise are associated with worse metabolic control.

Table II presents the means and standard deviations for each of the regimen-related behaviors. Relatively low rates of adherence were generally observed, consistent with Johnson et al. (1986). To summarize the most significant observations, study patients did little exercise, waited less than the recommended time between insulin and meals (often taking their insulin at the same time that they ate), deviated from dietary prescriptions by eating too much fat and concentrated sweets and too little carbohydrate, and measured their blood glucose less often than prescribed.

Multiple Regression Analyses: Predicting Metabolic Control

Multiple regression analyses were performed to determine the amount of variance accounted for by psychological and behavioral variables in the prediction of metabolic control. In considering predictor variables, attributional style for negative events was selected because of its significant relationship with mean HbA1. Adherence measures were also selected because some regimen behaviors were related to metabolic control, and because as a set their contributions may be more apparent than would be evident by considering them separately in zero-order analyses. The subject classification measures and depression were not considered since correlational analyses revealed that they were not significantly related to the HbA1 measures. A hierarchical design was utilized, with attributional style entered in the first step, and the set of adherence measures entered in stepwise fashion in the second step. Two analyses were performed, considering the prediction of mean HbA1 and current HbA1.

When mean HbA1 over the past year was the criterion variable, 29% of the variance was explained by the model, $F(6, 43) = 2.94$, $p < .02$. Attributional style accounted for a significant amount of the variance (10%) of mean HbA1, $F(1, 48) = 4.80$, $p < .05$. Although no single adherence factor accounted for a significant amount of variance, as a set they accounted for 19% of the variance of mean HbA1 $F(5, 43) = 2.30$, $p < .06$.

When current HbA1 was the criterion variable, the model accounted for 28% of the variance, $F(6, 43) = 2.77$, $p < .02$. Although no single variable accounted for a significant amount of variance on its own, the adherence factors as a set accounted for 24% of the variance $F(5, 43) = 2.87$, $p < .05$.

DISCUSSION

This study sought to determine the relationships among the learned helplessness attributional style and depression, regimen adherence, and metabolic control in diabetic youths. As predicted, the learned helplessness style was significantly associated with depression and worse metabolic control.

These findings highlight the importance of learned helplessness in both emotional and physical health outcomes in diabetic youths. The significant association between learned helplessness and depression in this sample is supportive of previous studies in nondiabetic children (Leon, Kendall, & Garbets, 1980; Seligman et al., 1984). The significant relationship observed between learned helplessness and long-term metabolic control has not, to our knowledge, been reported before. It is important to note, however, that the learned helplessness measure accounted for only 10% of the variance of mean HbA1 and was not significantly associated with current HbA1. It is clear that many factors affect metabolic control in patients with diabetes. However, we found no evidence that patients' age, sex, illness duration, pubertal status, or SES were related to HbA1. Furthermore, these patient variables were unrelated to learned helplessness.

What is the nature of the relationship between learned helplessness and poorer metabolic control? Because a correlational method was used in this study, causal relationships cannot be determined. It could be that young patients develop a learned helplessness attributional style secondary to a history of poor metabolic control. On the other hand, a preexisting learned helplessness style could influence metabolic control. Potential mechanisms include regimen adherence and stress.

We tested the hypothesis that regimen adherence mediates the relationship but could find no support for it. There may be a methodological explanation: Because the adherence measures were based on just a 3-day sample of behavior, they could be unrepresentative. However, the adherence levels were similar to those reported by Johnson et al. (1986), suggesting that they are representative of patients in specialized diabetes clinics. Although the current findings do not support the notion that learned helplessness is associated with poor metabolic control via disrupted regimen adherence, they should not rule out this possibility either. Prospective studies with repeated assessments of regimen adherence of patients who exhibit the learned helplessness attributional style would shed more light on this process.

A second possibility is that learned helplessness may be associated with increased stress, which in turn may impact directly on metabolic control via increased counterregulatory (i.e., glucose elevating) hormones such as epinephrine, cortisol, glucagon, and growth hormone. There is evidence from controlled laboratory studies that adult insulin-dependent diabetic patients have a hyperglycemic response to epinephrine (Berk et al., 1985; Shamoon, Hendler, & Sherwin, 1980). Although laboratory studies with diabetic adults (Kemmer et al., 1986) and children (Delamater, Bubb, et al., 1988) suggest that experimentally induced psychological stress does not cause acute worsening of glycemic control, clinical studies have shown a significant relationship between increased life stress and poor metabolic control in children (Brand et al., 1986; Chase & Jackson, 1981; Delamater, Smith et al., 1988; Hanson et al., 1987). If patients experience a significant amount of stress in their lives, and also feel helpless, increased stress hormones may disrupt their glycemic control directly via physiologic mechanisms.

Whether through effects on regimen adherence or increased stress, or secondary to chronic metabolic control problems, the current results indicate that learned helplessness has a significant association with poor metabolic control in adolescent patients. This finding supports recent studies of the significant relationship of other cognitive variables such as the health belief model (Brownlee-Duffeck et al., 1987) and diabetes self-efficacy (Grossman et al., 1987) with metabolic control in young patients with diabetes. Interestingly, the level of association between diabetes self-efficacy and mean blood glucose reported by Grossman et al. was comparable to the current finding associating learned helplessness with mean HbA1.

Although learned helplessness was related to depression, we did not find that depression was correlated with metabolic control. Previous studies with adults (Lustman, Griffith, Clouse, & Cryer, 1986; Mazze, Lucido, & Shamoon, 1984) and children (Simonds, 1977) have found depression associated with poor metabolic control. It should be noted that the adult studies utilized HbA1 to measure metabolic control, but the Simonds (1977) study did not. Furthermore, the Children's Depression Inventory was not used in the latter study. Our failure to find a relationship between depression and HbA1 was unexpected, given the results of previous studies and our findings of significant associations between learned helplessness and both depression and HbA1. The current study's reliance on a self-report measure of depression may have masked any relationship between depression and metabolic control. We did find, however, that the majority of children studied were well within the normal limits for this measure; only a few children exceeded the cutoff of 19 (representing the 90th percentile) suggested by Smucker et al. (1986). It is possible that a relationship between depression and metabolic control as measured by HbA1 would emerge in a larger sample of children with greater representation in the clinical range of depression.

In this study regimen adherence was unrelated with psychological variables. However, consistent with previous studies (e.g., Brownlee-Duffeck et al., 1987; Hanson et al., 1987), we found that regimen adherence was significantly associated with metabolic control, accounting for 24% of the variance of current HbA1. Low levels of exercise and poorer adherence to frequency of glucose testing and eating were associated with worse metabolic control. The association of increased exercise and lower HbA1 is supportive of a study demonstrating improved metabolic control of diabetic children after participation in a 12-week physical activity program (Campaigne, Gilliam, Spencer, Lampman, & Schork, 1984). The significance of the association of the eating/testing frequency factor with HbA1 is unclear; previous studies have not observed relationships between frequency of glucose testing and metabolic control (Delamater et al., 1989; Wing et al., 1985), and have not investigated the role of eating frequency.

In summary, the results of this correlational study indicate that the learned helplessness attributional style for negative events is associated with depression and higher glycosylated hemoglobin values in diabetic youth, and that regimen adherence is a significant determinant of metabolic control. These data support a growing literature documenting the important role of cognitive variables in relation to health outcomes, and suggest that cognitive therapies may be a helpful component in the treatment of young patients with diabetes. The relationships between psychological, affective, behavioral, and metabolic variables in diabetes are complex and challanging to sort out. Nevertheless, the current data indicate that such relationships exist, and specifically identify the learned helplessness style as related to both depression and metabolic control problems in young patients.

REFERENCES

Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87,* 49-74.

Anderson, B. J., Miller, J. P., Auslander, W. F., & Santiago, J. V. (1981). Family characteristics of diabetic adolescents: Relationship to metabolic control. *Diabetes Care, 4,* 586-594.

Berk, M. A., Clutter, W. E., Skor, D., Shah, S. D., Gingerich, R. R., Parvin, C. A., & Cryer, P. E. (1985). Enhanced glycemic responsiveness to epinephrine in insulin-dependent diabetes mellitus is the result of the inability to secrete insulin. *Journal of Clinical Investigation, 75,* 1842-1851.

Brand, A. H., Johnson, J. H., & Johnson, S. B. (1986). Life stress and diabetic control in children and adolescents with insulin-dependent diabetes. *Journal of Pediatric Psychology, 11,* 481-495.

Brownlee-Duffeck, M., Peterson, L., Simonds, J. F., Goldstein, D., Kilo, C. , & Hoette, S. (1987). The role of health beliefs in the regimen adherence and metabolic control of adolescents and adults with diabetes mellitus. *Journal of Consulting and Clinical Psychology, 55,* 139-144.

Campaigne, B. N., Gilliam, T. B., Spencer, M. L., Lampman, R. M., & Schork, M. A. (1984). Effects of a physical activity program on metabolic control and cardiovascular fitness in children with IDDM. *Diabetes Care, 7,* 57-62.

Chase, H. P., & Jackson, G. G. (1981). Stress and sugar control in children with insulin-dependent diabetes mellitus. *Journal of Pediatrics, 98,* 1011-1013.

Delamater, A. M. (1986). Psychological aspects of diabetes mellitus in children. In B. B. Lahey & A. E. Kazdin (Eds.), *Advances in clinical child psychology,* (Vol. 9). New York: Plenum Press.

Delamater, A. M., Bubb, J., Kurtz, S., Kuntze, J., Smith, J., White, N., & Santiago, J. (1988). Physiologic effects of acute psychological stress in adolescents with Type 1 diabetes mellitus. *Journal of Pediatric Psychology, 13,* 69-86.

Delamater, A. M., Davis, S. G., Bubb, J., Santiago, J. V., Smith, J. A., & White, N. H. (1989). Self-monitoring of blood glucose by adolescents with diabetes: Technical skills and utilization of data. *Diabetes Educator, 15,* 56-61.

Delamater, A. M., Smith, J. A., Lankester, L., & Santiago, J. V. (1988, April). Stress and metabolic control in diabetic adolescents. Paper presented at the annual meeting of the Society of Behavioral Medicine, Boston.

Diener, C. I., & Dweck, C. S. (1978). An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognitions following failure. *Journal of Personality and Social Psychology, 36,* 451-462.

Diener, C. I., & Dweck, C. S. (1980). An analysis of learned helplessness: The processing of success. *Journal of Personality and Social Psychology, 39,* 939-952.

Dweck, C. S., & Repucci, J. D. (1973). Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology, 25,* 109-116.

Finch, A. J., Saylor, C. F., & Edwards, G. L. (1985). Children's Depression Inventory: Sex and grade norms for normal children. *Journal of Consulting and Clinical Psychology, 53,* 424-425.

Gonen, B., Rachman, H., Rubenstein, A. H., Tanega, S. P., & Horowitz, D. L. (1977). Hemoglobin A1c: An indicator of the metabolic control of diabetic patients. *Lancet, 2,* 734-737.

Grossman, H. Y., Brink, S., & Hauser, S. T. (1987). Self-efficacy in adolescent girls and boys with insulin-dependent diabetes mellitus. *Diabetes Care, 10,* 324-329.

Hanson, C. L., Henggeler, S. W., & Burghen, G. A. (1987). Social competence and parental support as mediators of the link between stress and metabolic control in adolescents with insulin-dependent diabetes mellitus. *Journal of Consulting and Clinical Psychology, 55,* 529-533.

Hollingshead, A. B. (1957). *Two-factor index of social position.* Unpublished manuscript, Yale University Department of Sociology, New Haven, CT.

Johnson, S. B., Silverstein, J., Rosenbloom, A., Carter, R., & Cunningham, W. (1986). Assessing daily management in childhood diabetes. *Health Psychology, 5,* 545-564.

Kaslow, N. J., Tannenbaum, R. L., & Seligman, M. E. (1978). The KASTAN: A Children's Attributional Style Questionnaire. Unpublished manuscript, University of Pennsylvania, Philadelphia.

Kazdin, A. E. (1981). Assessment techniques for childhood depression: A critical appraisal. *Journal of the American Academy of Child Psychiatry, 20,* 358-375.

Kemmer, F., Bisping, R., Steingruber, H., Baar, H., Hardtmann, R., Schlaghecken, R., & Berger, M. (1986). Psychological stress and metabolic control in patients with Type I diabetes mellitus. *New England Journal of Medicine, 314,* 1078-1084.

Kovacs, M. (1985). The Children's Depression Inventory (CDI). *Psychopharmacology Bulletin, 21,* 995-998.

Kovacs, M., & Beck, A. (1977). An empirical clinical approach toward a definition of childhood depression. In J. G. Schulterbrandt & A. Raskin (Eds.), *Depression in childhood: Diagnosis, treatment and conceptual models.* New York: Raven Press.

Leon, G. R., Kendall, P. C., & Garbers, J. (1980). Depression in children: Parent, teacher, and child perspectives. *Journal of Abnormal Child Psychology, 8,* 221-235.

Lustman, P., Griffith, L., Clouse, R., & Cryer, P. (1986). Psychiatric illness in diabetes mellitus: Relationship to symptoms and glucose control. *Journal of Nervious and Mental Disease, 174,* 736-742.

Mazze, R. S., Lucido, D., & Shamoon, H. (1984). Psychological and social correlates of glycemia control. *Diabetes Care, 7,* 60-66.

Sanders, K., Mills, J., Martin, F., & Horne, D. J. (1975). Emotional attitudes in adult insulin-dependent diabetes. *Journal of Psychosomatic Research, 19,* 241-246.

Schafer, L. C., Glasgow, R. E., McCaul, K. D., & Dreher, M. (1983). Adherence to IDDM regimens: Relationship to psychosocial variables and metabolic control. *Diabetes Care, 6,* 493-498.

Seligman, M. E. (1975). *Helplessness: On depression, development, and death.* San Francisco: W. H. Freeman.

Seligman, M. E., Kaslow, N. J., Alloy, L. B., Peterson, C., Tanenbaum, R. L., & Abramson, L. (1984). Attributional style and depressive symptoms among children. *Journal of Abnormal Psychology, 93,* 235-238.

Shamoon, H., Hendler, R., & Sherwin, R. S. (1980). Altered responsiveness to cortisol, epinephrine, and glucoagon in insulin-infused juvenile-onset diabetics: A mechanism for diabetic instability. *Diabetes, 29,* 284-291.

Simonds, S. F. (1977). Psychiatric status of diabetic youth matched with a control group. *Diabetes, 26,* 921-925.

Smucker, M. R., Craighead, W. E., Craighead, L. W., & Green, G. J. (1986). Normative and reliability data for the Children's Depression Inventory. *Journal of Abnormal Child Psychology, 14,* 25-39.

Tanner, J. M. (1962). *Growth at adolescence* (2nd ed.). Oxford, England: Blackwell.

Wing, R. R., Lamparski, D. M., Zaslow, S., Betschart, J., Siminerio, L., & Becker, D. (1985). Frequency and accuracy of self-monitoring of blood glucose in children: Relationship to glycemic control. *Diabetes Care, 8,* 214-218.