

Predictors of Psychological Well-Being in a Diverse Sample of HIV-Positive Patients Receiving Highly Active Antiretroviral Therapy

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The purpose of the present study was to identify variables relevant to psychological well-being in HIV patients receiving highly active antiretroviral therapy (HAART). Multiple stressors accompany living with HIV while managing a HAART regimen. However, a variety of cognitive and behavioral variables can protect against or augment the deleterious effects of stress in this population. The authors hypothesized that satisfaction with social support, coping styles, and maladaptive attributions about HIV would explain more variance in psychological well-being than stressful life events per se. Participants were individuals with HIV receiving antiretroviral therapy—either starting a new HAART regimen or having difficulties adhering to their current regimen. Satisfaction with social support, coping styles, and punishment beliefs about HIV were uniquely associated with depression, quality of life, and self-esteem over and above the effects of stressful life events. These results provide support for continued psychosocial interventions that target these variables among patients with HIV.

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Over the past several years, developments in the treatment of HIV/AIDS have dramatically improved the prognosis of infected persons. Highly active antiretroviral therapy (HAART) causes longer life expectancy, reduction of HIV disease progression, and fewer complications related to compromised immunofunctioning.^{1–4} These advancements, combined with the increasing number of new HIV infections, have resulted in a large and growing cohort of persons with HIV who are living and coping with the multiple stressors that accompany the disease and its treatment.

These new treatments, however, are complicated and add to stressors associated with HIV infection. Kalichman

et al.⁵ outlined many of the psychological aspects of HAART, including the demands on food intake, numerous dosing times, strict timing of doses, and shifts in schedules and life tasks in order to maintain this regimen. Other chronic stressors include coping with side effects, the economic cost of expensive medications, potential employment-related impairments resulting from the medical or psychological aspects of HIV, interactions of HAART with other medications (including psychopharmacological interventions), negotiating life goals and plans in the context of this illness, and psychological distress that may occur from surviving an illness that has caused close friends or partners to die.^{5,6} These stressors exist in the context of any preexisting risk factors for psychological distress that may be present.

Although there has been some investigation of the association between coping styles, depressed mood, and psychological well-being among persons infected with HIV,^{7–10} these studies were conducted before HAART,

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when HIV was considered a life-threatening condition. The increase in longevity in this population, the association between life satisfaction and medical decision making,⁸ and the association between depression and poor adherence to HIV medications^{11,12} call for further investigation of psychological well-being among patients with HIV. Moreover, this research has the potential of guiding psychosocial intervention efforts to target quality of life among persons living with this chronic illness.^{5,6,8}

The present study examined the impact of several cognitive and behavioral variables related to psychological well-being among persons with HIV receiving HAART. We assessed psychological well-being with measures of depression, quality of life, and self-esteem. We hypothesized a significant relationship between an indicator of stress (negative life events) and lower well-being among persons with HIV prescribed HAART. We also hypothesized that several variables typically associated with psychological well-being would also be protective against the potentially deleterious effects of life stress. These potentially protective variables included higher levels of perceived social support¹³ and use of positive coping^{14,15} and lower levels of punishment beliefs about an individual's HIV infection and maladaptive coping. Punishment beliefs about HIV infection was added because of both clinical experience with HIV-positive individuals and because of the association between negative beliefs and depression and impaired problem-solving.¹⁶⁻¹⁸

METHOD

Participants and Procedure

The institutional review board at the health center reviewed and approved the study. All participants completed an informed consent process, which included signing an informed consent form with both a witness and the signature of the study staff member who explained the procedures.

Our study cohort included 84 persons with HIV infection (76 men, eight women) who were referred to a 12-week study of HIV medication adherence in 1998 and 1999. Recruitment was conducted through posters in a primary care setting for patients with HIV and through a local newspaper. Participants could enter the study if they were either starting new medications (N = 16), changing their current regimen (N = 18), or were having subjective difficulty with their current regimen (N = 50). All participants received nominal reimbursement for their time, and data

were collected as part of the baseline self-report assessment for the study of medication adherence.¹²

Participants were between the ages of 23 and 68 (mean = 41.5, SD = 8.45). The study group was ethnically diverse, with more than one-half (56%, N = 47) from communities of color. The breakdown of ethnic groups was as follows: African American (N = 23, 27%), Hispanic or Latino (N = 16, 19%), Caucasian (N = 37, 44%), biracial or multiracial (N = 3, 4%), and other (N = 5, 6%). The demographic questionnaire included an item assessing sexual orientation. For the men who answered this question (97%, N = 74 of 76), 13 (18%) reported themselves to be heterosexual, two (3%) bisexual, and 59 (80%) gay. All of the eight women in the study identified themselves as heterosexual. Approximately half (51%, N = 43) reported that they were "on disability," 24 (29%) worked full-time or were in school, eight (10%) neither worked nor were in school, and eight (10%) were working part time (one did not answer this question).

Measures

For the current study, all psychological characteristics were collected by self-report as part of a questionnaire battery administered to participants at their first study visit.

Dependent variables Depression was assessed with the Beck Depression Inventory,¹⁹ a well-validated, widely used self-report measure of depression. Self-esteem was assessed with the Rosenberg Self-Esteem Scale.²⁰ On this measure, participants rated 10 statements about their self-esteem on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) (Cronbach's α , current study group = 0.86). Statements include, "I feel that I am a person of worth, at least on an equal plane with other people," and "All in all, I am inclined to feel that I am a failure."

Quality of life was assessed by using the Quality of Life Inventory,²¹ a 17-item scale that assesses a person's satisfaction in particular areas of life that he or she deems important (e.g., health, self-regard, relationships, work).^{21,22} Individuals are asked to judge both the importance of and satisfaction with each domain ranging from 0 (not at all important) to 2 (extremely important) and from -3 (very dissatisfied) to 3 (very satisfied). The psychometric validity of the Quality of Life Inventory has been normed in samples of undergraduate students, undergraduate counseling center patients, psychiatric inpatients, and criminal offenders, with high test-retest reliability and strong associations with a variety of measures

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of subjective well-being based on interview, peer rating, and self-report measures.

Predictor variables The Life Experience Survey²³ is a 57-item scale used to assess the occurrence and impact of various life events. Participants report whether they have experienced any of a list of 57 events (e.g., change in residence, death of a family member, breaking up with boyfriend or girlfriend) in the past 6 months. This measure has shown adequate psychometric reliability and validity.²³ For the purposes of the present study, slight modifications to the wording of several items were made to acknowledge events related to same-sex sexual relationships (e.g., “spouse” was changed to “spouse or significant other”).

Perceived social support was assessed by using the short form of the Social Support Questionnaire.^{24,25} This measure yields scores for perceived satisfaction with social support and for number of social supports. The short form of the Social Support Questionnaire has psychometric characteristics that are similar to the long form,²⁶ and satisfaction with social support (Cronbach’s α , current study group = 0.94) as assessed with the Social Support Questionnaire correlates strongly with a variety of indicators of psychological adjustment.¹³

Coping styles were assessed by using the COPES,²⁷ a widely used multidimensional coping inventory developed and replicated with factor analytic procedures^{27,28} that yields two broad-based summary scores representing maladaptive and adaptive coping. Maladaptive coping (Cronbach’s α , current study group = 0.74) includes subscales for focusing and venting of emotions, denial, behavioral disengagement, mental disengagement, and coping through alcohol and drug use. Adaptive coping (Cronbach’s α , current study group = 0.91) includes subscales for active coping, planning, suppression of competing activities, growth, seeking emotional and instrumental social support, and coping through acceptance. The composite scores of adaptive and maladaptive coping were used in the present study because of the necessity of limiting the number of independent variables in the regression analyses.

Attributing one’s HIV status as a “punishment” is a common clinical response from patients, and this can be associated with a variety of maladaptive behaviors. Therefore we introduced a novel, face-valid measure of punishment beliefs and attributions about HIV and HIV medications. Responses were summed from three statements on which participants rated their agreement on a scale from 1 (strongly disagree) to 7 (strongly agree): “Medication is

my punishment for getting HIV,” “It doesn’t matter what I am prescribed for HIV, because the disease is a punishment,” and, “I have HIV because I am being punished for things I have done.” Chronbach’s α was adequate (0.63) for these three items.

RESULTS

Psychological characteristics for all measures are presented in Table 1. The mean quality of life score on the Quality of Life Inventory was in the low range for this measure,²¹ and the mean depression score on the Beck Depression Inventory was in the range of mild to moderate depression.¹⁹ Participants reported a mean of 6.5 events in the Life Experience Survey over the past 6 months.

Zero-Order Correlations

The dependent variables—depression, quality of life, and self-esteem—were significantly correlated with each other in the expected directions, with a positive correlation between quality of life and self-esteem ($r = 0.77, p < 0.001$) and negative correlations between these measures and depression ($r = -0.51, p < 0.001$ and $r = -0.67, p < 0.001$, respectively). The magnitude of these correlations represent separate but related constructs and therefore support analyzing each dependent variable separately.

The associations between predictor and dependent variables were generally significant and also in the ex-

TABLE 1. Predictor and Dependent Variables of Psychological Well-Being in 84 Patients With HIV Receiving Highly Active Antiretroviral Therapy

Measure of Psychological Well-Being	Mean	SD
Predictor variables		
Satisfaction with social support (Social Support Questionnaire)	4.4	1.4
Punishment beliefs ^a	6.5	4.5
Adaptive coping ^b	86.16	18.69
Maladaptive coping ^b	41.00	10.29
Dependent variables		
Quality of life (Quality of Life Inventory)	1.5	1.8
Self-esteem (Rosenberg scale)	31.3	6.0
Depression (Beck Depression Inventory)	14.2	8.8

^aSum of three statements regarding beliefs about HIV and HIV medications to which participants rated their agreement on a scale from 1 (strongly disagree) to 7 (strongly agree): “Medication is my punishment for getting HIV,” “It doesn’t matter what I am prescribed for HIV, because the disease is a punishment,” and “I have HIV because I am being punished for things I have done.”

^bFrom the COPES (27).

pected directions (Table 2). Stressful life events had a significant and negative association with quality of life and a significant positive association with depression, with a nonsignificant negative association with self-esteem. For satisfaction with social support, a significant positive association was seen with quality of life and self-esteem and a significant negative association was seen with depression. Adaptive coping had a significant positive association with both quality of life and self-esteem but was not significantly associated with depression. Maladaptive coping had a significant negative association with quality of life and self-esteem and a significant positive association with depression. Last, punishment beliefs about HIV infection had a significant negative association with self-esteem, a significant positive association with depression, and a nonsignificant negative association with quality of life.

Predicting Quality of Life, Self-Esteem,
and Depression From Stressful Life Events With
and Without Additional Psychosocial Predictors

In the following analyses we sought to examine the association between stressful life events and the dependent variables both before and after accounting for the variance associated with additional psychosocial predictors including satisfaction with social support, coping, and punishment beliefs about HIV. The analyses were structured in this manner to examine the relative importance of the hypothesized protective variables over and above the hypothesized deleterious effects of stressful events. Three hierarchical regression analyses were therefore performed with depression (Beck Depression Inventory scores), quality of life (Quality of Life Inventory scores), and self-esteem (Rosenberg scale scores) as dependent variables. For each, the stressful life events score was entered on the first step, and the additional predictor variables were entered during

the second step. These regression analyses are displayed in more detail in Table 3.

Preliminary analyses for multiple regressions The assumptions for multiple regression were generally met (including normality, linearity, heteroscedasticity of residuals, and low multicollinearity). Self-esteem and satisfaction with social support scores were slightly negatively skewed, and punishment beliefs about HIV were slightly positively skewed, but regression is fairly robust to this.

Given the study group size, we evaluated the possibility of combining participants who were starting medications, changing their regimen, and those who were reporting subjective difficulty with their current regimen. This seemed feasible for two reasons. First, there are no theoretical reasons to suggest an interaction between the effects of the predictors on the outcome with respect to these three groups. Second, we explicitly tested for interaction effects by dummy coding group and forming product terms with the predictors (social support, positive and negative coping, and punishment beliefs about HIV infection). None of the regression analyses revealed an interaction effect.

Depression Initially, stressful life events significantly accounted for 5% of the variance in the depression scores. However, after accounting for the additional psychosocial predictors, the unique variance due to stressful life events dropped to a nonsignificant level. The full regression model accounted for 49% of the variance in depression scores, with satisfaction with social support, adaptive and maladaptive coping, and punishment beliefs about HIV accounting for unique variances.

Quality of life Stressful life events also initially accounted for significant variance (9%) in quality of life score

TABLE 2. Zero-Order Correlations Between Predictor and Dependent Variables of Psychological Well-Being Among 84 Patients With HIV Receiving Highly Active Antiretroviral Therapy

Predictor Variable	Correlation (r) With Dependent Variable (df = 82)		
	Quality of Life (Quality of Life Inventory)	Self-Esteem (Rosenberg scale)	Depression (Beck Depression Inventory)
Stressful life events	−0.35**	−0.23 [†]	0.26*
Satisfaction with social support	0.42***	0.42***	−0.58***
Adaptive coping	0.39**	0.32**	−0.17
Maladaptive coping	−0.23*	−0.33**	0.34**
Punishment beliefs about HIV infection	−0.21 [†]	−0.38***	0.51***

[†]p < 0.08.

*p < 0.05. **p < 0.01. ***p < 0.001.

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in the initial step of the regression model. After including the additional psychosocial predictors, the unique variance due to stressful life events also dropped to a nonsignificant level. The full regression model accounted for 36% of the variance in quality of life scores, with satisfaction with social support, adaptive coping, and maladaptive coping accounting for unique variances.

Self-esteem The variance in self-esteem scores from stressful life events alone accounted for 4% of the variance ($p < 0.08$). However, the full model accounted for 42% of the variance, with adaptive and maladaptive coping and attitudes about HIV providing unique prediction.

DISCUSSION

In our study, stressful life events initially accounted for a significant portion of the variance associated with depression and perceived quality of life. This result is consistent with the idea that stressful life events have a negative impact on psychosocial well-being.^{14,15} However, once additional variables pertaining to perceived social support, adaptive coping, and punishment beliefs about HIV were

included in the model, the contribution of negative life events lost its significance. Ultimately, the best regression models identified perceived social support, adaptive coping styles, and lower levels of punishment beliefs associated with having HIV as unique predictors of depression, quality of life, and self-esteem. The analyses were consistent with our hypothesis that in patients taking HAART, psychosocial variables that are amenable to intervention efforts may be better predictors of psychological well-being than stressful life events per se.

Several studies conducted before the advent of combination antiretroviral therapy have examined coping styles, depressed mood, and psychological well-being among persons infected with HIV.⁷⁻⁹ Folkman et al.,⁷ for example, examined stress, control, coping, and depressive mood among HIV-positive and HIV-negative gay men in San Francisco in 1988 and 1989. Perceived controllable stress was associated with more positive coping styles and less depressed mood, while detachment in response to stress was associated with increased depression. Similarly, Wolf et al.¹⁰ found that active coping was associated with less mood disturbance and greater social support, whereas avoidance coping was associated with greater mood dis-

TABLE 3. Effect of Stressful Life Events, Both Alone and After Accounting for Additional Psychological Variables, on Depression, Quality of Life, and Self-Esteem in 84 Patients With HIV Receiving Highly Active Antiretroviral Therapy

Regression Variables	Multiple R ²	R ² Change	F Change	df	Semi-Partial Correlation (Squared)
Depression					
Step 1: stressful life events	0.05*	0.05	4.17	1, 82	0.05*
Step 2	0.49***	0.44***	16.79	4, 78	
Stressful life events					0.01
Satisfaction with social support					0.10***
Adaptive coping					0.03*
Maladaptive coping					0.03*
Punishment beliefs about HIV					0.08**
Quality of life					
Step 1: stressful life events	0.09**	0.09**	7.80	1, 82	0.09**
Step 2	0.36***	0.27***	8.14	4, 78	
Stressful life events					0.02
Satisfaction with social support					0.05*
Adaptive coping					0.11***
Maladaptive coping					0.04*
Punishment beliefs about HIV					0.01
Self-esteem					
Step 1: stressful life events	0.04 [†]	0.04 [†]	3.25	1, 82	0.04 [†]
Step 2	0.42***	0.38***	12.33	4, 78	
Stressful life events					0.00
Satisfaction with social support					0.02 [†]
Adaptive coping					0.14***
Maladaptive coping					0.07**
Punishment beliefs about HIV					0.06**

[†] $p < 0.08$.

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

turbance and less social support among symptomatic and asymptomatic HIV-positive persons. Although social support, coping, and beliefs about illness pathology¹² have frequently been examined in association with HIV as well as with other illnesses, few studies have examined these models within the context of the unique difficulties that are associated with living with HIV in the era of HAART.

Part of the value of identifying predictors of these outcomes is that it can guide clinicians toward other variables that may be useful in treatment. Since stressful life events are not uncommon in this population, it will be helpful to ensure the provision of psychoeducation about the effects of stress on health. However, our current research indicates that a clinician may offer substantially larger benefit to quality of life by addressing the other variables examined, namely social support, positive coping with illness, and punishment-related beliefs associated with HIV and its treatment. This is consistent with a recent finding that adaptive and maladaptive coping strategies mediated the significant relationship between dysfunctional attitudes and depression among HIV-seropositive men who have sex with men.²⁹ Psychoeducation or referral to cognitive behavior therapy, which actively targets adaptive coping strategies, may be useful to achieve these ends.

The association between these predictors and depression may also help clarify the link between depression and poor adherence to HIV medications.^{12,30,31} Adherence to challenging treatment regimens is presumably aided by optimism about one's ability to benefit from the treatment and adequate problem-solving skills and social support to adaptively cope with the challenging dosage regimen and difficulties with side effects associated with HAART. Because coping through problem-solving is a major component of adaptive coping, our study suggests that it is these abilities that appear to be compromised in individuals with depressed mood.

In studies of patients with a primary diagnosis of major depression, problem-solving abilities are compromised and negative thinking abounds, but successful treatment of depression ameliorates these difficulties.^{17,18} Accordingly, treatment of depressed mood in HIV persons has the potential of improving problem solving and reducing negative beliefs, and these changes may benefit medication adherence. Nonetheless, depression may be a consequence rather than a cause of negative beliefs and impaired problem solving. Regardless of the direction of causality, interventions targeting dysfunctional attitudes and problem-solving deficits hold promise of both increasing functioning and decreasing depression.³² In our own study,

we found that a single-session intervention targeting the rehearsal of adherence-relevant behaviors enhanced adherence in HIV-positive patients with depressed mood.¹² More comprehensive interventions hold the potential for offering even stronger treatment effects.

Limitations of the current study include the use of self-report measures, the absence of virological assessments, and the cross-sectional method of data collection. With respect to the use of self-report, most of the measures employed have been empirically validated with strong psychometric histories. The absence of virological assessments may be a limitation in that patients with worse health status may also affect worse quality of life and depression. However, including virological assessments would only increase the power of the psychosocial predictors if health status was included as a covariate, and without this, the current study still yielded significant results. Additionally, there is emerging evidence to suggest that patients with HIV who fare better in terms of psychosocial variables like stress, social support, coping, and depression also fare better in terms of disease progression and virologic, immunologic, and clinical status.³³⁻³⁵ The cross-sectional design does not allow for using the psychosocial variables to predict future difficulties or well-being. However, these variables (e.g., coping, social support, beliefs about HIV) are amenable to psychosocial interventions, such as cognitive behavior therapy, and patients with depression and poor life satisfaction may therefore benefit from efforts targeting these factors. These limitations provide support for future research focused on the interplay between these psychosocial variables and biological outcome as well as longitudinal studies to guide efforts aimed at preventing depression, poor self-esteem, and worse quality of life.

Findings discussed above indicate that psychological well-being is associated with worse self-care and adherence, and that worse self-care, such as medication adherence, is associated with worse medical outcome. Therefore, future research should test the effect of increasing psychological well-being through interventions that target the variables tested in the current study to affect both adherence and disease progression.

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References

1. Carpenter CC, Cooper DA, Fischl MA, Gatell JM, Gazzard BG, Hammer SM, Hirsch MS, Jacobsen DM, Katzenstein DA, Montaner JS, Richman DD, Saag MS, Schechter M, Schooley RT, Thompson MA, Vella S, Yeni PG, Volberding PA: Antiretroviral therapy in adults: updated recommendations from the International AIDS Society–USA Panel. *JAMA* 2000; 283:381–390
2. Deeks SG, Smith M, Holodniy M, Kahn JO: HIV-1 protease inhibitors: a review for clinicians. *JAMA* 1997; 277:145–152
3. Flexner C: HIV-protease inhibitors. *Drug Ther (NY)* 1998; 338:1281–1292
4. Goebel FD: Combination therapy from a clinician's perspective. *J Acquir Immune Defic Syndr* 1995; 10:S62–S68
5. Kalichman SC, Ramachandran B, Ostrow D: Protease inhibitors and the new AIDS combination therapies: implications for psychological services. *Prof Psychol* 1998; 29:349–356
6. Kelly JA, Otto-Salaj LL, Sikkema KJ, Pinkerton SD, Bloom FR: Implications of HIV treatment advances for behavioral research on AIDS: protease inhibitors and new challenges in HIV secondary prevention. *Health Psychol* 1998; 17:310–319
7. Folkman S, Chesney M, Pollack L, Coates T: Stress, control, and depressed mood in human immunodeficiency virus-positive and -negative gay men in San Francisco. *J Nerv Ment Dis* 1993; 181:409–416
8. Heckman TG, Somlai AM, Sikkema KJ, Kelly JA, Franzoi SL: Psychosocial predictors of life satisfaction among persons living with HIV infection and AIDS. *J Assoc Nurses AIDS Care* 1997; 8:21–30
9. Lenderking WR, Worth JL, Beckett A: Quality-of-life assessment in HIV-infected psychiatric outpatients: perceived health, functional status, symptoms, and preferences for cardiopulmonary resuscitation. *Psychol and Health* 1994; 9:51–64
10. Wolf TM, Balson PM, Morse EV, Simon PM, Gaumer RH, Dralle PW, Williams MH: Relationship of coping style to affective state and perceived social support in asymptomatic and symptomatic HIV-infected persons: implications for clinical management. *J Clin Psychiatry* 1991; 52:171–173
11. Holzemer WL, Corless IB, Nokes KM, Turner JG, Brown MA, Powell-Cope GM, Inouye J, Henry SB, Nicholas PK, Portillo CJ: Predictors of self-reported adherence in persons living with HIV disease. *AIDS Patient Care STDS* 1999; 13:185–197
12. Safren SA, Otto MW, Worth J, Salomon E, Johnson W, Mayer K, Boswell S: Two strategies to increase adherence to HIV antiretroviral medication: Life-Steps and medication monitoring. *Behav Res Ther* 2001; 39:1151–1162
13. Sarason BR, Sarason IG, Pierce GR: *Social Supports: An Interactional View*. New York, John Wiley & Sons, 1990
14. Carpenter BN: *Personal Coping: Theory, Research, and Application*. Westport, Conn, Praeger, 1992
15. Lazarus RS, Folkman S: *Stress, Appraisal, and Coping*. New York, Springer, 1984
16. Beck AT: The development of depression: a cognitive model, in *The Psychology of Depression: Contemporary Theory and Research*. Edited by Friedman RJ, Katz MM. New York, John Wiley & Sons, 1974, pp 3–20
17. Otto MW, Fava M, Penava SA, Bless E: Life event, mood, and cognitive predictors of perceived stress before and after treatment for major depression. *Cognitive Therapy and Res* 1997; 21:409–420
18. Peselow ED, Robins C, Block P, Barouche F, Fieve RR: Dysfunctional attitudes in depressed patients before and after clinical treatment and in normal control subjects. *Am J Psychiatry* 1990; 147:439–444
19. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J: An inventory for measuring depression. *Arch Gen Psychiatry* 1961; 4:561–571
20. Rosenberg M: *Society and the Adolescent Self-Image*. Princeton, NJ, Princeton University Press, 1994
21. Frisch MB: *Quality of Life Inventory: Manual and Treatment Guide*. Minneapolis, National Computer Systems, 1994
22. Frisch MB, Cornell J, Villanueva M, Retzlaff PJ: Clinical validation of the Quality of Life Inventory: a measure of life satisfaction for use in treatment planning and outcome assessment. *Psychol Assess* 1992; 4:92–101
23. Sarason IG, Johnson JH, Siegel JM: Assessing the impact of life changes: development of the Life Experiences Survey. *J Consult Clin Psychol* 1978; 46:932–946
24. Sarason IG, Levine HM, Basham RB, Sarason BR: Assessing social support: the Social Support Questionnaire. *J Pers Soc Psychol* 1983; 44:127–139
25. Sarason IG, Sarason BR, Shearin EN, Pierce GR: A brief measure of social support: practical and theoretical implications. *J Soc Pers Relat* 1987; 4:497–510
26. Siegert RJ, Patten MD, Walkey FH: Development of a Brief Social Support Questionnaire. *N Z J Psychol* 1987; 16:79–83
27. Carver CS, Scheier MF, Weintraub JK: Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychol* 1989; 56:267–283
28. Phelps SB, Jarvis PA: Coping in adolescence: empirical evidence for a theoretically based approach to assessing coping. *J Youth Adolesc* 1994; 23:359–371
29. Penedo FJ, Antoni MH, Schneiderman N, Ironson GH, Malow RM, Cruess S, Hurwitz B, LaPerriere A: Dysfunctional attitudes, coping, and depression among HIV-seropositive men who have sex with men. *Cognitive Therapy and Res* 2001; 25:591–606
30. Catz SL, Kelly JA, Bogart LM, Benotsch EG, McAuliffe TL: Patterns, correlates, and barriers to medication adherence among persons prescribed new treatments for HIV disease. *Health Psychol* 2000; 19:124–133
31. Paterson DL, Swindells S, Mohr J, Brester M, Vergis EN, Squier C, Wagener MM, Singh N: Adherence to protease inhibitor therapy and outcomes in patients with HIV infection. *Ann Intern Med* 2000; 133:21–30
32. Nezu AM, Nezu CM, Trunzo JJ, McClure KS: Treatment maintenance for unipolar depression: relevant issues, literature review, and recommendations for research and clinical practice. *Clin Psychol Science and Practice* 1998; 5:496–512
33. Gonzalez JS, Antoni MH, Penedo FJ, Duran RE, Schneiderman N: Social support, medication adherence and virologic, immuno-

- logic, and clinical status among HIV+ men & women, in Abstracts of the 60th Annual Meeting of the American Psychosomatic Society. McLean, Va, American Psychosomatic Society, 2002, number 121
34. Balbin EG, Ironson G, Solomon GF, O'Cleirigh C, Fletcher MA: Self and other acceptance, distress and disease progression in HIV. *Ibid*, number 122
35. Ironson G, Solomon G, Balbin E, O'Cleirigh C: Spirituality, compassion and long survival with AIDS. *Ibid*, number 55