PERGAMON

Personality and Individual Differences 30 (2001) 241–257

PERSONALITY AND INDIVIDUAL DIFFERENCES

www.elsevier.com/locate/paid

Emotional distress among HIV-positive individuals: the roles of acute negative life events and psychological diatheses

John E. Roberts *, Jeffrey A. Ciesla, David M. Direnfeld, Ross G. Hewitt

State University of New York at Buffalo, Department of Psychology, Park Hall, Box 604110, Buffalo, New York, 14260-4110, USA

Received 12 June 1999; received in revised form 24 January 2000

Abstract

The present study investigated the impact of negative life events and psychological diatheses (neuroticism, low self-esteem, and dysfunctional attitudes) on emotional distress among HIV-positive patients. Fifty-two participants completed questionnaires assessing acute stressful life events, psychological diatheses, perceived stress, and depressive symptoms. The following hypotheses were tested: (a) negative life events would predict depressive symptoms and perceived stress; (b) HIV-specific life events would be more strongly associated with depressive symptoms and perceived stress than general life events; and (c) psychological diatheses would moderate the relationship between acute life events and depressive symptoms, as well as the relationship between life events and perceived stress. Results indicated that both general and HIV-specific life events predicted depressive symptoms and perceived stress. However, no support was found for the hypothesis that HIV-related life events would be more potent. Psychological diatheses moderated the impact of life events on perceived stress, such that life events had a greater impact on those with lower levels of vulnerability. These results remained significant after controlling for biological markers of disease progression.

Keywords: HIV; Life events; Depressive symptoms; Perceived stress; Diatheses; Neuroticism; Self-esteem; Dysfunctional attitudes

1. Introduction

Human Immunodeficiency Virus (HIV) infection is a chronic illness that has affected over 30 million people worldwide (Center for Disease Control and Prevention, 1997). Until recent pharmaceutical developments, HIV infection was almost invariably a terminal illness that eventually

* Corresponding author. Tel.: +1-716-645-3650; fax: +1-505-212-6192.
E-mail address: robertsj@acsu.buffalo.edu (J.E. Roberts).

0191-8869/00/$ - see front matter
PII: S0191-8869(00)00042-8

resulted in death over a period of 10 to 15 years. Although it has been generally assumed that HIV-positive (HIV^+) individuals are at increased risk for emotional distress and depression (see Ciesla & Roberts, 2000, under review), few studies have examined the processes that may underlie this vulnerability. In particular, it is unclear whether or not acute negative life events contribute to emotional distress beyond the effects of the chronic stress associated with living with this highly stigmatized illness. Previous studies of acute stressful life events in this population have yielded inconsistent results, some finding that acute life events are associated with emotional distress (McClure, Catz, Prejean, Brantley & Jones, 1996; Nott & Vedhara, 1995; Thompson, Nanni & Levine, 1996), whereas others have failed to demonstrate such a relationship (Blaney et al., 1991; Evans et al., 1995; Neugebauer et al., 1992; Thomason, Jones, McClure & Brantly, 1996).

Investigators are beginning to explore the very likely possibility that individuals with HIV infection vary in terms of their vulnerability to the effects of these acute events. For example, several studies have found that social support among HIV^+ individuals is associated with lower levels of psychological distress both cross-sectionally (Fukunishi et al., 1997; Hays, Turner & Coates, 1992; Nott, Vedhara & Power, 1995) and prospectively (Dew et al., 1997; Hays et al., 1992; Lackner et al., 1993). Although there is strong evidence from studies with uninfected samples that social support acts as a buffer against the adverse effects of stressful life events (see Cohen & Wills, 1985 for a review), only one study has investigated whether or not social support moderates the effect of acute stressful life events among HIV^+ individuals (Hays et al., 1992). This study found that satisfaction with social support was associated with the development of fewer depressive symptoms one year later, particularly among individuals with high levels of stress (operationalized as the number of HIV symptoms). Other studies have found that certain coping behaviors are associated with lower levels of depressive symptoms among HIV^+ individuals both cross-sectionally (Commerford, Gular, Orr, Resnikoff & O'Dowd, 1994; Fleishman & Fogel, 1994; Fukunishi et al., 1997; Leserman, Perkins & Evans, 1992) and prospectively (Fleishman & Fogel, 1994; Vedhara & Nott, 1996). Although stress moderation has not been directly tested, several studies have found that various coping styles are associated with less severe depressive reactions during acute stressors such as natural disasters (Benight et al., 1997), bereavement (Folkman, Chesney, Collette, Boccellari & Cooke, 1996), and seropositivity notification (Lutgendorf et al., 1997). However, there is also evidence that stress can adversely affect coping behaviors among HIV^+ individuals (Folkman, Chesney, Pollack & Coates, 1993) raising the possibility of bidirectional influences.

In contrast to research focused on the social environment and coping behaviors, virtually no work to date has examined the degree to which aspects of personality and cognitive style influence vulnerability to psychological distress among HIV^+ individuals. Such psychological vulnerabilities have been intensively investigated in the general population (Coyne & Whiffen, 1995; Monroe & Simons, 1991; Nietzel & Harris, 1990), and are often referred to as 'diatheses'. Diatheses are defined as premorbid characteristics that hypothetically increase risk for a particular condition, particularly when combined with stressful life events. For example, theory and research based in the general population suggests that neuroticism is a fundamental dimension of personality that is critically involved in stress reactivity (Costa & McCrae, 1980; Eysenck & Eysenck, 1985). This dimension of personality involves moodiness, negative self-appraisals, loneliness, and other aspects of negative emotionality. Research in the general population has

found that neuroticism is associated with both increased sensitivity to daily stressful life events (Bolger & Schilling, 1991) and with depression-proneness (see Roberts & Gotlib, 1997a for a review). Relatively neurotic individuals seem to be at risk for developing depression subsequent to life stressors. Furthermore, a number of theorists and investigators have explored the possibility that aspects of vulnerable self-esteem act as diatheses for depression (see Roberts & Monroe, 1994, 1999 for reviews), whereas others have suggested that cognitive vulnerability to depression consists of dysfunctional attitudes or negative schemata (Beck, 1996; Schmidt, Schmidt & Young, 1999). These dysfunctional attitudes involve core beliefs about the self and world that are maintained in a rigid and excessive manner, for example, 'I am nothing if a person I love doesn't love me' and 'If I fail at my work, then I am a failure as a person'. Such dysfunctional attitudes are thought to result in emotional distress and depression when they are challenged by life events, for example the breakup of a relationship or the loss of a job, respectively.

Together these perspectives suggest that neuroticism, low self-esteem, and dysfunctional attitudes should amplify the distress and depressive symptomatology associated with acute negative life events among HIV^+ individuals. Accordingly, HIV^+ individuals with high levels of these diatheses would be more reactive to acute negative life events than those with lower levels of vulnerability. In other words, acute life events would be relatively strongly associated with distress and depression among the psychologically vulnerable, whereas there would be a weaker association among the less vulnerable. Statistically, this moderating effect would be represented by a significant interaction between measures of the diathesis and life stressors. Although it is surprising how few studies have investigated social support and coping as stress moderators among HIV^+ individuals, it is even more surprising that these aspects of personality and cognitive style have been almost completely neglected. Such research is important because it would help identify those individuals at most risk for becoming highly distressed following negative life events. This work is also important because little research has investigated these potential vulnerability characteristics in chronically stressed populations, such as those with HIV infection.

In addition to psychological diatheses that might influence the effects of acute stressors, it is possible that the content of certain types of acute life events might make them more or less distressing for this population. It has long been recognized that negative events differ in their severity, and thus in their potential to lead to psychological distress. Life events particular to one's life threatening illness may indeed be more salient to individuals than unrelated life events. A study of infected and uninfected gay men found that AIDS related events were associated with more distress than more general life events (Rosenberger et al., 1993). In another study, infected gay men reported that AIDS related events were their primary source of life stress (Demas, Schoenbaum, Wills, Doll & Klein, 1995). However, no systematic investigation has been conducted that compares general life events to HIV-related events in an HIV^+ sample.

The purpose of the present study was to examine the relationship between acute life events, psychological diatheses (neuroticism, low self-esteem, and dysfunctional attitudes), and emotional distress in a sample of HIV^+ individuals. We hypothesized that acute life events would be associated with elevated levels of depressive symptomatology and perceived stress. Further, we hypothesized that this association would be stronger for events that are specific to living with HIV-infection than for general negative life events. We predicted that psychological diatheses would moderate the association between acute life events and emotional distress, such that life events would have a more negative impact on individuals with higher levels of the diathesis.

Statistically, such moderation would be represented by an interaction between life events and diatheses in predicting emotional distress. Finally, we were interested in exploring whether acute life events have more of an impact on perceptions of stress or on depressive symptomatology, and if psychological vulnerability operates in a similar manner in moderating both of these relationships.

2. Method

2.1. Participants and procedure

Participants were HIV^+ patients being treated at the Erie County Medical Center's Immunodeficiency Clinic in Buffalo, NY, USA. Patients were approached when they came in for their regular checkups. Those who consented completed a questionnaire packet described below. Information regarding participant's disease progression ($CD4^+$ cell counts and CD4:CD8 cell ratios) was then obtained from participants' medical files. These data were collected between April 1997 and February 1998.

A total of 500 patients were approached, and 78 consented to participate. Of these, 26 did not provide complete data, resulting in a total sample size of 52 (46 male, 6 female). Lack of time was the primary reason given for declining to participate. The mean age of participants was 38.1 years (SD = 8.1). Sixty-nine percent identified themselves as homosexual or bisexual, 27% identified themselves as heterosexual, and 4% did not report their sexual orientation. Twenty-two individuals were diagnosed with AIDS at the time of participation (no disease stage information was available for two participants). On average, the sample was of low income with a median income bracket of $10,000 to $20,000.

2.2. Measures

2.2.1. Depressive symptoms

The Inventory to Diagnose Depression (IDD, Zimmerman, Coryell, Corenthal & Wilson, 1986) is a 22-item self-report instrument that was used to measure overall severity of depressive symptoms. This severity index has been found to correlate highly with total scores on the Beck Depression Inventory ($r = 0.87$) and the Hamilton Rating Scale ($r = 0.80$; Zimmerman et al., 1986). A recent college student sample reported a mean score of 11.2 (SD = 7.3) on this instrument (Roberts & Gotlib, 1997b). In the present sample, the mean score was 16.7 (SD = 13.6) and coefficient alpha was 0.92.

2.2.2. Perceived stress

The Perceived Stress Scale (PSS, Cohen, Kamarck & Mermelstein, 1983) was used to measure psychological distress. The PSS is a 14-item questionnaire that assesses thoughts and feelings associated with subjective levels of distress (e.g. felt nervous or stressed, felt that things were going your way). Participants were asked on a 5-point scale to indicate how often they had similar thoughts or feelings. For this study, participants were asked to base their ratings on the last three months. Two college student samples had mean scores of 23.2 (SD = 7.3) and 23.7 (SD = 7.8) on this instrument, whereas a community sample of individuals in a smoking cessation

program had a mean score of 25.0 (SD = 8.0) (Cohen et al., 1983). In the present sample the mean score was 24.7 (SD = 9.1) and coefficient alpha was 0.85.

2.2.3. Psychological diatheses

Psychological diatheses were measured with the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978), the Rosenberg Self-Esteem Questionnaire (RSE; Rosenberg, 1979), and the Neuroticism Scale of the Eysenck Personality Questionnaire – Revised Short Scale (Eysenck, Eysenck & Barrett, 1985). The DAS is a 40-item measure of rigid and excessive beliefs, such as 'I do not need the approval of other people in order to be happy' (reverse scored), and ' If I am to be a worthwhile person, I must be truly outstanding in at least one major respect.' Items are rated on a 7-point Likert scale (1 = totally disagree; 7 = totally agree). In the present sample, coefficient alpha was 0.95. The RSE is a 10-item measure of global self-regard, and includes items such as 'On the whole, I am satisfied with myself.' Items are rated on a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree). Coefficient alpha was 0.89. The neuroticism scale consists of 12 items, such as 'Does your mood often go up and down?' and 'Are you an irritable person?' Participants indicate 'yes' or 'no' to each item. In the present sample, coefficient alpha was 0.82.

2.2.4. General life events

The Life Experiences Survey (LES; Sarason, Johnson & Siegel, 1978) is a list of 59 life events covering a wide range of experiences. Nine items were removed from the original measure due to their specificity to college life (academic probation, changing a major, etc.), resulting in an inventory of 50 items. Participants were asked to indicate if they had experienced each event within the past three months. In order to minimize potential confounds between this measure and measures of perceived stress and depressive symptoms, scores were based on the raw count of events rated as negative.

2.2.5. HIV-specific life events

An inventory of 64 life events specifically related to being HIV-positive was constructed for this study — the Buffalo HIV Life Events Survey (BHLES). As with the LES, participants indicated if they experienced each event in the past three months. A total of 22 positive events were included in order to reduce the emotional reactions to completing the inventory. Items covered a wide range of life arenas, including relationships (e.g. death of a friend due to AIDS), financial (e.g. experienced difficulty affording treatment), health (e.g. experienced significant medication side-effects), employment (e.g. was terminated from job), and spiritual/religious (e.g. asked to leave or made to feel unwelcome in church/congregation) events. The inventory also provided the opportunity to write in up to three additional events. Both in the instructions and throughout the inventory, participants were instructed to only report events that were specifically associated with being HIV-positive (See Appendix A). Scores were based on the raw count of events that were rated as negative.

2.2.6. HIV antibody, CD4 and CD8 counts

HIV infection was documented for all participants with serum enzyme-linked immunosorbent assay (ELISA) and confirmed by western blot. CD4 and CD8 percentages were determined by

3-color panel flow cytometry. Absolute counts were calculated using total white blood cell count and total lymphocyte percent derived from concomitant hemocytometry.

3. Results

3.1. Preliminary analyses

Measures of neuroticism, self-esteem, and dysfunctional attitudes were moderately to highly intercorrelated (r's between 0.49 and 0.64). In order to simplify presentation of subsequent results, a composite measure was created by standardizing the three individual scales, and subsequently aggregating these z scores. With these three scales treated as items, coefficient alpha was 0.80 on the composite measure. Together these scales tap three important aspects of psychological vulnerability: (1) rigid, inappropriate, and perfectionistic beliefs about the self and the world; (2) negative self-evaluation; and (3) affective instability and reactivity. As a result of our procedure, these three components were weighted equally in the composite measure. We labeled this aggregate measure 'Psychological Diatheses'.

Although age was negatively correlated with severity of depressive symptoms ($r = -0.28$, $P < 0.05$), it was not significantly correlated with any of the other measures used in the present study (r's $< |0.24|$). Both CD4 counts and the CD4/CD8 ratio was not significantly correlated with any variable in the study (all r's $< |0.23|$). There were no significant gender differences on any of the variables in the study (all t's < 1.27).

3.2. Zero-order correlations

It was hypothesized that both acute life events and psychological diatheses would be related to depressive symptoms and perceived stress. Although perceived stress was strongly associated with level of psychological diatheses (composite measure: $r = 0.62$; neuroticism: $r = 0.61$, $P < 0.001$; self-esteem: $r = -0.64$, $P < 0.001$; DAS: $r = 0.35$, $P < 0.05$), it was not significantly correlated with either general life events or HIV-specific life events. (Table 1.) However, depressive symptoms

Table 1
Means, standard deviations, and zero-order correlations among measures[a]

Measure	IDD	PSS	Diatheses	LES	BHLES	CD4	M	SD
IDD	–						16.70	13.60
PSS	0.37**	–					24.68	9.08
Diathess	0.50***	0.62***	–				−0.04	2.55
LES	0.51***	0.25	0.31*	–			5.27	7.42
BHLES	0.52***	0.14	0.29*	0.88***	–		4.02	6.49
CD4	−0.18	−0.05	−0.03	−0.18	−0.24	–	339.02	222.70
CD4/CD8	−0.05	0.09	0.17	0.00	−0.01	0.69***	0.41	0.27

[a] IDD, Inventory to Diagnose Depression; PSS, Perceived Stress Scale; Diatheses, Composite of neuroticism, low self-esteem, and dysfunctional attitudes; LES, Life Events Survey; BHLES, Buffalo HIV Life Events Survey. *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

were moderately correlated with level of psychological diathesis (composite measure $r = 0.50$; neuroticism: $r = 0.38$, $P < 0.01$; self-esteem: $r = -0.50$, $P < 0.001$; DAS: $r = 0.40$, $P < 0.01$), general life events ($r = 0.51$), and HIV-specific events ($r = 0.52$). Partial correlations that controlled for measures of disease progression ($CD4^+$ cell counts and $CD4^+$:$CD8^+$ cell ratios) were essentially identical to the zero order correlations reported above.

3.3. Moderating effects of psychological diatheses

To test our hypotheses concerning the role that psychological diatheses might play in moderating the association between life events and psychological distress, a series of four multiple linear regressions were run. First, depressive symptoms was regressed on psychological diatheses, general life events, and their interaction term. This interaction term statistically represents the moderating effect of diatheses on the association between life events and emotional distress. Second, this analysis was repeated with HIV-specific life events and the corresponding interaction term. Finally, these two regressions were repeated predicting perceived stress. To simplify the presentation of our findings, we largely focus on analyses of the composite measure of psychological diatheses rather than its three individual components. Results based on each of the three components were virtually identical to those based on the composite measure.

As can be seen in Table 2, in predicting depressive symptoms, there were significant main effects for level of psychological diatheses ($\beta = 0.381$, $P < 0.01$) and general life events ($\beta = 0.391$, $P < 0.01$). However, the interaction term was not significant ($\beta = -0.321$, ns). This same pattern of

Table 2
Hierarchical multiple regression analyses predicting symptoms of depression[a]

Predictor	β	*pr*	*t*	Step R^2 change
General negative life events: LES				
Step 1				0.39***
LES	0.391	0.43	3.33**	
Diatheses	0.381	0.42	3.24**	
Step 2				0.03
LES×Diathess	−0.321	−0.23	1.62	
Model $R^2 = 0.42$, $F(3,48) = 11.70$, $P < 0.001$.				
HIV-specific life events: BHLES				
Step 1				0.40***
BHLES	0.406	0.45	3.53**	
Diatheses	0.385	0.43	3.35**	
Step 2				0.02
BHLES×Diatheses	−0.226	−0.18	1.301	
Model $R^2 = 0.42$, $F(3,48) = 11.79$, $P < .001$				

[a] IDD, Inventory to Diagnose Depression; PSS, Perceived Stress Scale; Diatheses, Composite of neuroticism, low self-esteem, and dysfunctional attitudes; LES, Life Events Survey; BHLES, Buffalo HIV Life Events Survey; β, standardized β weight; pr, partial correlation. *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

results was found when depressive symptoms was regressed on level of psychological diathesis and HIV-specific life events. Both diatheses ($\beta = 0.385$, $P < 0.01$) and HIV-specific events ($\beta = 0.406$, $P < 0.01$) predicted depressive symptoms, but their interaction was not significant ($\beta = -0.226$, ns). These interaction terms were not statistically significant when any of the three components of the composite measure of diatheses (neuroticism, self-esteem, DAS) were analyzed separately.

As can be seen in Table 3, when perceived stress scores were predicted by the same variables, a different pattern emerged. Although the main effect of general life events ($\beta = 0.057$, ns) was not significant, level of psychological diatheses ($\beta = 0.605$, $P < 0.001$) and the Life Events×Psychological Diatheses interaction were significant ($\beta = -0.657$, $P < 0.01$). This regression model accounted for 52.3% of the variance in perceived stress. The Diatheses×Life Events interaction was significant when each of the three components of the composite measure were analyzed separately (neuroticism: $\beta = -1.657$, $P < 0.05$; self-esteem: $\beta = 2.229$, $P < 0.05$; DAS: $\beta = -1.576$, $P < 0.01$).

The form of the significant Psychological Diatheses×General Life Events interaction is displayed in Fig. 1. To graph the interaction, predicted perceived stress scores were computed for four regression points; the combinations of one standard deviation above and below the means for both variables. In contrast to our hypothesis, the form of this interaction suggested that general life events were more strongly related to perceived stress among those individuals with lower levels of diatheses.

Results from the regression analysis including HIV-specific life events were similar. Although the main effect of HIV-specific events ($\beta = -0.048$, ns) was not significant, level of psychological

Table 3
Hierarchical multiple regression analyses predicting perceived stress[a]

Predictor	β	*pr*	*t*	Step R^2 change
General negative life events: LES				
Step 1				0.39***
LES	0.057	0.07	0.48	
Diatheses	0.605	0.59	5.16***	
Step 2				0.13*
LES×Diatheses	−0.657	−0.47	3.64**	
Model $R^2 = 0.52$, $F(3,48) = 17.55$, $P < 0.001$				
HIV-Specific life events: BHLES				
Step 1				0.39***
BHLES	−0.048	−0.06	0.41	
Diatheses	0.637	0.62***	5.47***	
Step 2				0.08**
BHLES×Diatheses	−0.454	−0.37**	2.73**	
Model $R^2 = 0.47$, $F(3,48) = 14.32$, $P < 0.001$				

[a] IDD, Inventory to Diagnose Depression; PSS, Perceived Stress Scale; Diatheses, Composite of neuroticism, low self-esteem, and dysfunctional attitudes; LES, Life Events Survey; BHLES, Buffalo HIV Life Events Survey; β = standardized β weight; *pr*, partial correlation. *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

diatheses ($\beta = 0.637$, $P < 0.001$) and the Events×Psychological Diatheses interaction were significant ($\beta = -0.454$, $P < 0.01$). The regression model involving HIV-specific stressors accounted for 47.2% of the variance in perceived stress scores. As can be seen in Fig. 2, the form of this interaction suggested that such HIV-specific events were more strongly related to perceived stress among individuals with lower levels of vulnerability. Consistent with the previous results, the Diathesis×Life Events interaction was significant (or marginally significant) when each of the three components of the composite measure were analyzed separately (neuroticism: $\beta = -1.323$, $P < 0.05$; self-esteem: $\beta = 1.349$, $P < 0.05$; DAS: $\beta = -1.002$, $P = 0.054$).

Given that several symptoms of depression overlap with those of HIV infection (e.g. appetite disturbance, weight loss, and fatigue), each of the aforementioned regression analyses was repeated, including measures of HIV disease progression as control variables. In particular, $CD4^+$ cell counts and $CD4^+$:$CD8^+$ cell ratios were entered together on the first step of the regression analyses. The addition of these variables did not affect the significance or pattern of the previously stated findings with our composite measure of psychological diatheses (though the specific

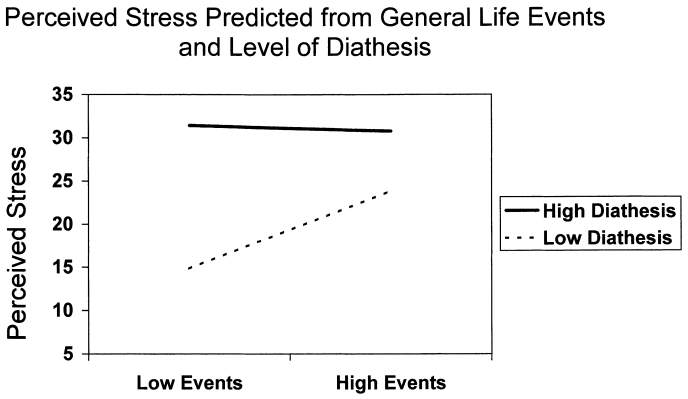

Fig. 1. Perceived stress predicted from general life events and level of diatheses.

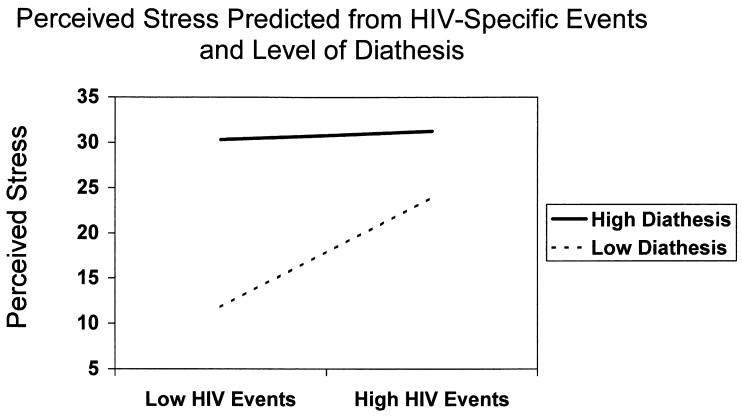

Fig. 2. Perceived stress predicted from HIV-specific events and level of diathesis.

components, neuroticism, low self-esteem, and dysfunctional attitudes, now only demonstrated marginally significant interactions with life events). Therefore, it is unlikely that previous findings were spurious, resulting from more seriously ill patients having artificially elevated scores on our measure of depressive symptoms.

4. Discussion

The present study examined risk for depressive symptoms and perceptions of stress among HIV^+ men and women. We were interested in exploring the role that acute stressful life events might play in the development of these forms of emotional distress, and in testing whether or not psychological diatheses including neuroticism, low self-esteem, and dysfunctional attitudes moderate the association between acute negative life events and emotional distress. To our knowledge, this study is among the first to explore aspects of personality and cognitive style that potentially act as stress moderators among HIV^+ persons.

In our sample of HIV^+ individuals, acute stressful life events were associated with higher levels of depressive symptoms. The strength of these univariate associations ($r = 0.51$ for general life events; $r = 0.52$ for HIV-specific life events) would be considered moderate in magnitude. Although our cross-sectional data obviously cannot determine causal direction, one possible explanation for these results is that acute negative life events resulted in depressive symptomatology among HIV^+ individuals who had otherwise been coping well with their medical conditions. These acute negative events might have acted as an additional burden over the ongoing chronic stress of HIV illness, and ultimately contributed to the development of depressive symptomatology. In contrast to our hypotheses, we found no evidence that psychological diatheses moderated the association between acute negative events and depressive symptoms. Both HIV^+ individuals who were high and those who were low in vulnerability reported elevated depressive symptoms if they had undergone negative life events and fewer depressive symptoms in the absence of negative events. These findings were consistent across analyses based on our aggregate measure of vulnerability and each of its three individual components (neuroticism, low self-esteem, and dysfunctional attitudes).

On the other hand, a different pattern emerged in terms of perceptions of stress among HIV^+ individuals. In the sample as a whole, acute negative events were unrelated to perceived stress. Neither HIV-related acute events nor general events unrelated to HIV illness were significantly associated with perceived stress in univariate analyses (r's < 0.26). However, this overall lack of association clouded underlying individual differences in reactivity to negative life events. In particular, level of psychological diatheses strongly moderated the association between acute events and perceived stress. In other words, the strength of association between acute life events and perceived stress varied as a function of vulnerability. In contrast to our hypotheses, the form of these interactions suggests that acute negative events were unrelated to perceived stress among HIV^+ individuals with higher levels of psychological diatheses, but instead they were strongly related to perceived stress among those with lower levels of vulnerability. Individuals with relatively elevated levels of these diatheses reported high levels of perceived stress regardless of whether or not they experienced acute negative life events. On the other hand, those with relatively low levels of these diatheses only reported higher levels of perceived stress when they had

experienced acute stressors. Perceived stress was considerably lower in the absence of these stressors. These results were similar for both general negative life events and those that were specific to HIV illness. The results also were consistent across our aggregate measure of psychological diatheses and each of its three components: neuroticism, low self-esteem, and dysfunctional attitudes each moderated the association between acute events and perceived stress.

Interestingly, Abramson, Alloy and Hogan (1997) noted that the form of diathesis-stress interactions are likely to vary as a function of the level of stress experienced in the sample as a whole. They predicted that high stress samples would likely result in counter intuitive interactions such as ours. Consistent with Abramson et al.'s observations, our results suggest that HIV^+ individuals who have greater psychological vulnerability experience high levels of perceived stress regardless of whether or not they are faced with acute negative events. Among these individuals who are suffering from a debilitating and terminal illness, those with greater vulnerability appear to be already psychologically overburdened and further difficulties in their lives can do little to make them feel more stressed. They already are highly distressed. It appears that the chronic stress of this illness combined with psychological vulnerability is sufficient to contribute to high levels of perceived stress regardless of additional acute life events. In other words, it is likely that there is a ceiling effect. In contrast, those individuals who are less psychologically vulnerable tend to experience relatively low levels of perceived stress when their lives are stable and they are not faced with the turmoil of acute stressors. However, as these individuals are confronted with acute negative events, they may begin to experience higher levels of perceived stress. Apparently these individuals have managed to successfully cope with the ongoing difficulties of their illness, but can become overwhelmed under the burden of additional acute stressors.

As a main effect, our aggregate measure of psychological diatheses was moderately to strongly associated with depressive symptoms ($r = 0.50$) and perceptions of stress ($r = 0.62$), suggesting that this combination of neuroticism, low self-esteem, and dysfunctional attitudes may play an important role in risk for emotional distress among HIV^+ individuals. However as discussed above, this vulnerability does not appear to involve increased sensitivity to acute life events. This is made clear by the fact that the Psychological Diatheses×Life Event interactions were non-significant predictors of depressive symptoms and that acute stressors were more strongly associated with perceived stress among HIV^+ individuals with lower (rather than higher) levels of psychological vulnerability. Although our data clearly demonstrate that psychological vulnerability is associated with perceptions of stress and depressive symptoms among HIV^+ individuals, the underlying mechanisms remain to be explored. Other work in the general population suggests that aspects of psychological vulnerability, such as neuroticism, are associated with negative biases in attention (Derryberry & Reed, 1994; Wallace & Newman, 1997) and memory (Martin, 1985), as well with rumination (Nolan, Roberts & Gotlib, 1998; Roberts, Gilboa & Gotlib, 1998). It may be that vulnerability contributes to emotional distress through these mechanisms, though it is also possible given our cross-sectional design that elevated levels of depressive symptomatology and stress negatively color individuals' ratings of personality and cognitive style (see Roberts & Gotlib, 1997a for a discussion of such alternative explanations). In other words, it may be that self-reported neuroticism, low self-esteem and dysfunctional attitudes are simply epiphenomena of emotional distress and depressive symptomatology.

In order to investigate the role of acute stressors that are thematically related to being HIV^+, we constructed the Buffalo HIV Life Events Survey (BHLES). Although there is an inventory

that includes both HIV-related and HIV-unrelated events (Nott & Vedhara, 1995), to our knowledge, there are no other self-report checklists of events that are exclusively associated with living with HIV infection. Our results suggest that both negative life events that are thematically related to HIV illness, such as being forced to disclose one's HIV status, and those that are unrelated to HIV illness play similar roles in the development of psychological distress. Both general acute life events and those that are specific to living with HIV illness were moderately associated with perceived stress and depressive symptoms. In contrast to our hypothesis, HIV-specific events were no more 'toxic' than other types of acute life events not necessarily related to being HIV^+. The fact that endorsement of general life events was highly correlated with endorsement of HIV-specific life events ($r = 0.88$) suggests the possibility that individuals vary in their proclivity to experience a wide variety of different types of negative events. However, it is also possible that this correlation in part results from biases in self-report ratings with some individuals being more prone to report experiencing events than others, perhaps as a result of negative cognitive biases (Monroe & Simons, 1991). Given that self-report measures of stressful life events are particularly prone to such biases (Monroe & Roberts, 1990), it would be important for future studies to use relatively objective interview-based assessments, such as the Bedford College Life Events and Difficulties Schedule (Brown & Harris, 1978).

Because of the current study's cross-sectional correlational design, small sample size, and reliance on self-report measures of psychological distress and negative life events, its results should be considered as preliminary and suggestive. Furthermore, because only about 10% of the individuals approached to participate completed this study, there is a potential sample bias. Although we have no data to determine if certain psychological characteristics discriminated those who chose to participate from those who declined, we strongly suspect that the more severely distressed individuals tended to decline. Consistent with this possibility, the mean perceived stress and depression scores in this HIV^+ sample were quite similar to those reported within presumably less stressed samples, such as college students (see Measures). This type of selection bias would have resulted in limited variance in our dependent measures, and would have attenuated associations between our variables. Together these limitations mandate the need for replication studies. Nonetheless, the present study is one of the first to examine stress moderators among HIV^+ persons. It is also the only study that we are aware of that has examined negative events that are specifically associated with living with HIV infection. Future work would benefit from prospective designs in order to determine if psychological vulnerabilities, such as neuroticism, low self-esteem, and dysfunctional attitudes, and life stressors are antecedents of depressive symptoms and perceived stress.

Appendix A. The Buffalo HIV life events survey

The following is a list of events that are sometimes related to being HIV^+-positive. Please indicate which of these events you experienced in the **Past Three Months**. *Only report events that were in some way associated with or connected to HIV status*. Please indicate whether or not you have experienced an event by circling the (Y)es or (N)o response. Then, for each event that you circle Yes, also rate how positive or negative the event was to you, using the seven-point scale below.

Extremely Positive	Moderately Positive	Somewhat Positive	Neutral	Somewhat Negative	Moderately Negative	Extremely Negative
1	2	3	4	5	6	7

Relationships: (please indicate events related to HIV status.)

_____ Y N *(1) Friend, lover, or family member tested negative for HIV. (Was not infected).
_____ Y N (2) Was ridiculed or rejected by family members.
_____ Y N (3) Had to care for HIV^+ friend, lover, or family member.
_____ Y N *(4) HIV^+ friend, lover, or family member's symptoms significantly lessened or disappeared.
_____ Y N *(5) Was cheered up by a close friend.
_____ Y N (6) Death of a friend, lover, or family member due to AIDS.
_____ Y N (7) Friend, lover, or family member diagnosed HIV^+.
_____ Y N *(8) Was cheered up by a lover.
_____ Y N (9) HIV^+ friend, lover, or family member's symptoms significantly worsened.
_____ Y N (10) Was ridiculed or rejected by a close friend.
_____ Y N *(11) Was cheered up by family members.
_____ Y N (12) Was ridiculed or rejected by a lover.
_____ Y N (13) Was physically threatened or assaulted.
_____ Y N (14) Was ridiculed or harassed by a stranger.
_____ Y N (15) Reduced, changed or stopped sexual activities.
_____ Y N *(16) Was complemented or looked up to for having courage in the face of being HIV^+.
_____ Y N (17) Relationship with partner ended.
_____ Y N (18) Was harassed by public service employees (e.g. police, fireman, etc.).
_____ Y N (19) Infected sexual partner or child with HIV virus.
_____ Y N (20) Was forced to disclose HIV status.
_____ Y N *(21) Was cheered up by a stranger.
_____ Y N *(22) Developed a new friendship or relationship with another HIV^+ person.
_____ **Y** N (23) Someone disclosed my HIV status without my consent.

Employment: (please indicate events related to HIV status).

_____ Y N (24) Had to stop or reduce working/school activities due to the progression of the illness.
_____ Y N (25) Was terminated from job or asked to leave school.
_____ Y N *(26) Was able to return to work due to recession of the illness.
_____ Y N *(27) Coworkers were accepting me after being informed of my HIV status.
_____ Y N (28) Duties and responsibilities in job changed.
_____ Y N (29) Was not hired for a job or not accepted in a school program.
_____ Y N (30) Was isolated from other employees.

_____ Y N *(31) Was able to accept new responsibilities or duties at work due to recession of the illness.

Financial: (please indicate events related to HIV status).

_____ Y N *(32) Was able to obtain health insurance without difficulty.
_____ Y N (33) Was evicted from or denied housing.
_____ Y N *(34) Received financial support from family, friends, or partner.
_____ Y N (35) Had health, life or dental insurance revoked.
_____ Y N (36) Was denied a loan or mortgage from bank (not because of bad credit).
_____ Y N (37) Was denied support services (e.g. meals-on-wheels, etc.).
_____ Y N (38) Experienced difficulty obtaining health insurance because of HIV status.
_____ Y N (39) Experienced difficulty affording treatment.
_____ Y N *(40) Qualified for free or reduced-cost health care.

Health: (please indicate events related to HIV status.)

_____ Y N (41) Had to limit participation in social activities due to the progression of the illness.
_____ Y N *(42) Began to feel significantly healthier.
_____ Y N (43) Was refused medical services by medical service employees (doctors, nurses, etc.).
_____ Y N (44) Was refused services from mental health professionals (psychiatrists, social workers).
_____ Y N (45) Had to give up pet(s) due to risk of transmission of animal diseases.
_____ Y N (46) Taken off of medication(s) because of becoming healthier.
_____ Y N (47) Experienced significant side-effects from medication(s).
_____ Y N (48) Had to quit smoking cigarettes.
_____ Y N (49) Had to quit using illicit drugs (marijuana, heroin, cocaine, etc.)
_____ Y N *(50) Recovered from past HIV symptoms.
_____ Y N (51) Had to restrict activities because of illness.
_____ Y N *(52) Began to appear physically healthier to others.
_____ Y N (53) Ridiculed because of appearance.
_____ Y N *(54) Side effects from medications lessened or disappeared.
_____ Y N (55) Was forced to rely on others for basic needs. (e.g. shopping, cooking, grooming etc.).
_____ Y N (56) Made arrangements for after one's death. (e.g. will, funeral arrangements).
_____ Y N (57) Unable to complete school degree.
_____ Y N *(58) Was able to become more independent due to a recovery of health.

Religious/spiritual: (please indicate events related to HIV status).

_____ Y N (59) Asked to leave or made to feel unwelcome in church/congregation.

_____ Y N *(60) Someone went out of their way to provide me spiritual/religious guidance.
_____ Y N *(61) Became more spiritual or religious due to becoming HIV^+.
_____ Y N (62) Denied spiritual/religious guidance.
_____ Y N *(63) Was reached out to by a church/congregation.
_____ Y N (64) Withdrew from church activities due to progression of illness.

Other: (please indicate events related to HIV status).

Other situation which you experienced as a result of contracting the HIV virus in the past three months? (please specify)
(65)_____
(66)_____
(67)_____

References

Abramson, L., Alloy, L. B., & Hogan, M. E. (1997). Cognitive/personality subtypes of depression: Theories in search of disorders. *Cognitive Therapy and Research, 21*, 247–265.

Beck, A. T. (1996). Beyond belief: A theory of modes, personality, and psychopathology. In P. M. Salkovskis, *Frontiers of cognitive therapy* (pp. 1–25). New York: Guilford Press.

Benight, C. C., Antoni, M. H., Kilbourn, K., Ironson, G., Kumar, M. A., Fletcher, M. A., Redwine, L., Baum, A., & Schneiderman, N. (1997). Coping self-efficacy buffers psychological disturbances in HIV-infected men following a natural disaster. *Health Psychology, 16*, 248–255.

Blaney, N. T., Goodkin, K., Morgan, R. O., Feaster, D., Millon, C., Szapocznik, J., & Eisdorfer, C. (1991). A stress-moderator model of distress in early HIV-1 infection: Concurrent analysis of life events, hardiness, and social support. *Journal of Psychosomatic Research, 35*, 297–305.

Bolger, N., & Schilling, E. A. (1991). Personality and the problems of everyday life: The role of neuroticism in exposure and reactivity to daily stressors. *Journal of Personality, 59*, 355–386.

Brown, G. W., & Harris, T. O. (1978). *Social origins of depression*. New York: Free Press.

Center for Disease Control & Prevention. (1997). *The HIV/AIDS Surveillance Report*. Vol. 9, No. 2.

Ciesla, J. A., & Roberts, J. E. (2000). *A meta-analysis of risk for Major Depressive Disorder among HIV-positive individuals*. Manuscript under review

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385–396.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310–357.

Commerford, M. C., Gular, E., Orr, D. A., Reznikoff, M., & O'Dowd, M. A. (1994). Coping and psychological distress in women with HIV/AIDS. *Journal of Community Psychology, 22*, 224–230.

Costa, P. T., & McCrae, R. R. (1980). Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. *Journal of Personality and Social Psychology, 38*, 668–678.

Coyne, J. C., & Whiffen, V. E. (1995). Issues in personality as diathesis for depression: The case of sociotropy-dependency and autonomy-self-criticism. *Psychological Bulletin, 118*, 358–378.

Demas, P., Schoenbaum, E. E., Wills, T. A., Doll, L. S., & Klein, R. S. (1995). Stress, coping, and attitudes toward HIV treatment in injecting drug users: A qualitative study. *AIDS Education and Prevention, 7*, 429–445.

Derryberry, D., & Reed, M. A. (1994). Temperament and attention: Orienting toward and away from positive and negative signals. *Journal of Personality and Social Psychology, 66*, 1128–1139.

Dew, M. A., Becker, J. T., Sanchez, J., Caldararo, R., Lopez, O. L., Wess, J., Dorst, S. K., & Banks, G. (1997). Prevalence and predictors of depressive, anxiety, and substance use disorders in HIV-infected and uninfected men: A longitudinal evaluation. *Psychological Medicine, 27*, 395–409.

Evans, D. L., Lesserman, J., Perkins, D. O., Stern, R. A., Murphy, C., Tamul, K., Liao, D., van der Horst, C. M., Ha l, C. D., Folds, J. D., Golden, R. N., & Petitto, J. M. (1995). Stress-associated reductions of cytotoxic T lymphocytes and natural killer cells in asymptomatic HIC infection. *American Journal of Psychiatry, 152*, 543–550.

Eysenck, H. J. & Eysenck, M. W. (1985). *Personality and individual differences: A natural sciences approach*. New York: Plenum Press.

Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*, 21–29.

Fleishman, J. A., & Fogel, B. (1994). Coping and depressive symptoms among people with AIDS. *Health Psychology, 13*, 156–169.

Folkman, S., Chesney, M., Collette, L., Boccellari, A., & Cooke, M. (1996). Postbereavement depressive mood and its prebereavement predictors in HIV$^+$ and HIV- gay men. *Journal of Personality and Social Psychology, 70*, 336–348.

Folkman, S., Chesney, M., Pollack, L., & Coates, T. (1993). Stress, control, coping and depressive mood in human immunodeficiency virus-positive and -negative gay men in San Francisco. *Journal of Nervous and Mental Disease, 181*, 409–416.

Fukunishi, I., Hosaka, T., Negishi, M., Moriya, H., Hayashi, M., & Matsumoto, T. (1997). Avoidance coping behaviors and low social support are related to depressive symptoms in HIV-positive patients in Japan. *Psychosomatics, 38*, 113–118.

Hays, R. B., Turner, H., & Coates, T. J. (1992). Social support, AIDS-related symptoms, and depression among gay men. *Journal of Consulting and Clinical Psychology, 60*, 463–469.

Lackres, J. B., *et al.* (1993). A longitudinal study of psychological distress in a cohort of gay men: Effects of social support and coping strategies. *Journal of Nervous and Mental Diseases, 181*, 4–12.

Leserman, J., Perkins, D. O., & Evans, D. L. (1992). Coping with the threat of AIDS: The role of social support. *American Journal of Psychiatry, 149*, 1514–1520.

Lutgendorf, S. K., Antoni, M. H., Ironson, G., Klimas, N., Fletcher, M. A., & Schneiderman, N. (1997). Cognitive processing style, mood, and immune function following HIV seropositivity notification. *Cognitive Therapy and Research, 21*, 157–184.

Martin, M. (1985). Neuroticism as predisposition toward depression: A cognitive mechanism. *Personality and Individual Differences, 6*, 353–365.

McClure, J. B., Catz, S. L., Prejean, J., Brantley, P. J., & Jones, G. N. (1996). Factors associated with depression in a heterogeneous HIV-infected sample. *Journal of Psychosomatic Research, 40*, 407–415.

Monroe, S. M., & Roberts, J. E. (1990). Conceptualizing and measuring life stress: Problems, principles, procedures, progress. *Stress Medicine, 6*, 209–216.

Monroe, S. M., & Simons, A. D. (1991). Diathesis/stress theories in the context of life stress research: Implications for the depressive disorders. *Psychological Bulletin, 110*, 406–425.

Neugebauer, R., Rabkin, J. G., Williams, J. B. W., Remien, R. H., Goetz, R., & Gorman, J. M. (1992). Bereavement reactions among homosexual men experiencing multiple losses in the AIDS epidemic. *American Journal of Psychiatry, 149*, 1374–1379.

Nietzel, M. T., & Harris, M. J. (1990). Relationship of dependency and achievement/autonomy to depression. *Clinical Psychology Review, 10*, 279–297.

Nolan, S. A., Roberts, J. E., & Gotlib, I. H. (1998). Neuroticism and ruminative response style as predictors of change in depressive symptoms. *Cognitive Therapy and Research, 22*, 445–455.

Nott, K. H., & Vedhara, K. (1995). The measurement and significance of stressful life events in a cohort of homosexual HIV positive men. *AIDS Care, 7*, 55–69.

Nott, K. H., Vedhara, K., & Power, M. J. (1995). The role of social support in HIV infection. *Psychological Medicine, 25*, 971–983.

Roberts, J. E., Gilboa, E., & Gotlib, I. H. (1998). Ruminative response style and vulnerability to episodes of dysphoria: Gender, neuroticism, and episode duration. *Cognitive Therapy and Research, 22*, 401–423.

Roberts, J. E., & Gotlib, I. H. (1997a). Social support and personality in depression: Implications from quantitative genetics. In G. R. Pierce, B. Lakey, I. G. Sarason, & B. R. Sarason, *Social support and personality: Structure, process, and change* (pp. 187–214). New York: Plenum.

Roberts, J. E., & Gotlib, I. H. (1997b). Vulnerability to episodes of dysphoria: gender, early childhood loss, and personality. *British Journal of Clinical Psychology, 36*, 195–208.

Roberts, J. E., & Monroe, S. M. (1994). A multidimensional model of self-esteem in depression. *Clinical Psychology Review, 14*, 161–181.

Roberts, J. E., & Monroe, S. M. (1999). Vulnerable self-esteem and social processes in depression: Toward an interpersonal model of self-esteem regulation. In T. Joiner, & J. Coyne, *The interactional nature of depression: Advances in interpersonal approaches* (pp. 149–187). Washington, DC: American Psychological Association.

Rosenberg, M. (1979). *Conceiving the self*. New York: Basic Books.

Rosenberger, P. H., Bornstein, R. A., Nasrallah, H. A., Para, M. F., Whitaker, C. C., Fass, R. J., & Rice, R. R. (1993). Psychopathology in human immunodeficiency virus infection: Lifetime and current assessment. *Comprehensive Psychiatry, 34*, 150–158.

Sarason, I. G., Johnson, J. H., & Siegel, J. M. (1978). Assessing the impact of life changes: Development of the life experiences survey. *Journal of Consulting and Clinical Psychology, 46*, 932–946.

Schmidt, N. B., Schmidt, K. L., & Young, J. E. (1999). Schematic and interpersonal conceptualizations of depression: An integration. In T. Joiner, & J. Coyne, *The interactional nature of depression: Advances in interpersonal approaches* (pp. 127–148). Washington, DC: American Psychological Association.

Thomason, B., Jones, G., McClure, J., & Brantley, P. (1996). Psychosocial co-factors in HIV illness: An empirically-based model. *Psychology and Health, 11*, 385–393.

Thompson, S. C., Nanni, C., & Levine, A. (1996). Primary versus secondary and central versus consequence-related control in HIV-positive men. *Journal of Personality and Social Psychology, 67*, 540–547.

Vedhara, K., & Nott, K. H. (1996). Psychosocial vulnerability to stress: A study of HIV-positive homosexual men. *Journal of Psychosomatic Research, 41*, 255–267.

Wallace, J. F., & Newman, J. P. (1997). Neuroticism and the attentional mediation of dysregulatory psychopathology. *Cognitive Therapy and Research, 21*, 135–156.

Weissman, M. A., & Beck, A. T. (1978). Development and validation of the Dysfunctional Attitude Scale: A preliminary investigation. Paper presented at the annual meeting of the American Educational Research Association, Toronto, Ontario, Canada

Zimmerman, M., Coryell, W., Corenthal, C., & Wilson, S. (1986). A self-report scale to diagnose major depressive disorder. *Archives of General Psychiatry, 43*, 1076–1081.