THE ROLE OF POSITIVE LIFE EVENTS ON TREATMENT OUTCOME DURING ACUTE AND MAINTENANCE INTERPERSONAL PSYCHOTHERAPY FOR RECURRENT MAJOR DEPRESSIVE DISORDER

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Major Depressive Disorder (MDD) is a highly recurrent and potentially chronic disorder. While much research has focused on the role of severe life events as important risk factors for depression onset, less is known about the relationship between positive life events and MDD. The purpose of the current study was to examine the relationship between positive life events and recovery from an acute episode of depression and maintenance of recovery in the context of Interpersonal Psychotherapy (IPT) treatment in women with recurrent MDD. One hundred thirty-one women who were enrolled in the "Maintenance Psychotherapy in Recurrent Depression" study (MH 49115 E. Frank, PI) entered into maintenance treatment and received at least one Life Events and Difficulties Schedule interview (LEDS; Brown & Harris, 1978). To simultaneously account for both positivity and threat, event ratings were divided into four mutually exclusive categories: provoking, severe, neutral, and positive. A Cox proportional hazards model with each of the four categories of life events included as time-dependent covariates was used to test the cumulative effects of life events on 1) time to remission during the acute treatment phase and 2) time to recurrence during the maintenance phase. Contrary to the hypotheses, there was no relationship between the cumulative experience of positive life events and remission from MDD during the acute treatment phase, nor was there a significant relationship between the cumulative experience of positive life events and episode recurrence. However, the cumulative experience of "neutral" life events was significantly related to episode recurrence, even when controlling for demographic and clinical variables, including personality pathology. This finding suggests that the cumulative effects of seemingly benign "neutral" events may disrupt therapy processes and

trigger episode recurrence. Future work is needed to further elucidate the nature of these neutral life events and how they may be related to stress reactivity or stress generation in patients at high risk for MDD recurrence. This may help to clarify the mechanisms by which life events contribute to depression and how best to target these areas in therapy.

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1.0 INTRODUCTION

1.1 OVERVIEW

Major Depressive Disorder (MDD) is a common disorder that will affect about 26% of women and 12% of men at some point during their lifetime (Angst, 1992). The majority of patients treated for MDD experience a recurring course of depression (Keller, 1999). MDD is associated with a significant degree of psychosocial disability, including impairments in employment and relationships that affects most areas of day–to-day functioning (Judd et al, 2000). These deficits often continue even after symptom remission. Because of the chronicity of episodes and extent of impairment associated with MDD, both acute and maintenance treatment are integral components of management.

It is often useful to examine factors associated with depression onset and recovery in order to develop more effective acute and maintenance treatments. Much research has focused on the role of life stress in the development of depression as well as episode relapse or recurrence. Severe life events, especially those events involving feelings of entrapment or loss, are important risk factors for depression onset, increased episode duration, and relapse.

Much less is known about the relationship between positive life events and MDD. There is some evidence that positive life events act conversely to negative life events on the course of MDD and are associated with episode remission; however, the majority of studies have been conducted in community samples with poorly defined event criteria or mixed diagnostic samples. The few clinical studies addressing this topic paid little attention to the effects of treatment on positive event experience and were not conducted during controlled treatment trials. No studies have examined the intensity or the duration of effect of positive events. In addition, no studies have examined positive events in the context of maintenance of MDD remission.

Psychotherapeutic treatments for MDD are well suited to reduce both depressive symptoms and the accompanying psychosocial impairments. Interpersonal psychotherapy (IPT) in particular was specifically designed to treat depression in a psychosocial context. It is not known by what mechanism IPT is effective. While there is some evidence IPT is protective against stressful life events, positive life events may also be important. For example, dysfunctional interpersonal skills and high-risk social environments are thought to provoke or perpetuate depressive episodes. IPT facilitates improvements in interpersonal skills, which may help the person to experience a positive event that in turn provides a sense of relief, or hope about the future and reduces depressive symptoms.

Thus, the purpose of the current study is to examine the role of positive life events in the context of receiving Interpersonal Psychotherapy for the acute and maintenance treatment of MDD. We will examine the relationship between positive life events and remission from an acute episode of MDD in a sample of women with recurrent depression receiving outpatient IPT. We will also examine the relationship between positive life events and maintenance of recovery during maintenance treatment with IPT. Just as the additive experience of negative life events shortens time to episode onset, cumulative effects of positive life events may also be important. Therefore, we will include a model of summation and decay in the analyses to account for the intensity and decay of multiple events. Finally, we will explore the nature of positive life events during acute IPT and maintenance IPT to examine whether or not there are any differences in the content or focus of these events between the two treatment periods. This is an important first step in elucidating the relationship between positive life events and acute or maintenance treatment with IPT, with possible implications for determining (and eventually enhancing) the mechanisms by which IPT effectively treats recurrent MDD.

As an introduction, I will begin by discussing the epidemiology of MDD and its potential causes. I will also discuss methodological limitations of conducting life event research in general. Then, to provide historical context for the current study I will highlight the existing literature examining the relationship of negative or stressful life events with MDD onset, relapse, and recurrence. Next, I will define positive life events and discuss previous studies examining the relationship between positive events and MDD. To provide a background for relating positive life events in the context of psychotherapeutic treatment, I will

summarize the theory and goals of IPT. Finally, I will discuss how positive events might be related to depression recovery and maintenance of recovery, particularly in the context of receiving IPT.

1.2 MAJOR DEPRESSIVE DISORDER

Major Depressive Disorder is a highly recurrent and potentially chronic disabling disorder. About one in five people will develop a major depressive episode during their lifetime (Kessler, et al, 1994), and the risk of recurrence within one year of an initial episode is between 30 and 50 % (Angst, 1992; Belsher & Costello, 1988; Coryell, Endicott & Keller, 1991; Merikangas, Wicki, & Angst, 1994) This probability increases after multiple episodes (Angst, 1992; Merikangas et al., 1994; Thase, 1990). Seventy to eighty percent of those with recurrent depression will experience another episode within two years of an index episode (Angst, 1992). Over one third of patients experience chronic episodes that last at least two years (Keller & Hanks, 1995). Additionally, it has been estimated that depressive symptoms are present at least 60% of the time during long-term follow-up (Judd, 1997; Judd, et al, 1998). Thus, research into the causes of MDD recurrence is of great importance.

As MDD is thought to be etiologically heterogeneous (Winokur, 1997), much investigation has focused on potential causes. For over 30 years psychosocial stressors have been considered to have an important role in depression onset and recurrence. Psychosocial stressors may include such constructs as interpersonal relationships, social support, and marital quality. These life stressors explain more variance in depression risk than genetic factors or past history of depression (Kendler, Kessler, Neale, Heath, & Eaves, 1993). Twin studies have consistently shown large effects for environmental stressors on depression risk (Kendler, et al, 1993; Kendler, Karkowski, & Prescott, 1999; Kendler, Neale, Kessler, Heath, & Eaves, 1993; Kendler, et al, 1995; Kessler, Kendler, Heath, Neale, & Eaves, 1992; Kendler & Prescott, 1999; Lyons, et al, 1998; McGue & Christensen, 1997; McGuffin, Katz, Watkins, & Rutherford, 1996; O'Connor, McGuire, Reiss, Hetherington, & Plomin, 1998; Plomin, Lichtenstein, Pederson, McClearn, & Nesselroade, 1990; Silberg, et al, 1999; Thapar, Harold, & McGuffin, 1998). These stressors are risk factors for depression onset, depression chronicity, and episode relapse or recurrence.

For example, numerous studies in both community and clinical samples have shown that severe life events are associated with onset of depression (Tennant, 2002). Severe life events, chronic stressors (especially interpersonal difficulties), and poor quality of marriage have all been associated with increased chronicity of depressive episodes (Brown & Harris, 1978; Brown & Moran, 1994; Goering, Lancee, & Freeman, 1992; Hickie & Parker, 1992; Murphy, 1983). Recent environmental stress is associated with relapse (Belsher & Costello, 1988; Paykel & Tanner, 1976). Even after a sustained recovery patients continue to show impairment in interpersonal relationships, engaging in pleasurable activities, and overall dissatisfaction with life (Coryell, et al, 1993), making the possibility of relapse or recurrence likely.

A better understanding of the relationship between psychosocial stress and depression onset, acute treatment response, and maintenance of recovery can lead to more effective treatment interventions as well as prevention strategies. One way to study this relationship is by utilizing life event measures to characterize psychosocial stressors.

1.3 METHODOLOGICAL LIMITATIONS OF LIFE EVENT RESEARCH

Life event measurement is a critical component of research into psychosocial stress. Before reviewing life event research findings, it is important to address some relevant methodological considerations. There are two primary methods for assessing life events: interview measures and self-report checklists. Advantages of the self-report checklist include ease of administration, relatively low expense, and ease of modification depending on target population or research question. However, checklist measures do not typically differentiate the magnitude of severity of an event, and they are unable to distinguish events that may be directly caused by the respondent's illness or intentional behaviors (Brown, 1989; Dohrenwend, Link, Kern, Shrout, & Markowitz, 1987; Dohrenwend, Raphael, Schwartz, Stueve, & Skodol, 1993). Thus, interview measures are an improvement over self-report checklists; however, they have the potential to overestimate the causal role of life events (McQuaid, et al., 1992; Tennant, Bebbington, & Hurry, 1981). For example, the rating method used by interview measures does not account for the degree of independence, or how much agency the person had over the event

(Stueve, Dohrenwend, & Skodol, 1998). Independence can refer to the degree to which the person's illness contributed to or caused the events, or it can refer to the degree to which the person's behavior caused an event. Accounting for an event's independence can influence the magnitude of the relationship between life events and illness. If an event is not independent from the illness, then the significance of the event is likely lessened.

Both self-report checklist and interview methods usually require some degree of retrospective recall. A few studies have addressed the implications of recall on event reporting. For example, Monroe (1982) using a self-report measure, Psychological Epidemiology Research Interview (PERI; Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978), compared retrospective (one to two year recall) reporting of events to a "concurrent" (one month) reporting of events. Monroe found a decrement in reporting of life events, especially desirable events, when assessed over a long period of time. Although the 'concurrent' recall was superior to the longer-term recall, even the one-month recall may yield underreporting of events. Other studies have attempted to address when event reporting becomes unreliable (termed "fall-off"). Surtees and colleagues (1986) found that most fall-off occurs for non-severe events. Nielsen and colleagues (1989) did not find evidence for fall-off in reporting of major difficulties or severe life events for at least a five-year period prior to the life event interview. Another factor to consider with retrospective recall is the potential for state-dependent recall bias. People are more likely to recall events congruent with their current mood (Blaney, 1986). It is possible that people could over-report events due to current mood states or they may over-report events as "effort after meaning" (Brown, 1974), where they are looking for an explanation for their illness.

There are also certain temporal factors with regard to how life events are defined, categorized, and analyzed. Some measures require that the effects of an experience last at least two weeks to be considered "an event", an arbitrary period of time. The point at which an event becomes a chronic stressor is also an arbitrarily set rule, which varies from instrument to instrument. Additionally, the time points used in the analysis of life event data are often arbitrarily chosen. For example, early studies divided the length of the interview period into three-month segments and compared the rates of events in each segment to determine a "risk period". This method cannot precisely determine a period of risk and it also cannot examine the possible cumulative effects of experiencing multiple events of differing

magnitudes. Other studies only examined the relationship between one threatening event (an event that occurred closer in time to onset or an event that occurred first in a defined time period) and depression onset. This also fails to account for possible cumulative effects. Subsequent studies have improved upon these methods by using survival analysis to examine the temporal relationship between events and onset (Bebbington, et al, 1993; Brown, Harris, & Hepworth, 1994; Frank, Anderson, Reynolds, Ritenour, & Kupfer, 1994). Other studies have attempted to account for any possible additive effects of multiple events as well as event decay over time (Frank, et al, 1996; Surtees, 1989; Surtees & Ingham, 1980). While these methods offer significant improvements in the way life events are examined or analyzed, much work still needs to be done in developing analytical strategies that best capture the richness of the data.

1.4 NEGATIVE LIFE EVENTS AND MDD

1.4.1 Description of the "Gold Standard" of rating

As reviewed above, psychosocial stressors play an important role in the onset of MDD, sustaining depressive symptoms and leading to episode recurrence. The majority of this research has focused on the role of negative life events. The most widely used interview measure of life events is the Life Events and Difficulties Schedule (LEDS; Brown & Harris, 1978). The LEDS has several advantages over the self-report checklists: it facilitates more accurate dating of events, it uses recall-enhancing strategies, and it better distinguishes between differing types of events. It reduces subjectivity on the part of the interviewee, as the raters are trained to ignore self-reports of the subject's feelings or judgments and to look for behavioral evidence about event occurrence. In addition, there is a manual of precedent examples to use for the ratings and consensus meetings (with raters blind to subjective reports or diagnoses) held to discuss final ratings. The LEDS is designed to measure both acute events and chronic difficulties using a contextual method of rating. Contextual ratings are based on "what most people in that circumstance would feel about the event given the plans and purposes of the person as

well as biographical circumstances". Events are rated on a four-point scale (1- severe, 2-moderate, 3-mild, 4-little/none) on several subcategories including short-term threat, long-term threat, and degree of positivity. Severe events (or provoking agents) are defined as those events rated at a '1' or '2' level and have been found to be etiologically central to depression onset (Brown & Harris, 1978; Brown & Moran, 1994). Difficulties are defined as chronic problematic situations, regardless of severity, that last a minimum of four weeks. Difficulties are rated on a six-point scale and the ratings can change (up or down) depending on changing circumstances. See Appendix A for examples of typical events and difficulties.

1.4.2 Onset of depressive episode

As mentioned above, it is generally agreed that stressful life events are associated with onset of depressive episodes. It is thought that events that occur more proximally to the onset of depression are the most salient predictors of depression onset (Bebbington et al., 1993; Brown & Harris, 1978; Surtees & Ingham, 1980). Impact of life events is highest in the three-week period prior to onset and decays over time (Surtees, et al, 1986). For example, forty-five percent of those who experienced a life event experienced onset of depression within four weeks of that event (Surtees et al., 1986). Most events tend to be clustered within the three months preceding episode onset (Brown & Harris, 1986; Stueve, et al, 1998; Surtees et al., 1986). Additionally, the risk associated with severe events is higher than those for minor events: life events that occur after an initial severe provoking agent significantly decrease time to depression onset (Brown & Harris, 1978; Frank et al., 1996; Stueve, et al, 1998; Surtees et al., 1986). Neutral events may also shorten time to depression onset, usually after an initial severe provoking agent (Frank et al., 1996). However, the types of events that typically trigger depression tend to be those involving feelings of entrapment or a loss, which could be due to separation, death, loss of a role, loss of resources, or loss of cherished ideas (Brown, 1993; Brown, Harris, & Hepworth, 1995; Brown, Lemyre, & Bifulco, 1992). In contrast to negative events, positive events have not been found to delay the time to depression onset (Frank et al., 1996).

1.4.3 Relapse and recurrence

Less is known about the relationship of life events and recurrence of depression. Early findings have suggested that stressful life events may increase recurrence risk (Paykel & Tanner, 1976). Patients who relapse report significantly more life events (especially those considered to be undesirable) in the 3 months prior to relapse than non-relapsing controls (Paykel & Tanner, 1976). More recently Mundt and colleagues (2000) studied prospectively the relationship between life events and relapse in a sample of severely depressed in-patients using an instrument that was designed to include subjective and objective ratings of events. The patients were followed for over two years after discharge from the psychiatric hospitalization. They found that patients who relapsed experienced a significantly greater amount of undesirable life events and/or stressful situations during the three months preceding relapse compared to those who did not relapse. They also found a significant difference in cumulative undesirable life events or stressful situations between the group of patients who relapsed during the two-year follow-up period and those that remained well. In addition, life events and situations reported three months prior to index hospitalization were also related to time to relapse. Those patients who reported one or fewer stressful events were more likely to stay well during the follow-up period compared to those patients who reported two or more events. It is interesting to note that the subjective self-report ratings rather than the objective investigator-made ratings were more consistently associated with relapse over the two year time period. These findings are similar to those of Reno and Halaris (1990) who also found that it was the reduction in subjective stress rather than objective stress related to remission in endogenously depressed patients. Mood-congruent recall bias may have accounted for these results, highlighting the importance of objective life event measures. However, these results may also suggest that factors such as coping, social support, or other individual differences such as cognitive style or personality traits, are important to consider when examining life event – depression relationships.

Chronic stressors (or difficulties as defined in LEDS terminology) may be more influential than acute events for relapse or recurrence of depression. In one study acute events did not affect outcomes during the one and four-year follow-up but chronic stressors, especially health and family related stressors, did (Swindle, Cronkite, & Moos, 1989). Chronic stressors have been found to delay episode

remission (Brown & Moran, 1994; Harris, Brown, & Robinson, 1999) and are associated with relapse (Reno & Halaris, 1990). Chronic stressors are also associated with depression for a longer period of risk (Avison & Turner, 1988; Kendler & Prescott, 1998).

A few studies have examined episode relapse and recurrence in relation to receiving treatment. Harkness and colleagues (2002) found no relationship between severe events during maintenance treatment following episode remission and time to recurrence even though the rates of severe event occurrence were similar or even higher during the maintenance period as compared to the period prior to episode onset. This finding is in concordance with earlier reports (Monroe, Roberts, Kupfer, & Frank, 1996). Monroe and colleagues found that life events were predictors of recurrence in patients receiving maintenance medication but not receiving maintenance psychotherapy (IPT-M) alone. Together these results are suggestive of a protective effect of IPT-M against stressful life events. The authors suggest that it may be the reinforcement of coping skills and interpersonal relationship skills facilitated by IPT-M that is decreasing the potency of severe events (Harkness et al., 2002). On the other hand, Paykel and Tanner (1976) did not find evidence that either tricyclic antidepressants or psychotherapy were protective against event-related relapse. While the psychotherapy did not prevent relapse in this study, it did improve social functioning, which could be considered to be a proxy for positive life events (Weissmann, Klerman, Paykel, Prusoff, & Hanson, 1974) and provide indirect evidence for a protective effect of treatment against negative life events. Although IPT may improve social functioning over time it is still unknown what role positive life events play during the maintenance period. It has not been demonstrated whether positive life events are associated with decreased recurrence.

1.5 POSITIVE LIFE EVENTS

1.5.1 Defining positive life events

Positive events have been conceptualized and assessed in several ways. For example, the behavioral theory of depression asserts that the severity and intensity of depressive episodes is related to

the rate of positive reinforcement received (Lewinsohn & Graf, 1973). In this theory, improvement of depressive episodes is associated with an increase in positive reinforcement. Thus, the Pleasant Events Schedule (PES) was designed to assess potentially reinforcing events (MacPhillamy & Lewinsohn, 1972; 1982). It is a 320 item, self-report inventory that measures the frequency and enjoyability of commonly rewarding events. The scale covers a wide variety of experiences, including: "being at the beach", "laughing", and "being alone" (1982). Studies using the PES in depressed samples have found depressed mood to be correlated with decreased occurrence of pleasant events (Lewinsohn & Libet, 1972; Lewinsohn & Graf, 1973). Conversely, associations between increased pleasant activities and improvements in depressive symptoms have also been found (Lewinsohn, Youngren, & Grosscup, 1979). However, these findings were correlational and the direction of causation is unclear.

Positive events have also been conceptualized as counterparts to "daily hassles" or minor stressful events. In this conceptualization, minor positive events are commonly referred to as "daily uplifts", positive or favorable experiences that are hypothesized to act as stress buffers (Kanner, Coyne, Schaefer, & Lazarus, 1981). These events are thought to reflect more immediate appraisals of events than is the case for major life events (DeLongis et al., 1982). The Uplifts Scale is a 135-item scale designed to measure these events (Kanner et al., 1981). Examples of items on this scale include: "relating with friends", "daydreaming", "making a friend", and "pleasant smells". Studies using the Uplifts Scale have generally found that these types of events are not strongly associated with health or psychological outcomes (DeLongis et al., 1982; Lazarus, 1984).

These measures of positive events stand in contrast to those measured by the long-term contextual positivity scale of the LEDS. The items on the PES and by the Uplifts Scale are broad and assess common everyday events. There is some potential overlap of these measures with the LEDS in experiences measured; however, this overlap depends greatly on personal interpretation of the items on the self-report checklists.

Positive life events as measured by LEDS methodology have received relatively little attention in the study of MDD. Initial studies using the LEDS focused on 'neutralizing' events, events that reduced the severity of, or eliminated, a preceeding chronic stressor. These studies found only a modest relationship between neutralizing events and remission (Giel, Ten Horn, Ormel, Schudel, & Wiersma, 1978; Parker,

Tennant, & Blignault, 1985; Tennant, Bebbington, & Hurry, 1981). Brown and colleagues (1988) theorized that positive life events would play an equally important role in recovery from depression as stressful life events do in depression onset, like a "mirror image". They noted that many events did not reduce or neutralize a difficulty but they did mean some type of important change for the person. To further investigate the role of life events and recovery, Brown developed classifications for positive events, including but not limited to rating neutralizing events. These positive events were initially conceptualized as difficulty reductions, fresh start events, or anchoring events. *Difficulty reduction* is another term for neutralizing events. They can be defined by calculating an overall difficulty score pre and post recovery or by looking at the score reduction of one particular difficulty (from 'severe' to 'some' or 'none'). *Fresh start events* are events that involve a new beginning in a significant aspect of a person's life. They are viewed as the mirror image to the loss and disappointment events that are important for depression onset (Brown, Lemyre, & Bifulco, 1992). Fresh start events are often related to reductions in chronic stressors and account for the majority of events that occur prior to recovery (Brown, 1993). Even though difficulty reductions often arise from a fresh start event, both make independent contributions to recovery (Brown, Adler, & Bifulco, 1988). *Anchoring events* are those events that act to diminish uncertainty and increase security. Anchoring events often establish a person's role or identity, such as finalizing a divorce, buying a house, or gaining steady employment after a long period of unemployment. These categories were later expanded to include ratings for delogjamming, hope, relief, reconciliation, restoration, goal attainment, reroutinization, goal provision, and enjoyment/interest. See Appendix B for definitions and examples of positive events. However these expanded categories are generally are highly correlated with, and can usually be captured by, one of the three main categories (Brown, 1993). It should be emphasized that these events are not necessarily entirely positive. Events that have high threat ratings can also have a positive meaning as well. For example, a woman caring for a severely ill child who is often hospitalized would receive at least a moderate rating on a positivity scale upon the child's death. Even though the death of a child is considered to hold a marked degree of threat, the woman would also be relieved of a significant emotional and financial burden. The contextual rating method used in the LEDS is well suited to capture complex meanings found in such events.

1.5.2 Relationship between positive events and MDD

Most positive life events research associated with depression has examined the neutralizing events. In a one-month prospective study of neurosis in a community sample, Tennant and colleagues (1981) examined both severe life events and neutralizing life events. They found that remitted neurotics reported three times as many neutralizing events as non-remitted neurotics, and that thirty-one percent of remissions were attributable to occurrences of a neutralizing event. These results were not due to those failing to remit experiencing further severe events; when subjects who experienced subsequent severe threatening events were excluded, the relationship between neutralizing events and remission remained. It could be argued that it was the severity of the disorder rather than the neutralizing events that was responsible for the relationship with episode remission since neutralizing events occurred more often in subjects with shorter depression duration. However, the authors did not find an association between remission, severity of disorder, syndrome type, or treatment. A similar study conducted in a small outpatient sample of non-endogenous depression found that experiencing events thought to have a positive effect was related to symptoms improvement at both the 6 and 20 week follow-up points. Neutralizing events were predictive of improvement of depressive symptoms after 20 weeks (Parker, et al, 1985). The termination of an adverse event by a neutral event seems to neutralize the effects of earlier threatening events (Parker, et al, 1985; Tennant, et al, 1981).

Early findings suggested that neutralizing events appeared to be more important for remission than other types of positive events (Tennant, et al, 1981). However, Tennant and colleagues did not directly test this hypothesis and they used an early version of the LEDS that did not contain the well-defined ratings for positive events that were later added. Subsequent community studies using the expanded LEDS interview have found that positive events consisting of anchoring or fresh start experiences were also related to depression improvement in women, independent of the rate of difficulty reduction (Brown, et al, 1988; Brown & Harris, 1992; Brown, et al, 1992). Fresh start events were significantly related to episode recovery regardless of initial difficulty score (Brown, et al, 1988). Brown, Harris, Hepworth, and Robinson (1994) replicated these community study findings in a patient sample. Additionally, they found that fresh start events were associated with reduced episode chronicity. Recovery

may only be related to difficulty reduction events if the level of the difficulty is equivalent or above the high-moderate range indicating that the individual is experiencing high levels of stress (Brown, et al, 1988; Reich & Zautra, 1988). The relief from distress is thought to sufficiently motivate a person to continue with problem solving efforts (Reich & Zautra, 1988). However, those with higher difficulty scores at baseline were less likely to recover regardless of difficulty-reduction or fresh start events (Brown, et al, 1988). These findings pose an interesting conceptual problem: a person is less likely to recover if they are experiencing a severe degree of chronic stress, though it is only this severity that allows them to experience any relief with another positive event.

A more recent series of studies examining the relationship between positive life events and episode course and recovery has been carried out using a longitudinal sample of primary care patients in Groningen, The Netherlands. The sample consisted of 170 patients who met criteria for at least one episode of mental disorder (mostly depression or anxiety disorders) during the study period (Leenstra, Ormel, & Giel, 1995). The authors utilized a life event inventory to prior to the initial assessment. Interviewers then followed up on the answers to the screenings using a semi-structured format based on the LEDS interview. Ratings were also guided using LEDS criteria. Leenstra and colleagues defined positive life events among five non-mutually exclusive dimensions (highly positive, neutralization, goal attainment, fresh start, and anchoring).

During the follow-up period, 112 patients were considered ‘recovered’ and 58 were classified as still symptomatic. They found that the incidence of positive events was highest in the recovered group in the three months prior to remission. The length of affective episode was not related to positive events. Difficulty reduction events seemed to be the most influential type of positive event with respect to effects on episode recovery. There are several limitations that warrant discussion concerning the above findings. The authors used odds ratios comparing periods of time as the unit of analysis and these periods of time were selected arbitrarily. This strategy has limitations, including varying lengths of episode duration (longer time accounted for equals more opportunity to experience an event). The authors compensated for this problem by using the McNemar test in which each subject contributes equally to the base rate and essentially acts as their own control. However, this method of analysis does not account for delayed effects of event exposure or decay of event impact over time.

As a follow-up to Leenstra and colleagues, Oldehinkel, Neeleman, and Ormel (2000) examined predictors of time to remission from depression in the same sample of primary care patients. Specifically the authors focused on why some people benefit from positive events whereas others do not. The authors improved upon Leenstra's methodological limitations by using survival analysis rather than arbitrarily defined periods of time. Positive events were not found to be a necessary nor sufficient condition for remission. Additional factors were found to influence the relationship between positive life change and depression recovery. For example, women were found to benefit more from positive events than men (Oldenhinkel, Ormel, & Neeleman, 2000). Positive life events were also more influential for those with avoidant coping styles, and less influential for those with large social support networks. Neuroticism modified the association of positive life events with time to remission: those with high neuroticism were more likely to benefit from positive life events. The authors concluded that faster remission is associated with low severity of premorbid difficulties, high self-esteem, and tension reduction coping style. The authors also examined the possibility that the experience of positive events were a consequence of depression remission rather than a contributor. They did not find this to be the case; the majority of positive events occurred in the months prior to depression remission.

Neeleman, Oldehinkel, and Ormel (2003) further refined the above findings using the same primary care sample. The authors utilized a competing outcomes approach to examine whether positive events mediate the effects of other variables on time to remission. They found that symptom severity at baseline or disorder diagnosis did not affect the relationship between time to remission and positive life events. There was a three-way interaction among life change and other predictors of time to remission: impact of social isolation on time to remission is a combination of direct effects buffered by positive events, which are less likely to occur in the socially isolated. The probability of experiencing a positive life event was less likely in those patients with more severe episodes and patients with higher levels of anxiety symptoms (Neeleman et al., 2003). The authors also found that patients who were already at increased vulnerability to delayed remission (i.e. socially isolated, personality factors) were also less likely to experience positive life events. However, once a positive life event was experienced, these personal vulnerability factors were no longer associated with lower remission rates. In other words, positive life events have powerful effects on depression recovery – if the person can experience one.

While the above studies have contributed greatly to our understanding of positive life events and their relationship with depression remission or recovery, there is still much work that needs to be done. The early community studies did not use well-defined criteria for positive events other than events that reduced chronic stressors. The Groningen sample was ascertained through primary care practices and may not be reflective of more severe depressive and anxiety disorders: this sample consisted of mixed diagnostic groups with the majority only reporting mild disorders, so conclusions about MDD are limited. While the authors modeled their life event methods after the LEDS methodology, they still utilized a questionnaire format to elicit life event reports. This may limit comparisons that can be made to other samples using LEDS interviews.

Only three studies have looked at positive life events in clinical samples (Brown, 1993; Brown, et al, 1994; Parker, et al, 1985). The results generally confirm the findings from the community studies. There is some evidence that antidepressant treatment lessens the impact of positive events on depression recovery, but both positive events and antidepressant treatment were necessary in the predictive model (Brown, et al, 1994). Although there is some suggestion that depression treatment may influence the experience of life events, these studies merely followed patients who were being treated as inpatients or outpatients, and they were not conducted during controlled treatment trials.

1.6 INTERPERSONAL PSYCHOTHERAPY FOR RECURRENT MDD

The high risk of recurrence of MDD has led researchers to test the provision of maintenance treatments as a prophylaxis against future episodes (Kupfer & Frank, 1987; Kupfer, Frank, & Wamhoff, 1996; Thase, et al., 1992). Cognitive Behavior Therapy (CBT), Cognitive Behavioral Analysis System of Psychotherapy (CBASP), and Interpersonal Psychotherapy (IPT) have all been adapted for use as continuation or maintenance treatments for depression. This review will focus on IPT.

IPT (Klerman, Weissman, Rousanville, & Chevron, 1984) was developed as a treatment specifically for depressed patients. IPT asserts that depression occurs in an interpersonal context and that interpersonal difficulties often perpetuate depressive episodes. The goals of IPT are to help the

patient to develop effective ways to manage interpersonal stressors associated with the onset of depressive symptoms, master current social roles, and adapt to interpersonal situations. IPT treatment usually focuses on one or two out of four possible problem areas: grief, interpersonal disputes, role transitions, or interpersonal deficits. Grief is an appropriate problem focus if the patient is exhibiting delayed or distorted grief reactions. The goal of the treatment is to facilitate mourning and to help reestablish the person's interests and relationships with others. The interpersonal disputes focus area is chosen if a patient is experiencing a nonreciprocal role expectation with a close other. The therapist helps the person to recognize the nonreciprocal expectations and then modify expectations and/or work on communication strategies to resolve the dispute. A focus on role transitions is chosen for the patient who is having difficulty coping with life changes. This focus helps the patient to accept the loss of an old role, see the benefits of the new role, and develop social support and new skills needed to acquire mastery of the new role. If a patient has inadequate interpersonal relationships or is substantially socially isolated, interpersonal deficits is chosen as the treatment focus. This problem focus facilitates the reduction of social isolation and encourages the formation of new relationships. For a comprehensive review of problem areas and specific treatment strategies refer to the IPT manual and book (Klerman, Weissman, Rousanville, & Chevron, 1984; Weissman, Markowitz, Klerman, 2000).

While IPT facilitates the development of coping strategies for interpersonal problems associated with the onset of depression, Maintenance Interpersonal Psychotherapy (IPT-M) emphasizes the psychosocial and interpersonal context of the remitted state. The goal of IPT-M is to help the patient to develop more effective strategies to cope with interpersonal problems that might arise following remission of depression (Frank, Kupfer, Cornes, & Morris, 1993). It is also designed to enhance existing patient strengths and facilitate the development of new strengths. For example, patients are encouraged to develop stronger social networks, refine social skills, enhance existing relationships with others, or modify maladaptive communication skills. Therapists using IPT-M are particularly vigilant for signs of interpersonal problems that are similar to those that were associated with episode onset (Frank, 1991). IPT-M specifically targets problems that persist into remission and aims to reduce the number and severity of stressful life events, particularly interpersonal events, which might increase the risk of recurrence (Frank & Spanier, 1995). Indeed, there is now some evidence that IPT-M decreases the

likelihood of stressful life events provoking a recurrence (Harkness, et al, 2002). IPT-M has been shown to be an efficacious treatment in the long-term prophylaxis of recurrent depression following acute treatment (Frank, et al, 1990; Reynolds, et al, 1999).

1.7 POSITIVE EVENTS, IPT, AND RECOVERY

Brown and colleagues initially conceptualized positive life events as having “mirror image” effects to those of negative life events. In other words, while negative life events mean loss, danger, or humiliation for the person, positive life events bring hope, a promise of new beginnings, relief, or security. Positive events could increase as a result of IPT as they are evidence are that the person is actively engaging in meaningful or pleasurable activities. Someone who experiences a positive life event may be making life changes that move them in a productive new direction or they may be relieved of a significant burden. Thus, positive events are a sign of improved social functioning, a goal of IPT which aims to help a person to become less socially isolated or more secure in their identified roles. Therefore, positive life events are implicated in remission from MDD. Experiencing positive life events may also keep a person well after episode remission by continuing to bring hope and security to their lives. During maintenance treatment, these events show that the person is maintaining forward progress towards goals, continuing to upkeep social support and improved communication skills, and better social responsiveness, the lack of which have been linked to depression recurrence.

Although developed with stressful life events in mind, the stress generation theory as posited by Constance Hammen may be particularly useful in illustrating how positive events might be important for recovery from depression. The stress generation theory asserts that some characteristics of women with depression contribute to or fail to prevent the occurrence of stressful life events, especially in the interpersonal domain (Hammen, 1991). This stress generation pattern serves to provoke depression onset as well as recurrence (Hammen & Brennan, 2002). Dysfunctional interpersonal skills or attachments that contribute to the development of a dysfunctional social realm can also increase the chance of stressful events occurring, even when not symptomatic (Hammen, 2003). Maladaptive

interpersonal skills combined with a maladaptive social context (high risk environment or unstable social circumstances) facilitate stressful interactions with others. Additionally, dysfunctional interpersonal skills, poor interpersonal problem-solving abilities, and dependence on others for self-worth may make these women more vulnerable to the effects of social stressors (Cyranowski, Frank, Young, & Shear, 2000; Hammen, 2003).

Conversely, positive events, especially those in an interpersonal domain, may also hold more salience for these vulnerable women. As discussed by Oldehinkel and colleagues (2000), positive life events are more influential for people with smaller support networks, avoidant coping styles, or neurotic personality traits. Additionally, people who are at high risk for developing depression who are also less likely to experience a positive event stand to gain the most from a positive event. Once they experience that event, the other vulnerability factors are neutralized (Neeleman, Oldehinkel, & Ormel, 2003). The experience of a positive event means that the person is removed from a risky situation (maladaptive social context) and/or improving interpersonal deficiencies that make them more vulnerable to depressive relapse or recurrence. These initial positive experiences may perpetuate further positive events and reduce depressive symptoms. So, a key question becomes – how can the likelihood of a positive event occurring be increased?

It has been repeatedly emphasized that treatments for depression need to address more than just clinical symptoms but also interpersonal functioning (Hammen & Brennan, 2002; Hirschfeld et al, 2000; Weissman, 1997; Weissman & Paykel, 1974). Preliminary evidence has already shown that, in the context of receiving a treatment that specifically targets interpersonal functioning, patients can learn to prevent stressful events or at least be better able to cope with negative events (Harkness et al, 2000). On the other hand, therapy may help vulnerable individuals to better utilize or take advantage of positive events, or it may help the person interpret the event as positive.

1.8 WHAT IS THE MECHANISM OF IPT?

IPT is specifically targeted for the interpersonal context. Deficiencies in interpersonal functioning have been repeatedly shown to be important for the perpetuation of depression. IPT is thought to work by targeting these interpersonal deficiencies. However, we don't yet know the mechanism of action of IPT. IPT may be protective from negative events, but positive events may also play a role. For example, IPT teaches improved communication skills and coping strategies for stressful environments. These new skills may facilitate meaningful life changes or steps toward life goals (a positive event). This new hope or relief in turn alleviates depressive symptoms.

How IPT may bring about positive events is illustrated in the following example. A woman comes into treatment with significant marital problems. The therapist and patient agree on interpersonal disputes as a treatment focus. The woman learns that the root of the dispute is that she wants to go back to school and work on a nursing degree but her husband is worried about their finances. The therapist works with the woman on communicating her needs effectively, communicating her disappointments, communicating her goals, and listening to the needs of her husband. After a few weeks, the patient is arguing much less with her husband and they have agreed that she can return to school if she gets a scholarship (neutralization). The patient applies to school and is approved for funding (fresh start event). The patient's symptoms continue to diminish as the patient continues to work towards her new career. During maintenance treatment, the patient is continuing to work on her communication skills with her husband as well as learning new ways to cope with her new demands at nursing school. Through her improved interpersonal skills, the patient makes a new friend at school (difficulty reduction –if patient was socially isolated), and gets an A on her first clinical rotation (goal provision). The patient's husband is still concerned about finances, but the patient is better able to negotiate solutions and has even convinced him to seek treatment for his anxiety (relief). Thus, this example illustrates how positive life events might mediate the effects of IPT on depression remission and sustained recovery.

1.9 SUMMARY

We still have much to learn about the association between positive life events and depression. Positive life events are thought to be important for episode recovery, like a mirror image to stressful events and episode onset. Much of the research examining positive events has focused on neutralizing or fresh start events. These positive events have been found to be associated with remission from depressive episodes in both community and clinical samples. However, the early community studies did not use well-defined criteria for positive events and the diagnostic criteria for MDD were rudimentary. While the Groningen primary care studies made great improvements to the methodology and statistical methods used, the sample may not be directly generalizable to patients with MDD. Only three studies have examined positive life events in clinical samples. All three have concluded that the experience of positive life events is associated with recovery from depressive episodes and possible reduced episode chronicity. There is some evidence that antidepressant medication diminishes this relationship; however, no studies have been done during controlled treatment trials. To our knowledge, no studies have examined the role of positive life events in the maintenance of depression remission.

Maintenance treatment is especially important for MDD because of the high risk of recurrence. Several studies have shown that even after sustained recovery, patients continue to show interpersonal and social impairments leaving them vulnerable to relapse (Coryell, et al, 1993; Hammen & Brennan, 2002; Weissman & Paykel, 1974). Maintenance psychotherapy was designed to prevent or at least prolong time to episode recurrence. Maintenance IPT in particular targets many of these interpersonal problems that are associated with vulnerability to depressive relapse. Several studies have shown that patients continue to make social and functional gains up to one year after therapy has ended (Weissman, Klerman, Prusoff, Sholomskas, & Padian, 1981). These gains are further improved when the patient is receiving maintenance therapy (Cyranowski et al, 2004). We still don't know precisely how IPT-M effectively prevents depressive recurrence. Preliminary evidence suggests that such maintenance treatment may be protective from negative or stressful life events (Harkness et al, 2002). By focusing on improving communication skills and coping strategies, IPT-M may be facilitating the generation of positive life events exemplified by actively engaging in meaningful life changes and progress towards life goals.

In this model, the occurrence of positive events is mediating the relationship between IPT and remission. While we can't directly test whether positive events are mediating the relationship between IPT and remission in the current study, we can test the relationship between positive events and remission in the context of receiving IPT treatment. This is an important first step in examining the relationship between positive events and depression remission and prevention of recurrence.

1.10 CURRENT STUDY

The purpose of the current study is to determine the role of positive life events during recovery and maintenance of recovery in depression. We will use a sample of women with recurrent MDD enrolled in a study of the effectiveness of IPT in the prevention of episode relapse. We seek to elucidate the *nature* of positive life events during acute treatment and maintenance therapy for depression, and the *role* of positive events during the acute and maintenance periods.

Historically, the experience of multiple stressful life events were thought to have a "wearing down" effect on an individual's resistance to depression and it wasn't known how long any single event continued to exert its influence on episode onset over time. Surtees and Ingham (1980; see also Surtees, 1989) were the first to apply a continuous model of summation and decay to life events with regards to the onset of depression. In this model latency time is defined as the lapse between the earliest severe event and the onset of illness in a specified time period and it is assumed that the impact of subsequent events summate during that time. Surtees also included a decay parameter that was fixed a priori to model the change in stress intensity over time. To improve upon this model, Frank and colleagues (1996) developed a linear decay model that estimates the intensity and decay parameter from the data rather than fixing them in advance. For this project, the linear decay model as described by Frank and colleagues can be used to model the effects of positive life events on time to episode remission during the acute treatment phase and the time to episode recurrence during the maintenance treatment phase. In contrast to the "wearing down" process exemplified by the accumulation of negative life events, positive events may build-up or restore "resistance" to depression over time. No previous studies have examined

the intensity or the duration of intensity of positive events after illness onset or during treatment. Thus, we will test the following:

What is the relationship between positive events and remission from an acute episode of depression?

Hypothesis #1: In depressed outpatients receiving IPT in a clinical trial, the probability of episode remission increases after the experience of a positive life event. Specifically, the cumulative experience of positive life events during the acute treatment phase will decrease time to episode remission.

What role do positive events play during the maintenance period?

Hypothesis #2: The cumulative experience of positive life events during the maintenance treatment phase will increase time to episode recurrence in the same sample of depressed outpatients receiving IPT.

Further exploratory analyses will be conducted to attempt to further elucidate the nature of positive life events experienced by outpatients with MDD. No published reports have examined whether patients are more likely to experience certain categories of events during different phases of treatment. Since IPT treatment focus often shifts from learning interpersonal skills and coping strategies needed to cope with an acute depressive state during the acute phase of treatment to prevention of depressive episodes by enhancing existing skills and reducing interpersonal stressors during the maintenance phase of treatment, one would predict a change in positive event categories as well. As no research to date examined this issue and there is limited evidence about the reliability of rating these event subcategories, these analyses, while innovative, can only be considered preliminary.

What is the nature of positive life events during recovery and maintenance of recovery of depression?

Hypothesis #3: Categories of positive events experienced during the maintenance period will differ within individuals from the categories of positive events during recovery from depression.

2.0 METHODS

2.1 OVERVIEW

The data proposed for use in the current study will be drawn from the study titled “Maintenance Psychotherapy in Recurrent Depression” (MPRD; MH 49115-06-10, Dr. Ellen Frank, Principal Investigator). The MPRD study was developed to examine the effectiveness of varying “doses” of Interpersonal Psychotherapy in the prevention of relapse in recurrent MDD. The study is divided into three distinct treatment phases: Acute, Continuation, and Maintenance. Once entered into the Maintenance phase, patients received weekly, bi-weekly, or monthly psychotherapy. The University of Pittsburgh institutional review board approved the study protocol. All patients provided written informed consent prior to their participation in any research procedures.

2.2 STUDY SAMPLE AND DESIGN

The study population consisted of 233 adult women with recurrent unipolar major depressive disorder. Inclusion criteria for the study were: 1) at least one prior episode of major depression within the last two and a half years; 2) a current episode of depression; 3) a remission period of at least 10 but not more than 130 weeks; 4) females aged 20 to 60; 5) willingness to forego psychotropic medications. Exclusion criteria were 1) meeting criteria for another Axis I disorder, except comorbid anxiety or eating disorders; 2) drug or alcohol abuse within the past two years; 3) history of manic episodes; 4) meeting full criteria for Borderline or Anti-social personality disorders; 5) suicidal or psychotic symptoms requiring inpatient hospitalization; 6) early onset dysthymia; 7) presence of significant medical illness. Procedures

and design of study is described in detail elsewhere (Frank et al, 2000). Figure 1 shows a diagram of the study timeline.

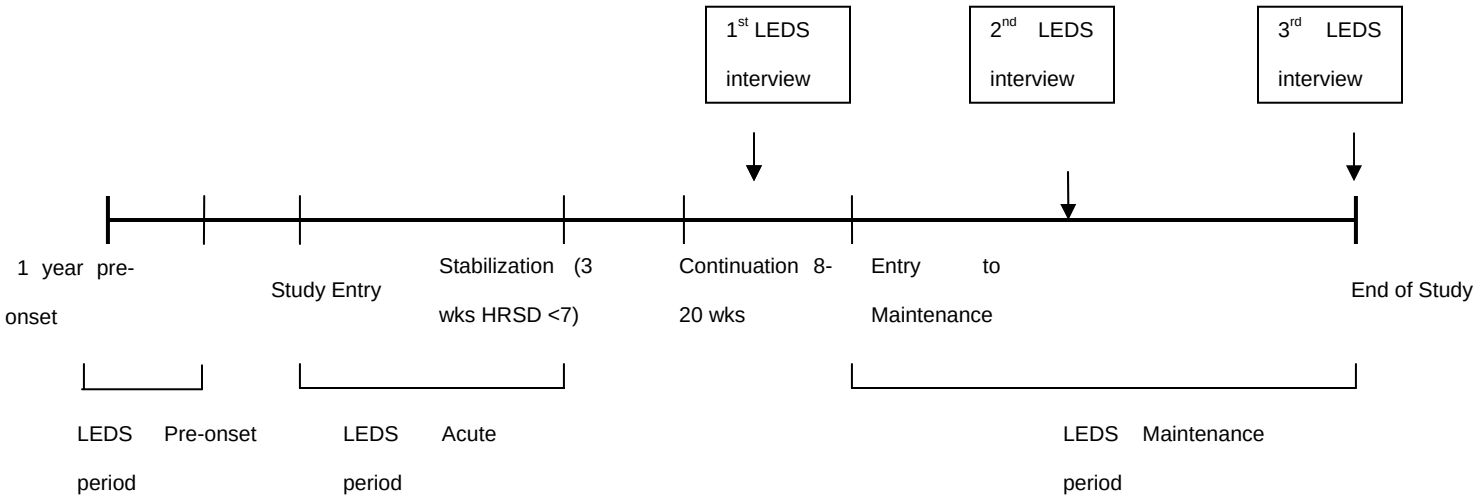

Figure 1. Illustration of study timeline

Briefly, patients entered the first phase of the protocol in an acute major depressive episode and began treatment with Interpersonal Psychotherapy (IPT). Stabilization was defined as a score of seven or less on the Hamilton Rating Scale for Depression (HRSD) for at least three consecutive weeks and clinical agreement that the episode had remitted. Following remission of the index episode, patients were entered into an 8-week Continuation phase. Patients who remained in remission during the Continuation Phase were entered the Maintenance phase of preventive psychotherapy (IPT-M) for a period of two years or until recurrence. Patients who did not remit with psychotherapy alone were assigned to a combination treatment of IPT and pharmacotherapy. This treatment continued until remission at which

point they would enter into the Continuation phase of 20 weeks. If they remained in remission during the 20 weeks, they were then tapered off of the medication and received IPT alone for 4 to 6 weeks. Patients were discontinued from the study if they failed to remit after 24 weeks of treatment. Patients able to tolerate the discontinuation without relapse entered into the Maintenance phase for two years or until recurrence. Once entered into the maintenance phase all patients were randomly assigned to receive weekly, bi-weekly, or monthly IPT-M. Patients were discontinued from the study if they experienced a relapse of depressive symptoms. See Figure 2 for diagram of participant flow. The sample for the proposed study would include those patients who entered into the acute phase of treatment and also completed the Life Events and Difficulties Schedule after remission of the index episode (N=174).

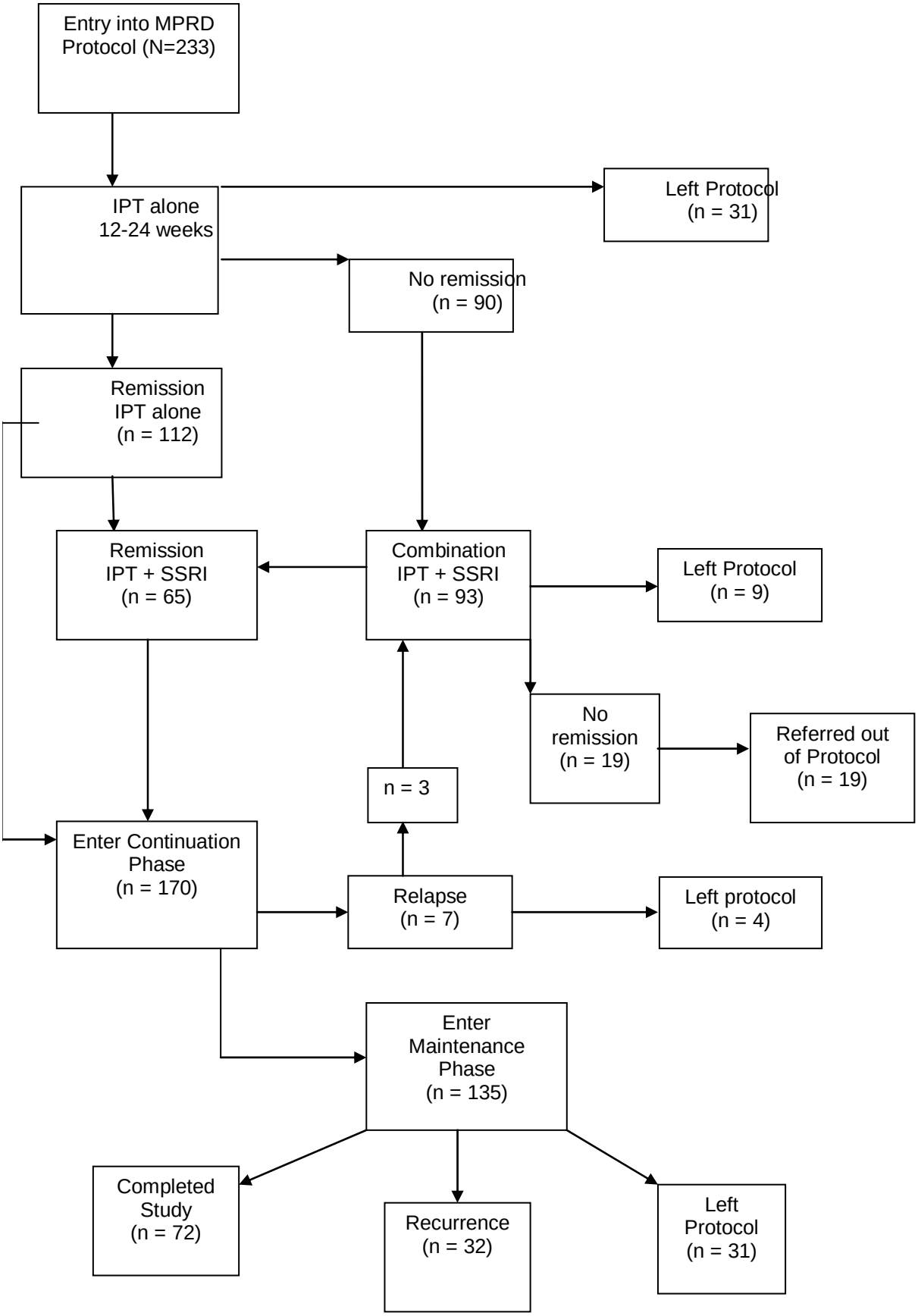
Entry into MPRD Protocol (N=233)
IPT alone 12-24 weeks
Left Protocol (n = 31)
No remission (n = 90)
Remission IPT alone (n = 112)
Remission IPT + SSRI (n = 65)
Combination IPT + SSRI (n = 93)
Left Protocol (n = 9)
No remission (n = 19)
Referred out of Protocol (n = 19)
n = 3
Enter Continuation Phase (n = 170)
Relapse (n = 7)
Left protocol (n = 4)
Enter Maintenance Phase (n = 135)
Completed Study (n = 72)
Recurrence (n = 32)
Left Protocol (n = 31)

Figure 2. Participant flow for MPRD study

2.3 MEASURES

Schedule for Affective Disorders and Schizophrenia (SADS; Endicott & Spitzer 1978): The SADS is a semi-structured diagnostic interview developed for use in research studies of affective and schizophrenic disorders. This instrument was used prior to 1994, at which time it was replaced by the Structured Clinical Interview for DSM-IV.

Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1994): The SCID is a structured diagnostic interview that was designed to correspond to DSM-IV diagnoses. The SCID has shown to be both reliable and valid in diagnosing Axis I disorders (Williams, Gibbon, First, Spitzer, Davies, & Borus, 1992).

Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II; First, Spitzer, Gibbon, & Williams, 1995): The SCID-II is a semi-structured diagnostic interview developed to measure DSM personality disorders. The SCID-II covers personality disorder diagnoses in the following clusters: Cluster A (paranoid, schizoid, and schizotypal); Cluster B (narcissistic, anti-social, borderline, and histrionic); and Cluster C (avoidant, dependent, obsessive-compulsive, and passive-aggressive). A threshold rating for a symptom is given if the symptom is "pathological, persistent, and pervasive" (First et al., 1995). A subthreshold rating can also be given for a particular symptom if the symptom is present but does not meet criteria for a threshold score. Overall, the SCID-II has been shown to be moderately reliable (k=.53) and comparable to other measures of Axis II disorders (First et al., 1995).

Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960): The HRSD is a symptom assessment tool for use with persons diagnosed with depressive disorders. Patients were assessed at each clinic visit. Scores are available for both the 25-item and the 17-item scales. The HRSD was used to define treatment remission and recurrence. Interrater reliability levels for the MPRD study exceeded .90.

Life Event and Difficulties Schedule (LEDS; Brown & Harris, 1978): The LEDS instrument is a semi-structured interview that measures the likely contextual meaning of events and difficulties. This means that the ratings are based on "how a typical person would be expected to think/feel about an event" based on the situational context. The ratings do not take the subject's feelings, reactions, or biases into account. Events are only rated if they involve the subject and/or close others, as defined by the interviewer and subject prior to beginning the interview. There are roughly 70 broad categories of events that can be placed into one of 10 domains (education, work, reproduction, housing, money/possessions, crime/legal, health/accidents, marital/partner relationship, other relationships, and miscellaneous).

The LEDS uses a 4-point scale to rate events (marked, moderate, some, little/none). Events are rated in terms of short-term (peak unpleasantness/threat in the first few days of event) and long-term (peak threat/unpleasantness 10-14 days after start of an event) contextual threat. There are 28 rating scales to describe both the threatening and positive qualities of each event. For example, ratings of positive aspects of each event are completed with the following scales: Degree of Long-term Contextual Quality (an overall rating of the positive elements of an event), Fresh Start Event (no, yes, potential), Delogjamming (if above Fresh Start event is rated potentially or yes, this scale is not rated), Hope, Relief, Reconciliation, Restoration, Goal Attainment, Reroutinization, Goal Provision, Anchoring, and Enjoyment/Interest.

Events lasting at least four weeks can be rated as Difficulties. Difficulties are rated on a 7-point scale; high marked, low marked, high moderate, low moderate, mild, very mild, and not/no longer a difficulty. Experiences that the subject reports that do not qualify as an event may be classified as an Incident. An Incident is defined as a change that happens to the subject that fails to reach the inclusion threshold for an event. This may be because the occurrence is not serious enough or because it happens to a person outside of the close network identified in LEDS. Incident categories include positive codes (i.e. News of success, news of pregnancy, anniversaries, other positive incidents).

Trained raters used the Bedford College criteria to rate the interviews. All ratings were then presented at a consensus meeting that consisted of the LEDS director (Barbara Anderson, Ph.D.) and bachelor and master's level interviewers that had received extensive training from George Brown and

Tirril Harris, either at Bedford College, London or at WPIC in Pittsburgh. Consensus panel raters were blind to onset and offset dates of depressive episodes. All discrepancies among raters were resolved through group discussion and use of the LEDS "dictionary" that contains over 5,000 case vignettes to provide anchoring examples and standardization. Previous work with LEDS in this sample has indicated sufficient interrater reliabilities for threat ratings ([kappa] = .86; Harkness, Frank, Anderson, et al., 2002). Other studies have suggested good inter-rater reliability for LEDS positive life events (*k*=.73 Brown 1993; *k* >.60 *Leenstra* et al., 1995). All LEDS interviews were conducted while the participant was in remission of depression episode in order to prevent bias in recall of events (Bebbington, 1986; Fiedler & Stroehm, 1986). LEDS interviews were conducted once prior to entrance into maintenance phase and once yearly during maintenance treatment. The first LEDS interview covered events that occurred during the year prior to onset of the index episode of depression. Subsequent events were covered during the yearly follow-up interviews. For the proposed analyses, events occurring during the acute phase of treatment will be garnered from the first follow-up interview. Events during the maintenance phase will be taken from the appropriate first and second follow-up interviews.

2.4 DETAILED HYPOTHESES AND ANALYTIC PLAN

2.4.1 Preliminary Analyses

All data were analyzed using SAS® for Windows version 8 (SAS Institute Inc, Carey, NC). Spearman correlations were used to examine the relationships of demographic and clinical variables with positive life events to test for potential confounding relationships. We used t-tests to test for differences between patients who received LEDS interviews and those that did not participate in any LEDS interview. We also used t-tests to compare differences between patients that entered into the Maintenance phase and those that terminated prior to entering into Maintenance. Wilcoxon-Mann-Whitney scores were calculated to test for differences in life event ratings between patients who terminated during the Acute phase and patients who attained remission during Acute treatment. Wilcoxon's rank sign test was used

to determine the stability of life event reports within subjects across study phases. The rate of events was calculated for the one-year period prior to the index episode (Pre-onset phase). The Acute phase included the rate of events between entry into the study until Stabilization. The Maintenance phase included the rate of events between entry into Maintenance treatment and ending at the date of recurrence, termination, or study completion. Additionally, Spearman correlations were used to test for individual differences in event reports across study phases. We utilized Poisson regression to examine whether the lag time between episode remission and participation in the LEDS interview was related to the number of positive life events recalled. The "Degree of long-term contextual positive scale" (the overall rating of positivity) indicated positive events occurring in the year prior to onset of depressive episode. The date at which the patient was considered stabilized (3 weeks of HRSD $\leq$ 7) was used as the remission time-point. We then computed the number of weeks between this stabilization date and the date of LEDS administration.

2.4.2 Primary Hypotheses

Hypothesis #1: *In depressed outpatients receiving IPT in a clinical trial, the probability of episode remission changes after the experience of a positive life event. Specifically, the cumulative experience of positive life events during the acute treatment phase will be associated with decreased time to episode remission.*

To test hypothesis #1 we utilized the proportional hazards model (Kalbfleisch & Prentice, 2002) with a linear decay process (as described by Frank, et al, 1996) of positive events included in the model as a time-dependent covariate. The starting point of the latency process was the entry into the Acute treatment phase, and the point at which the patient reached Stabilization (three consecutive weeks of HRSD score $\leq$ 7) was the end-point. The hazard at time t in the absence of any other event is $h(t)$, which denotes the risk of failure (i.e. remission). If an additional event occurs at t_1, then the hazard changes to $h(t)e^{\beta 1t}$ for t after t_1, but remains $h(t)$ for t between 0 and t_1. If an additional event occurs at t_2, then the hazard changes to $h(t)$ for t between 0 and t_1, $h(t)e^{\beta 1t}$ for t between t_1 and t_2, and $h(t)e^{(\beta 1+\beta 2)t}$ for t after t_2. A positive value for the parameter β_1 denotes that the event at t_1 shortens time to remission (increases

risk). In other words, a positive value for the parameter indicates that the event is hastening episode remission. The magnitude of the parameter indicates the degree to which the underlying hazard is changed by the additional events.

Previous research has shown the potential confounding effects of depressive episode severity and antidepressant medication treatment on life events. Therefore, to control for these potential confounders, we included antidepressant treatment status (0=no SSRI, 1=SSRI), duration of index episode, age at study entry, age at first depressive episode, and baseline HRSD score as covariates in the model.

Hypothesis #2: *The cumulative experience of positive life events during the maintenance treatment phase will be associated with increased time to episode recurrence in the same sample of depressed outpatients receiving IPT.*

To test hypothesis #2 we applied the same model of linear decay of multiple positive life events on time to recurrence after remission. In this model, the date at which the person entered the Maintenance phase was the starting point of the latency process, and the end-point was the date of recurrence or the end of the study. In contrast to the model for hypothesis #1, we did not expect to see a positive value for the parameter β_1. A negative value for the parameter β_1 denotes that the event at t_1 increases time to recurrence (decreases risk), indicating that the event is prolonging time in Maintenance. A positive value for the parameter would indicate that the positive event is actually reducing the time to recurrence. We also included antidepressant treatment status and other demographic and clinical variables as covariates in the model to control for their potential confounding effects.

2.4.3 Exploratory Analyses

Hypothesis #3: *Categories of positive events experienced during the maintenance period will differ within individuals from the categories of positive events during recovery from depression.*

Factor analysis was used to reduce the dimensionality of the data. The quality of the factor solutions was judged by following the simple structure criteria (Gorsuch, 1983; Tabachnik & Fidell, 2001): 1) interpretability of the factor loadings, 2) amount of iteration sequences, 3) number of variables highly

loaded onto more than one factor, and 4) intercorrelations of variable clusters and factor intercorrelations. It should be noted that there are no criterion variables against which to test factor solutions, unlike in other statistical techniques; therefore, a factor is only one interpretation of an implicit construct (Gorsuch, 1983; Tabachnik & Fidell, 2001). Conclusions that can be drawn from exploratory factor analysis techniques are therefore limited and further research is necessary to assure that resulting factors are legitimate operational constructs (Gorsuch, 1983).

3.0 RESULTS

3.1 SAMPLE CHARACTERISTICS

Of the 233 women enrolled in the MPRD study, 174 participated in at least one LEDS interview (69 study completers, 32 recurrers, and 73 study terminators). Of the 174 women, 131 entered the maintenance phase and 43 terminated the study prior to maintenance. As shown in Table 3.1 there were no significant differences between the women that participated in the LEDS interview and those that did not.

Table 3.1. Demographic characteristics for patients with LEDS (n=174) and no LEDS (n=58).

	LEDS (n=174)	**No LEDS (n=58)**	
Age at Study	37.97 (10.35)	36.78 (9.25)	*t* = - 0.78, *p*= .44
Education(years)	15.05 (1.89)	14.84 (2.02)	*t* = - 0.71, *p*= .48
# Previous Episodes	4.65 (2.77)	6.08 (6.28)	*t* = 1.60, *p*= .12
Age at 1st episode	24.59 (9.38)	22.97 (8.11)	*t* = - 1.18, *p*= .24
Duration of Episode(weeks)	26.57 (20.71)	23.12 (17.24)	*t* = - 1.14, *p*=.25
Baseline HRS-17	18.62 (2.98)	18.11 (3.12)	*t* = 1.11, *p*= .27
Baseline HRS-25	22.31 (3.70)	21.86 (3.78)	*t* = 0.79, *p*= .43
Race			
White	152	51	
Black	15	5	
Hispanic	2	1	
Other	5	1	*Fisher's Exact* (*df*=2), *p*= 1.00
Marital Status			
Married	67	20	
Divorced/Separated	38	16	
Never Married	63	21	
Widowed	6	1	*Fisher's Exact* (*df*=3), *p*= .79
Employment Status			
Full-time	93	33	
Part-time	38	7	
Homemaker	17	7	
Student	7	2	
Unemployed/Laid-off	19	9	*Fisher's Exact (df*=4), *p*= .49

Note: One patient had participated in the LEDS interview; however, the data were unavailable.

Demographic and clinical characteristics for the women who participated in at least one LEDS interview are shown in Table 3.2 (significant differences between groups are highlighted in bold). Reasons for termination included: relapse after entering continuation phase (*n*=13), non-response to treatment (*n*=15), treatment non-compliance (*n*=4), withdrawn consent/inconvenience (*n*=9), and change in primary diagnosis (*n*=2). There were no significant differences between patients who entered maintenance and terminators on any demographic variables. Acute phase terminators scored significantly higher on the baseline HRSD-17 item scale ($t(172)= -2.65$, $p=.0087$) and both the 17 and 25 item HRSD at the endpoint ($t(172) = - 4.94$, $p<.0001$; $t(172) = -5.47$, $p<.0001$, respectively). Acute phase terminators were also more likely to require antidepressant medication during the Acute phase (X^2 (1, n=174) = 32.30, $p<.0001$).

Table 3.2 Demographic and depressive episode characteristics of participants entering vs. not entering the maintenance phase who received at least one LEDS interview.

	All LEDS participants **(N=174)**	Entered Maintenance **(n= 131)**	Terminators **(n=43)**
Age at Study	37.97 (10.35)	37.87 (10.22)	38.34 (10.75)
Education (years)	15.05 (1.89)	15.09 (1.88)	14.99 (1.93)
# Previous Episodes	4.65 (2.77)	4.69 (2.95)	4.51 (2.08)
Age of 1st Episode	24.59 (9.38)	25.13 (8.95)	23.05 (10.48)
Duration of Episode(wks)	26.57 (20.71)	26.85 (20.94)	25.48 (20.01)
Baseline HRSD-17	18.62 (2.98)	**18.28 (2.85)**	**19.59 (3.16**)
Baseline HRSD-25	22.31 (3.70)	22.05 (3.71)	23.09 (3.55)
End HRSD-17	7.50 (7.64)	**5.98 (7.50)**	**12.07 (6.13)**
End HRSD-25	9.24 (9.58)	**7.19 (9.18)**	**15.41 (8.02)**
Race			
White	152	113	40
Black	15	12	4
Hispanic	2	2	0
Other	5	5	0
Employment Status			
Full-time	93	77	18
Part-time	38	28	10
Homemaker	17	12	5
Laid-off	1	1	0
LOA	4	2	2
Student	7	4	3
Unemployed	14	8	6
Type of Episode			
Melancholic	73	58	15
Atypical	18	13	5
Neither	80	59	21

Out of the 135 women who entered into the Maintenance phase, 131 had data from at least one LEDS interview. One hundred thirty-one had complete data for the Pre-onset phase (one year prior to index episode onset), 126 had complete data for the Acute phase (entrance into study until stabilization), 85 had data through the first year of the Maintenance phase and 49 had complete data for the entire Maintenance phase. Demographic and clinical information for these groups is summarized in Table 3.3 (significant differences highlighted in bold). Of the women who have data through the entire Maintenance period (full LEDS), 16 remained in remission through the entire study period, 27 women had a recurrence, and 5 terminated. In contrast, of the women without full LEDS data 53 remained in remission, 6 had a recurrence, and 24 terminated. This difference is significant, patients with full LEDS data were more likely to have had a recurrence than those without Full LEDS data (X^2 (2, n=131) = 39.09, p <.0001). Additionally, patients with full LEDS data had significantly higher baseline HRSD scores than those without full LEDS. Patients with full LEDS spent significantly more weeks in the Acute phase of treatment and significantly fewer weeks in the Maintenance phase of treatment. There were no other significant differences between the two groups, including SSRI status, race, marital status, and employment status [(SSRI: X^2 (1, n=131) = 1.11, p= .29) (Race: *Fisher's Exact* (2, n=131) p= .06) (Marital: *Fisher's Exact* (2, n=131) p= .07) (Employment: *Fisher's Exact* (2, n=131) p= .59)].

Table 3.3 Demographics and clinical characteristics of subjects who entered maintenance (n=131) with full LEDS data (n=49) vs. those without full LEDS data (n=83).

	Full LEDS	**Incomplete LEDS**	***t (p)***
	Mean (SD)	Mean (SD)	
Age at study entry	39.56 (10.30)	36.89 (10.17)	- 1.59 (.11)
Education(years)	15.23 (2.13)	15.00 (1.73)	- 0.68 (.49)
Age at 1st episode	24.56 (8.25)	25.53 (9.39)	0.08 (.93)
# Previous episodes	5.39 (3.61)	4.31 (2.47)	- 1.60 (.11)
Duration of episode(wks)	28.17 (23.01)	26.16 (19.87)	- 0.83 (.41)
Baseline HRSD-17	**18.94 (3.28)**	**17.90 (2.53)**	**- 2.01 (.05)**
Baseline HRSD-25	**23.13 (4.62)**	**21.39 (2.93)**	**- 2.24 (.03)**
Stabilization HRSD-17	4.85 (1.79)	4.49 (1.70)	- 0.78 (.44)
Stabilization HRSD-25	6.01 (2.33)	5.29 (2.00)	- 1.60 (.11)
SSRI (yes/no)	15/33	19/64	
# weeks in Acute phase	**21.65 (9.58)**	**17.17 (5.64)**	**- 2.07 (.04)**
# weeks in Maintenance phase	**60.5 (36.16)**	**77.61 (37.59)**	**2.99 (.003)**
End Status			
Completed study	**16**	**53**	
Recurrence	**27**	**6**	
Terminated	**5**	**24**	

Note: Baseline HRSD scores measured at study entry. Stabilization HRSD scores are the average of the three-week stabilization period scores.

Demographic and clinical characteristics are also shown for the women who completed two years of Maintenance without a recurrence (n=69), women who had a recurrence during Maintenance (n=33), and women who terminated treatment prior to the end of the study (n=29) (see Table 3.4). On average, those who terminated the study were younger than either those who completed or those who recurred. They also tended to report younger age of first depressive episode onset than the women who completed the two years of Maintenance. Additionally, those patients who had a recurrence during the Maintenance phase had higher HRSD scores at entry into the Maintenance phase of treatment than those who completed the two years without a recurrence. The patients who recurred averaged roughly two weeks longer in the Acute phase of treatment than those who did not recur, and they were more likely to have required adjunctive antidepressant medication during the Acute phase. Patients recurred after an average after 39 weeks of Maintenance treatment.

Table 3.4 Demographic and clinical characteristics for patients who completed two years of maintenance (n=69), recurrence during maintenance (n-33), or terminated during maintenance (n=29).

	Complete Mean (SD)	Recurrence Mean (SD)	Terminate Mean (SD)
Age at study entry [a]	38.67 (9.42)	40.76 (10.98)	32.69 (9.81)
Education (years)	14.99 (1.83)	15.24 (2.00)	15.14 (1.92)
Age at 1st episode [b]	26.86 (9.74)	24.06 (9.16)	22.44 (5.57)
# Previous episodes	4.73 (3.35)	5.35 (2.85)	3.89 (1.79)
Duration of episode	26.91 (20.99)	26.85 (20.37)	26.89 (22.49)
Baseline HRSD-17	18.04 (2.70)	18.97 (3.40)	18.07 (2.48)
Baseline HRSD-25	21.68 (3.82)	22.67 (4.41)	22.10 (2.41)
Stabilization HRSD-17	4.61 (1.89)	4.94 (1.43)	4.31 (1.67)
Stabilization HRSD-25	5.46 (2.24)	6.14 (1.92)	5.18 (2.14)
Maintenance HRSD-17 [c]	3.23 (2.51)	4.67 (3.42)	3.34 (2.91)
Maintenance HRSD-25 [d]	3.86 (3.26)	5.48 (3.73)	3.89 (3.63)
# weeks in Acute [e]	17.96 (7.84)	21.83 (9.66)	17.05 (5.18)
# weeks in Maintenance [f]	103.48 (3.58)	38.63 (24.19)	33.83 (25.64)
SSRI yes/no [g]	14/55	15/18	5/24

[a] F=5.58, p=.0048, df=2 (complete vs. terminate; recur vs. terminate)
[b] F=2.89, p= .06, df=2 (complete vs. terminate)
[c] F=3.00, p=.05, df=2 (complete vs. recur)
[d] F=2.69, p=.07, df=2 (complete vs. recur)
[e] F=3.55, p=.03, df=2 (complete vs. recur; recur vs. terminate)
[f] F=248.17, p= <.0001, df=2 (complete vs. recur; complete vs. terminate)
[g] X^2=8.83, p=.01, df=2

3.2 DESCRIPTIVE CHARACTERISTICS OF LEDS EVENTS

To ease interpretability of the LEDS ratings, all ratings were reverse coded so that impact increased numerically (1-little/none, 2-some, 3-moderate, 4-marked). Table 3.5 shows the descriptive statistics for the ratings on the long-term contextual positivity scale in the Pre-onset, Acute, and Maintenance phases of the study. It should be noted that 37 patients did not have any LEDS data collected during the Maintenance phase, leaving 93 patients who had at least one day in Maintenance measured by LEDS.

Table 3.5 Total number, average number of events, and average rating of events rated on the long-term contextual positivity scale for each study phase

	Total Events	Average Events (SD)	Max Events	Average Rating (SD)
Pre-Onset (n=131)	918	7.01 (4.14)	17	1.48 (.70)
Acute (n=131)	401	3.06 (3.16)	21	1.50 (.69)
Maintenance (n=93)	888	9.35 (7.41)	39	1.46 (.70)

Note: Total events = the number of total events rated in each phase. Average events = the average number of events rated per patient in each phase. Max events is the highest number of events reported per patient in each phase. The Average rating is the average rating received on the long-term contextual positivity scale in each phase.

In order to simultaneously account for both long-term contextual positivity ratings and long-term threat ratings of each event, ratings were divided into four distinct categories based on Tu and colleagues (2000): Severe negative events (moderate to marked threat/no positivity), Positive events (non-severe events with moderate to marked positivity), Severe events with positivity (moderate to marked threat and moderate to marked positivity), and Neutral events (non-severe events with little or no positivity). These categories were thought to better reflect the “impact” of an event. For example, if an event was rated as

little/none on the positivity scale, it is likely that the event was rated as a moderate or marked on the long-term threat scale. If the event was to be counted as low positive, we may have been missing some of the meaning from the high negative rating. Similarly, if an event is rated low positive and also rated as low negative, that event is likely to have a differing impact than the low positive/high negative. If only one dimension was used, this information would be lost. Because only four events total that fit into the "severe events with positivity" category, we omitted these events from the analyses. Further, we divided the "severe event" category into two categories to reflect differences between events where the focus was the subject or a close other and events which were other focused. Thus, our four categories for this analysis were: Provoking events, Severe events, Neutral events, and Positive events. The first category is Provoking level events. Provoking level events are those events that are rated as marked or moderate on long term threat, some or none on long term positive, and are subject or joint focused. This event category is consistent with provoking events as described by Brown and colleagues (1978; 1994), as events that are depressogenic. The second category is Severe events. Severe events are rated marked or moderate on long term threat, some or none on long term positive, but are other-focused. The third category, Neutral events, are events that are rated as some or none on long term threat and some or none on long term positivity. The final category consists of Positive events. Positive events are rated as some or none on long term threat and marked or moderate on long term positivity. Table 3.6 shows the descriptive statistics for each of the categories of events in each phase. Again, the sample for the Maintenance phase consists of the 93 patients who had at least one day of LEDS measured in this phase. As can be seen in this table, the events are not normally distributed.

Table 3.6 Descriptive statistics for the number of events reported (separated by event category).

Total # Events

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	7.01	4.14	6.0	1	17	0.59	- 0.55
Acute	131	3.06	3.16	3.0	0	21	2.29	8.45
Maintenance	93	9.55	7.36	7.0	0	39	1.24	2.07

Total Provoking Level Events

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	1.40	1.76	1.0	0	10	2.13	5.84
Acute	131	0.44	0.88	0.0	0	5	2.56	7.58
Maintenance	93	1.70	2.59	1.0	0	18	3.49	17.56

Total Severe Events

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.29	0.81	0.0	0	5	3.50	13.54
Acute	131	0.10	0.37	0.0	0	3	4.91	30.53
Maintenance	93	0.42	0.83	0.0	0	5	2.87	10.87

Total Neutral Events

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	4.62	3.35	4.0	0	14	0.82	0.17
Acute	131	2.23	2.43	2.0	0	14	1.91	5.38
Maintenance	93	6.52	5.01	5.0	0	22	1.00	0.67

Total Positive Events

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.68	1.05	0.0	0	5	1.79	3.06
Acute	131	0.26	0.55	0.0	0	3	2.32	5.84
Maintenance	93	0.86	1.12	0.0	0	5	1.42	1.96

The data above must be interpreted with some caution because of the varying lengths of time each patient spent in the Acute and Maintenance phases. For example, it would not be informative to compare the number of events experienced by a patient that relapsed within the first month of Maintenance with a patient who completed the two years of maintenance treatment without a recurrence. The probability that the patient who completed the study would have a greater number of events than the patient who relapsed is greater because the duration of measurement was twenty-two months longer. In order to control for the varying length of time spent in the study phases, an event per day rate was computed by taking the number of events experienced and dividing by the number of days spent in the phase. Univariate distributions are shown in Table 3.7. As shown in this table, on average, patients experienced 0.14 events per week. The most frequently occurring events by far were Neutral events, while the least common events were Severe events.

Table 3.7 Descriptive statistics for the number of events experienced in each study phase using the event per day rate.

Total # Events/Day

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.02	0.01	0.02	0.003	0.05	0.59	0.55
Acute	131	0.02	0.02	0.02	0	0.10	0.99	0.81
Maintenance	93	0.02	0.01	0.02	0	0.07	0.94	1.48

Total Provoking Events/Day

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.004	0.005	0.003	0	0.03	2.13	5.84
Acute	131	0.003	0.007	0.0	0	0.04	2.58	7.65
Maintenance	93	0.004	0.007	0.002	0	0.05	3.80	20.91

Total Severe Events/Day

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.0008	0.002	0.0	0	0.01	3.50	13.54
Acute	131	0.0007	0.003	0.0	0	0.03	6.60	54.05
Maintenance	93	0.001	0.002	0.0	0	0.01	3.13	10.86

Total Neutral Events/Day

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.01	0.009	0.01	0	0.04	0.82	0.17
Acute	131	0.02	0.02	0.01	0	0.01	0.98	0.36
Maintenance	93	0.02	0.01	0.01	0	0.05	0.89	1.13

Total Positive Events/Day

Phase	N	Mean	SD	Median	Min	Max	Skewness	Kurtosis
Pre-Onset	131	0.002	0.003	0.0	0	0.01	1.79	3.06
Acute	131	0.002	0.004	0.0	0	0.02	2.27	4.95
Maintenance	93	0.002	0.003	0.0	0	0.02	2.27	7.76

In addition to the four categories of life events, another type of positive event, difficulty reduction events, were created by looking at change points in the ratings of chronic difficulties. Difficulty ratings that decreased from high marked, low marked, or high moderate ratings to mild, very mild, or none were considered to be Major Difficulty Reductions. Difficulty ratings that decreased from low moderate, mild, or very mild to none were considered to be Minor Difficulty Reductions. Table 3.8 shows a descriptive summary of Difficulty Reduction events illustrating the total number of events reported per phase, the average number of events reported in each phase, and the largest number of events reported per phase. These data are not normally distributed.

Table 3.8 Summary statistics for major and non-major difficulty reduction events for pre-onset, acute, and maintenance phases.

	Total # Events	Average # Events (SD)	Maximum # Events
Pre-Onset (n=131)			
Major	17	0.13 (.38)	2
Non-Major	141	1.08 (1.41)	10
Acute (n=131)			
Major	7	0.05 (.23)	1
Non-Major	75	0.59 (.95)	6
Maintenance (n=93)			
Major	13	0.10 (.32)	2
Non-Major	157	1.20 (1.60)	8

3.3 STABILITY OF EVENTS ANALYSES

Wilcoxon's Rank Sign Test was used in order to determine the stability of event reporting within subjects across phases. The total event per day rate (total number of events divided by total number of

days in study phase) was used to account for differing length of time in the study phases. Three difference scores were then computed: 1) Acute minus Pre-Onset 2) Maintenance minus Acute and 3) Maintenance minus Pre-Onset. Results are shown in Table 3.9. These results show that event reports tend to remain stable across the Acute and Maintenance phases; however, the total number of events per day and Neutral events per day reports are significantly higher in the Acute and Maintenance phases compared to the Pre-Onset phase.

Table 3.9 Stability of event per day rates across phases.

	S statistic (p-value)				
Phase Comparison	Total Events/Day	Provoking/Day	Severe/Day	Neutral/Day	Positive/Day
Acute-Pre-Onset *n*=131	953.5 (.03)	- 502.5 (.06)	- 40.5 (.39)	1217.5 (.003)	75 (.64)
Maintenance-Acute *n*= 93	89 (.73)	171.5 (.28)	55 (.38)	- 91.5 (.71)	- 28 (.82)
Maintenance-Pre-Onset *n*=93	- 814.5 (.0015)	159.5 (.043)	78 (.23)	801 (.001)	13 (.92)

Spearman correlations were calculated to test for individual differences across phases in the stability of event reporting (rather than group mean differences). Correlations were computed between the total number of events per day, provoking number of events per day, severe number of events per day, neutral events per day, and positive number of events per day between each study phase. Results are shown below in Table 3.10. As shown in the table, the event per day rate is generally uncorrelated from phase to phase.

Table 3.10 Spearman correlations for the stability of the rate of events per day between study phases (n=93).

	Pre-Onset	Acute	Maintenance
Total Events/Day			
Pre-Onset		**.36***	.02
Acute			.12
Provoking/Day			
Pre-Onset		.06	.08
Acute			.14
Severe/Day			
Pre-Onset		.10	.08
Acute			.03
Neutral/Day			
Pre-Onset		**.27****	.02
Acute			.08
Positive/Day			
Pre-Onset		.10	**.23**†
Acute			.09

* $p < .0001$
** $p = .002$
† $p = .008$

3.4 ATTRITION ANALYSES

3.4.1 Acute Phase Terminators

Event data were available for the Acute phase of treatment for the 43 patients who were enrolled in the study but failed to reach the Maintenance phase. Wilcoxon-Mann-Whitney scores were calculated to test for differences between patients who terminated and those that attained remission during the Acute phase for each category of events. There were no significant differences between patients who terminated prior to Maintenance and patients who entered Maintenance (n=131) on any event category [(Total events/Day z = -.71, p= .48) (Provoking/Day z = .64, p= .52) (Severe/Day z = 1.39, p= .16) (Neutral/Day z = -.85, p=.39) (Positive/Day z = .08, p= .94)].

Spearman rank correlations were used to examine the relationship between HRSD scores and Acute event categories in the patients who terminated prior to the Maintenance phase. All correlations were non-significant except for the relationship between Severe events per day and the last available HRSD-17 and HRSD-25 item scores (r_s= .50, p= .0007; r_s= .46, p= .002, respectively).

Chi-square analyses were then performed to test for differences between types of events and reason for termination. Fisher's exact test was used for comparisons with cells less than five. The Total number of events was then classified as "High" or "Low" using a median split of the event per day rate. The five reasons for termination categories were combined into three categories in order to increase cell sizes; nonresponder (n= 15), relapse (n=15), and other (n=13). There were no significant differences between categories of events endorsed and reason for termination (*Fisher's Exact* (n=43), p= .65).

3.4.2 Maintenance Phase Terminators

Wilcoxon-Mann-Whitney scores were computed to test for differences between the 49 women who have complete LEDS data and the 83 women without complete data, to determine whether or not

there are any differences between these groups on the total number of events per day in each phase of the study. There were no significant differences in the baseline and acute phases (Pre-Onset Total z= -.72, p= .47; Acute Total z=.30, p= .77). Patients with complete LEDS data reported a significantly higher number of total events per day during the Maintenance phase (z= -2.67, p= .008).

3.5 TEST FOR RECALL EFFECTS

In order to explore any potential effects of recall on reporting of LEDS events, the number of days between stabilization date and date of the first LEDS interview were calculated and regressed on the number of events reported during the Pre-Onset period (one year prior to index episode onset). The average number of days between stabilization and the date of the first LEDS interview was 87.40 (+/- 140.03); however, a univariate test indicated the presence of one outlier. After deletion of the outlier (who had 1,087 days between stabilization and the first LEDS interview) the mean days between the stabilization date and the LEDS interview was 93.48 (+/- 121.99). Poisson regression analyses of the lag time for all events reported during the Pre-Onset period were conducted. The Poisson model with the total number of events as the dependent variable and the number of days as the independent variable showed an overdispersion indicating that the distribution was an inadequate fit (scaled deviance (df=129) = 2.47 and scaled Pearson X^2= 2.45). The model was then computed using a negative-binomial regression; the goodness of fit parameters were adequate (df=129 scaled deviance = 1.04 and scaled Pearson X^2 = .99). The results were non-significant (df=1, X^2 =.23, p = .63). Similar results were found after removal of the outlier: the Poisson distribution was overdispersed (scaled deviance (df=128) = 2.45 and scaled Pearson X^2= 2.43). The negative-binomial regression showed adequate fit of the model (df=128 scaled deviance = 1.05 and scaled Pearson X^2 = .99). Again, the results were not significant (df=1, X^2 = 1.20, p = .27). Thus, there does not appear to be a relationship between number of days between stabilization and LEDS interview and number of events reported in the Pre-Onset period.

The number of days between onset of depressive episode and date of first LEDS interview were calculated to explore the effects of length of time between episode onset and the number of events

reported during the Pre-Onset period,. The average number of days between these dates was 409.58 (*SD*= 205.94). Univariate analyses indicated the presence of one outlier who had 703 days between onset of depressive episode and date of the first LEDS interview. After deletion of the outlier, the average number of days between episode onset and date of the first LEDS interview was 404.33 (*SD*= 197.82). Poisson regression was used to determine if there is a relationship between the number of events reported during the baseline period and the lag time between interview and baseline period. The dependent variable was the total number of events and the independent variable was the number of days. As in the previous analysis, the Poisson model was overdispersed (scaled deviance (*df*=128) = 2.32 and scaled Pearson X^2= 2.23). A negative-binomial regression indicated adequate fit (scaled deviance (*df*=128) = 1.04 and scaled Pearson X^2= .98). The relationship between onset of episode/interview lagtime and the number of events reported during the baseline period was significant (*df*=1, X^2 = 9.06, *p* = .0026). After removal of the outlier, the results were similar. The Poisson distribution did not adequately fit the data (scaled deviance (*df*=127) = 2.33 and scaled Pearson X^2= 2.28). The negative-binomial distribution was adequate (scaled deviance (*df*=127) = 1.04 and scaled Pearson X^2= .98) and the relationship is significant (*df*=1, X^2 = 7.34, *p* = .0067). These results indicate that, as the number of days between onset and interview decreases, the total number of events reported during the Pre-Onset period increases, suggestive of a possible recall effect.

3.6 PRELIMINARY ANALYSES

Preliminary analyses were conducted in order to determine any significant relationships between demographic and clinical variables. Spearman correlations were calculated for the total number of events in each phase with demographic and clinical variables. Results are shown in Table 3.11 with significant correlations (p<.05) highlighted. As can be seen in the table, age at the time of study, duration of current episode, and age at first episode, are all significantly related to the number of events reported during the study.

Table 3.11 Spearman correlations between demographic and clinical variables with total number of events.

	r_s (p)		
	Pre-Onset Total	Acute Total	Maintenance Total
Age at study entry	**- .23 (.008)**	**- .28 (.001)**	**- .23 (.02)**
Education (years)	- .02 (.78)	- .03 (.76)	.13 (.23)
Duration of index episode	**- .22 (.01)**	.03 (.69)	- .14 (.17)
Age at first episodes	**- .18 (.04)**	**- .20 (.02)**	- .08 (.47)
# Previous Episodes	- .04 (.63)	- .14 (.12)	- .02 (.81)
Baseline HRSD-17	- .07 (.40)	- .06 (.48)	.08 (.45)
Baseline HRSD-25	- .08 (.37)	- .07 (.42)	.08 (.44)
Stabilization HRSD-17	- .01 (.91)	- .07 (.45)	- .03 (.77)
Stabilization HRSD-25	- .08 (.38)	- .10 (.26)	.07 (.53)
Maintenance HRSD-17	- .10 (.24)	**- .18 (.04)**	.03 (.80)
Maintenance HRSD-25	- .09 (.29)	- .16 (.07)	.05 (.66)
End HRSD-17	- .06 (.46)	- .00 (.99)	- .09 (.41)
End HRSD-25	- .06 (.49)	- .03 (.77)	- .09 (.38)

Spearman correlations were also used to describe the relationship between demographic and clinical variables and the events per day rate. Table 3.12 shows these results with significant ($p<.05$) bolded. As shown in this table, age at time of study, duration of index episode prior to study entry, and age at first episode are still inversely related to the rate of event reports in the study phases. Stabilization and Maintenance HRSD scores are inversely correlated to the rate of events in the Acute phase (as the number of events during the Acute phase decreases, HRSD scores increase), while Endpoint HRSD (last available HRSD score) scores are positively correlated with the rate of events reported in the Maintenance phase (as HRSD score increases, number of events increases).

Table 3.12 Spearman correlations between demographic and clinical variables with total events per day.

	r_s (p)		
	Pre-Onset Total/Day	AcuteTotal/Day	MaintenanceTotal/Day
Age at study entry	**- .23 (.008)**	**- .27 (.002)**	- .16 (.13)
Education (years)	- .02 (.78)	- .01 (.87)	.01 (.95)
Duration index episode	**- .22 (.01)**	.04 (.67)	- .08 (.46)
Age at first episode	**- .18 (.04)**	**- .19 (.03)**	**- .01 (.04)**
# Previous Episodes	- .04 (.63)	- .15 (.10)	- .03 (.79)
Baseline HRSD-17	- .07 (.40)	- .10 (.26)	.04 (.71)
Baseline HRSD-25	- .08 (.37)	- .15 (.10)	.01 (.90)
Stabilization HRSD-17	- .01 (.91)	- .13 (.13)	- .03 (.77)
Stabilization HRSD-25	- .08 (.38)	**- .17 (.05)**	.06 (.54)
Maintenance HRSD-17	- .10 (.24)	**- .21 (.02)**	.03 (.80)
Maintenance HRSD-25	- .09 (.29)	**- .20 (.02)**	.06 (.59)
End HRSD-17	- .06 (.46)	- .12 (.21)	**.24 (.02)**
End HRSD-25	- .06 (.49)	- .13 (.12)	**.24 (.02)**

Chi-square analyses were used to test the relationship between events and the categorical demographic variables. A median split was used to categorize the total number of events to "high" or "low" in each phase. Fisher's exact test was utilized to interpret cell sizes less than 5. As shown in Table 3.13, marital status is significantly related to the total number of events in the baseline phase; patients who were never married report a higher number of total events, while patients who were married or divorced report lower numbers of total events. Employment status is also significantly related to the total number of events reported in the baseline phase; part-time workers and students report higher total

events than homemakers and full-time workers. No other significant relationships were found between demographic characteristics and total number of events.

Table 3.13 Chi-square test of demographic characteristics and total events in each phase.

	Baseline	**Acute**	**Maintenance**
		X^2, p (df,n)	
Race	*Exact p*= .92 (2, 131)	*Exact p*=.33 (2, 174)	*Exact p*=.88 (2,93)
Marital Status	***X^2*=12.09, *p*=.007** (3,131)	X^2= .69, *p*=.87 (3,174)	X^2=.87, *p*=.83 (3,93)
Employment Status	***Exact p*=.02** (4,131)	X^2= 1.97, *p*=.74 (4,174)	*Exact p*=.97 (4,93)
Episode Type (Melancholic/Atypical)	X^2=3.26, *p*=.20 (2,129)	X^2=2.51, *p*=.28 (2,129)	X^2=1.30, *p*=.52 (2,93)
SSRI treatment required	X^2=.05, *p*=.82 (2, 131)	X^2=.13, *p*=.72 (2,174)	X^2=.54, *p*=.46 (2, 93)

3.7 MAIN ANALYSES

3.7.1 Hypothesis 1

Hypothesis 1 proposed that the probability of episode remission changes after the experience of a positive life event. A Cox regression survival analysis was performed to measure the effect of positive life events on time to remission during acute IPT treatment. In this model, the life event ratings were included as time-varying covariates. The starting point of the latency process was entry into the Acute

treatment phase. The point at which the patient entered Stabilization was the endpoint. A positive value of the parameter indicates that the event shortens time to remission (increases risk). In other words, a positive value for the parameter indicates that the event is hastening episode remission. The magnitude of the parameter indicates the degree to which the underlying hazard is changed by the additional events. This hypothesis was tested in several steps. First, models were run using only the ratings on the long-term contextual positivity scale; these ratings were assumed to be additive in their effect over time. Based on the preliminary analyses described above age at study entry, duration of index episode, age at first depression onset, and baseline HRSD score were added into the model in order to control for any possible confounding effects. Additionally, the need for adjunctive antidepressant medication during the acute phase (yes=1, no=0) was included as a covariate. In the Cox model, parameters reported are the effects of that parameter controlling for all the other covariates in the model. Because the question of interest was relationship of positive events to *remission*, only those patients who reached remission of the acute episode and entered into the maintenance phase were included in the analyses (*n*= 131). As shown above, the only significant difference between patients who entered into the maintenance phase and those that terminated prior to maintenance was baseline HRSD score, which was controlled in the model. Univariate analyses indicated the presence of one outlier (one patient reported a high number of events). The subsequent models were run both with and without this outlier; the results were nearly identical. Therefore, results using the full sample size are reported. Since by design every patient in this analysis reached remission, there is no censored data. Data ties were handled by the Efron approximation (Efron, 1977). Table 3.14 summarizes the results for the following models (model 1-4):

Model 1: This model included the cumulative event rating as a time-dependent covariate as the only predictor of time to remission. As can be seen in Table 3.14, the cumulative experience of long term positivity was not a significant predictor of time to remission.

Model 2: This model included the addition of Difficulty Reduction events as a time-dependent covariate to the cumulative event rating. Major Difficulty Reductions were given a weight of 3, minor were giver the weight of 1 to reflect the degree of reduction. Neither covariate significantly predicted time to remission.

Model 3: The third model added antidepressant medication status as a covariate to the cumulative event and difficulty reduction events. In this model, only medication status significantly predicted time to remission. As can be seen in the table, the parameter estimate of the covariate is negative, indicating a decreased "risk" of remission. In other words, patients who required antidepressant medications during the acute phase took a longer time to reach remission.

Model 4: Finally, the full model was tested which included cumulative events, difficulty reduction events, medication status, age at study entry, duration of index episode, age at first onset, and baseline HRSD score. Again, contrary to the hypothesis, the only significant predictor of time to remission was medication status. The "risk" of remission for patients who did not take medication is over five times that for patients who did require antidepressant medication during acute treatment.

Goodness-of-fit (models 1-4): A comparison of goodness-of-fit statistics across each of the four models indicates increasing fit with additional parameters entered into the model. There was little improvement to model fit from the additional parameters added to model 4 compared to model 3.

Table 3.14 Results of the acute phase Cox regression models 1-4 using the long-term contextual positivity rating as a time-dependent covariate (n=131).

	Parameter estimate	Standard error	X^2	Pr> X^2	Hazard ratio
Model 1					
Positivity	.027	.022	1.58	.21	1.028
Model 2					
Positivity	.033	.023	2.05	.15	1.034
Difficulty Reduction	- .005	.086	.004	.95	.995
Model 3					
Positivity	.009	.024	.126	.72	1.009
Difficulty Reduction	.060	.076	.636	.43	1.062
Meds	- 1.723	.288	35.82	< .0001	.179
Model 4					
Positivity	.015	.026	.344	.56	1.016
Difficulty Reduction	.065	.075	.749	.39	1.067
Meds	- 1.729	.292	34.94	< .0001	.177
Age at entry	.006	.011	.356	.55	1.006
Baseline HRSD	- .011	.032	.117	.73	.989
Duration	- .0008	.004	.042	.84	.999
Age at 1st episode	.005	.012	.154	.69	1.005

Key: Positivity refers to the long-term contextual positivity scale rating which was assumed to be cumulative; Difficulty Reduction refers to the cumulative rating of difficulty reduction events and was included as a time-dependent covariate; Meds refers to antidepressant medication required during Acute phase coded 0 for no and 1 for yes.

The second test of this hypothesis included the addition of the decay parameter (Frank et al., 1996) that accounted for the decay of the event effect over time. This parameter was included in the above-mentioned models as a time-varying covariate. Including this parameter yielded abnormally large standard errors (greater than 900) indicating a potential problem of multicolinearity. It was therefore concluded that this decay parameter was not a good fit to the data and was removed from subsequent analyses.

As previously discussed, it is likely that examining only the positive dimension of the event rating without considering the threat dimension of the event does not adequately capture the richness of the data or the full meaning of the event. Therefore, the final test of the hypothesis included computing the models using the four-category separation of events as described previously (provoking, severe, neutral, and positive). These results are summarized in Table 3.15 (models 5-8).

Model 5: This model was divided into four submodels (a-d). Each event category was treated as a time-dependent covariate as the only predictor in the model. As can be seen in the table, none of the event categories significantly predicted time to remission.

Model 6: This model included all four categories of events concurrently as time-dependent covariates in the model. This result was not significant.

Model 7: All four categories of events, difficulty reduction events, and medication status were included as covariates. As found in Model 3, only medication status significantly predicted time to remission. Again, the parameter estimate is negative, indicating that requiring antidepressant medication was associated with an increased time to remission.

Model 8: This final model included the four event categories along with all of the other covariates. Only medication status significantly predicted time to remission. Those patients who did not require antidepressant medication were at five times greater “risk” of remission than those that did.

Goodness-of-fit (models 5-8): A comparison of goodness-of-fit statistics across each of these models again suggests improvement in model fit with the addition of difficulty reduction events and medication status as covariates, with little additional benefit of adding age, HRSD scores, duration, and age of first episode. Both models 7 and 8 indicate improvement of fit over Model 4, suggesting benefit of including the event categories rather than only including long-term contextual positivity ratings.

Table 3.15 Results of acute phase Cox regression event category models 5-8 using the four category classification of events as time-varying covariates (n=131).

	Parameter estimate	Standard error	X^2	Pr> X^2	Hazard ratio
Model 5					
a. Provoking	- .020	.113	.034	.85	.979
b. Severe	.069	.281	.062	.80	1.072
c. Neutral	.061	.044	1.96	.16	1.063
d. Positive	.072	.159	.208	.65	1.075
Model 6					
Provoking	- .011	.119	.009	.93	.989
Severe	.100	.283	.125	.72	1.105
Neutral	.091	.047	3.64	.06	1.095
Positive	- .089	.174	.259	.61	.915
Difficulty Reduction	.013	.083	.026	.87	1.014
Model 7					
Provoking	.152	.130	1.36	.24	1.164
Severe	- .166	.289	.328	.57	.847
Neutral	.029	.048	.364	.55	1.029
Positive	- .141	.168	.705	.40	.869
Difficulty Reduction	.062	.074	.704	.40	1.064
Meds	- 1.78	.303	34.71	< .0001	.168
Model 8					
Provoking	.170	.133	1.62	.20	1.185
Severe	- .169	.293	.332	.56	.844
Neutral	.029	.051	.324	.57	1.029
Positive	-.134	.172	.611	.43	.874
Difficulty Reduction	.066	.075	.778	.38	1.068
Meds	- 1.79	.308	33.65	< .0001	.167
Baseline HRSD	- .027	.033	.633	.43	.974
Age at entry	- .0007	.011	.003	.95	.999
Duration	- .0007	.004	.036	.85	.999
Age at 1st episode	.100	.013	.624	.43	1.010

Key: Meds refers to antidepressant medication required during Acute phase; Duration refers to the duration of the index episode

3.8 HYPOTHESIS 2

This hypothesis stated that the cumulative experience of positive life events during the maintenance treatment phase would lengthen time before episode recurrence. A Cox regression analysis was used to test the effect of positive life events on time to recurrence during Maintenance IPT treatment. In this model, the date at which the patient entered the Maintenance phase of treatment was the starting point of the latency process, and the end point was the date of recurrence or the end of the study. In this model, a negative value for the parameter denotes that the event increases time to *recurrence*, or prolongs time in the Maintenance phase. A positive value for the parameter would indicate that the event is increasing the risk for recurrence. This model was also tested in several steps, with the life event ratings included as time dependent covariates. First, models were run using only the ratings on the long term contextual positivity scale. Ratings on the long term positive scale were considered to be cumulative in their effects over time. Next, age at time of study, duration of index episode, age of first depression onset, and stabilization HRSD scores were included in the models to control for potential confounding effects. The use of adjunctive antidepressant medication during the Acute phase of treatment was also included in this model to control for the effects of antidepressant discontinuation and potential confounding effects of depression severity. The average number of sessions per week was included as a covariate to test for possible effects of the differing frequencies of maintenance therapy received,. All patients who entered the Maintenance phase were included in the analyses (n=131). Observations were considered censored at the last day of LEDS data available or at completion of the study. Data ties were handled by the Efron approximation. Table 3.16 summarizes the results for the following models (models 9-12).

Model 9: This model included the cumulative long term positivity rating as a time-dependent covariate as the only predictor in the model. As can be seen in Table 16, this was a significant predictor of time to recurrence. However, contrary to the prediction, the cumulative rating on the positivity scale

predicted increased probability of recurrence. For each point of increase of life event positivity, risk of recurrence increases by about 7%.

Model 10: This model included the addition of Difficulty Reduction events as a time-dependent covariate to the cumulative long-term contextual positivity event rating. As shown below, the long-term contextual positivity scale still predicts risk of recurrence: for every one-point increase on this scale, risk of recurrence increases by 7.5%. Difficulty reduction events did not significantly predict time to recurrence.

Model 11: This model included long-term contextual positivity events, difficulty reduction events, antidepressant medication status, stabilization HRSD-25 scores, Maintenance HRSD-25 scores, duration of index episode, age at first depression onset, and age at time of study. As shown in the table, positivity ratings still continue to predict increased risk of recurrence controlling for the other covariates in the model. Those patients who required antidepressant medication during the acute phase have a two-fold greater risk of recurrence than those who did not. For each additional point scored on the HRSD-25 upon entry into maintenance, there is a 17% increase in risk of recurrence. Finally, for each year of age at time of study entry, the risk of recurrence increases by almost 5%.

Model 12: This model included cumulative ratings of positivity events, difficulty reduction events, medication status, age of first episode onset, duration of index episode, age at study entry, and stabilization and maintenance HRSD-25 scores, and the average number of IPT sessions received per week. These results continue to indicate that for each additional point on the long-term contextual positivity scale, there is a 10% increase in risk of recurrence. Those patients who required antidepressant medication during the acute phase continue to show a two-fold increase in risk of recurrence relative to those that did not require antidepressant treatment. For each additional point scored on the HRSD25 at entry into maintenance, there is a 9% increase in risk of recurrence. For each additional year older at entry into study, there is a 5% increase in risk of recurrence. For each additional year of age at time of first depression onset, there is a 9% decrease in risk of depression recurrence. Finally, there is almost a four-fold increase in risk of depression recurrence associated with each additional IPT session per week.

Goodness-of-Fit (Models 9-12): A comparison of goodness-of-fit across these four models indicates improvements in model fit with the additional parameters in the model. There was only minimal improvement in fit between models 11 and 12.

Table 3.16 Results of maintenance phase Cox regression models 9-12 using the long-term contextual positivity ratings as time-dependent covariates (n=131).

	Parameter estimate	Standard error	X^2	Pr> X^2	Hazard ratio
Model 9					
Positivity	.064	.029	4.89	.03	1.067
Model 10					
Positivity	.073	.031	5.35	.02	1.075
Difficulty Reduction	- .036	.106	.117	.73	.964
Model 11					
Positivity	.103	.036	8.01	.005	1.109
Difficulty Reduction	-.143	.120	1.44	.23	.87
Meds	.70	.385	3.29	.07	2.01
Age at study entry	.046	.020	5.31	.02	1.047
Stabilization HRSD	- .025	.203	.28	.90	.975
Maintenance HRSD	.157	.063	6.14	.01	1.17
Duration	- .0007	.010	.005	.94	.999
Age 1st episode	- .038	.023	2.67	.10	.963
Model 12					
Positivity	.097	.036	7.17	.007	1.102
Difficulty Reduction	- .124	.122	1.03	.31	.883
Meds	.846	.386	4.81	.028	2.331
Age at study entry	.053	.020	7.34	.007	1.055
Stabilization HRSD	.085	.087	.965	.326	1.09
Maintenance HRSD	.088	.046	3.66	.06	1.092
Duration	- .003	.010	.081	.78	.997
Age 1st episode	-.045	.022	3.91	.05	.956
Sessions/week	1.38	.51	7.30	.007	3.99

Key: Positivity refers to the long-term contextual positivity scale rating which was assumed to be cumulative; Difficulty Reduction refers to the cumulative rating of difficulty reduction events and was included as a time-dependent covariate; Meds refers to antidepressant medication required during Acute phase coded 0 for no and 1 for yes. Duration refers to the duration of the index episode; Sessions/week refers to the average number of sessions per week each patient received during Maintenance.

The second test of this hypothesis included the same decay parameter described under hypothesis 1 to test the timing of the effects of the life events. The parameter was included as a time-varying covariate. As in hypothesis 1, inclusion of this parameter in the model yielded large standard errors. It was again concluded that this parameter was not a good fit to the data and was removed from subsequent analyses.

The final test of this hypothesis included computing the Cox regression models using our four category separation of events. These results are summarized in Table 3.17 (models 13-16).

Model 13: This model was divided into four submodels (a-d). Each event category was treated as a time-dependent covariate as the only predictor in the model. As can be seen in the table, only neutral events significantly predict time to episode recurrence. For each additional neutral event experienced there is a 12% increase in risk to recurrence.

Model 14: This model included all four subcategories of events simultaneously as time-dependent covariates and also included the addition of difficulty reduction events as time-dependent covariates. Again, only neutral events significantly predict time to episode recurrence. Controlling for all other event types, for every additional neutral event experienced, risk of recurrence increases by almost 20%.

Model 15: This model included all four event categories, difficulty reduction events, antidepressant medication status, HRSD-25 scores at stabilization, HRSD-25 scores at entry into Maintenance, age at time of study, duration of index episode, and age at first depression onset. As seen in the table below; neutral events continue to significantly predict episode recurrence after controlling for the other covariates. There is a trend for difficulty reduction events to decrease risk of recurrence (each additional difficulty reduction event equals a 20% decrease in risk of recurrence). As age at time of study entry increases, risk of recurrence increases by 7%. As age at time of first depression onset increases, risk of recurrence decreases by 7%. As HRSD-25 score at entry into Maintenance increase, risk of recurrence increases by 12%.

Model 16: This final model included the same covariates as in Model 15, with the addition of average number of maintenance IPT sessions per week. Results were similar with this additional parameter. Contrary to the findings in model 12, number of IPT sessions did not appear to be related to time to depression recurrence when controlling for the other covariates in the model.

Goodness-of-Fit (models 13-16): Goodness-of-fit criteria indicate improvement in model fit with the additional covariates in the model. Models 14,15, and 16 indicate improvement of fit over Model 12, suggesting benefit of including the event categories rather than only including long-term contextual positivity ratings.

Table 3.17 Results of maintenance phase Cox regression event category models 13-16 using the four category of events classifications as time-dependent covariates (n=131).

	Parameter estimate	Standard error	X^2	Pr> X^2	Hazard ratio
Model 13					
a. Provoking	- .102	.122	.706	.40	.902
b. Severe	- .099	.317	.099	.75	.905
c. Neutral	.115	.053	4.72	.03	1.122
d. Positive	.158	.182	.754	.39	1.171
Model 14					
Provoking	- .049	.133	.135	.71	.952
Severe	- .125	.371	.114	.74	.882
Neutral	.180	.071	6.44	.01	1.197
Positive	.237	.214	1.23	.27	1.267
Difficulty Reduction	-.100	.123	.663	.42	.905
Model 15					
Provoking	- .106	.165	.407	.52	.900
Severe	- .382	.376	1.033	.31	.682
Neutral	.347	.084	17.19	< .0001	1.415
Positive	.063	.238	.071	.79	1.065
Difficulty Reduction	-.228	.136	2.81	.09	.796
Meds	.544	.385	1.99	.158	1.72
Age at study entry	.073	.022	11.35	.0008	1.076
Age 1st episode	- .073	.026	7.75	.005	.929
Duration	.005	.010	.221	.638	1.005
Stabilization HRSD25	.144	.011	2.10	.145	1.155
Maintenance HRSD25	.118	.050	5.63	.018	1.126
Model 16					
Provoking	- .126	.167	.569	.45	.881
Severe	- .365	.376	.943	.33	.694
Neutral	.328	.086	14.699	.0001	1.388
Positive	.076	.237	.103	.75	1.079
Difficulty Reduction	-.212	.137	2.41	.12	.808
Meds	.656	.397	2.73	.10	1.927
Age at study entry	.072	.022	10.44	.001	1.074
Duration	.004	.010	.170	.68	1.004
Age 1st episode	- .071	.027	6.95	.008	.931
Stabilization HRSD25	.132	.102	1.70	.19	1.142
Maintenance HRSD25	.109	.051	4.59	.03	1.115
Sessions/week	.860	.605	2.02	.16	2.36

Key: Difficulty Reduction refers to the cumulative rating of difficulty reduction events and was included as a time-dependent covariate; Meds refers to antidepressant medication required during Acute phase coded 0 for no and 1 for yes. Duration refers to the duration of the index episode; Sessions/week refers to the average number of sessions per week each patient received during Maintenance.

3.9 HYPOTHESIS 3

Hypothesis 3 predicted that the categories of positive events experienced during the maintenance phase would differ within individuals from the categories of events during the acute phase. Each event was rated on the 11 positivity subscales. As few events were rated higher than a 1-little/none on the long-term contextual positivity scale, few events were rated higher than a 1-little/none on the subscales. This is illustrated in Table 3.18 below. Fresh start ratings were not included in the table because they were rated on a different scale: -1 no possibility, 0 potential, 1 definite. Only three out of 918 events were rated as potential or definite fresh start events in the Pre-Onset phase, four out of 400 in the Acute phase, and one out of 888 in the Maintenance phase.

Table 3.18 Percentage of positivity subscales rated by severity in each phase of study.

	Little/None	Some	Moderate	Marked
Pre-Onset Phase				
Delogjamming	99	1	0	0
Hope	97	3	0	0
Relief	87	10	3	0
Reconciliation	99	0	1	0
Restoration	98	1	1	0
Goal Attainment	89	7	4	1
Enjoyment	76	18	6	0
Reroutinization	99	1	1	0
Goal Provision	96	3	2	0
Anchoring	96	2	1	0
Acute Phase				
Delogjamming	97	1	0	0
Hope	94	4	1	0
Relief	81	14	4	0
Reconciliation	97	2	0	0
Restoration	98	1	0	0
Goal Attainment	88	7	4	1
Enjoyment	79	15	5	1
Reroutinization	99	0	1	0
Goal Provision	94	3	2	0
Anchoring	93	5	2	0
Maintenance Phase				
Delogjamming	99	0	0	0
Hope	97	2	1	0
Relief	86	10	4	0
Reconciliation	98	1	0	0
Restoration	98	2	0	0
Goal Attainment	90	6	3	0
Enjoyment	76	18	4	0
Reroutinization	99	1	0	0
Goal Provision	93	5	1	0
Anchoring	96	2	0	0

Correlational analyses were executed in order to further explore the nature of these positivity subscales and to determine whether the subscales were factorable. The first set of correlations describes the interrelationship among the subscales within each phase. Table 3.19 shows the results of these analyses. As can be seen in the table, few correlations exceed 0.3, indicating that the data may not be appropriate for factor analysis. Tests of Kaisers's Measure of Sampling Adequacy confirms the unfactorability of these data; in the Acute phase only four out of ten scales have levels greater than 0.6 and in the Maintenance phase seven out of ten meet criteria.

Table 3.19 Spearman correlations between positivity subscales in the acute and maintenance phases.

r_s	Delog	Hope	Relief	Recon	Restor	Goal	Enjoy	Rerout	Provis	Anchor
Delog		.09	**.18**	**.18**	**.21**	-.03	.01	-.01	-.02	-.03
Hope			**.21**	**.14**	**.18**	**.19**	.09	-.02	.04	**.23**
Relief				-.02	.01	**.23**	.06	-.03	-.02	**.14**
Recon					**.33**	-.05	.06	-.01	.05	.04
Restor						-.04	.05	**.31**	-.03	-.03
Goal							**.37**	-.03	**.29**	**.49**
Enjoy								-.03	**.41**	**.37**
Rerout									-.02	-.02
Provis										**.51**

Maintenance Phase (n=888 events)

r_s	Delog	Hope	Relief	Recon	Restor	Goal	Enjoy	Rerout	Provis	Anchor
Delog		**.16**	**.11**	**.12**	**.10**	**.14**	**.12**	**.13**	**.16**	**.15**
Hope			**.23**	.08	.07	.16	.11	.09	**.21**	.14
Relief				.03	-.01	**.20**	.07	.13	.02	.12
Recon					**.25**	-.01	.13	-.01	-.03	-.02
Restor						.01	.15	.21	-.00	.02
Goal							**.44**	.04	**.43**	**.45**
Enjoy								.05	**.34**	**.23**
Rerout									.10	.15
Provis										**.51**

Note: p<.01 highlighted in bold.

The second set of correlations describes the interrelationships among the subscales between the Acute phase and the Maintenance phase. The average rating for each patient on each positivity subscale was computed. Spearman correlations were used to test the relationship between the subscale averages between the Acute and Maintenance phases. Results are shown in Table 3.20. As can be seen in the table, Hope, Goal Attainment, Enjoyment, and Anchoring are correlated between phases.

Table 3.20 Spearman correlations between acute positivity subscales and maintenance positivity subscales.

N=99

				Acute						
r_s	Delog	Hope	Relief	Recon	Restor	Goal	Enjoy	Rerout	Provis	Anchor
Maintenance										
Delog	-.04									
Hope		**.30**								
Relief			.15							
Recon				.05						
Restor					.17					
Goal						**.27**				
Enjoy							**.29**			
Rerout								.11		
Provis									.13	
Anchor										**.26**

Note: p<.01 highlighted in bold.

3.10 POST HOC ANALYSES

The findings that neutral events may be contributing to depression recurrence while receiving IPT led to some additional exploratory analyses about possible reasons for this finding. One potential contributor to the experience of life events and the effect of life events on treatment outcomes may be the influence of personality pathology.

In order to explore the potential relationship between life events and personality disorders and the effects on treatment outcome, personality disorder diagnoses were included as a covariate in the above proportional hazards regression models described in Hypothesis 1 and 2, using SCID-II data that was available for 125 women who entered in the Maintenance phase of the study. One hundred and twenty-one patients had both SCID-II data and LEDS data available for analysis. SCID-II variables were scored on 12 diagnoses as either threshold, subthreshold or absent. Data were combined in the following ways: 1) all subthreshold and threshold responses summed and used as a continuous variable 2) threshold responses used to create a present/absent dichotomy. Scores are reported for both individual personality diagnoses and Cluster scores. See tables 3.21 through 3.23 for a summary. The most prevalent personality disorder diagnosis falls in the Cluster C category, while the least prevalent fall within Cluster A.

Table 3.21 Frequency of threshold and subthreshold SCID-II personality scores (n=125).

Cluster	Mean	SD	Maximum
A	3.81	5.04	23.00
B	6.76	7.24	41.00
C	16.10	10.85	53.00
Total	26.67	19.66	92.00

Note: Scores calculated by summing the number of threshold and subthreshold items for each personality disorder category. The total score represents the total number of threshold and subthreshold items endorsed in all categories.

Table 3.22 Frequency of SCID-II personality disorder diagnoses (n=125).

Diagnosis	Yes	No
Paranoid	2	123
Schizotypal	0	125
Schizoid	0	125
Total Cluster A	2	123
Histrionic	2	123
Narcissistic	1	124
Borderline	4	121
Antisocial	0	125
Total Cluster B	6	119
Avoidant	7	118
Dependent	3	122
Obsessive-Compulsive	5	120
Passive-Aggressive	6	119
Self-Defeating	7	118
Total Cluster C	21	104
Total any PD diagnosis	26	99

Table 3.23 Frequency of multiple SCID-II personality disorder diagnoses (n=125).

Cluster	**# of Diagnoses:**	**0**	**1**	**2**	**3**	**4**
A		123	2	0	0	0
B		119	5	1	0	0
C		104	16	3	2	0
Total		99	18	6	1	1

Previous analyses in this sample have shown significant group differences between patients meeting criteria for personality disorder diagnoses and those who do not meet criteria (Cyranowski et al., 2004). Patients with personality disorder diagnoses were more likely to need adjunctive antidepressant medication during the Acute phase of treatment and they were more likely to recur during the Maintenance phase of treatment.

Preliminary analyses were conducted to determine if there was any relationship between personality disorder diagnosis and life events. Spearman correlations were used to calculate the associations of the categorical personality disorder diagnoses (by cluster) and the continuous personality disorder score (sum of threshold and subthreshold items endorsed) with the four categories of life events (provoking, severe, neutral, and positive). Because of the small number of severe events, the provoking and severe categories were combined. In order to control for time in each phase, the event per day rate was used. Results are shown in Table 3.24 below.

Table 3.24 Spearman correlations between events per day and SCID-II personality disorder.

Acute phase (n=121)

r_s	Acute Total	Maint Total	Acute Severe	Maint Severe	Acute Neutral	Maint Neutral	Acute Positive	Maint Positive
Total PD	.07	**-.25**	.10	-.19	.01	-.20	**.19**	-.10
Cluster A	-.02	-.17	.06	-.13	-.08	-.17	.08	-.09
Cluster B	.16	.07	.09	.14	.16	.05	**.18**	.06
Cluster C	.03	**-.28**	.05	**-.23**	.00	**-.22**	.10	-.14
PDSUM	.17	.07	.06	.05	.11	.06	**.23**	.12
A_SUM	.12	.10	.04	.03	.06	.12	**.20**	.06
B_SUM	**.26**	.10	.06	.12	**.21**	.10	**.22**	.14
C_SUM	.11	.04	.03	.02	.06	.04	**.21**	.12

Note: Total PD score was the sum of all SCID-II threshold personality disorder diagnoses received. Cluster A, B, and C were the sum of all threshold diagnoses received in the respective cluster. PDSUM is the sum of all subthreshold and threshold items endorsed on SCID-II. A_SUM, B_SUM, C_SUM include the sum of subthreshold and threshold items endorsed in the respective clusters. Significant correlations ($p<.05$) are in bold.

As illustrated in the table, there seems to be a relationship between personality disorder diagnosis and reports of life events, although not in an intuitive direction. As the number of personality disorder diagnoses increased, the number of positive life events per day decreased; especially in Cluster C or when using the sum of threshold and subthreshold scores. It was decided to test this relationship further by including personality disorder diagnoses and scores in the Cox model described in Hypothesis 1 and 2. This enables a test of the influence of personality on time to remission controlling for life events, as well as the effects of life events while controlling for personality.

3.10.1 Acute Phase Outcomes

SCID-II data were incorporated into the Cox regression model in two ways: categorical (presence or absence) and continuous (sum of threshold and subthreshold scores). The first model included the four event categories (provoking, severe, neutral, and positive) and the difficulty reduction events as time-dependent covariates. The total number of personality disorder diagnoses was included as a time-invariant covariate. In order to control for potential confounding effects of episode severity and other demographic factors, age at time of study, duration of episode, baseline HRSD scores, age at first episode, and antidepressant medication status were also included as covariates. Similar to the results described in Hypothesis 1, only medication status significantly predicted time to remission. Patients who did not require antidepressant medication had nearly 6.5 times decreased time to remission of those that did. There were no other significant predictors of time to remission in this model, including personality disorder diagnoses.

Table 3.25 Results of post hoc analyses showing acute phase Cox regression model including personality disorder diagnosis (n=121).

Covariate	Parameter Estimate	Standard Error	X2	Pr>X	Hazard Ratio
Provoking	.25	.14	3.13	.08	1.29
Severe	-.18	.30	.35	.55	0.84
Neutral	.03	.05	.37	.55	1.03
Positive	-.16	.18	.84	.36	0.85
Diff. Reduction	.04	.08	.33	.57	1.05
Total # PD dx	.22	.16	1.94	.16	1.25
Meds	-1.88	.33	32.5	< .0001	0.15
Age at study entry	.0004	.01	.0013	.97	1.00
Duration of episode	.0005	.004	.01	.91	1.00
Baseline HRSD-25	-.04	.03	2.08	.15	0.96
Age at first episode	.01	.01	.91	.34	1.01

Note: Total # PD dx reflects total number of SCID-II personality diagnoses meeting threshold criteria. Meds coded 0 if no adjunctive antidepressant medication required during Acute phase and coded 1 if adjunctive antidepressant medication required during Acute phase. Provoking, severe, neutral, positive, and difficulty reduction events were included as time-variant covariates.

The next model examined the inclusion of personality disorder diagnosis as a continuous variable. This model included the four life event categories and difficulty reduction events as time-dependent predictors. The sum of the subthreshold and threshold items on the SCID-II was included as a continuous measure of personality. The other demographic and clinical covariates were also included as described above. Again, medication status was the only significant predictor of time to remission.

Table 3.26 Results of post hoc analyses showing acute phase Cox regression model including continuous personality pathology score (n=121).

Covariate	Parameter Estimate	Standard Error	X2	Pr>X	Hazard Ratio
Provoking	.26	.14	3.49	.06	1.30
Severe	-.26	.31	.70	.40	0.77
Neutral	.03	.05	.33	.57	1.03
Positive	-.10	.18	.28	.60	0.91
Diff. Reduction	.07	.08	.91	.34	1.08
SUM PD	-.01	.01	1.08	.30	0.99
Meds	**-1.87**	**.33**	**31.79**	**< .0001**	**0.16**
Age at study entry	.002	.01	.04	.85	1.00
Duration of episode	-.001	.005	.06	.80	1.00
Baseline HRSD-25	-.03	.03	1.49	.22	0.97
Age at first episode	.01	.01	.47	.49	1.01

Note: SUM PD reflects total number of subthreshold and threshold SCID-II personality disorder criteria endorsed. Meds coded 0 if no adjunctive antidepressant medication required during Acute phase and coded 1 if adjunctive antidepressant medication required during Acute phase. Provoking, severe, neutral, positive, and difficulty reduction events included as time-varying covariates.

3.10.2 Maintenance Phase Outcomes

The next series of models tested SCID-II personality in the same ways as described above. The first model included the four categories of events and difficulty reduction events as time variant covariates along with total number of personality disorder diagnoses, antidepressant medication status in Acute phase, age, duration, age at first episode, stabilization HRS25 and maintenance HRS25 scores. As found in hypothesis two, neutral events, medication status, and age at time of study all significantly increased the risk of recurrence. In addition, the total number of personality diagnoses also increased the risk of recurrence, even controlling for the other covariates. For each additional personality disorder endorsed, the risk of recurrence increased by over 2 ½ times. Results were the same when substituting the continuous measure of personality for the categorical measure. In this model, for each additional point on the personality score, the risk of recurrence increased by about 4%.

Table 3.27 Results of post hoc analyses showing maintenance phase Cox regression model including personality disorder categorical diagnosis (n=121).

Covariate	Parameter Estimate	Standard Error	X2	Pr>X	Hazard Ratio
Provoking	-.29	.19	2.31	.13	0.75
Severe	-.10	.40	.06	.80	0.90
Neutral	.41	.09	19.74	<.0001	1.51
Positive	.24	.25	.91	.34	1.27
Diff. Reduction	-.28	.15	3.56	.06	0.75
Total # PD dx	.96	.23	16.98	<.0001	2.62
Meds	.98	.42	5.50	.02	2.67
Age at study entry	.08	.03	8.77	.003	1.08
Duration of episode	.008	.01	.49	.48	1.01
Age at first episode	-.04	.03	1.81	.18	0.96
Stabilization HRSD-25	.12	.11	1.18	.28	1.13
Maintenance HRSD-25	.08	.05	2.31	.13	1.09

Note: Total # PD dx reflects total number of SCID-II personality diagnoses meeting threshold criteria. Meds coded 0 if no adjunctive antidepressant medication required during Acute phase and coded 1 if adjunctive antidepressant medication required during Acute phase. Provoking, severe, neutral, positive, and difficulty reduction events were included as time-varying covariates. Stabilization HRSD-25 item score reflects an average of three stabilization scores received prior to entering continuation. Maintenance HRSD-25 item score is the score received at entry into Maintenance.

To further elucidate the relationship between personality disorders and time to recurrence, personality clusters were included as separate covariates in the above described models. We wanted to test the effects of Cluster C specifically, since the most frequently endorsed personality disorders in this sample, and depressed samples in general, were in Cluster C. This model included the four categories of events and difficulty reduction events as time-dependent covariates along with the total number of Cluster C PDs, medication status, age at study entry, age at first episode, duration, stabilization HRSD-25 and maintenance HRSD-25. As found above, neutral events, medication status, age at study entry, and Cluster C personality disorders all significantly increased risk of recurrence.

Table 3.28 Results of post hoc analyses showing maintenance phase Cox regression model including total number of Cluster C personality disorder diagnoses (n=121).

Covariate	Parameter Estimate	Standard Error	X2	Pr>X	Hazard Ratio
Provoking	-.18	.18	.95	.33	0.84
Severe	-.22	.40	.29	.59	0.80
Neutral	.40	.09	19.49	<.0001	1.49
Positive	.24	.25	.91	.34	1.27
Diff. Reduction	-.27	.14	3.57	.06	0.76
# Cluster C	.95	.29	10.78	.001	2.59
Meds	.83	.41	4.06	.04	2.29
Age at study entry	.07	.02	8.19	.004	1.07
Duration of episode	.006	.01	.28	.60	1.01
Age at first episode	-.04	.03	2.44	.12	0.96
Stabilization HRSD-25	.15	.11	1.84	.18	1.16
Maintenance HRSD-25	.08	.05	2.18	.14	1.08

Note: # Cluster C reflects total number of SCID-II personality diagnoses meeting threshold criteria for a Cluster C personality disorder. Meds coded 0 if no adjunctive antidepressant medication required during Acute phase and coded 1 if adjunctive antidepressant medication required during Acute phase. Provoking, severe, neutral, positive, and difficulty reduction events were included as time-varying covariates. Stabilization HRSD-25 item score reflects an average of three stabilization scores received prior to entering continuation. Maintenance HRSD-25 item score is the score received at entry into Maintenance.

This finding is particularly interesting given the inverse correlation between Cluster C diagnosis and the number of neutral events reported per day. This suggests the possibility of an interaction between these variables. We first included Cluster C diagnoses as a stratification variable. In this type of analysis, the variance attributed to group differences in the stratification variable is removed. The results of this model continue to indicate significant effects of neutral events and age increasing risk of recurrence. Another way to test for possible interaction effects within a Cox regression is to use a "by" variable. This type of analysis divides the sample into two groups, having a Cluster C diagnosis or no Cluster C diagnosis. The results are then reported for each group. In the no C PD group (n=101, 23 recur): neutral events and age continue to increase risk of recurrence. In addition, difficulty reduction events were found to significantly increase time in maintenance. In the group with Cluster C personality disorder (n=20, 10 recur), the sample size was too small to handle the relatively large number of covariates. These results yielded extremely large parameter estimates and standard errors, indicating that the model was not adequately fit to the data. Although there may be an interaction between personality variables and life events, our sample is not large enough to test this effect. This is an interesting question for future research.

4.0 DISCUSSION

4.1 OVERVIEW

The relationship between life stress and MDD has been widely studied, though few studies have examined the role of positive life events. This study examined the relationship between the experience of positive life events and recovery from an acute episode of depression and maintenance of recovery in the context of IPT treatment in a sample of women with recurrent MDD. Using the "gold standard" of life event measurement, the LEDS, we were able to characterize life events throughout the entire phase of acute treatment and maintenance treatment with IPT. This was the only study to our knowledge examining positive life events in a clinical sample during a controlled treatment trial. It is also the only study to our knowledge that examined positive life events during prophylactic IPT, a treatment specifically designed to prevent depressive episode recurrence by enhancing interpersonal functioning.

4.2 REPORTING AND RATING OF EVENTS

We originally planned to utilize only the ratings on the long-term contextual positivity scale of the LEDS and not the long-term threat ratings to examine the effects of positive life events in isolation. However, initial analyses indicated that important information was lost if we accounted for only one dimension of an event. To account for both dimensions (positivity and threat), we reclassified events into four mutually exclusive categories modeled from the categories used in Frank et al 1996 and Tu et al 2000: *provoking* (marked/moderate threat, little/no positivity, subject focused), *severe* (marked/moderate threat, little/no positivity, other focused), *neutral* (little/no threat, little/no positivity), and *positive* (little/no

threat, marked/moderate positivity). These categories were then used to more specifically examine the relationship between each type of event and episode recovery and episode recurrence. The most frequently occurring type of event was neutral events, with patients reporting from zero to twenty-two events per study phase. In contrast, severe and positive events were reported less frequently, with patients reporting from zero to five events per study phase. We also examined the effects of difficulty reduction events, events that reduce the level of chronic difficulties. Reported rates of these types of events ranged from zero to eight reductions per study phase. The frequency of event reports tended to remain stable across the Acute and Maintenance phase. However, the total number of events reported, and the number of neutral events reported, were significantly higher in the Acute and Maintenance phases as compared to the Pre-onset phase. This was true even after controlling for the length of the phase. This is consistent with previous reports of event "fall-off" that suggest that it is only non-severe events that are vulnerable to this effect (Nielsen et al., 1989; Surtees et al., 1986). One likely explanation for our result is recall bias for events reported in the Pre-onset phase, as we found that as the number of days between the LEDS interview and episode onset increased, the number of events reported decreased. Another potential reason for this discrepancy is that events in the Acute and Maintenance phase were typically measured in the second or third LEDS interview, which may have contributed to a "practice effect" or priming for remembering events.

Preliminary analyses revealed interesting relationships between total number of events reported and age at study entry and age at first episode onset. We found significant relationships between age and total number of events reported all three phases: as age increased, the number of events reported decreased. Additionally, as duration of the index episode increased, the number of events reported in the pre-onset phase decreased. The age at first depressive episode experienced was also significantly related to the number of events reported: as the age at first episode increased, the number of total events and total number of events per day reported decreased. There were also significant differences between depression severity scores as measured by the HRSD and number of events reported. HRSD scores at stabilization and at the start of maintenance were significantly inversely related to the number of events reported in the Acute phase. As these were correlations, the causal direction of this relationship is unclear. Experiencing fewer events could have led to higher HRSD scores,

or patients who were more depressed could have experienced fewer events. Similarly, final HRSD scores were related with the number of events per day reported during the Maintenance phase. Again, the direction of the effect is unclear. It would be interesting to further explore these relationships using a concurrent account of weekly depression scores and events.

4.3 EVENTS AND TREATMENT OUTCOMES

Contrary to our hypotheses, we found no relationship between the cumulative experience of positive life events and remission from MDD during the acute treatment phase. The only significant predictor of time to remission from the acute episode was the need for adjunctive antidepressant medication, an expected finding as by study design antidepressant medication was added to the treatment of patients who did not show a timely response to IPT alone. Also contrary to our hypothesis, we did not find a significant relationship between positive life events and decreased risk of episode recurrence. During the maintenance phase of treatment, we found that several demographic and clinical features were related to recurrence. First, older age at time of study was related to shorter time to depression recurrence, even after controlling for all other demographic and clinical variables as well as life events. Second, after controlling for all other demographic, clinical, and life event variables, earlier age of first depressive episode significantly predicted shorter time to recurrence. Third, higher HRSD scores at entry in the maintenance phase were related to decreased time to episode recurrence. These three variables have all been previously associated with episode recurrence (Gonzales, Lewinsohn, & Clarke, 1985; Kessing, 1998; Solomon, Keller, Leon et al., 2000). Fourth, we found that the cumulative experience of neutral life events was significantly related to episode recurrence. Specifically, controlling for all other types of events, demographics, and clinical variables, as the number of neutral events experienced during the Maintenance phase increased, the risk of episode recurrence increased. None of the other types of events, including difficulty reduction events, were significantly related to the risk of recurrence. Finally, in exploratory analyses, we found that the cumulative experience of neutral life

events continued to predict shorter time to episode recurrence even after controlling for personality pathology.

Our findings are in contrast to previous studies that have examined positive life events in depression. Community and primary care studies using LEDS methodology have found that positive life events, especially neutralization events, were predictive of improvement in depressive or anxiety symptoms (Brown et al., 1988; Brown & Harris, 1992; Brown et al., 1992; Leenstra, Ormel, & Giel, 1995; Oldehinkel, Neeleman, & Ormel, 2000; Tennant et al., 1981). Only three studies have examined positive life events and remission from depression using clinical samples (Brown, 1993; Brown et al., 1994; Parker et al., 1985). The earliest of the studies, Parker and colleagues (1985) studied a small sample of patients with non-endogenous depression. The patients were measured on previous number of depressive episodes, socio-demographics, episode severity, and life events at baseline, six, and twenty week follow-ups. They found that positive life events experienced during the six week interval between the baseline and first follow-ups were associated with symptom improvement at six and twenty weeks. They also found that neutralization events during this period were associated with symptom improvement after twenty weeks. This study was a naturalistic study of depression recovery which did not control treatment received during the course of the study, and none of the patients were taking antidepressant medication. Brown (1993), in a mixed sample of inpatients, outpatients, day-patients, and psychiatric patients appearing in an emergency room, utilized the LEDS to examine the role of positive life events and recovery from depression. Brown found that 41% of patients experienced a positive event prior to episode recovery. Positive life events were not associated with episode recovery in those patients on antidepressant medication. Further analyses indicated that both positive event experience and antidepressant medication were required to model episode recovery; however, the effect was larger for positive events. Brown did not discuss the types of treatments used or the duration of treatment received during the course of the study. The third clinical study utilized a similar mixed sample (inpatient, outpatient, day-patient) to examine predictors of chronic courses of depressive episodes (Brown, et al., 1994). The patients were interviewed at baseline and at two year follow-up. They found that positive life events reduced the occurrence of episodes with a chronic course. This effect was significant, but

modest. Little is known about the demographic or clinical characteristics of this sample as it was not discussed by the authors.

There are several differences between our study and the previous studies which may account for the contrasting findings. Our study was a controlled trial of psychotherapy conducted in an academic medical center. We used DSM diagnoses and strict inclusion and exclusion criteria for study entry to ensure a relatively homogeneous sample of women with Major Depression (versus other principal diagnoses). Our sample included women who had experienced multiple previous episodes of depression. We utilized a number of clinical assessments resulting in a well characterized sample. In addition to sample difference, there are differences in the method of analyses used. All three prior studies compared the percentage or number of positive events experienced in various intervals between patients who recovered versus those who did not recover. Our analyses used a more robust model of timing of events and time to recovery. This enabled us to detect the effects of the events and the timing of the effects while simultaneously controlling for the effects of other variables such as medication and age that are also prognostic of recovery or recurrence. Ours is also the only study to examine the role of positive life events in maintenance of recovery.

One reason for the lack of predictive findings of positive life events in our sample could be the low occurrence of positive events in our study compared to previous studies. For example, early studies using LEDS found that over one-third of the patients experienced a positive life event during the study period. In contrast, only 21% of our patients reported at least one positive event during the acute phase of treatment, which accounted for only about 8% of the total number of life events. In a similar study (Frank et al., 1996), positive life events comprised about 20% of the total number of events. Because of the low occurrence of positive events, we were unable to meaningfully explore any differences between the qualitative features of positive events experienced during different phases of depressive illness and recovery.

There are several possible explanations for the low rate of positive events reported in our sample. This is the first study to examine positive life events in a clinical sample of women with highly recurrent MDD during acute and maintenance treatment. These women had experienced an average of over four previous MDD episodes, with many having a first episode beginning during adolescence or earlier. It may

be that these women were less likely to recognize or report positive events. Alternatively, these women may not be as sensitive to the effects of positive events and more sensitive to the effects of more neutral or threatening events, therefore less likely to report positive events. This possibility is consistent with the trait-negative bias that is well documented in depression (Gotlib, Kasch, Traill, et al., 2004; Gotlib, Krasnoperova, Neubauer, & Joormann, 2004; Joormann, 2004; Koster, De Raedt, Goeleven, Franck, & Crombez, 2005; Leppanen, 2006; MacLeod, Mathews, & Tata, 1986; Segal, Kennedy, Gemar, Hood, Pedersen, & Buis, 2006). Additionally, a previous study noted that positive events were less likely to occur in patients with more severe episodes and higher levels of anxiety symptoms (Neeleman et al., 2003), characteristics that are more common in clinical samples such as ours. Another possibility is that these highly recurrent women simply did not yet have the resources or environments that are conducive to experiencing positive events as they were early in their recovery. At such a vulnerable point in the recovery process, these women may not yet have had the interpersonal skills or resources to experience positive events or change their environments to make positive event occurrence more likely. It would be interesting to compare the rates of positive events as recovery persists to look for an increasing trend in the experience of positive events. Finally, it must also be noted, that the threshold for receiving a positive event rating was much higher in this study (B. Anderson, personal communication) than in the traditional LEDS community studies. Because the primary goal of using the LEDS in this study was to examine factors related to onset of depression and depression recurrence, the interviewers and raters may have been biased towards events with more negative connotations. It is possible that the raters were not as attuned to pick up positive events, pick out positive meaning from threatening events, or that they were not as likely to elicit these types of events during the LEDS interview. As the raters were highly trained and the ratings were reviewed during consensus meetings, this possibility seems unlikely.

4.4 NEUTRAL EVENTS – A MISLEADING LABEL?

Although we did not find a relationship between positive life events and recovery from depression, we did find a relationship between neutral life events and episode recurrence. Using the four category

event classification, survival analyses revealed a significant relationship between neutral life events (those events rated low on both positive and threat dimensions) and shorter time to episode recurrence. This suggests that in this sample, events previously labeled as neutral are not benign. While this was an unexpected finding, it is not unprecedented. Frank and colleagues (1996) also found that if a low threat/low positivity event occurs after a provoking agent level event, the patient was over three times more likely to become depressed than those patients who did experience that type of event. In an overlapping patient sample, Tu and colleagues (2000) found that neutral life events were predictive of a longer time to episode remission.

Why would so-called neutral events be more potent instigators of recurrence than provoking or severe events? It is possible that since that the sheer number of neutral events compared to the number of positive or negative events contributed to their potency. Another possible reason for our finding is that IPT-M was designed to target the events or situations that were linked with onset of the index episode. A considerable amount of therapy time is spent examining the factors related to episode onset and actively develop skills to recognize and cope with potential triggers. For example, consider the case of a woman who experienced a depressive episode around the time of a significant relationship break-up. The IPT therapist would help her to relate her depressive symptoms to the circumstances surrounding the break-up and then help the patient to learn ways to avoid such an occurrence in the future or how to manage mood symptoms if another break-up were to occur. This could mean working on communication skills to avoid arguments or working on ways to develop more social support so that she is not as lonely after a break-up. In contrast, if the woman were to come into therapy reporting that she was moving into a new apartment (rated as a neutral event), this might not have been attended to in the session or might be given only minimal attention.

Consistent with this are the previous findings, as well as in the present analyses in an expanded analysis of the same sample, that severe events occurring during the maintenance phase of treatment were not predictive of episode recurrence (Harkness et al., 2002). The authors suggested that a potential mechanism by which IPT-M works is to decrease the potency of severe events. We found that the patients who did not recur experienced just as many provoking and severe events as those that did recur. However, patients who did not recur did not experience as many neutral events or as many

positive events as those that recurred. It is possible that the women that did not recur were somehow able to cope with the severe events successfully without generating additional events, perhaps via a dampening down of stress generation. Alternatively, perhaps these women who were experiencing a lot of life events, even seemingly non-threatening ones, were unable to utilize the interpersonal skills provided in therapy or maintain focus on just one subset of events going on in their lives. These women, who were already at high risk for recurrence, were reporting high rates of provoking and severe events in addition to the neutral events. These women may have been already utilizing all of their available resources to stave off the effects of the severe events. They may have not had any resources in reserve to deal with these other types of stressors and neutral stressors accumulated.

Another possibility for the potent effects of these neutral events is that LEDS methodology has not successfully captured the "true" meaning of these types of events for our sample of women. Even though LEDS uses a contextual rating strategy that is designed to take into account social and environmental circumstances when assigning threat, it may be that subjective perceptions of threat are more important, especially for more minor events. It must also be emphasized that while these events were rated as having low threat and low positivity, they still met LEDS criteria for being an event. Descriptions of some of the events that were categorized as neutral are presented in Appendix A. Upon review of these descriptions, it is not hard to imagine how these events could be perceived as quite stressful, particularly for someone newly recovered from a severe illness. So while this type of event may not be enough to trigger an initial episode of depression, they could be highly potent in a vulnerable group of patients, especially when experienced in high numbers.

4.5 ARE NEUTRAL LIFE EVENTS THE SAME AS DAILY HASSLES?

Daily hassles are relatively common events that arise out of day-to-day living; such as, traffic jams, broken appliances, or unexpected work deadlines (Kanner, Coyne, Schaefer, & Lazarus, 1980). The effects of daily hassles on mood are thought to last typically less than one day, except in certain more vulnerable individuals (Bolger, DeLongis, Kessler, & Schilling, 1989; Caspi, Bolger, &

Eckenrode, 1987). Neutral life events may overlap with daily hassles; however, there are some key differences. For example, the Hassles Scale as developed by Kanner and colleagues (1980) includes vague items such as: “Troublesome neighbors” or “Problems with your lover”. If the trouble with the neighbor is their pet getting loose, then that would probably not be rated as a LEDS event. However, if the trouble with the neighbor is that their pet got loose and bit your child causing a trip to the emergency room, a LEDS event would definitely be rated. While LEDS events are rated based on objective behavioral evidence for the event, daily hassles are typically measured by self report checklists that only capture subjective experiences.

Several studies have compared both daily hassles and life events and their relationship with psychological or health outcomes. Most of these studies have found that hassles are independent predictors of health and psychological outcomes while life events are not related to outcomes outside of their shared effect with hassles (Almeida & Kessler, 1998; Bolger, DeLongis, Kessler, & Schilling, 1989; DeLongis, Coyne, Dakof, Folkman & Lazarus, 1982; Eckenrode, 1984; Kanner, Coyne, Schaefer, & Lazarus, 1981; Serido, Almeida, & Wethington, 2004). Early studies found that when daily hassles were controlled for, the effects of life events were no longer predictive of psychological distress (DeLongis et al., 1982; Eckenrode, 1984; Kanner, et al., 1981). These studies suggest that life events influence psychological health status through their influence on the experience of daily hassles. There are several methodological issues with the findings of these studies that warrant discussion. First, although recall bias is usually not a concern for measuring daily hassles, they tend to be measured using checklist reports, and these studies typically use a checklist for major life events as well. The checklist method of assessment may underestimate the role of major stressors, and it does not account for varying degrees of stressors (an advantage of the contextual rating method). Second, these community studies have consistently found that the major stressors measured do not occur frequently, in contrast to findings in clinical samples, making comparisons more difficult. Additionally, as Monroe (1984) discussed, major life events and minor life events may be redundant. In addition to possible item overlap, a major life event puts a person at risk for experiencing the minor. More recently, Pillow and colleagues (1996) have agreed that minor life events that stem from a major life event or life change can account for psychological distress because minor life events are ongoing occurrences. They also propose a model in

which the major life event moderates the relationship between minor event and outcome by sensitizing the person to remember more minor events related to the major event. On the other hand, once having experienced a major life event, the person may start the coping process to handle the resultant minor events (Pillow et al., 1996). In summary, this literature suggests that a model that includes both major and minor events is necessary to get a complete picture of the relationship between stress, coping, and psychological outcomes.

4.6 HOW ARE LIFE EVENTS RELATED TO PERSONALITY PATHOLOGY?

It is commonly thought that the presence of co-occurring personality pathology in patients with MDD adversely affects treatment outcomes. Many studies have found that co-occurring personality disorders also adversely affect psychosocial and interpersonal functioning (Diguer, Barber, & Luborsky, 1993; Frank et al., 1987; Hardy et al., 1995; Pilkonis & Frank, 1988; Shea et al., 1990; Zuckerman et al., 1980). Previous work in this sample found that co-morbid personality pathology was related to an increased risk of episode recurrence (Cyranowski, Frank, Winter, et al., 2004). Other studies have suggested that personality factors are associated with higher rates of negative life events (Jovev & Jackson, 2006; Pagano, Skodol, Stout, et al., 2004; Samuels, Nestadt, Romanoski, Folstein, & McHugh, 1994; Seivewright, 1987; Seivewright, Tyrer, Ferguson, Murphy, & Johnson, 2000). Bolger and Schilling (1991) found that reactivity to minor stressors was the most important factor that differentiated levels of distress reported by patients categorized as high-neuroticism versus low-neuroticism. Gunthert and colleagues (1999) also found that neurotic patients were more likely to rate minor events as stressful, especially if they were interpersonal events, than non-neurotics. We did a series of exploratory analyses to examine the possible relationship between personality pathology and life events as well as what effects they have on recurrence. Correlational analyses indicated several significant but modest relationships between SCID-II personality disorder criteria and life events. We found positive correlations between neutral and positive life events reporting during the Acute phase of treatment with Cluster B diagnoses and Cluster A, B, and C personality pathology measured continuously. We also found inverse

relationships between the number of severe and neutral life events per day reported during the maintenance phase and Cluster C personality diagnoses. We included personality disorder diagnoses as predictors in the survival analysis in two ways, first as a categorical predictor (diagnosis versus no diagnosis) and then as a sum of subthreshold and threshold items endorsed on the SCID-II to give a continuous measure of personality characteristics. Upon inclusion in the survival models, we found that after controlling for all other variables in the model, personality pathology was not significantly related to episode remission during the acute phase of treatment. However, personality pathology was a significant predictor of episode recurrence during the maintenance phase. Neutral life events continued to predict episode recurrence even when controlling for the effects of personality pathology. This presents a potentially interesting finding: neutral events are inversely related to personality, yet both factors are associated with an increased risk of recurrence. Unfortunately, our sample size was too small to reliably test the possibility of an interaction effect; preliminary evidence points to life events being more important for recurrence in those women without personality pathology.

4.7 WHAT ARE THE IMPLICATIONS OF THESE FINDINGS FOR IPT?

One of the eventual goals of this line of research was to help elucidate potential mechanisms of IPT effectiveness. While we did not test this in the current study, we can comment on how the current findings can help to improve IPT treatment. One possibility is that the cumulative experience of neutral events may serve to derail therapy in these highly vulnerable women. Previous work has suggested that IPT is most effective when the therapist is able to maintain the focus of therapy on interpersonal themes (Frank, Kupfer, Wagner, et al., 1991). When the therapy sessions are less focused, the therapy tends to not be as successful. Thus, neutral life events may divert the therapy focus. In this study, patients may have been continuing to bring up these seemingly more minor events or events that were not related to the focus area requiring the therapist to continually “put out small fires” rather than attend to the larger focus area. Conversely, neutral life events are not typically a focus of IPT; therefore patients may not learn the interpersonal skills to deal with these types of events.

4.8 LIMITATIONS

There are several limitations to this study that must be addressed. First, the collection of life event data is retrospective and we did find some evidence of lower reporting for neutral events in the pre-onset phase. Although every effort was taken to minimize the effects of recall bias, this concern remains. Second, because the number of positive events reported was small, we were unable to test certain hypotheses adequately. Third, there were relatively few patients for whom LEDS data was available throughout the entire two year maintenance period. Although we were able to maximize the use of the data collected by considering the data censored at the time of last available LEDS interview in our survival models, we cannot be certain what effects having complete data for all patients would have on our findings. However, preliminary analyses of demographic and clinical characteristics did not indicate any significant differences between the patients that had complete data compared to the patients that did not have complete data. Fourth, the results of our study may not be generalizable to other patient populations. Our sample consisted of primarily white, highly educated women who sought treatment at an academic medical center. It is likely that male depressed patients have some different risk factors for remission and relapse, particularly in relation to life events. Previous work examining daily hassles (Kanner et al., 1982) as well as using LEDS (Oldehinkel, Neeleman, & Ormel, 2000) has found gender differences in effects of positive life events. Additionally, our analyses of the effects of life events on maintenance treatment outcomes could only be carried out on those patients who were able to reach the maintenance phase of treatment. Those patients who relapsed prior to this phase may show different patterns of life event effects than what we found. Also, while not strictly a limitation: not many patients actually recurred. These findings should be examined in a sample in which more recurrence is expected. Fifth, we did not have a non-depressed control group or a no-treatment control group. We are not able to test whether the influence of life events on recurrence is specific to recurrence while receiving IPT treatment or recurrence in general without having an untreated control condition. Also, without a non-depressed control group we do not know if the rate of life events or the ration of neutral life events to severe reported by our patients is different from what would be expected in a non-depressed person. Finally, we must emphasize that the results of this study were hypothesis generating rather than

confirmatory analyses. We conducted a large number of statistical analyses, thereby increasing the chance for type I error inflation.

4.9 SUMMARY AND FUTURE DIRECTIONS

In this study we found that contrary to our hypothesis, positive life events were not related to shorter time to remission of depression or longer time to episode recurrence in this clinical sample of highly recurrent women. However, we did find that neutral life events were important predictors of episode recurrence, even after controlling for factors indicative of depression severity. We also found evidence for a potential interaction between personality disorders and life events; however, the sample was too small to thoroughly test this possibility.

It could be argued that since this study had such a small number of recurrences examining the predictors of those recurrences are of little value. We assert that although the number of patients who recurred was small, they are still reflective of women with significant vulnerability to recurrence. It remains unclear whether these women are more sensitive to life events or have low social support, poor coping styles, or an inability to utilize psychotherapy effectively. This remains an important issue to continue to research. The fact that the provoking and severe events were not instigating depression recurrence in this sample is a remarkable testimony to the benefits of maintenance therapy. Our findings generate the hypothesis that neutral events are able to disrupt therapy process, and future research is needed to further elucidate the mechanism by which this may occur.

Future work is needed to better characterize patients at risk for recurrence. For example, the women that recurred in this study could have been highly reactive to stress and thus generated many neutral life events as a result, or they could have bad coping skills and thus could not effectively cope with increased amounts of stress. There is some indication that personality factors could interact with the experience of life events; however, larger samples will be needed to test these hypotheses. Answers to these questions would facilitate improvements in therapy techniques used to treat these vulnerable patients. For example, a therapist could facilitate the development of better coping skills for broader

types of stressors, not just stressors associated with onset of the depressive episode, especially if these events tend to occur outside of the IPT focus area.

Future research is needed to further elucidate the nature of these neutral life events that we solicited in the LEDS interview. In our sample, the LEDS does not seem to be accurately capturing the nature of neutral life events in that they are rated as low threat/low positivity, instead they may be important targets for treatment. It is not known what relationship the neutral events may have with previously experienced severe events or ongoing chronic difficulties. It is also not known whether interpersonal events are more potent instigators of recurrence than other types of events. The implementation of more sophisticated analytical techniques may be needed to deal with the complexity of the data obtained using the LEDS. It may be useful to examine a model of stress that includes daily hassles and LEDS events and difficulties along with the interactions of all three distinct types of stressors to best understand the relationship between life events and recovery and recurrence of depression. This may help to fine tune the processes or mechanisms by which life events contribute to depression and how best to target these areas in therapy.

APPENDIX A

LEDS EVENT VIGNETTES

This appendix includes LEDS event vignettes of at each rating level. The first page provides an overview of each of the four categories of events rated and some examples of chronic difficulties. The next pages provide further examples in each category to illustrate the range of events experienced at each rating level.

Provoking Event (Marked/Moderate threat and Little/No positivity):

The event is S's daughter, age 15, dying in a car accident. S was told about the accident by one of her daughter's friends who had thought that she had already known what happened. The police had tried to contact S about her daughter's death, but S was not home.

Severe Event (Marked/Moderate threat and Little/No positivity –other focused):

S says that her mother is underweight and does not eat healthfully. Sister took her mother to the hospital. The doctors told S that her mother almost died from malnutrition. They said that she may be depressed or suffering from the beginning signs of Alzheimer's disease. S's mother goes untreated.

Neutral Event (Little/No Threat and Little/No positivity):

S meets T. through the dating service. They start to go out and meet several times in the following two weeks.

Positive Event (Little/No threat and Marked/Moderate positivity):

A few weeks after S graduated, she is notified that she has been chosen for an NCAA (National College Athletic Association) Scholar/Athlete award. They award her a certain amount of money (approx $3,00) towards graduate school because of both her scholarship and contributions to athletics.

Difficulty (Marked):

S was arrested and jailed for selling cocaine to an undercover police officer. S was sentenced to 1 year in state prison. S shares a cell with 3 others. Family only visits once per month. S's parole hearing takes longer than expected.

Other examples of Provoking or Severe Events

S separates from second husband of 8 years after experiencing trouble communicating, lack of shared interests, and tension. Husband had instigated the breakup. S moves in with her mother, who is 86 and becoming senile.

S is enrolled in a 5 year bachelor's and master's degree program at XX University's Occupational Therapy program. S failed Gross Anatomy, a required class for the course one year ago, attempted suicide and was hospitalized. At the time she was asked to leave the program, but she petitioned to be able to re-take the class and remain in the program. S returned to school part-time to retake the class. S fails the course again and receives a letter telling her that she has been kicked out of the combined bachelor's/Master's program in Occupational Therapy.

S receives a poor score on her yearly review. She receives 2 out of 4, (2 is the lowest acceptable score). S has never scored so low before. This will affect her merit salary increases and will force S to participate in a performance improvement program.

Other examples of Neutral Events

S was hired as a full time regular employee with a company for which she was temping. The event involves the formalization of her employment accompanied by a raise in pay and benefits plan. There are no changes in job responsibilities at this time.

S and her husband have been living in Virginia for over a year. They have recently purchased a house about 1/2 hour away from the rented townhouse that they have been living in since moving to the area. This event is their moving to the new house. S reports that within 2 weeks they have settled in well and are enjoying the new neighborhood. No problems reported. S had not made any close friends in the old neighborhood.

S's new girlfriend asked S several weeks ago if she can move in with her. S agrees to let her move in.

S has been living with K for the past four months. S and K drove to ex-boyfriend's to pick up her car and computer. S and ex-boyfriend get into an argument. He yelled at S because she was taking all of her things that he was still using. S ended the argument by taking everything that she had to have and leaving everything else behind.

S's daughter was released from the psychiatric hospital because S's health insurance had run out. Before daughter was discharged, the workers worked with S on a behavior plan targeting de-escalating and calming techniques that S and the school can use with daughter.

S takes the MCAT. She will not receive her results for several weeks.

S was hit in her car from behind by a truck. The truck lifted S's car and it turned around and came down. S took off her seatbelt and went to get out of the car and had a pain shoot up her back. S did not move but called the paramedics from her car phone saying that she had been in an accident. When the paramedics came, they put her in a stretcher and took her to the hospital. The doctors checked her out and told her that she had severe whiplash. They also said that there is a bone spur and it will start a degenerative disc problem. When she was on the stretcher, she started to get what appeared to be a

migraine headache. The doctors were concerned so they did a CAT Scan. They found no brain damage. S stayed at the hospital overnight. S has continued to have problems with pain in her neck and with mobility.

S is putting on a play. S contacts the PR representative for the University. He agrees to organize the publicity. He does not do this. S calls the AIDS organization and they know nothing about this. The PR guy shrugs off S by saying that he did his job. S writes a letter to her boss and his boss. S, PR guy, and CEO meet to end this situation. PR guy is rude and leaves half way through. No further action is taken.

S gave her cat to her parents rather than taking it with her to someone else's home. There are no problems with this. S will be able to see her cat twice a year when she visits her parents.

S's son asks S if he can go somewhere and she tells him no. He continues to ask if he can go and begins acting up. S grabs him by the hair and slaps him across the face and tells him to shut up. He leaves the room. Within the following week, S has told her husband and they have contacted the employee assistance program at his company. S wanted to talk to someone about what she had done and wanted to make sure it did not happen again. Within two weeks, S has talked to someone at the EAP and can call them again if she can. She has not hit any of her children since.

S's son falls off of his bike and breaks his arm. S takes him to the ER where he is given a cast. At the end of 2 weeks he still has the cast, is doing fine.

S's son Ryan has his wisdom teeth removed.

After a routine physical S is told to have an ultrasound in order to ascertain what the lumps were the doctor felt during a pelvic exam. They are benign.

Other Positive event examples

S has been unemployed for about 6 weeks. She interviews for a job as an architectural draughtsperson / CAD operator. Two days after the interview she is offered the job, which she accepts, and starts work the next week. This is a full-time job, which includes benefits.

S finds out that she is pregnant. It will be her first child but not her first pregnancy (she had an ectopic pregnancy in her 20's). The baby was planned for several months.

S and her husband have been taking care of S's mother in law for the past six months because she has dementia. They have been taking her to doctor appointments, shopping for her, and cleaning her apartment. Her dementia has gotten bad and she is no longer able to live by herself. S's brother in law offered to take her in. S and her husband no longer have any care giving responsibilities.

S graduated from college two years ago. Since then she has been working as an asst. manager at shoe store and living at home with her mother and brother. S sends her resume to a publishing company, and a week later she hears that she has been granted an interview. Within a week she flies to Chicago and interviews for the position.

S contacts her mother when she wants to refinance her house. S's mother is on the deed because she co-signed the mortgage when S bought the house but S paid her off three years ago. They have a difficult relationship, mostly centering on S's abusive stepfather, from whom S's mother has been long divorced. By the end of two weeks S's mother has apologized for some of what happened in the past and the two are planning to stay in closer touch. They have not talked for six years, apart from one phone call.

Other examples of chronic difficulties

S's husband goes to a bar every night after work for a drink. He rarely gets drunk. Drinking has not affected his work, driving, or finances, though they do have frequent arguments about it.

S's 9-year old son was diagnosed with dyslexia one year ago after three years of experiencing difficulties at school. S went to talk to the teachers. She now has a special tutor.

APPENDIX B

DEFINITIONS AND EXAMPLES OF THE SUBCATEGORIES OF POSITIVE LIFE EVENTS

Type of Event/ Definition of Event

Neutralizing (Severe long -term threat is reduced)
S's mother dies after lengthy nursing home stay with Alzheimer's Disease

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Fresh Start (A new beginning)
S gets full-time job after working part-time at unfulfilling position

---

Anchoring (Establishing a role or identity/ Diminished uncertainty)
S's temporary position is made full-time, her first full-time position in 10 years
S tells family that she is in a homosexual relationship

Delogjamming (An impasse is cleared with potential for fresh start)
S left a job because was repeatedly harassed, did not have alternative job
S's son is diagnosed with dyslexia, S is allowed to attend school with son to help

---

Hope (Change is possible to state of deprivation)
S tells her daughter that she is dating someone new, daughter reacts positively

---

Relief (Relief from state of deprivation possible)
S's husband gets a job after long unemployment and financial problem
S's son returns to school after long absence due to anxiety and PTSD

Reconciliation (Reunion after break in contact)
S begins to see her ex-girlfriend socially again after volatile break-up

---

Restoration (Lost object/person/cherished idea is regained)
S is permitted to start 2nd year graduate school after academic probation
After his release from prison, S resumes daily contact with his teenage son

---

Goal Attainment (Achieving a prior set goal)
S receives an acceptance letter from top choice of colleges
S graduates from trade school and begins full-time job in field

---

Reroutinization (Resumption of comfortable routine)
S returns to work after a 1-month long sick leave

Goal Provision (New meaningful purpose provided)
S runs for and is elected treasurer of her social club
S passes qualifying physical to join armed forces

Enjoyment/Interest (Degree of pleasure or meaning)
S retires after 36 years of teaching
S runs the Boston Marathon

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