Life Events, Life Structure,

and Depression

BY

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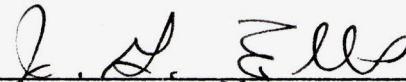
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ABSTRACT

Research continues in the search for a cognitive
mediating variable in the relationship between severe life
events and depression. However, the "dysfunctional
cognitions" theories of Beck (1974) and Seligman (1975)
have not been very successful, and the work on cognitive
complexity based on the ideas of Kelly (1955) and Bieri
(1955) has not included investigation of the role of the
stressful life event in the etiology of depression. In the
present study, Costello's (1976) cognitive theory
concerning differentiation in the perception of life
structure was tested. The theory states that, following a
stressful life event, those individuals with a less
differentiated life structure are more likely to become
depressed. Self-report data were collected from 39 male
and 112 female undergraduates. The measures of
differentiation of life structure were derived from
multidimensional scaling and cluster analysis: (1)
dispersion between life areas, (2) number of clusters of
life areas, (3) proportion of life areas sharing a cluster
with the life area in which the stressful life event
occurred. It was hypothesized that there there would be a
negative relationship between dispersion and depression,

and number of clusters and depression, for those
individuals who had experienced one or more life events
(life event group). However, a modest but insignificant
negative relationship was found between dispersion in life
structure and depression for the control group, with no
relationship between dispersion and depression for the life
event group. Subsequent analyses using only subjects who
had experienced one stressful life event resulted in a
moderate positive relationship between dispersion and
depression, opposite to the hypothesis. Using only female
subjects resulted in an even stronger, significant positive
relationship between dispersion and depression for those
females who had experienced one life event. Possible
explanations for the unexpected results are discussed,
including methodological error and alternative hypotheses.

ACKNOWLEDGEMENTS

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INTRODUCTION

There has been a considerable amount of research indicating that the occurrence of stressful life events is associated with an increased risk for minor and major depressive disorders (eg. Brown & Harris, 1978; Costello, 1982; Holmes & Rahe, 1967; Paykel et al., 1969; Sandler & Ramsay, 1978; Vinokur & Selzer, 1975). Although the association between stressful life events and depression may appear to be robust, it has been pointed out that the occurrence of these events accounts for only 10% of the variance in the incidence of depression (e.g., Tennant, Bebbington, & Hurry, 1981; Thoits, 1983).

Research has also shown that this relationship holds only for life events of a severe nature (Brown & Harris, 1978; Costello, 1982). Although some researchers have investigated the effect of minor daily events, or "hassles" (Kanner, Coyne, Shaefer, & Lazarus, 1981), the methodology and conceptualization of this approach has been criticized. For example, a substantial number of the daily hassles on Kanner's et al. (1981) Hassles Scale were actually symptoms of psychological disorder (Dohrenwend, Dohrenwend, Dodson, & Shrout, 1984). For these reasons, the present investigation is focussed on severe, stressful life events.

A number of studies in the life event literature have

focussed on whether certain aspects of events are important in the association with depression (Hurst, 1979). For instance, the change or readjustment necessitated by the life event has been postulated to be the most important aspect (Holmes & Rahe, 1967; Holmes & Masuda, 1974; Ruch, 1977). This view has been widely challenged, however, with its detractors focussing instead on the undesirability of the event (e.g., Gersten, Langner, Eisenberg, & Simcha-Fagan, 1977; Tennant & Andrews, 1978; Vinokur & Selzer, 1975). Other aspects suggested include the type of life area affected (e.g., marriage or work; Ruch, 1977), whether a loss resulted (e.g., Paykel et al., 1969) and the uncontrollability of the event (Seligman, 1975). However, there has been little success in showing the impact of any other aspect of events, other than undesirability (Blaney, 1984).

There has also been considerable research attempting to identify person and situation variables that might moderate the stressful impact of severe events (Dohrenwend & Dohrenwend, 1974; Tennant et al., 1981). Hinkle (1974) suggested that a healthy person's invulnerability is due to either (1) no preexisting pattern of illness, or (2) some psychological characteristic which serves to insulate them. Antonovsky (1974) advocated the study of one's "resistance

resources"; that is, the individual's ability to resolve the tension resulting from the change that accompanies a life event.

Lack of intimacy with a spouse and not having a confidant have both been found to increase the risk of depression in women (Brown & Harris, 1978; Costello, 1982). However, whether these variables increase the risk of depression directly, or work by modifying the risk associated with severe events, is a controversial issue (Everitt & Smith, 1979; Oatley & Bolton, 1985; Parry & Shapiro, 1986; Tennant & Bebbington, 1978). Other vulnerability factors identified by Brown & Harris (1978) in their research on women include: lack of employment outside of the home, the loss of a mother before the age of 11, and three or more children at home, under the age of 14. However, Brown & Harris's (1978) results have not always been replicated. For example, Costello (1982) did not find that the number of children at home or loss of a mother before age 11 were related to the onset of depression.

Recently, there has been considerable emphasis in the literature on the search for cognitive variables as mediating factors in the relationship between stressful life events and depression. The main focus has been on the

theories of depressogenic cognitions presented by Beck
(1974) and Seligman (1975). Both postulate that
depressogenic cognitions are antecedents to depression,
rather than concomitants of depression. The premises of
each theory and the applications in research up until the
present time will now be reviewed.

Beck (1974) postulated that the depressed person has a
stable, cognitive schema which screens incoming
information, and ultimately leads to negative cognitive
distortion. The schema is believed to be a representation
of the past experience for a given individual; in the
schema of a depressed individual, however, experiences are
distorted by dysfunctional thoughts with the depressed
individual tending to exaggerate personal faults and
belittle personal strengths. Beck (1974) described these
thinking patterns in the context of a negative cognitive
triad, which consists of a negative conception of the self,
of the external world, and of the future.

An example of a typical paradigm that is used to test
Beck's theory is the differential recall of positive and
negative events by depressed versus nondepressed
individuals. The theory predicts that depressed
individuals will recall proportionately more negative
events due to the misperception of environmental input

through their negative schemata. Variations on the basic paradigm have included: showing differential recall of success and failure at a task (e.g., Kuiper, 1978); differential recall of positive and negative self-referent adjectives (Kuiper & MacDonald, 1982); differential recall of past positive and negative life experiences (Lloyd & Lishman, 1975). However, the results of research using Beck's theory have been less than conclusive (Blaney, 1986). Although depressed people do tend to make negative and self-defeating remarks, it has not yet been demonstrated that these remarks represent stable cognitive distortions that occur without prompting on the part of the investigator (Coyne & Gotlib, 1983).

Seligman's (1975) first explanatory model of depression was the learned helplessness model. Seligman found that dogs who were exposed to inescapable shock did not learn to escape shock when a new situation did allow for escape. He extrapolated to the human condition, attributing depression to the helplessness one feels when exposed to environmental events beyond his/her control.

Seligman's original model has been revised (Abramson, Seligman, & Teasdale, 1978). The reformulated model of learned helplessness still asserts the importance of the depressed individual having learned that negative outcomes

are uncontrollable. However, it is the attributions that one makes about the negative outcomes that determine whether or not a depressive episode will occur. Depressed individuals learn to attribute negative outcomes to internal ("I am unable to control outcomes"), global ("I have no control over any situation in my life"), and stable ("I never have, or will have, any control") factors (Abramson et al., 1978).

Despite extensive research, the reformulated learned helplessness model has also met with limited success. Although research evidence has supported a modest relationship between attributional style, in general, and depression (Raps, Peterson, Reinhard, Abramson, & Seligman, 1982), the support for the specific dimensions has been mixed (Coyne & Gotlib, 1983). There is also little support for attributional style being a cause, rather than a result, of depression (Lewinsohn, Steinmetz, Larson, & Franklin, 1981).

Beck's (1974) and Seligman's (1975) theories have generated a lot of interest in the cognitive approach to depression. Beck's emphasis is on the negative, blaming self-image of the depressed individual and Seligman's emphasis is on the perceived lack of control. However, Coyne and Gotlib (1983) concluded that the addition of the

attributional component to the original learned
helplessness model renders it difficult to obtain data that
supports one theory while contradicting the other. It is
not surprising, therefore, that research in both theories
has moved in a parallel direction. Both theories have
recently been tested in terms of a vulnerability model,
trying to show that cognitive distortion is a mediating
factor between life events and depression.

The adaptation of Abramson et al.'s (1978) theory to a
vulnerability model is called a diathesis-stress model.
The diathesis-model states that an attributional style of
attributing negative outcomes to internal, stable, and
global factors puts one at risk, in the presence of a life
event, for depressogenic attributions, which cause
depression. Metalsky, Abramson, Seligman, Semmel, and
Peterson (1982) took a measure of attributional style
before the occurrence of a life event and found that
attributional style did correlate significantly with mood
disturbance following the event. However, Williams (1985)
pointed out that the correlation between attributional
style and mood disturbance in the group who had had the
life event, was not significantly different from the
correlation in the group who had not had a life event. The
moderate relationship evidenced between attributional style

and depression does not appear to be affected by whether or not a life event has occurred. Brewin (1985) suggested that the reformulated model is reduced to a coping model, whereby attributional style will predict future depression regardless of the occurrence or timing of any life event; that is, the attributional style reflects either a positive or negative coping style.

The vulnerability model approach to Beck's theory had defined the depressed person's negative schema as the mediating factor between life events and depression. For example, a study by Hammen, Marks, deMayo, and Mayol (1985) tested the hypothesis that an individual's negative self-schema interacted with negative life events to result in depression. However, rather than being a stable attribute, the negative schema tended to fluctuate with mood. Hammen et al. (1985) concluded that, while the self-schema may have an impact on the maintenance of depression after onset, there is no evidence of its role as a vulnerability factor in the relation between life events and depression.

The evidence in support of Beck's (1974) theory and Seligman's (1975) model is equivocal. The conclusion that must be drawn is that cognitive distortion theories have not greatly helped to clarify the relationship between

stressful life events and depression. However, this does not preclude the possibility that another type of cognitive factor may be acting as a mediating variable. Perhaps the emphasis of cognitive risk factors should no longer be on the distortion of thought processes. Indeed, Coyne and Gotlib (1983) cite research that suggests depressives' estimation of their own abilities may actually be less distorted than that of normal subjects (e.g., Alloy & Abramson, 1979).

Fortunately, there is evidence of a new direction being taken in the cognitive literature. Oatley and Bolton (1985) have developed a social-cognitive theory of depression, incorporating previous findings in the field and presenting a new cognitive approach for future research. Their formulation involves the effect of life events on the "sense of self". Their definition of self is based on Mead's (1912/1964) concept, where the inner consciousness is structured in the form of social input from the external environment. Oatley and Bolton (1985) see the sense of self expressed as a role or roles, with a "coherent set of long-term mutual goals and associated plans" (p. 379). If an individual experiences a life event, there should be no adverse effect if there are alternative roles to which the individual can turn. The

importance of this alternative availability of gratification has been stressed previously by Willner (1984). However, if a life event occurs and results in the thwarting of the single role by which an individual defines himself/herself, a loss of the sense of self occurs, leading ultimately to depression.

Oatley and Bolton (1985) have presented a coherent, logical theory that incorporates previous research (e.g., Brown & Harris, 1978), does not preclude biological factors (e.g., Akiskal & McKinney, 1973), and introduces a testable cognitive variable without the emphasis on distortion. Although this theory has not been tested directly, Stewart and Salt (1981) did find that role related variables moderated the effect of work and home stress for women. Their findings suggest that a married woman with a career and a family is able to use each role to deal with the stresses of the other, whereas single career women and housewives have fewer alternatives.

Kelly's (1955) personal construct theory, while not new, has recently been used to test a posited relationship between depression and cognitive structure. However, before the literature is discussed, it is useful to review the basis of personal construct theory.

A personal construct is seen as the way in which two

elements in an individual's environment are viewed as similar, and contrast with a third. The relationship established within the individual'system of constructs is seen as deterministic; that is, the structure determines future behavior (Kelly, 1955). The methodology designed by Kelly to determine an individual's constructs is the Role Construct Repertory Test (RCRT). Subjects are asked to name a list of individuals in their lives, usually individuals who fulfill particular roles (e.g., sister, someone you admire, person you like the least). These names form the rows of a matrix. Taking the role names in triads, the subject indicates in which way two of them are alike, and different from a third. For example, if Person A and B are very religious and Person C is an atheist, the construct is religiosity/atheism. When a given number of constructs have been determined, each individual on the grid is rated as to which pole of the construct best describes him/her (Ryckman, 1978). Originally designed for diagnostic purposes, the RCRT has also been widely used in research.

Kelly (1955) proposed that the personal construct system of a depressed individual was characterized by constriction and pre-emptive thinking. Constriction is a process by which the individual tries to minimize apparent

contradictions between his/her constructs by reducing
his/her perceptual range of events or elements within the
environment (Ashworth, Blackburn, & McPherson, 1982;
Sheehan, 1985). An example of constrictive thinking is:
"All I care about is school; nothing else is important."
Pre-emptive thinking amounts to limiting the number of
constructs to be applied to environmental elements, leading
to a fixed, rigid construct system with few contradictions
(Ashworth et al., 1982; Sheehan, 1985). An example of
pre-emptive thinking is: "School is only important in
helping me to secure my financial future."

Based on Kelly's (1955) theory, Bieri (1955)
introduced the concept of cognitive complexity-simplicity.
Bieri felt that people differed in how well their system of
constructs differentiated other people in their
environment. Using the RCRT, Bieri measured complexity in
the following way: if the identified individuals could not
be differentiated from one another on the basis of their
construct ratings, the subject's constructs were considered
to be functionally equivalent, and the subject was
identified as having a simple cognitive structure. For
example, a subject identifies two constructs,
"authoritarian" and "intelligent". For both constructs,
the subject identifies persons A, C, D, and F as having

both characteristics, and persons B, E, G, and H as not having both characteristics. "Authoritarian" and "intelligent" would be considered functionally equivalent, within a relatively simple cognitive structure. This was hypothesized to reflect an incomplete differentiation of the boundaries between oneself and the external world, leading to assumptions of exaggerated similarity between oneself and others (Bieri, 1955). Cognitive complexity, on the other hand, represented differentiation within the construct system where the individual had not only a greater number of constructs, but was also able to make finer discriminations between different aspects of the individuals within his/her environment (Bieri, 1961).

Cognitive complexity-simplicity, as defined by Bieri (1955), incorporates the concepts of pre-emption and constriction. Although different studies tend to refer to either pre-emption/constriction with reference to Kelly, or cognitive complexity with reference to Bieri, the conceptualizations are similar. For the purposes of this review, the term "cognitive complexity" will be used to refer to studies of either origin. Cognitive complexity has been studied in relation to many variables, including hemispheric dominance (e.g., Domangue, 1984) and marital satisfaction (e.g., Neimeyer, 1984). However, the studies

of interest are those recent studies which have examined the relationship between cognitive complexity and depression.

'No longer is the measurement of complexity as simplistic as Bieri's (1955) method of comparing rows and columns on the RCRT. Instead, principal component analysis is used to analyze the constructs and their interrelationships (for a review of principal component analysis, see Kerlinger, 1973). The measures of complexity are determined by the number of factors derived from the constructs, as well as the proportion of variance that is accounted for by the first (or first few) factors. Cognitive simplicity should result in fewer factors with a large proportion of variance being accounted for by relatively few factors (Ashworth et al., 1982; Sheehan, 1985). This would indicate a cognitively simple individual who uses a limited number of constructs in his/her interaction with the environment.

The results of such studies have been mixed. Space and Cromwell (1980) compared depressed patients, mixed psychiatric controls, and normal controls on cognitive complexity, hypothesizing that depressed individuals would be relatively cognitively simple. They used three indices: the eigenvalue of the first factor, the sum of the

eigenvalues for the first two factors, and the number of factors obtained . However, they found no significant differences between any of the three groups on any of the three measures.

Ashworth et al. (1982) compared six groups: currently depressed patients, manic-depressives, schizophrenics, alcoholics, recovered depressives, and nonpsychiatric controls. Complexity (or constriction) measures were defined as the amount of variance accounted for by the first factor, and the amount of variance accounted for by the first three factors. There were no significant differences on the former measure, but the depressed patients' three major components did account for significantly more variance than the manic, schizophrenic, and alcoholic groups. Interestingly, depressed patients were not significantly different on any of the measures obtained from the recovered depressed or the nonpsychiatric controls. Although Ashworth et al. (1982) concluded that the depressed group was somewhat more cognitively simple than the other groups, the lack of difference between the depressed, formerly depressed, and normal control groups suggest that complexity should be tested as a more enduring trait which may put one at risk for depression under certain circumstances, but does not necessitate depression

simply given its presence.

Sheehan (1985) studied complexity in a group whose members had a major depressive disorder. Over the course of psychotherapy, she hypothesized that depressed individuals would become more differentiated (Sheehan, 1985). To calculate the complexity measure, principal components analysis was done with a program that also determined a distance measure between the individuals named on the RCRT (INGRID 1972; Slater, 1977). The further apart the named individuals were, the more differentiated (or complex) the subject was considered. Although the changes were in the expected direction, they did not reach significance. However, Sheehan (1985) used only 12 subjects, with no psychiatric or normal control group. Also, as in the previously cited studies, it was again assumed that there should be a change in cognitive complexity as the depression level changes. All of these studies ignore the possibility that cognitive complexity is an enduring individual trait, rather than one which is expected to change with depressive onset.

One rather unusual study of cognitive complexity and depression was reported by Angellilo, Cimbolic, Doster, and Chapman (1985). They hypothesized that increasing depressive severity would be indicated by increasing

complexity; this seems quite unusual when one looks at the previous literature and the theory of cognitive complexity as it was developed by Bieri (1955) and Kelly (1955), who both implied that a complex system is more adaptive than a simple one. Angellilo et al. (1985) reported no significant differences between a depressed group, a psychiatric control group, and a normal control, and they found no relationship between depression and complexity. It is difficult to evaluate these results, however, due to the lack of information regarding the exact method they used in the calculation of complexity scores. Angellilo et al. (1985) refer to Landfield's Role Construct Repertory Test (LRCRT; Landfield, 1971) in their methodology, but they do not provide a clear description of how the complexity measures were derived.

There are several criticisms that can be levelled at the cognitive complexity research to date. It is of interest to note that Bieri could foresee some of the problems long ago, yet the problems have yet to be dealt with adequately. First, Bieri (1961) cautioned that careful assessment of the comparability of different measures of complexity is necessary in order to be sure that different researchers are measuring the same concept. In Bieri's (1955) original conception of complexity, a

score of -1 was given every time two constructs were
.functionally equivalent, with a large negative number
indicating a greater level of cognitive simplicity. Space
and Cromwell (1980), Ashworth et al. (1982), and Sheehan
(1985) utilized principal component analysis. Angellilo et
al. (1985) used a somewhat ambiguous procedure with
predictions that had no theoretical basis.

Secondly, Bieri (1961) posed a related question in
regard to the use of the RCRT.

Theoretically, the issue is whether the cognitive
system of the individual is characterized by
relatively enduring modes of cognitive
schematization manifested in consistencies in
conceptual behavior across stimulus situations,
or whether these cognitive styles must be
delimited in terms of the specific stimuli
present. (Bieri, 1961; p. 368)

That is, is it appropriate to define complexity only
within the boundaries delineated by the RCRT methodology
(significant others and constructs), or should complexity
also be expected to be manifested in other stimulus
situations? Other possible stimuli include other areas of
a persons' life such as personal roles (e.g., friend,
mother, spouse, worker), values, or goals. One pair of

investigators who have taken the more cross-situational approach are Palys and Little (1980;1983) in their work on life satisfaction. Although their methodology is based on a grid matrix similar to that designed by Kelly (1955), they do not limit their study to significant others and constructs. Instead, they use the "personal project" as their unit of analysis. A personal project is defined as a goal-directed behavior stream (Palys, 1979), or as a sequence of related actions directed towards achieving a personal goal (Little, 1983). Examples include losing weight, improving one's relationship with a spouse, or getting the basement cleaned out. Personal projects are identified by the subjects themselves; the projects can be something done alone or with others, something concrete or abstract, and they can be of varying duration (Palys & Little, 1980). The subject then rates each project on several dimensions (e.g., how visible it is to other people, the time spent on each project, etc.), and indices are derived to establish whether different personal projects facilitate or conflict with each other. Although the concept of personal projects is an interesting one, there are no reported studies of the personal projects approach being used in relation to depression. In fact, there are no reported studies using the personal projects

approach beyond the original work by Palys and Little.

Another area of research which has taken the idea of complexity and differentiation beyond the limited methodology of the personal construct approach is the concept of "psychological differentiation", described by Witkin and his associates (1979). The hypothesis is that an individual's various behaviours will reflect his/her level of psychological differentiation. These different behaviours will be interrelated, resulting in consistency across different situations. For example, a differentiated system is one in which the individual shows more self-other segregation in terms of separating his/her own feelings, needs, and characteristics from those in his/her environment. In a less differentiated system, there are less definite boundaries between the self and outer world (Witkin, Goodenough, & Oltman, 1979).

Many different domains of behavior have been considered in the testing of psychological differentiation. For example, psychological differentiaion is considered to be closely related to field independence, so several studies have focussed on an individual's disembedding ability in perception with the rod and frame test (e.g., Faterson & Witkin, 1970). Psychological differentiation is considered to be a cognitive style where undifferentiated,

field dependent people tend to rely more on external referents; studies have found that field dependent individuals tend to be more sociable, more reliant on physical closeness to others, and even more effective than field independent individuals in social situations (e.g., Oltman, Goodenough, Witkin, Freedman, & Friedman, 1975). Differentiated and undifferentiated individuals are expected to show the use of different types of defense mechanisms (isolation and intellectualization, vs. repression and denial, respectively). Further, research has even shown less hemispheric differentiation in field dependent individuals (e.g., Oltman, Ehrlichman, and Cox, 1977). However, there is no evidence of any research having been done regarding the relationship of psychological differentiation and depression.

The third problem associated with the work on cognitive complexity is that even when the relationship of cognitive structure and depression has been studied, the role of life events has not been considered. This is somewhat surprising since the results of the studies have never found a strong difference in complexity between depressed and nondepressed individuals. Perhaps if cognitive complexity were considered instead as a mediating variable in the relationship between life events and

depression, a significant relationship between cognitive structure and depression would emerge.

The theory tested in the present investigation is an alternative approach to the search for a valid mediating cognitive variable in the relationship between life events and depression. It is a theory that also looks at cognitive structure, but in a slightly different way than the previous work based on Kelly (1955) and Bieri (1955). Instead of studying the ways in which an individual describes significant others in his/her environment, the present theory looks at the percieved relationships between different areas of activity within an individual's life.

This theory was derived from Costello's (1976) discussion of the nature of depression, where he stressed the importance of the loss of incentive that is evident in the depressed individual. He suggested that the loss of incentive is the reason for the inactivity and lack of interest considered to be central symptoms in clinical depression by most researchers and clinicians (Akiskal & McKinney, 1973; Fawcett, Clark, Scheftner, & Gibbons, 1983; Fawcett, Clark, Scheftner, & Hedeker, 1983). The lack of interest and inactivity are also central symptoms among the DSM-III criteria (American Psychiatric Association, 1980) for major depressive disorders.

Costello (1976) suggested that one of the causes of loss of incentive may be the result of a loss of structure in a person's life that takes place when an event occurs (e.g., loss of a loved one). A person's life structure is conceived as his/her perception of the interrelationships that exist between the different aspects, or areas, of a persons life, such as family, friends, work, and so on. Although different life areas can be considered individually, they are not lived independently of each other. Each person compartmentalizes their life areas to a different degree. It is possible to have a strongly interdependent structure where all life areas are close together, or to have clusters of life areas where two interdependent areas are quite distant from two other interdependent areas, or to have a very differentiated life structure where different areas are quite independent and distant from each other.

The mutual interdependence in activities can be described as a system whereby the incentive and reinforcement for an activity in one area of life is dependent upon being able to participate in activities in another part of life - particularly those life areas that are closer cognitively within the life structure. This proposal is linked to Costello's (1972) earlier emphasis on

the loss of reinforcer effectiveness and the resulting loss of interest observed in depressed individuals.

Costello (1976) proposed that the risk for depression produced by a severe life event is decreased for those individuals with a differentiated life structure. The less interdependent one's life areas are, the less effect a life event and resulting activity loss will have on other life areas. However, if an individual does not differentiate between life areas, a stressful life event such as the loss of a job will "spill-over" onto his/her family life, social life, and other areas. The reinforcer effectiveness of activities in the family and social domains is lessened or lost, and depression occurs. Conversely, if this same individual's educational pursuits are differentiated from his/her family, social life, and work, this spill-over into his/her education activities should not occur. Those life areas closely related to another life area where the life event occurs (crisis area) will be more adversely affected than those less related, or further away in a cognitive sense.

Similar ideas to Costello's have been proposed regarding the relationship between cognitive structure, depression, and life events. Oatley and Bolton (1985) divided the symptoms of depression into three categories:

(1) loss of a sense of self, (2) dysphoric emotions, and (3) strategies of interaction. The development of a depressed person's strategies of interaction are described by Oatley and Bolton in terms that resemble Costello's (1976) concept of loss of structure. People have patterns of interaction with one another, held together by mutual plans and goals. If a life event occurs that results in the failure of the mutual plans, an individual's social structure is broken (Oatley & Bolton, 1985). A depressed person's resulting strategies of interaction involve a regression to childhood maneuvers of sullenness and help-seeking behavior.

Klinger's (1975; Klinger, Barta & Maxeiner, 1981) theory of current concerns also presents similar ideas. A current concern is viewed as an incentive-based process: it is a continuing state with a definite onset signifying a commitment to a goal, and an offset where there is either consummation of the goal or disengagement. Disengagement occurs when the route to the desired goal is blocked, and when it occurs the incentive is lost and depression results. Klinger (1975; Klinger et al., 1981) postulated that at the time of disengagement the value of other incentives will be low, as though there were a carry-over effect from one current concern to another.

Despite the noted similarities in theory, however, there has been little empirical investigation into variables which bear any similarity to Costello's (1976) life structure variable. One exception is a series of studies by Devins and his associates. Devins, Binik, Hutchinson, Hollomby, Barre & Guttman (1984a) investigated the extent to which End-Stage Renal Disease (ESRD) and its treatment interfered with other important areas of the patients' lives. They found that the amount of intrusiveness of the illness, as perceived by the patient, had a significant positive correlation with negative mood.

Another study, by Devins, Binik, Manden, et al. (1984), established that ESRD patients do, as a group, differentiate between life areas. They found three clusters of life areas: health, personal life, and social life. One of their hypotheses was that if patients defend against the threats imposed by their illness and its treatment via defensive denial, then the perceived intrusiveness of ESRD into nonillness areas of life (personal and social life) should be unrelated to the patients' negative and positive moods, but the perceived intrusiveness of ESRD in illness-related life areas (health) should be related to negative and positive moods. However, there were no differences in how negative mood was

associated with perceived intrusiveness across the three clusters. Intrusiveness was, in fact, related to negative mood in all three clusters.

It is possible that a differential pattern of relationships between the three life clusters and depression was not found in Devins's and his associates research because the statistical clustering of life areas was done collapsing across subjects. As Costello's (1976) theory suggests, it is expected that different people have different ways of organizing, or clustering, their life areas. By looking at individual differences in cognitive life structure, one may be able to determine more accurately any mediating effect of life area differentiation on depression, after the occurrence of a stressful life event. Using an individual differences approach has been cited as a preferred route for life event research to take (e.g., Paykel, Prusoff, & Uhlenhuth 1971; Depue & Monroe, 1986).

The goal of the current study was to determine if there is a significant association between an undifferentiated structure and the likelihood of depression, following a severe life event. In order to test the association between structure and depression, it was necessary to find a method of representing an

individual's perceived cognitive life structure. A statistical technique called multidimensional scaling (MDS) was determined to be the most appropriate. The underlying assumption of the procedure is that there is a relationship between the psychological concept of dissimilarity and the mathematical concept of distance. Subjects are asked to rate the degree of dissimilarity between all possible pairs of stimuli (in this case life areas), and MDS transforms the dissimilarity scores into the perceived distance between stimuli, represented by dispersed points on a geometric, Euclidean space map (Davison, 1985; Schiffman, Reynolds, & Young, 1981).

There are several advantages to the MDS approach versus the principal component method used in the reviewed studies of cognitive complexity. Principal component analysis analyzes data sets where a number of stimuli have been rated on a number of attributes that are at least partially determined by the experimentor. MDS, however, relies solely on the subjects to judge the similarity between stimuli with no outside influence on the way in which they make their judgments. The subject can consider any relevant demographic, behavioural, or personality dimensions (Jones, 1983). The resulting spatial map of stimuli is not based on an assumption of linearity so the

solution is more parsimonious and interpretable than principal component analysis (Schiffman, Reynolds & Young, 1981). Once the points are located on the MDS map, the coordinate system can be discarded; interpretation can be based on distances between the points (Ramsay, 1982).

Two different measures of differentiation were derived from the MDS map: (1) an overall measure of dispersion (distance) among life areas, and (2) the number of clusters of life areas. Measuring the cognitive structure in both ways is consistent with Bieri's (1961) concern regarding the proper conceptualization of cognitive complexity. It could be considered in terms of the distance (or differentiation) between elements, or in terms of the organizational properties between elements (e.g., how they cluster; Bieri, 1965).

A measure of what proportion of life areas shared a cluster with the crisis area was also calculated. This was to test the aspect of Costello's (1976) theory that posited that life areas closer to the crisis area would be more adversely affected than those life areas which are more distant.

The formal hypotheses were:

1. When a stressful life event has occurred, the likelihood of depression will increase as the

number of clusters of life areas in an
individual's cognitive life structure decreases.

2. When a stressful life event has occurred, the
    likelihood of depression will increase as the
    total dispersion between life areas in an
    individual's cognitive life structure decreases.

3. When a stressful life event has occurred, the
    likelihood of depression will increase as the
    number of life areas in the cluster containing
    the crisis area increases.

METHOD

Subjects

Students in four upper-level psychology courses were
invited to participate. One hundred and seventy-two
students volunteered. The inclusion criteria for the study
were that the subjects must be between the ages of 18 and
40, and they must have completed all of the scales and
questions. Six individuals did not complete the Center for
Epidemiologic Studies Depression Scale (CES-D), 10
individuals presented suspect data (that is, seriously
restricted use of the scales of measurement), and five
individuals fell beyond the age criteria of 18 to 40. The
final sample consisted of 151 students, with 39 males and
112 females. Their mean age was 23.24. Twenty-eight of
the subjects were married, 122 were single, and four were
divorced. For the purposes of analysis, the divorced
subjects were included in the single group. Due to the
extremely small number of subjects in the divorced group,
any results using it as a separate category would be too
unstable to interpret with any confidence.

Measures

(1) Demographic Information

Information was gathered on each subject's age, sex,

highest level of education, current living arrangement,
marital status, and occupation. Socioeconomic status was
determined as high, middle, or low (1, 2, or 3
respectively), based on the occupation of the head of the
household (Blishen & Carroll, 1978; Blishen & McRoberts,
1976).

(2) Life Domain Similarity-Dissimilarity Ratings

The list of life areas included:

Relationship with Partner

Having and Raising Children

Relationship with Other Family

Relationship with Friends

Financial Security and Material Well Being

Maintenance of Health and Personal Safety

Work

Recreational Activities

Education

Personal and Spiritual Development

Community and Civic Activities

The life areas chosen for this study were based on the
results of a study by Flanagan (1978). He categorized 6500
critical incidents, from the lives of 3000 people, into 15
quality-of-life components on the basis of the similarity
of behaviours and experiences. the second step was a

national survey on the quality-of-life of 2200 individuals.
Participants were asked how important each of the 15
. components were to their overall quality-of-life. The
proportion of individuals rating each component as
important ranged from 36% to 98%.

These components were selected as the life areas for
this investigation due to their compatibility with the
concept of life areas as stated in Costello's (1976)
theory. However, in three cases, Flanagan's (1978)
components were combined into one life area in order to
keep the number of paired comparisons done by the subjects
to a minimum. "Socializing", "passive and operational
recreational activities", and "active and participatory
recreational activities" were combined into Recreational
Activities. "Personal understanding and planning" and
"creativity and personal expression" were combined into
Personal and Spiritual.Development. Finally, "activities
related to helping or encouraging other people" and
"activities relating to local or national governments" were
combined into Community and Civic Activities.

The first task for the subject was to indicate the
extent to which they had been active in each of the life
areas in the previous three months, on a scale of zero to
three. Zero indicated no activity, one indicated a little

activity, two indicated occasional activity, and three indicated frequent activity. Then, for every possible pair of life areas (55 in total), the subjects were asked to indicate along a 99 millimeter line the degree of similarity between those two areas judging by their own life experience.

Due to the large number of subjects that participated in the study, it was not feasible to prepare a different life area rating scale for each subject which included only those life areas that the individual subject was active in. A pilot study was done to determine if making subjects give dissimilarity judgments on irrelevant life areas would have a significant impact on how they made dissimilarity judgments on relevant life areas.

Seven subjects were given a list of the 11 life areas and asked to indicate those areas in which they had been active in the the past three months. Two different rating scales were then given to each subject at a one week interval: the first rating scale included all comparisons for the list of 11 life areas, and the second rating scale included paired comparisons only for the life areas that they had indicated an activity rating of one or greater. The two sets of results for each subject were compared.

There was a significant difference between the two

mean dissimilarity measures for only one subject (t(44) = -3.04, p<.05). The correlation coefficients calculated between the two sets of dissimilarity measures for each subject ranged from r(44) = .44, p<.008, to r(44) = .80, p<.0001. Finally, the life area configuration map was determined for each subject on both rating scales, using MDS. A measure of the fit between the two sets of results was determined for each subject. The coefficients ranged between .60 and .86, indicating a reasonable fit between the two models for all of the subjects (Ramsay, 1982).

These results indicated that there should not be a significant impact on the dissimilarity measures of active areas when the inactive, irrelevant life areas are also compared. For the purposes of analysis, therefore, only those dissimilarity judgments for areas having an activity rating of one or greater were used.

In order to test hypothesis three - whether an increasing proportion of life areas sharing a cluster with the crisis area increases the liklihood of depression - the crisis area had to be determined for each individual. Therefore, subjects were also asked to indicate which life area had been the most affected by each life event or difficulty.

(3) <u>Life</u> <u>Events</u> <u>and</u> <u>Difficulties</u> <u>Questionnaire</u>

The scale consists of a list of 35 severe life events and 10 severe difficulties. The particular events and difficulties chosen were based on a list of life events and chronic difficulties developed from the results of a community study of depression in Calgary women (Costello, 1982). The list was expanded from the original to make it clear who the focus of the life event or difficulty was. For example "You, or someone close to you, is involved in a serious car accident" was expanded to "You are involved in a serious car accident", "Your child is involved in a serious car accident", and "A member of your extended family is involved in a serious car accident".

This measure was used not only to determine which life events and difficulties had occurred, but also to determine in which group, life event or no life event, the subject should be included. Severe difficulties increase the risk of depression, although not to the same degree as life events (Brown & Harris, 1978; Costello, 1982). Since severe difficulties and stressful life events exert independent effects on depression, they were both included in the study. Any subject who had had a severe life event and/or a severe difficulty was placed in the life event group; the remaining subjects were placed in the control

group. In the case where a subject presented related life events and difficulties, only the life event that triggered the beginning of the difficulty was counted. This method is outlined by Brown and Harris (1978).

The subject was asked to indicate if any of the events or difficulties had occurred in the previous three months. The three month period was chosen on the basis of previous findings in the literature. Brown and Harris (1978) and Finlay-Jones and Brown (1981) found that it was in the nine to 12 weeks prior to interview that depressed individuals reported significantly more stressful life events. Also, Tennant et al. (1981) found that there may be a problem with recall if a subject is required to remember events that occurred more than three months prior to testing. Therefore, the three month reporting period appeared to be optimal for subject recall and determining any effect of life events on depression.

Space was provided to include any events or difficulties not printed on the list. The Brown and Harris (1978) dictionary was used to determine the inclusion criteria of severity of life events and difficulties provided by the subjects.

(4) <u>The</u> <u>National</u> <u>Institute</u> <u>of</u> <u>Mental</u> <u>Health's</u> <u>Centre</u>
<u>for</u> <u>Studies</u> <u>Depression</u> (<u>CES-D</u>) <u>Scale</u>

This scale is a 20-item, self-administered
questionnaire in which the range of possible scores is from
zero to 60. The CES-D measures the subject's level of
depressive symptomatology (cognitive, affective, and
behavioural) by determining the symptoms that are present,
then weighting them by their frequency.

In order to include the major components of depressive
symptomatology, the items of the CES-D were chosen from
established depression scales that had been validated by
the clinical literature and factor analytic studies (Devins
& Orme, 1985). The CES-D scale was validated on a
community sample (Radloff, 1977) and can be used with adult
populations regardless of age, sex, or socioeconomic
status. Research has found that the scale has adequate
validity for research purposes (Radloff & Locke, in press)
and it has been tested in many different areas of
depression research, including the effects of negative life
events (Devins & Orme, 1985; Radloff, 1977).

The time frame of the CES-D was changed in this study.
The subjects were instructed to indicate how they had felt
"in the past month" rather than "in the past week". In
this study the subjects were instructed to recall life

events for the previous three months, so it was felt that
the measure of depressive symptomatology should cover
closer to the same period. The potential impact of the
"one week" versus "one month" instructions was examined by
Devins et al. (1986) on two samples of students. Devins
and his associates found no significant differences in
total CES-D scores, or in individual item differences.
They concluded that the CES-D data obtained from subjects
using a "one month" time frame were appropriate for
comparison with data from other groups where a "one week"
time frame had been used.

Depressive symptomatology was chosen as the dependent
measure rather than presence or absence of major clinical
depression due to its applicability to the population and
methodology of the study. It is unlikely that a reasonable
number of clinical depression cases would have been found
in a student population. Also, the continuous nature of
the CES-D scores allows for more power in the statistical
analyses of the hypotheses.

Procedure

The materials were presented in a booklet form, in a
predefined order. The demographic information was
presented first, followed by the Life Area
Similarity-Dissimilarity Ratings, the Life Events and

Difficulties Questionnaire (LEDQ), and finally the CES-D Scale. This order was chosen to ensure that the subjects made their similarity judgments first, without the influence of thinking about life events or depressive symptomatology. The judgments of similarity were to be made without the investigator providing any boundaries as to how 'similarity' was to be defined, and it was felt that any other order of presentation could unintentionally provide such boundaries for the subjects.

Potential subjects were approached during classtime in four upper-level Psychology courses. They were given the following information:

"I am currently doing a study for my master's thesis, testing a new cognitive vulnerability model. I am here to ask for your participation in that study. I cannot tell you too many of the details of my research right now due to any influence it may have on your responses, but when you are finished, the study will be fully explained. As you will see from the booklet, all questions are straightforward and contain no hidden meaning.

You are under no obligation to participate. In fact, if you are not interested, I prefer that you not take a booklet. It takes approximately 20 minutes to complete, and considerable thought and effort. I would appreciate

your assistance, but you should not feel obliged to participate if you are not interested."

The subjects were debriefed once the booklets were handed back into the investigator.

Statistical Analyses

The statistical method used for the testing of the relationship between life structure and CES-D scores was Analysis of Partial Variance. This method is a special case of hierarchical multiple regression in which any covariates are entered as a block, and the independent variable is entered last (Cohen & Cohen, 1983).

The relationship between CES-D scores and life structure was determined independently within each group. The covariates for each of the two groups, the life event group and the control group, were determined empirically. It was not expected that the life event group and the control group would necessarily have the same covariates; however, it was expected that the covariates for each group would represent extraneous variance that was irrelevent to the relationship under study. Pedhazur (1982) has suggested that a covariate should correlate with the dependent variable with at least a /.3/ magnitude before it is included in the regression analysis. However, a /.2/ criterion was used in this study to be more conservative.

It was hypothesized that the partial correlation of life structure and CES-D scores would be significant only in the life event group. As pointed out by Williams (1985), the crucial test of the type of relationship posited in hypotheses one and two is not only the association between life structure and depression within the life event group, but also the difference in the size of the association between the life event group and the control group. The difference would be tested using transformed Fisher Z scores of the partial correlations. To calculate transformed scores for the partial correlations, the variance of each coefficient was calculated as 1/n-k-3, where k is the number of covariates for each group (Neter & Wasserman, 1974).

In order to test hypothesis three, a Pearson correlation coefficient between the proportion of life areas sharing the cluster with the crisis area, and CES-D scores, was calculated.

RESULTS

Multidimensional Scaling and Clustering

In order to calculate both the dispersion measure of life areas and the number of life area clusters for each subject, multidimensional scaling (MDS) was used. The particular MDS program used in this study was MULTISCALE II, designed by Ramsay (1982). This program was run separately for each subject in order to determine his/her unique life structure. The solution was limited to a 2-dimensional result. With only 11 possible stimuli, a solution beyond this level is relatively meaningless and difficult to interpret (Ramsay, personal communication, March 10, 1986; Schiffman et al., 1981). An example of a subject's life structure map is provided in Figure 1. Only the dissimilarity measures for active life areas were included in the analyses, so the the number of spatial points (life areas) for each subject ranged from 6 to 11.

The coordinates for each subject's life area structure were subjected to cluster analysis in order to calculate life area dispersion and life area clustering. CLUSPLUS, a clustering program designed specifically for this study by Smith (1986), first created a dispersion measure, based on the average distance of the points (representing the life areas) around a centroid point. Secondly, a measure of the

```
        -8.0     -6.0     -4.0     -2.0     0.0     2.0     4.0     6.0     8.0     10.0     12.0
  12.0   •        •        •        •        •       •       •       •       •       •        •         12.0


  10.0                                                                        ..                         10.0


   8.0                              F  Relationship with Friends                                          8.0


   6.0                                                                .                                    6.0
          G  Community and Civic Activities

   4.0                                                    . .                                              4.0


   2.0                  _      K  Recreational Activities                                                  2.0
                     .  .                               I  Education
                                                       J  Work
   0.0                                             H  Personal              A  Financial                  0.0
                                                      Development              Security
                                                B  Health
  -2.0                                                                                                    -2.0

            D   Having and Raising Children

  -4.0                                                                                                    -4.0
            C  Relationship ε  Relationship with
               with Partner    other Family
  -6.0                                                                                                    -6.0


  -8.0                                                                                                    -8.0
       -8.0    -6.0     -4.0     -2.0     0.0     2.0     4.0     6.0     8.0     10.0     12.0
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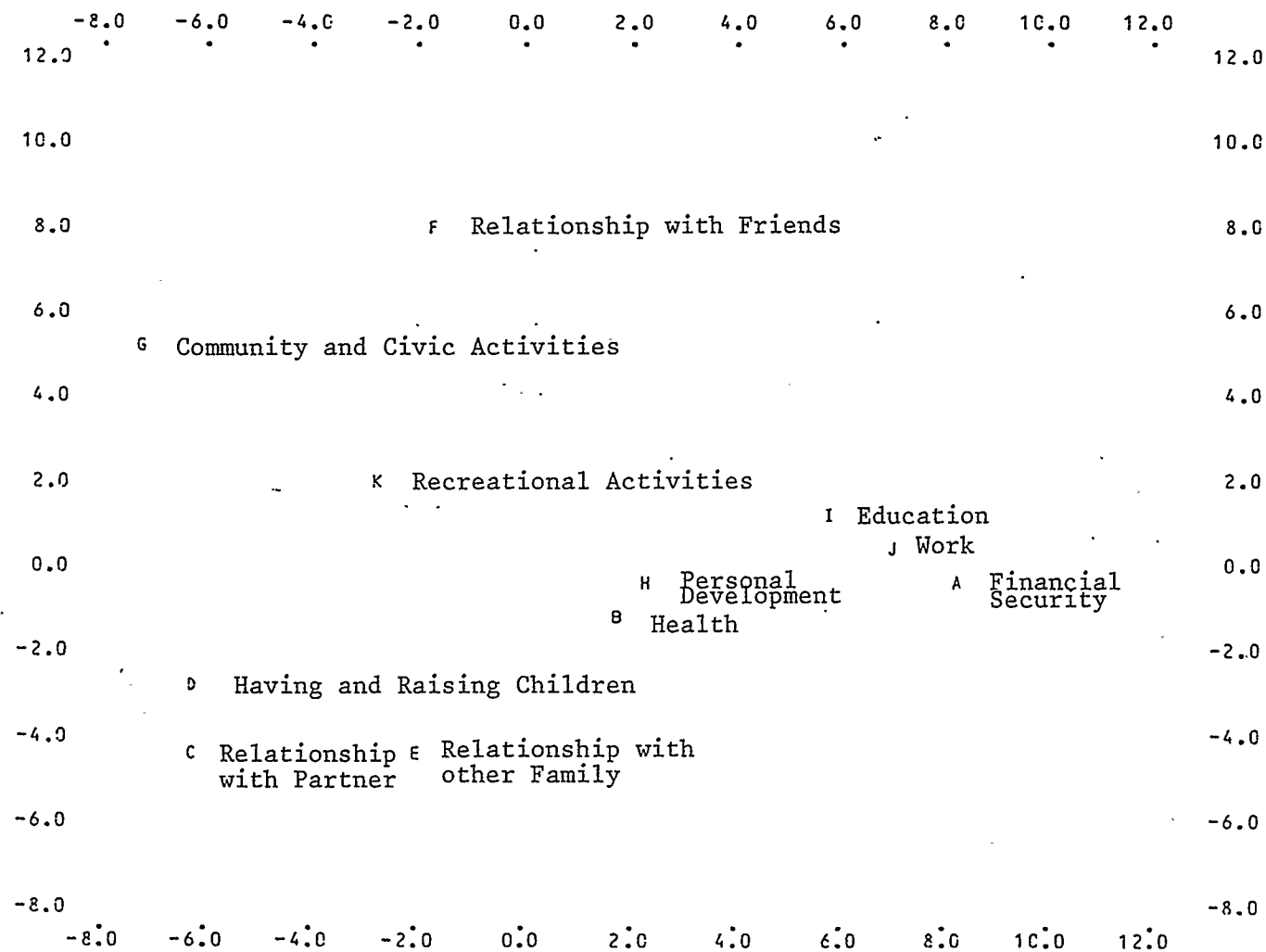
Figure 1 An example of a Life Structure Map as calculated by MULTISCALE II

number of clusters of life areas for each subject was determined by grouping the life areas in such way that the the ratio of the dispersion between the clusters to the dispersion within the clusters was maximized (Everitt, 1974).

For the entire set of scores, there was a significant correlation between the number of clusters and the number of active areas, $r(151) = .297$, $p < .001$. However, there was no association between the dispersion scores and the number of active areas. (It should be noted that a two-tailed test was used for all correlations.)

Group and Sex Differences

The mean CES-D score for the group of subjects was 15.48 (s.d. = 9.66). This distribution of CES-D scores compares quite closely to the CES-D scores collected in a pilot study to the present investigation, where the mean was 14.40 (s.d. = 9.28). The present scores are considerably higher than the mean of 11.8 for students obtained in a study by Barnes and Prosen (1984); however, there was no indication of what populations of students their classification of "student" included.

The hypothesized relationships between life structure and depression were predicted to exist only after a life event had occurred. The first step to testing the stated

hypotheses was to assign the subjects into either the life event group or the control group. Subjects were included in the life event group if they had one or more life events or chronic difficulties in the last three months ($\underline{n}$ = 106). The rest of the subjects comprised the control group ($\underline{n}$ = 45).

Costello's (1976) theory assumes that the life structure of an individual is a stable characteristic that is not expected to change following a life event. Therefore, no significant differences were expected between the life event group and the control group on any of the life structure variables: number of active areas, dispersion, or number of clusters. No significant differences were found between the two groups on the life structure variables or age (see Table 1). However, there was a significant difference in CES-D scores between the two groups, with the life event group scoring significantly higher ($\underline{F}$(1,149) = 15.552, $\underline{p}$<.001).

There were no significant differences between the sexes on any of the following variables: dispersion, clusters, number of active areas, age, number of stressful life events, number of chronic difficulties, or CES-D scores. For the primary analyses, therefore, the data were combined across sexes.

Table 1

Group Means on Differentiation, Active Areas, Age, and Depression Scores

	Group	
	Life Event ($\underline{n}$ = 106)	Control ($\underline{n}$ = 45)
Dispersion	25.98 (49.13)[a]	17.71 (23.37)
Clusters	5.02 (1.58)	5.00 (1.462)
Active Areas	9.48 (1.05)	9.16 (1.13)
Age	22.80 (4.93)	24.30 (4.91)
CES-D*	17.41 (9.98)	10.93 (7.12)

a standard deviations enclosed in brackets

* $\underline{F}$ (1,149) = 15.552, $\underline{p}$<.001

Hypothesis Testing

A) Hypothesis One: When a stressful life event has occurred, the likelihood of depression will increase as the total dispersion between life areas in an individual's cognitive life structure decreases.

First, the covariates for the Analysis of Partial Variance were chosen. The covariate for the life event group was found to be the number of chronic difficulties, and the covariate for the control group was the number of active areas. It was expected that the partial correlation of dispersion and CES-D scores would be significant in the life event group, but not in the control group. As evident in Table 2, this hypothesis was not supported. The Pearson correlation coefficient between dispersion and CES-D scores was close to significance only in the control group (r(45) = -.249, p<.10). Once entered into the regression equation, dispersion did not add significantly to the amount of variance accounted for, in CES-D scores, for either group. However, a test for significant differences between the two dispersion partial correlations, using transformed Fisher Z scores, did result in a significant difference between the two partial correlations, Z = -1.915, p<.05.

Table 2

<u>Results of Regressing CES-D Scores on Dispersion Scores for the Life Event Group and the Control</u>
<u>Group</u>

Group	Overall Equation		Covariates			Dispersion			
							partial[d]		
	R^2	F	r^a	β^b	t^c	r	r	β	t
Life Event Group (n = 106)			Chronic Difficulties						
	.06932	3.836*	.229*	.247	2.574**	.097	.134	.132	1.377
Control Group (n = 45)			Active Areas						
	.15668	3.901*	-.341*	-.311	-2.172*	-.249	-.213	-.203	-1.415

a   pearson correlation coefficient

b   standardized regression coefficient

c   t-test of standardized regression coefficient

d   partial correlation coefficient

* $p < .05$

** $p < .01$

B) Hypothesis Two: When a stressful life event has occurred, the likelihood of depression will increase as the number of clusters of life areas in an individual's cognitive life structure decreases.

In the testing of the second hypothesis, the covariates used were the same as those for hypothesis one. In the Analysis of Partial Variance equation, however, the number of clusters was entered into the equation last to determine its relation to the CES-D scores. The addition of the number of clusters into the equation did not contribute significantly to the proportion of variance accounted in the CES-D scores (see Table 3).

When the partial correlations between the number of clusters and CES-D scores were tested for differences between the two groups, the results were nonsignificant.

C) Hypothesis Three: When a stressful life event has occurred, the likelihood of depression will increase as the number of life areas in the cluster containing the crisis area increases.

In order to test this hypothesis, 35 subjects were chosen who had only one life event or difficulty in the previous three months, and had placed the event within a

Table 3

Results of Regressing CES-D Scores on Cluster Scores for the Life Event Group and the Control Group

Group	Overall Equation		Covariates			Clusters			
	R^2	F	r	β	t	r	partial r	β	t
Life Event Group (n = 106)	Chronic Difficulties								
	.05430	2.957	.229*	.226	2.360*	.056	.047	.046	.479
Control Group (n = 45)	Active Areas								
	.14013	3.442*	-.341*	-.383	-2.584**	.059	.164	.159	1.075

* $p < .05$

** $p < .01$

specific life area. This enabled the investigator to determine the cluster the event belonged to, and the proportion of life areas sharing the cluster. A Pearson correlation coefficient was calculated to determine the relationship between the proportion of life areas in the life event cluster and CES-D scores, but the results were nonsignificant.

Nonnormality of Dispersion Scores

A series of analyses were undertaken to determine if there was any effect of the nonnormal distribution of dispersion scores on the testing of the hypotheses. The distributions of dispersion scores within each group were highly positively skewed and leptokurtic, so two transformations suggested by Glass and Hopkins (1984) for positively skewed data were used - the square root of the dispersion scores and the log transformation of the dispersion scores. Whereas the distribution of the square root of dispersion scores was still positively skewed and leptokurtic, the distribution of the log of dispersion scores was very close to normal. However, the zero-order correlations of the transformed scores with CES-D scores indicate that such transformations did not alter the magnitude of the relationship between the CES-D scores and dispersion. As a further check, a nonparametric Spearman's

correlation coefficient was also calculated for the
relationship between dispersion and CES-D scores. The
association was not significant for either group, but it
was very close in magnitude to the Pearson correlation
coefficient obtained in the original analysis for the
control group (r ranks) = -.276, $p<.10$ vs. $r(45) = -.254$,
$p<.10$). Therefore, due to the consistency of the results,
the dispersion scores were left in their original form. A
trend analysis was performed to determine if the modest
relationship between CES-D and dispersion scores could be
explained by an underlying curvilinear relationship.
Although there was evidence of such a relationship in the
total sample, it did not reach a significant level using
the conservative post hoc method suggested by Pedhazur
(1982). Residuals analysis suggested there may be
heteroscedasticity in the life event group. However, as
regression analysis is robust to violations of assumptions
such as heteroscedasticity and nonnormality (e.g., Glass &
Hopkins, 1984; Pedhazur, 1982), no major changes were made
to the dispersion data.

Analysis Using Subjects With Only One Life Event or Difficulty

When there is more than one stressful life event or
chronic difficulty, it is possible to have had them occur

in the same life area, different life areas but the same cluster, or in completely different clusters. There could also be any range of dispersion scores between the life areas in which the life events occurred. Unfortunately, it is not possible to statistically control for the structural relationship between life events; it is only possible to control for the frequency of occurrence. In order to try and eliminate some of the unexplained variance between life events in the life event group, the analyses were re-run using individuals who had only one life event or one difficulty. It was felt that this restriction of the life event group would clarify the interpretation of the results of hypotheses one and two.

There were 51 subjects who had only one life event or difficulty. Once again, it was necessary to establish that there were no significant differences in the life structure variables between the one event group and the control group. As seen in Table 4, there were no significant differences between the two groups on dispersion, clusters, active areas, or age. There was a significant difference in CES-D scores, with the one event group being significantly higher ($\underline{F}(1,94) = 4.53$, $\underline{p}<.05$).

a) Hypothesis one: When a stressful life event has
   occurred, the likelihood of depression will

Table 4

Group Means on Differentiation, Active Areas, Age, and Depression Scores

for the One Event Group and the Control Group

	Group	
	One Event (n = 51)	Control (n = 45)
Dispersion	27.14 (58.63)[a]	17.71 (23.37)
Clusters	4.78 (1.57)	5.00 (1.46)
Active Areas	9.51 (1.10)	9.16 (1.13)
Age	23.65 (5.77)	24.30 (4.91)
CES-D*	14.86 (10.44)	10.93 (7.12)

a standard deviations enclosed in brackets

* F (1,94) = 4.52, $p < .05$

increase as the total dispersion between
life areas in an individual's cognitive
life structure decreases.

The covariates determined for the Analysis of Partial
Variance were sex and socioeconomic status. The addition
of dispersion into the equation did not produce a
significant change in the amount of variance accounted for
(see Table 5). However, the partial correlation
coefficient was stronger in magnitude for the one event
group than it was in the life event group (partial r(51) =
.249 vs. partial r(106) = .132). Once again, the
direction of the relationship was the opposite to that
which was hypothesized. A test for significant differences
between the dispersion partial correlation for the one
event group and the dispersion partial correlation for the
control group, using transformed Z scores, resulted in a
significant difference, Z = 2.203, p<.05.

   b) Hypothesis Two: When a stressful life event has
      occurred, the likelihood of depression will
      increase as the number of clusters of life
      areas in an individual's cognitive life
      structure decreases.

The covariates, sex and socioeconomic status, were
entered first. However, the addition of the cluster scores

Table 5

Results of Regressing CES-D Scores on Dispersion Scores for the One Event Group and the Control
Group

Group	Overall Equation		Covariates			Dispersion			
	R^2	F	r	β	t	r	partial r	β	t
One Event Group (n = 51)	.16390	3.071*	Sex						
			.270*	.248	1.714	.203	.249	.240	1.763
			Socioeconomic Status						
			-.271*	-.178	-1.245				
Control Group (n = 45)	.15668	3.901*	Active Areas						
			-.341*	-.311	-2.172**	-.249	-.213	-.203	-1.415

* $p < .05$

did not add significantly to the proportion of variance accounted for, in the one event group (see Table 6).

Testing of Hypotheses for Each Sex Separately

Since females outnumbered males in the sample by a ratio of over two to one, the analyses were run separately for females to determine if any of the hypothesized relationships could be further clarified with a more homogeneous sample. Although males and females did not differ significantly on their CES-D scores, previous studies have generally found that depression is approximately twice as prevalent in females as in males (Clayton, 1986). Therefore, it seemed reasonable to test hypotheses one and two separately by sex.

The results for hypothesis one are shown in Table 7. The life event group included those women who had had one or more stressful life events or severe difficulties in the previous three months. The one event group (a subset of the life event group) included those women with only one life event or major difficulty. The control group consisted of women with no life events or difficulties. Only the control group had a covariate, which was the number of active areas.

Dispersion was significantly related to CES-D scores in both event groups, but the overall equation for the

Table 6

Results of Regressing CES-D Scores on Cluster Scores for the One Event Group and the Control Group

Group	Overall Equation		Covariates			Clusters			
	R^2	F	r	β	t	r	partial r	β	t
One Event Group (n = 51)	.11023	1.941	Sex			.091	.043	.041	.294
			.270*	.195	1.320				
			Socioeconomic Status						
			-.271*	-.199	-1.351				
Control Group (n = 45)	.14013	3.442*	Active Areas			.059	.164	.159	1.075
			-.341*	-.383	-2.584**				

* p<.05

** p<.01

Table 7

Results of Regressing CES-D Scores on Dispersion Scores for Female Subjects

Group	R^2	F	r	partial r	β	t
Life Event Group (n = 81)	.04959	4.122*	.223	-	.223	2.030*
One Event Group (n = 40)	.09809	4.134*	.313*	-	.313	2.033*
Control Group (n = 31)	.14874	2.446		-.287		

* p<.05

control group was not significant. Since the relationship between dispersion and CES-D scores was significant in both event groups, the partial correlation for the control group was necessary to test for significant differences in the relationship between the two event groups and the control group, as per Williams (1985). Therefore, the partial correlation between CES-D and dispersion scores was calculated for the control group, although it was recognized that further analysis of the control group is generally not warranted in post hoc tests of this sort. The relationship between dispersion and CES-D scores in each group was actually a zero-order correlation because there were no covariates. Therefore, the correlation between CES-D scores and dispersion in both event groups was tested against the partial correlation between CES-D scores and dispersion in the control group. The correlation of dispersion and CES-D scores for the life event group and the partial correlation of dispersion and CES-D scores for the control group were significantly different, Z = 2.339, p<.01. The correlation of dispersion and CES-D scores for the one event group and the partial correlation of dispersion and CES-D scores for the control group were also significantly different, Z = 2.576, p<.01.

For hypothesis two (Table 8), none of the equations

were significant.

Due to the small sample size, the regression analyses are not reported for the male sample. There was a great deal of multicollinearity between the covariates and independent variables which would render it very difficult to interpret any results.

Table 8

Results of Regressing CES-D Scores on Cluster Scores for Female Subjects

Group	Overall Equation	
	R^2	F
Life Event Group (n = 81)	..00166	<1.0
One Event Group (n = 40)	.00022	<1.0
Control Group (n = 31)	.13445	2.175

DISCUSSION

Overall, the hypotheses in this investigation were not supported. Hypothesis one predicted, for the life event group, a negative relationship between the dispersion of life areas and depression. However, there was a negative relationship between dispersion and depression only in the control group, which did not reach significance. When the life event group was altered to include only those subjects with one life event or difficulty, the relationship was actually positive - although not at a significant level - which was opposite to the direction hypothesized. Hypothesis two predicted, for the life event group, a negative relationship between the number of clusters of life areas and depression. There was no support for this hypothesis. There was also no support for hypothesis three, which predicted for the life event group a positive relationship between depression and the proportion of life areas sharing a cluster with the crisis area.

There are two possible explanations for the negative results. The first explanation is that, although the theory was sound, the methodology was faulty. The alternative explanation is that Costello's (1976) theory relating life area differentiation and depression is wrong, regardless of whether or not the methodology was

appropriate. Each of the alternatives must be considered due to their implications for this investigation and future research. It seems appropriate to begin with a discussion of the methodology used in the present study, followed by a discussion of the conceptual issues.

There is extensive use of university undergraduates as a subject population in all areas of psychology, especially in the study of depression and life events (e.g., Hammen & Cochran, 1981; Metalsky et al., 1982). However, there has also been widespread criticism concerning whether or not university undergraduates are an appropriate population for such studies.

Firstly, there is the concern as to whether results from a population of students are generalizable to a clinically depressed population. The assumption that is often made in research is that students exhibit depression that is not different in kind from clinical depressives, but only in degree (Depue & Monroe, 1978). However, some critics have argued that depression in students is manifested only through mood disturbance and not the full range of symptoms that define a true depressive episode (e.g., Akiskal, 1979).

Secondly, when undergraduates have been investigated, there has been a lack of congruence between psychiatric

clinical diagnosis and the depression scores obtained from the self-report measures used (Coyne & Gotlib, 1983). For example, in a study by Bumberry, Oliver, and McClure (1978), a psychiatric rating of the students found that the mean Beck Depression Inventory (BDI) score for the psychiatrists' "moderately depressed" category was actually higher than for students placed in the "severely depressed" category.

Thirdly, if an hypothesis concerning clinically depressed - nondepressed differences is being tested on students exhibiting only minor depressive symptomatology, a lack of results could lead erroneously to a rejection of a hypothesis concerned with clinical levels of depression (Coyne & Gotlib, 1983).

Fourthly, the duration of the depressive symptomatology reported by students has been questioned. In a study by Hammen (1980) the mean BDI score of 35 depressed students dropped from 18.37 to 10.29 in the two to three weeks between initial testing and further interviews. At the second testing, 53% of the depressed students scored in the nondepressed range. This suggests that any elevation of depression scores demonstrated by students will be of limited duration (Coyne & Gotlib, 1983). In fact, Hatzenbuehler, Parpal, and Matthews (1983)

found that test-retest reliability of the BDI for 75 students was only .83 when they were retested the same day. Zimmerman (1986) did a similar study, but tested the students at a one week interval. He asked students to rate items with respect to the previous week, rather than with respect to the present moment as do the original instructions to the BDI. Nevertheless, Zimmerman found similar results to previous studies. The test-retest correlation for all 132 students was .64 ($p<.001$), but the original BDI score was significantly higher than the second score (8.52 vs 7.05, $t(131) = 3.18$, $p<.005$). Forty-three students were classified as depressed at time 1, but over 50% of these were reclassified as nondepressed at time 2. The rate of reclassification declined with increasing initial severity (Zimmerman, 1986). He also found that the instability in symptomatology was stronger in students who had high life event scores for the week previous to time 1 testing. That is, reclassification of the students was significantly more frequent in the high life stress group.

In a pilot study to the present investigation, there was a test-retest reliability check done on the CES-D. Although the time interval was five to six weeks and the two different scales were involved, it is interesting to compare the pilot results to the previously reported

findings for the BDI. The correlation between the two sets of CES-D scores was $r(61)$ = .538, $p<.0001$, and there was no significant difference between the mean score at time 1 of 14.43, and the mean score at time 2 of 14.31. However, these results are drastically altered when, at time 1, the students are divided into depressed and nondepressed using 16 as a CES-D cut-off score (Radloff, 1977; Radloff & Locke, in press). For the students scoring less than 16 at time 1, the mean CES-D score was 8.04, and at time 2, their mean score increased to 11.13 ($t(37)$ = -2.17, $p<.05$). The test-retest reliability was only $r(38)$ = .08, $p>.10$. The students scoring 16 or over at time 1 had a reasonable test-retest correlation of $r(23)$ = .562, $p<.005$, but the mean CES-D score dropped from 23.43 to 19.57 ($t(22)$ = 2.18, $p<.05$). These results are consistent with Zimmerman's (1986) findings that the stability of depressive symptomatology (as measured by the test-retest reliability) increases as initial severity increases. However, the statistically significant increase in time 2 scores for the low initial scorers and the significant decrease for the high initial scorers is more likely a function of regression towards the mean, than a reflection of some inherent differences between the groups.

In order to try to replicate Zimmerman's (1986)

finding that there is more instability associated with students who had experienced life events, two groups in the pilot study were compared – those who had had a life event prior to time 1 but none between time 1 and time 2, and those who did not have a life event before either testing time. However, due to the small sample sizes (19 and 14 respectively) the results are inconclusive. Both groups had over 65% of the initially depressed individuals (CES-D scores >15) reclassified as nondepressed, but this is based on only six initially depressed individuals in the life event group and three in the control group. A better analysis of the present data is a comparison of the test-retest reliabilities for the two groups. The life event group's correlation coefficient was only r(19) = .291, p>.10, whereas the group that had not had a life event had a coefficient of r(14) = .647, p<.05. This contrast in reliability coefficients is consistent with Zimmerman's (1986) conclusions regarding the instability of depressive symptomatology in students who had experienced life stress.

Student populations are generally used to represent the community at large, as was the case in the present study. However, this use must be questioned due to the elevation of the student CES-D scores in the present

investigation over the community norms that were provided in early validation studies of the CES-D. The mean for the undergraduate sample in this study was 15.48. The mean for a community sample in a study by Weissman, Sholomskas, Pottenger, Prusoff, and Locke was 9.10 (1977), and the means obtained by Radloff and Locke (in press) in five different communities ranged from 7.92 to 9.92. The mean obtained in this study is very close to the score of 16 used by Radloff (1977) as a cutoff for case depression, and considerably higher than the cutoff of 13 established by Costello and Devins (1986) using the CES-D as a screen to the Present State Examination (PSE) interview to establish case depression. This could indicate an overall higher level of depression among students in general, or it could be due to other confounding factors. One potentially confounding variable in trying to compare depression in students to a community sample is age. Age has been found to be associated with depression (e.g., Markush & Favero, 1974), although not consistently (e.g., Brown & Harris, 1978). Although the mean ages were not reported for the Weissman et al. (1977) or Radloff and Locke (in press) studies, they indicate using a wider range of ages than was used in the present study (18 - 65).

Hammen et al. (1985) postulated that university is a

particularly stressful time for students, which suggests that the number of life events may be elevated compared to the general population, and the present results support this idea. For example, the present sample reported a mean of 1.19 life events for the previous three months, whereas Monroe (1982b) reported means of .54 to .91 life events for a group of employees asked to recall the previous four months. However, other reasons for the present study's elevated number of reported life events will be discussed further on in the discussion.

If researchers are to continue using students as a subject population, it is necessary to undertake a major study to compare students to clinical samples and community samples on all relevant parameters of depression and life events. The three groups need to be compared on the incidence of severe life events and duration of major difficulties, and on the type and severity of life events and difficulties that occur. They also need to be compared in terms of the prevalence of clinical depression, their presenting symptoms, and the various social and individual factors which have been associated with depression (e.g., age and marital status). There have been studies which compared normal individuals with depressive symptoms to clinically depressed individuals (e.g., Weissman, Prusoff,

& Pincus, 1975). The results suggest that patients are more impaired in terms of behavioural and somatic components. However, the mood associated with the depression of normals may be as severe as that in a clinical depression, and the subjective feelings of sadness and loneliness may actually be higher in normal depression (Weissman et al., 1975).

Although one may question the representativeness of student populations in relation to community and patient populations, undergraduates per se appear to be a legitimate population for study (Coyne & Gotlib, 1983). Depression and suicide among college students have been recognized as a serious problem (e.g., Sarason & Sarason, 1984); therefore, it may be useful to concentrate on what research with students tells one about students, rather than what research with students tells one about people in general.

The next potential source of methodological error is in the measurement of life events. The literature is full of criticisms of life event methodology, especially when combined with retrospective designs (e.g., Dohrenwend, 1974; Monroe, 1982a; Monroe, 1982b). One problem with asking subjects to recall past events is that one can argue that the occurrence of the depressive episode may have

caused the depressed person to exaggerate the number of past events to explain his/her distress (Brown, 1974). However, Brown and Harris (1978) did not see this as an insurmountable problem. Using a probing interview method, they found that depressed women were no more inaccurate in describing their lives before their depressive episode than nondepressed women were in describing their lives before a particular date.

A more serious issue associated with retrospective studies, including the present study, is the assumption that the life event precipitated the depression, rather than vice versa. It has been suggested (e.g., Hinkle, 1974) that a depressive episode may actually influence the occurrence of certain events, such as marriage break-up or the loss of a job. In order to address this problem, Brown and Harris (1978) introduced the concept of "independent events", which were those events which could be argued logically to be independent of the onset of a disorder. "Possibly independent" events were those for which the same logical arguments could not be made, but there was no evidence that it was related to any behaviour of the subject. In their Camberwell study, Brown and Harris (1978) reported that "independent" and "possibly independent" events had the same association with

depressive onset and concluded that it was not likely that the womens' disorders had resulted in the occurrence of events. However, Costello (1982) found that although there was a significant association between "independent" events and depression, the association between "possibly independent" events and depression was much stronger. Costello (1982) found the same kind of results for the "independent" and "possibly independent" difficulties.

Prospective studies looking at this issue have also provided conflicting results. Gersten et al. (1977) tested depression in children at two different times and took a measure of life events at time 2. Their results suggested that life events did not precipitate depression, but instead there was a confounding of life events and the depressive disorder. However, Gersten et al.'s (1977) procedure must be questioned; there was at least a five year interval for which life events had to be recalled, and all information was obtained from the childrens' mothers. Although they attempted to use only events that were independent of the childrens' psychological functioning, there was apparently no attempt to account for the mothers' psychological functioning.

Among the studies which have found evidence of a causal pathway from severe life event to depression is one

by Ferguson and Horwood (1984). Using a structural
equation model, they found that although depression and
life events were reciprocally related, the major
relationship was from life events to depression. A study
by Lin and Ensel (1984) had similar results. In an
analysis of depression change over two time periods, they
found that improvement in depression scores at time 2 was
related to a decrease in undesirable life events and
deterioration at time 2 was related to an increase in
undesirable life events. In general, it seems that the
assumption that life events precipitate depression is a
reasonable one.

Collecting information on life events using an
interview, such as the Brown's (1978) Interview Schedule
for Life Events and Difficulties, is the method of choice
(Thoits, 1983). However, it is not always possible to
employ lengthy interviewing techniques, and the alternative
is to use a checklist. However, there are problems
associated with using checklists in general, as well as
problems specifically related to the checklist used in the
present study.

In a thorough review of life event research, Thoits
(1983) outlined the major concerns regarding the use of
life events checklists. For example, checklists tend to

use simplistic wording of the events, allowing for too much interpretation on the part of the subject. Also, the test-retest reliablities of the checklists have been low to moderate. Low test-retest reliabilities support Uhlenruth, Balter, Lipman, and Haberman's (1977) finding that a person's ability to remember past events declined significantly with time. However, as discussed in the Method section, the choice of the three month recall period for the present study was chosen to minimize any problems associated with recall.

Another problem associated with checklists is the sampling of events. Thoits (1983) points out that former scales have included events more likely to occur only in particular subgroups of the general population. However, Costello and Devins' (1986) Life Events and Difficulties Questionnaire (LEDQ) was designed to include those severe life events and major difficulties that had been previously shown to be related to the onset of depression (Brown & Harris, 1978; Costello, 1982); it also provides space for the subject to include any events which may have occurred and are not provided on the list.

The LEDQ does, however, present one potentially serious problem. In a validation study, Costello and Devins (1986) administered the LEDQ as a screening device,

then followed up the subjects with Brown's (1978) Interview

Schedule for Life Events and Difficulties. Almost all of

the women who indicated on the checklist that a life event

or severe difficulty had not occurred, had not had a life

event or severe difficulty identified at interview (97%).

However, the specificity of the LEDQ was poor; only 57% of

women indicating a life event on the LEDQ and 55% of women

indicating a difficulty were identified as actually having

experienced the respective problems (Costello & Devins,

1986).

The implication is that one can be fairly confident in

assuming that the control group of subjects in this study

was free of life events and difficulties in the three

months previous to testing. However, it is likely that the

life event group contained individuals who did not, in

fact, experience a stressful life event or severe

difficulty. This raises questions about the homogeneity of

the life event group and implies that there could have been

masking of the true relationship between life structure and

depression. This idea is supported by the increase in

magnitude of the positive correlation between life

structure and depression for those individuals who had had

only one life event or difficulty. As some of the

unexplained variance is removed, the relationship becomes

stronger - although in a direction opposite to that which was hypothesized. This issue will be dealt with further later on in the discussion.

There is no evidence of methodological error associated with the life structure variables that could explain the lack of obtained results. There were two measures of life structures - dispersion and clusters. This was done to see if life structure was better represented by the cognitive distance between life areas, by the particular groupings of the life areas, or conceivably by both. Both measures were obtained by initially determining the cognitive map of the individual using multidimensional scaling, then a clustering program was used to determine an overall disperson score, as well as a clustering of life areas. The solutions were based on mathematical principles, yet matched the solution that would be determined through visual inspection. There was no correlation between these two measures.

Since the clustering program used was developed for this study, further validation is necessary. However, there were no apparent problems that surfaced during this investigation.

Testing hypothesis three presented a problem. In order to correlate, to depression, the proportion of life

areas sharing a cluster with the crisis area, it was only possible to test those subjects who had experienced only one life event, and had indicated to which life area the event belonged. As a result, this narrowed the sample to only 35 subjects. It was not statistically possible to test this hypothesis with individuals who had had life events in more than one cluster since there was no single reference cluster for those individuals. Using an interview technique for testing in the future should result in a more well-defined sample with which to test this hypothesis.

Depue and Monroe (1986) stated that "prediction can only be as complete as the adequacy of the conception and measurement of the predicted variable itself" (p. 37). In the present study, the predicted variable was depression, and the conception and measurement of depression, as measured by the CES-D scale, may be one factor that could depress the association between life structure and depression, following a severe life event.

There are several problems associated with depression symptom checklists in general. Firstly, they tend to include symptoms that indicate generalized psychological distress, but do not identify specific disorders (Depue & Monroe, 1986; Thoits, 1983). Elevated scores on depression

self-report scales may be a result of a transient mood shift, chronic mild depression, a primary depressive disorder, or some other psychiatric disorder (Depue & Monroe, 1978). There is also far less information available with self-report scales than a clinician would require in his/her diagnosis. Further, subjects lack the clinical perspective to objectively rate the severity of their symptoms (Depue & Monroe, 1978).

Also, it is possible that social desirability could influence the CES-D scores. It has been suggested that each sex and different ethnic groups perceive the desirability of self-report items differently (e.g., Dohrenwend & Dohrenwend, 1969), although the empirical evidence is mixed (Thoits, 1983). Social desirability is one possible explanation for the elevated scores found in the student samples versus community samples that were discussed earlier. It is also a problem that would affect CES-D scores in an idiosyncratic manner, making it difficult to interpret overall scores.

Finally, the emphasis upon somatic complaints has been noted as a problem in several checklists (Thoits, 1983). However, in a psychometric analysis of the CES-D comparing several illness populations to a normal population, Devins et al (1986) found that the somatic items on the scale did

not confound the overall score of depressive symptomatology.

Overall, the problems associated with the CES-D do not appear to be any more serious than those associated with any other depressive symptomatology questionnaire. The most serious methodological problem appears to be the posited heterogeneity of the life event group, due to the lack of specificity in the LEDQ. Unfortunately, it is difficult to address the issue of heterogeneity of the life event group in a post hoc manner. However, there were two factors that seemed to contribute to the heterogeneity of the life event and control groups that could be tested: frequency of life event and difficulty occurrence, and sex differences. It must be kept in mind that the a priori hypotheses were not supported so the ideas presented are only speculative. However, the post hoc results for the one event group and the women were interesting, and reasonably stable, and therefore merit discussion.

First, all subjects with more than one life event or difficulty were removed from the life event group. Whether this new group represented a different population of people entirely (i.e., those people who tend to experience singular life events, or perhaps those who would only report one) or whether the narrowing of the group simply

eliminated a number of individuals who had overreported life events is unknown. However, it would appear that it did remove some of the unexplained variance because the partial correlation between life structure dispersion and depression increased from .134 to .249, which did not meet, but closely approached, significance. This is in contrast to the significantly different partial correlation in the control group of -.213.

Although there were no significant differences between the sexes for the overall CES-D scores, sex differences are common in the literature. Possible reasons for the differences have included socialization processes, biological differences, or differences in the manifestation of depression (Sarason & Sarason, 1984). One interesting study by Padesky and Hammen (1981) found no sex differences in an overall score of depression derived from the Minnesota Multiphasic Personality Inventory (MMPI), but they did find sex differences in the expression of depressive symptomatology. Men expressed more somatic complaints, social withdrawal, and cognitive and motivational deficits, whereas women are less self-confident and more self-critical (Padesky & Hammen, 1981). If it is true that males and females express different symptomatology, it is also possible that they

express a different relationship between life structure and depression. When the females were analyzed separately, the results were parallel to those reported for the sexes together, but were even stronger in magnitude. The correlation between dispersion and CES-D scores for the life event group was $r(81) = .223$, $p<.05$. The correlation between dispersion and CES-D scores for the one event group was $r(51) = .313$, $p<.05$. Both of these values were significantly different from the partial correlation of the control group, $r(45) = -.287$, $p>.05$. It is unfortunate that the results for the males were uninterpretable due to the small sample size and multicollinearity of the variables. A comparison of males and females would make an interesting future study.

Although a negative relationship between dispersion and depression was not hypothesized for those individuals who had not experienced a life event, it is consistent with several other theories. The literature on cognitive complexity, as reviewed earlier, is largely based on the assumption that decreased differentiation, or cognitive simplicity, is associated with increased depression. Further, the trend towards a positive relationship between dispersion and depression in the life event group was the opposite of the hypothesized direction for this study and

the previous work on cognitive complexity. However, it is quite possible that the occurrence of a life event could have a dramatic effect on the relationship between life structure and depression. The following alternative hypothesis is based on the results of this, and previous, studies.

Although there has been a demonstrated relationship between life events and depression, it is not the case that all people who become depressed have had a life event. Despite a positively skewed distribution, the CES-D scores for the control group ranged from two to 39 - the latter representing an extremely high score. Perhaps an individual facing ordinary daily hassles and stressors is at an advantage when his/her life areas are distant from one another. Difficulties at work do not interfere with his/her family life, and he/she can still enjoy a game of racquetball with friends despite a minor argument with his/her spouse. An undifferentiated person, on the other hand, would tend to limit the elements within the environment to which he/she attends, resulting in a rigid, more tightly interrelated system (Sheehan, 1985). When daily stressors occur, the individual is less able to deal effectively with them due to having a structure closed to more "distant" alternatives. This could lead to an overall

decrease in activity due to incentive and reinforcement being lost for other activities within the interrelated structure (Costello, 1976).

This idea is also consistent with the theoretical account of the conception of adult development by Levinson (1986). His theory incorporates the concept of an individualistic life structure, of which the main components are relationships with others (e.g., friends, lovers, social movements, etc.). He states that "the peripheral components [of the life structure] are easier to change or detach; they involve less investment of self and can be modified with less effect on the fabric of the person's life." (Levinson, 1986; p. 6) This would suggest that, in normal adult development, a more differentiated structure allows for changes to occur more easily with less stress on one's life as a whole.

However, after a severe life event occurs, a more integrated life structure may be a protective factor against depression. Perhaps more overlap between areas of the life structure allows for stronger social support, which research has shown to mitigate the effects of life events (Cohen & Wills, 1985). When one's life areas are highly integrated, the people in each area are likely to know more about what happens in those other life areas.

When others have more knowledge about the life area which has been affected, they may be able to provide more constructive support. For example, two different people are fired from their jobs. Person A has an undifferentiated, integrated life structure, whereas Person B has a differentiated, dispersed life structure. The spouse of Person A has heard A talk about his/her job and is able to judge how A feels about the loss. Person B, however, has always kept his/her job separate from his/her family. B's spouse knows very little about the original job situation and may find it much more difficult to give B the support he/she needs.

The amount of differentiation in a person's life can be conceptualized as presenting a different amount of risk depending on the environmental circumstances, rather than defining a level of adaptability independent of the context. Both Costello (1976) and Witkin et al. (1979) see differentiation as an enduring characteristic of the individual. The level of differentiation accounts for the association between the elements in one's life, which is in turn responsible for individual self-consistency. Differentiation is not a quality expected to change with psychopathology or environmental changes. This is supported in Sheehan's (1985) study where the subjects'

level of depression improved significantly, but their measure of complexity did not change significantly. Also, in the present study, there was no significant difference between the dispersion or cluster measures between the life event group and the control group, or the one event group and the control group. Instead, differentiation should be conceptualized as a relatively stable, individualistic characteristic.

A differentiated person may be thought of as one who is at a minimum risk given the type of stress we deal with on a daily basis, but if a stressful life event should occur, he/she is then at maximum risk. An undifferentiated individual is in the opposite situation; he/she is at risk for having trouble in coping with daily problems, but he/she is "hedging his/her bets" in the case of a major life event or difficulty.

It seems that the present study is the first in which cognitive structure has been studied in its relationship to life events and depression. In order to test future hypotheses based on Costello's (1976) theory and the results of this study, there are several variables that should be taken into account.

Firstly, it is clear that any further research must incorporate better homogeneity of the groups being tested.

This will involve using an interviewing technique to gather information on severe life events and major difficulties, rather than relying on a checklist. It will also necessitate a measurement technique which can adequately measure not only the number of life events and difficulties, but also the relationship between them.

Secondly, there should be a sufficiently large sample of males and females. The reason for the apparent sex differences in the occurrence and expression of depression is still a topic of great debate; it would be very interesting to see if there are differences in terms of the type of relationship between life structure and depression.

Thirdly, a prospective study is necessary make any strong statements concerning the stability of the cognitive life structure. Although no significant differences were found between the event groups and the control group for any of the life structure variables, it is still conceivable that the occurrence of a severe life event did effect the life structure of the individuals in the event groups. It is possible, for example, that the occurrence of a severe life event changes the individual life structure in different ways for different people; this type of change can not be tested for in a retrospective design.

Lastly, an important change may be necessary in the

conception of depression. Depue and Monroe (1986) suggest that although there has been gradual development in the theory and testing of stressful life events, there has not been equal development in the measure of depression. They believe that there is great heterogeneity amongst individuals who score high on depressive checklists. This view is supported by several others, including Fawcett and her colleagues. Similarly to Costello (1976), Fawcett, Clark, Scheftner, and Gibbons (1983) and Fawcett, Clark, Scheftner, and Hedeker (1983) view anhedonia, or the inability to experience pleasure in situations that normally elicit pleasure, as an important symptom of depression. However, they view anhedonics as a qualitatively different subset of depressives in general (Fawcett, Clark, Scheftner, & Gibbons, 1983). Anhedonics are hypothesized to exhibit symptoms of loss of interest in sex, appetite, social contacts, and work, with more evidence of suicidal despair (Fawcett, Clark, Scheftner, & Hedeker, 1983). Those depressives who are not considered anhedonic - that is, hedonics - are thought to exhibit neurotic qualities and show symptoms of hypochondriasis, irritability, indecision, and pessimism (Fawcett, Clark, Scheftner, & Gibbons, 1983; Fawcett, Clark, Scheftner, Hedeker, 1983; Klein, 1983).

Costello's (1976) theory is worthy of further study for several reasons. First, it seems obvious from the proliferation of studies that cognitions will continue to be considered an important aspect of depression. Secondly, Costello's theory addresses criticisms directed at the area in general - for example, Depue and Monroe (1986) conclude that stable attributes of an individual may be a stronger predictor of depression than psychosocial variables that are potentially transient. Thirdly, testing of the theory allows for concomitant testing of alternative hypotheses. Lastly, the results of this study (albeit in post hoc analyses) provide interesting points of departure for further hypotheses and study. In future research, for Costello's theory as well as other research into life events and depression, there should be stronger efforts made to define and measure the concepts more distinctly. This would allow new theories to be tested fairly, rather than being relegated to the "no results" category.

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