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STRESSFUL LIFE EVENTS AND SUBJECTIVE DISTRESS: THE DEVELOPMENT

OF A MULTI-DIMENSIONAL MODEL

by

Hans O. F. Veiel

Diplom-Psychologe, Universitat Freiburg, April, 1976

THESIS SUBMITTED IN PARTIAL FULFILLMENT OF

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ABSTRACT

The literature on stressful life events was reviewed. Special consideration was given to conceptual and methodological issues of life event questionnaires and to moderator effects of third variables. A number of hypotheses were established regarding a) the homogeneity of items of life event questionnaires, b) moderator effects of different dimensions of objective social support patterns on the correlation between stressful life events and distress symptoms, c) moderator effects of different personality dimensions, and d) combined moderator effects of social support and personality. The subjects in this investigation were 461 male and female college students.

The following results were obtained:

- The dependent variable "subjective distress symptoms" was found to comprise three independent dimensions representing depression symptoms, tension/anxiety symptoms, and psycho-physiological symptoms.

- The variable "objective social support" comprised at least two independent dimensions, frequency of social activity and social network size.

- There was a subset of "contingent" life events which were partly brought about by individuals who showed high levels of anxiety and tension. This subset accounted for most of the correlation between traditional life event scores and psychological distress symptoms.

- Large social networks _increase_ the effects of stressful life

events on symptoms. This result was explained in terms of
the difference between _objective_ patterns of social support
that were examined in this investigation, and the _subjective_
feelings and beliefs of being supported that were typically
involved in the "buffering" effects reported in the
literature.

- Among the personality variables, only "Psychoticism" moderated
the effects of life events: women with high "Psychoticism"
scores tended to react more strongly to stressful life
events with symptoms of tension and anxiety.

The results showed a remarkable over-all pattern of specificity:
most effects, although highly significant, were present in only
one symptom complex, which differed from case to case. It is
held that the processes involved in the pathogenic effects of
life events are specific and narrow with respect to the symptoms
elicited, as well as with respect to the personality and social
variables involved. This was taken as an indication that
stressful life events may best be regarded not as having general
psychopathogenic effects, but as _exacerbating_ latent pathogenic
processes characteristic of the particular personality
organization and/or of the particular social environment of an
individual.

A la memoria de

Amparo

Ay hija, sabes, sabes
De donde vienes?

De un lago con gaviotas
Blancas y hambrientas.

DEDICATION

v
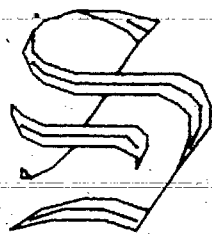
olent nonnumquam illi, qui ingenui sui foetus luci publicae exponere volunt, anxie circum— spicere, quos sibi deligant patronos, quorum vel splendore aliquid sibi lucis circumdare, vel auctoritate male— volorum spiculas & insultus re— pellere, vel merita depraedicare, vel favorem denique promereri possint.

Mihi vero non diu dispiciendum fuit, vel quo lumine libellus noster collucere, vel quo clypeo contra ictus hostium muniri, vel quorum adversus me benevolentia parari & celebrari posset.

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This dissertation has been made possible, above all, by the patience and indulgence of Kirsten, Jan, and Katrin.

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R. Koopman, who was always available when his advice was needed, and who kindly pretended to think I understood the subject matter of our discussions;

lastly, and particularly, E. Clarke, who never asked why.

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Part I

INTRODUCTION

1. A Historical Review

It appears as though the current everyday use of the concept of "stress" reflects the popular adoption of a new scientific concept that has relevance to everyday behaviour. Actually, the reverse is the case. The word "stress" is of Latin origin and was used in the English language for centuries to mean "hardship" or "adverse situation" (Mason, 1975a; Selye, 1975). It was adopted by the physical and engineering sciences in the 17th, 18th, and 19th centuries to measure the impact of a physical force acting on a solid body (Hinkle, 1973). The original meaning has persisted, however, and in the 19th and early 20th centuries, "stress", in the sense of psychosocial hardship or adverse situation, was commonly recognized as a cause of "ill health" and "mental disease" (Hinkle, 1973).

In the early 20th century, Cannon (1939) began using the term "stress" with the relatively vague meaning of an unspecified environmental demand on a "biological organization", causing it to adjust in order not to disintegrate. In the second edition of his book "The Wisdom of the Body" (Cannon, 1939),

however, the term assumes little prominence. It is used only occasionally, does not appear in the (admittedly small) index, and is neither defined nor explained. Cannon relied on the concept of "homeostasis" - the tendency to restore physiological equilibria disturbed by "stress" - to explain the phenomena he describes.

H. Selye, following Cannon and common usage, at first used the term to denote environmental stimuli impinging on the organism (Mason, 1975a). However, he later defined "stress" differently as the state of the organism that is elicited by environmental "stressors", and is manifested by the "General Adaptation Syndrome". In Selye's own words:

> While stress is reflected by the sum of the non-specific stages which occur in the body at any one time, the general adaptation syndrome (or G.A.S.) encompasses all non-specific changes as they develop throughout time during continued exposure to a stressor. One is a snapshot, the other a motion picture of stress. (Selye, 1956, p.64).

The G.A.S. proceeds through the stages of 1) Alarm Reaction (involving a mobilization of body resources), 2) Resistance (representing adaptation of body processes to meet the increased demand), and 3) Exhaustion (representing a depletion of body resources followed, when not reversed, by death).

H. G. Wolff, in his book "Stress and Disease" (Wolff, 1953, pp 15,74,91) used the term "stress" in the original sense of an external condition acting on the organism (referring to "man under stress" (p.15), but in his foreword he attempted to define it, by attempting to draw an analogy with the concept of

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"stress" in the physical sciences, as the "internal or resisting force brought into action in parts by external forces or loads" (p. v), which leads to change in the organism. However, he later clarified this issue (Wolff, personal communication quoted by Hinkle, 1973, p. 34) by stating:

> I have used the word (stress) in biology to indicate that state within a living creature which results from the interaction of the organism with noxious stimuli or circumstances, i.e., it is not a stimulus, assault, load, symbol, burden, or any aspect of the environment, internal, external, social, or otherwise.

This concept of "stress" is quite similar to Selye's -- an internal state elicited by noxious stimuli of the environment, and it probably reflects the influence of Selye's ideas.

H. G. Wolff was among the first to emphasize the involvement of the "nervous system" and of cognitive evaluations in the determination of the stressfulness of external stimuli (Hinkle, 1973). He described two categories of stress-producing stimuli, one acting directly (e.g., strong mechanical, chemical, or electrical stimuli), the other acting indirectly, their effects being dependent on their perception by the individual. However, due to the focus of his research, the state of "stress" that resulted from these stimuli appears to have still been conceived in physiological terms.

Subsequent research on the differential impact of psychological and physical aspects of noxious stimulation has shown that physiological stimuli stripped of psychological significance are relatively inefficient in eliciting stress responses, at least at low to moderate levels of stimulation

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(Mason, 1971, 1975b).

Mason (loc. cit.) argued that most former research confounded noxious physical stimulation (heat etc.) with information about the stimulation (animals knowing that they are being, or going to be, mistreated), and with other psycholog- ically discomforting stimulation (new experimental box etc.). He proposed a largely psychological mediation of a general stress response (see also Lazarus, 1966). It is, he argued, the preparation for motor action which is the most general response mechanism for adaptation to the environment in higher organisms, and which is the logical non-specific reaction to environmental demands. He reported that some physiological reactions to such physically noxious situations as heat exposure are counterproductive in terms of purely physiological adaptation.

Mason acknowledged the possibility of a direct effect of physical stimuli on physiological stress reactions (Wolff's "direct" action), but relegated them to a minor role. He argued that the endeavour to generally link psychological research to Selye's essentially physiological stress concept is not very productive, given the lack of clarity in the organization of psychological stress responses. According to him, Selye's "non- specific response" is best seen as a complex psychological response in preparation for an environmental challenge, following a higher-order cognitive evaluation and integration of external stimulation. In Wolff's terms (Wolff, 1953), this would mean that all or most stressful stimuli act indirectly (see also

Mikhail, 1981).

During a considerable number of years, until the 1960s, research on psychosocial and physiological stressful conditions ran parallel to each other, without much contact between the two fields (Mason, 1975a, 1975b). A gradual rapprochement occurred when, as Mason (1975b) states, the search for physiological, non-specific "first mediators" of stress, which would correspond to the non-specific "stressfulness" of stimuli, did not bear fruit.

While most of the research on both physical and psychosocial stressful conditions concerned physical illness as its final outcome, the theory of the environmental or psycho-social causation of psychologic disorder was dominated by psychoanalytic and behaviouristic paradigms. Both posited specific conditions as causes of specific disorders, with the psychoanalists favouring symbolic-historical mechanisms, and the behaviourists favouring functional-temporal mechanisms; and both orientations elaborated paradigms of (e.g., Alexander, 1950; Alexander, French, & Pollack, 1968) or furnished evidence for (e.g., N. E. Miller, 1969) change of peripheral physiological parameters by psychological mechanisms. Neither, however, had any place for non-specific noxious conditions.

Today, while "stress" commonly refers to environmental conditions leading to psychological discomfort (Coleman, 1973; Mason, 1975a), there is also a body of research which follows Selye's conceptualization of it as an organismic response to

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those environmental conditions (Selye, 1950, 1956, 1974), and there appears to be little consistency in its use (Mason, 1975a). Thus, "stress" has come to refer to "a thing, a process, a quality, or a state, either internal or external to oneself" (Christensen, 1981, p. 62). The nature of the mechanism by which "stress" affects health remains unclear: while the early work on "stress" implied physiological mechanisms, newer conceptualizations point to <u>psychological</u> mediators even for physical stressors.

2. Stressful Life Events

Most of the early research on "stress" concerned physical "stressors". However, soon after the introduction of the term "stress" by Selye (1936) and quite independently from physiological "stress" research, other researchers began to examine psychosocial stressful conditions and their association with physical illness.

In 1951, A. Meyer introduced the "life chart", documenting major psychosocial events in the patient's history, as a tool in medical diagnosis (Holmes & Masuda, 1974). In the early 1960s, Rahe and his co-workers examined the occurrence of the patients' changes in social status and other "major social readjustments" in the time preceding illness onset in different nosological groups of medical patients (Rahe, Meyer, Smith, Kjaer, & Holmes, 1964). They found that "different disease entities occur in a setting characterized by a significant clustering of changes in social status" (p. 41). (See also Berle, Pinsky, Wolf, & Wolff, 1952). They subsequently published the "Schedule of Recent Experiences" (SRE) (Holmes & Rahe, 1967) which contained the

most frequent and important "stressful life events" in a
checklist. The main purpose of these and other life event
questionnaires was to measure the amount of "life stress", i.e.
of stressful psycho-social pressure experienced in a given
period, and to relate it to the onset of somatic or psycholog-
ical disorder.

The notion that adverse psychosocial events precede illness
onset, was not a novel idea in the 1960s. Rahe et al. (1964)
cite many studies from the late 1950s and early 1960s with
similar concepts. What was new was Rahe et al.'s (1964) attempt
to compile the most typical events into a list that could be
applied as a self-report questionnaire.

In 1967, Holmes & Rahe refined this list by assigning
weights to each event according to its stressfulness. In order
to arrive at these weights, they asked subjects to rate for each
event the relative adjustment it made necessary in proportion to
a standard event (marriage). The resulting "Social Readjustment
Rating Scale" (SRRS) comprised 43 items (in later editions only
42 - Rahe, 1978), each with a weight between 0 and 100 (derived
from the average adjustment ratings). In subsequent administra-
tions of the SRRS, the sum of scores of events experienced by
the subject could then be taken to represent his "life stress"
score.

In the following one and a half decades, many elaborations
and variations of this first "life event questionnaire" have
been published, either to widen its scope (Rahe, 1975), for

reasons of methodological refinement (Cochrane & Robertson, 1973; B. S. Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978; Hough, Fairbank, & Garcia, 1976; Hurst, Jenkins, & Rose, 1978; Paykel, Prusoff, & Uhlenhuth, 1971; Sarason, Johnson, & Siegel, 1978; Tennant & Andrews, 1976); to make it more suitable for special populations like college students (Marx, Garrity, & Bowers, 1975; Sarason et al., 1978), adolescents (Newcomb, Huba, & Bentler, 1981), sales people (Hurst, 1979), pregnant women (Chalmers, 1981), or children (Coddington, 1972; Monaghan, Robinson, & Dodge, 1979); or to tap different realms of stress,=.ful conditions (Antonovsky, 1974; Ilfeld, 1976a; Kanner, Coyne, Schaefer, & Lazarus, 1981).

Effects of stressful life events

The effects of stressful life events on the individual have been evaluated in terms of both physical and mental functioning.

Physical illness

Numerous studies have been done relating the occurrence of life events to the onset of different somatic diseases like cancer (Lehrer, 1980), myocardial infarction (Theorell, 1974; Theorell & Rahe, 1972), lower back pain (Leavitt, Garron, & Bieliskaus, 1979), orthopedic and obstetrical illnesses (Frost & Clayton, 1977), and undifferentiated physical illness (Marx et al., 1975). Generally, the investigators found significant

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differences in the number or importance of life events exper-
ienced before illness onset.

Psychological disorder

Significant differences have also been found between groups
of normal controls and depressed (Beck & Worthen, 1972; Brown,
Sklair, Harris, & Briley, 1973a; Brown, Harris, & Petro, 1973b;
Hudgens, 1974; Jacobs, Prusoff, & Paykel, 1974; Paykel, Myers,
Dienelt, Klerman, Lindenthal, & Pepper, 1969; and especially
Lloyd, 1980) and schizophrenic (Beck & Worthen, 1972; Birley &
Brown, 1970; Brown et al., 1973a; Brown et al., 1973b; Harder,
Gift, Ritzler, & Kokes, 1981; Jacobs et al., 1974; Jacobs &
Myers, 1976; and especially Rabkin, 1980) psychiatric patients.

Life events have been found to be significantly related to
the level of psychological impairment in psychiatric in- and
out-patients (Cooper & Sylph, 1973; Frost & Clayton, 1977;
Harder, Strauss, Kokes, Ritzler, & Gift, 1980; Morrison,
Hudgens, & Barchha, 1968; Thomson & Hendrie, 1972; Uhlenhuth &
Paykel, 1973a; Uhlenhuth & Paykel, 1973b), or in generally
normal populations (Berkman, 1971; Grant, Sweetwood, Yager, &
Gerst, 1981; Kanner et al., 1981; Markush & Favero, 1974; Marx
et al., 1975; Miller, Ingham, & Davidson, 1976; Myers,
Lindenthal, Pepper, & Ostrander, 1972; Newcomb et al., 1981;
Sarason et al., 1978; Williams, Ware, & Donald, 1981). Psycho-
logical impairment or distress was usually measured either by
Langner's (1962) 22-item scale, Gurin's mental health index

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(Gurin, Veroff, & Feld, 1960), or by self-report questionnaires
for anxiety and depression symptoms, and the correlations
between these and life event questionnaires, although signifi-
cant, typically do not exceed 0.30 (Rabkin & Struening, 1976).

Moderator variables

The weak effect of stressful life events on illness and
distress indicated by the maximal correlation of .30 does not
mesh with most theoretical concepts about the role of environ-
mental factors in the etiology of psychological distress. One
possible reason for this discrepancy is the action of moderator
variables: vulnerability to stressful experiences in general may
vary systematically in accordance with third variables, which
moderate the relationship between stressful events and
psychological distress (Zubin & Spring, 1977).

The possible existence of moderator variables is not a new
idea. Dohrenwend & Dohrenwend (1974) called for examination of
the physiological, psychological, and social factors moderating
the relationship between life events and distress symptoms, and
Paykel (1974), reporting on his research, stated:

> It was clear that most of the variance in determining
> development of depression was due not to the occurrence
> of the event itself but to its interaction with pre-
> disposing factors of vulnerability. (p. 21)

And Kessler (1979a) discussed a theoretical model designed to
distinguish between differential "impact" of stressful life
events on different groups of subjects and differential

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"exposure" to events.

McFarlane et al. (1980) have pointed out that moderating factors may be external or internal; in other words, they may be characteristics of the individual or of the environment in which he lives. Typically, three categories of variables have been examined as to their moderating effects: socio-demographic variables, personality and social support. In this dissertation, only the latter two are dealt with.

Social support

Research on stress and stressful life events originally focussed on types of stress, and the kinds of its effects. In the early seventies, however, an important study by Nuckolls, Cassel, & Kaplan (1972) examined the combined effects of "psychosocial assets" and stressful life events on pregnancy complications, and found that neither variable on its own had strong effects. But looking only at women with high life event scores, they found that those with many psychosocial assets had one third the complication rate of those with few psychosocial assets. Similar studies followed, and there is now a growing body of research indicating that psychosocial assets, referred to as "social support", either has direct beneficial effects on mental and physical health, or "buffers" the effects of stressful life events, or both (e.g., Andrews, Tennant, Hewson, & Vaillant, 1978; Eaton, 1978; Finlayson, 1976; Gore, 1978; Kessler, 1979b; LaRocco, House, & French, 1980; Miller, P. M., &

Ingham, 1979; Norbeck & Tilden, 1983; Pearlin & Johnson, 1977;
Schaefer, Coyne, & Lazarus, 1981; Thoits, 1982a, Thoits, 1982b;
Wilcox, 1981; Williams et al., 1981). There has also appeared a
number of theoretical formulations of the effects on mental and
physical health of social support and lack thereof (Cassel,
1974; Cobb, 1976; Kaplan, Cassel, & Gore, 1977; Dean & Lin,
1977).

A major limitation of this research, however, has been the
absence of a definition of "social support". A variety of
measures of health has been used as dependent variables in the
social support literature, including psychological and psycho-
physiological distress symptoms like the Langner (1962) or the
Gurin (Gurin et al., 1960) scales and other measures of mental
health, as well as specific medical criteria like pregnancy
complications, and even such broad ones as general mortality
(Berkman & Syme, 1979). But until recently, empirical studies
had only vaguely, or not at all, defined "social support".

B. S. Dohrenwend et al. (1978), Norbeck & Tilden (1983),
and Schaefer et al. (1981) have raised the possibility of
different aspects of social support having different kinds of
effects on health. Unfortunately, such studies are a very small
minority, and the major issue in the literature is currently
whether the influence of social support on health is through
direct effects, or through "buffering" the effects of
environmental stress (e.g., LaRocco, 1983; Thoits, 1983).

Personality

Generally, the body of research dealing with personality as
an intervening factor in stress reaction is rather thin, consid-
ering the number of investigations on personality dimensions in
other contexts. Most studies were conducted in the late 1970s
and later (e.g., Kobasa, 1979; Smith, Johnson, & Sarason, 1978;
Theorell, 1976; Tyson, 1981), perhaps because only then was the
limited usefulness of life event questionnaires on their own
becoming generally recognized, and ways sought to improve on
them.

It is probably because of the influence of the non-specifi-
city paradigm of stress effects that personality variables as
moderating factors of stressful events have, until relatively
recently, received little research attention. While personality
variables play a prominent role of transforming specific events
into specific somatic illnesses in psychosomatic theories
(Alexander, 1950; Alexander et al., 1968), "stress" models of
physiological disorders underscore the non-specificity of
pathogens and the arbitrariness of the resulting dysfunctions
with regard to "stressors" (Selye, 1950). This leaves little
room for personality variables.

Nevertheless, the moderating role of several personality
dimensions have been examined. These include "Locus of Control"
(Rotter, 1966), Sensation-seeking (Zuckerman, Kolin, Price, &
Zoob, 1964), Self-esteem, and the A-B personality dimension
(Engel, 1968; Friedman & Rosenman, 1959). Cobb (1974) has also

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mentioned the possible role of "denial" as a personality trait

in mediating the experience and report of life events (see also

Lazarus, 1981b).

3. Conceptual Issues

Theoretical importance of the "life event" concept

The conceptual importance of "stressful life events" is
that they represent a class of generally pathogenic psychosocial
conditions, as opposed to the specific physical (for example,
micro-organisms) or psychosocial (for example, overindulgence in
childhood) pathogenic conditions postulated by traditional
theories of mental and physical illness. Probably under the
influence of Selye's concept of, and research on, "stress",
stressful life events have been conceived as "social stressors",
with similar general and undifferentiated effects on health as
were assumed by Selye and other researchers in the 1940s and
1950s to be typical of physical stressors.

If life events affect mental and physical health just by
putting adaptive strain on the organism, then equivalence could
be implied between physical stress factors and psychosocial ones

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like life events: _pathological reactions could then be seen as
due to the "load" life events put on the organism.

If, however, the stressful effects of life events depend on
cognitive evaluations, subjective and idiosyncratic, as Mason
(1971, 1975a, 1975b) proposes, the conceptual elegance of a
causal sequence from the environmental condition to the individual's maladaptive reaction is lost: if it is the individual's
internal state, his value system, or his interpretation of
events and of his resources that make them stressful, it does
not make much sense to call the events, independent of their
perceiver, "stressful".

A similar situation exists with regard to environmental
boundary conditions: If it is the social context (the social
support system, the socio-economic situation, etc.) that makes
events "stressful", then it is not precise to call the events
so.

In both cases, conceptualization of the way in which life
events affect health will have to rely heavily on concepts and
theoretical formulations of how cognitions and other individual
processes, or social environments in general, affect health. In
other words, not just the kind of effects would be determined,
by these variables, but also whether there is an effect or not.
The conceptual and practical significance of "stressful life
events" for the etiology of illness, then, would be diminished
in direct proportion to the role of boundary conditions in
determining their effects: predisposing and moderating personal

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and general social conditions, together with theories of their effects, would play a dominant role.

Under these considerations, the small effects of life events on health, as illustrated by the typical correlation of .30 or less between life events and illness (see Chapter 4), together with the effects of moderator variables which define the conditions under which the effect is present, limits the theoretical importance of "stressful life events" to merely showing that there is a detrimental effect of negative aspects of the social environment on health. Questions about the size of the effect, the conditions of its presence, the kind of people affected, the kind of environment conducive to it, and about the mechanisms by which it comes about are left unanswered by the concept of "stressful life events".

For theories of physical illness, it does not matter very much whether etiological psychosocial conditions are life events, personality variables, family structures, cultural pressures, or any combination of the above: since the classical and apparently still predominant theoretical models conceive of physical illness as caused by and expressed in physical phenomena, the recognition of psychosocial etiological factors would add a new dimension, as it indeed has (Weiner, 1977); whether these can best be conceptualized as "stressful life events" or not, is a secondary question.

Psychological disorders, however, have long been recognized as arising in response to adverse psycho-social conditions. To

prove that a subset of those conditions cause psychological distress and illness would not prove anything new. The theoretical contribution of the concept of "stressful life events" is that they may represent general, non-specific psychopathogenic conditions, as opposed to the specific processes and mechanisms postulated by both psychoanalytical and behavioural paradigms. To the degree that the effects of life events are relative, and that general "stressfulness" of life events does not exist, the theoretical bonus of the concept of "stressful life events" vanishes; to show that life events are pathogenic under some specific conditions is not enough here.

In sum: The theoretical value of the concept of "stressful life events" for theories and conceptualizations of mental illness depends directly upon their non-specificity and generality of their effects across individuals and conditions. If these effects are specific and conditional, as it indeed seems to be the case, then "stressful life events" are reduced to a purely statistical concept with little theoretical significance on their own.

Definitions.   The term "moderator variable", as used in
this dissertation, refers to variables modifying the association
between stressful life events and/or other environmental stress-
ful conditions and mental or physical well-being. Elsewhere,
these variables have also been called "modifiers", "buffer
variables", "vulnerability factors", or "mediators" (Cleary &
Kessler, 1982). As the term is used here, "moderator variable"
does not refer to those variables that can be regarded as
interpolated between stressful life events and their detrimental
effects, being caused by the former and in turn causing the
latter. It equally does not refer to variables that can be
conceived as eliciting life events and as affecting mental and
physical health by virtue of this association.

Essentially, a variable moderating the effects of life
events on health manifests itself through statistical inter-
action between itself and life events (Cohen, 1978; Cleary &
Kessler, 1982), and the terms "moderator effect" and "inter-
action effect" refer to the same empirical phenomenon. This
interaction may or may not be accompanied by a statistical main
effect of the variable in question on the dependent variables.

Moderating variables can be conceptualized as enduring
conditions (of the individual or the environment), such as
personality traits, social patterns, or habits, which exist

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independently from the occurrence of stressful events, or as actual coping behaviours dealing with stressful events after they have occurred, and represent ways in which individual personal and social resources are brought to bear on specific stressful circumstances. Enduring conditions and coping behaviours can be regarded as distal and proximal aspects, respectively, of the same phenomena. In this dissertation, I shall concern myself mainly with the former.

"Moderating" vs "mediating" effects. The use of the term "moderator variable" in the context of research on stressful life events implies that its effects are secondary, only moderating the primary, and implicitly more important, effects of life events. This notion may be justified if the "moderator variable" does not have any direct effects (statistical main effects) on the dependent variable on its own. As will be argued later, this is difficult to establish in connection with social variables like "stressful life events". If the supposed moderator variable influences dependent variables in its own right, supposed moderator variable influences dependent variables in its own right, however, the interaction between itself and life events becomes directionally ambiguous, and the empirical data alone do not allow conclusions as to which variable moderates the effects of the other: to contend that, e.g., marital status moderates the association between life events and psychological distress rather than SLE moderate the association between marriage and psychological distress has to

depend on theoretical considerations. Given the rudimentary
state of theories about why and how life events affect mental
and physical health, any such statement will be difficult to
prove.

In sum, only variables that can be demonstrated not to have
direct (main) effects on physical and psychological distress may
be considered "true" moderators of the association between life
events and the latter. Otherwise, the distinction between
"moderating" and "moderated" variables becomes arbitrary.

Distinguishing "stressful life events" from moderator
variables. Defining a set of conditions as representing a
possible or actual "moderator variable" conceptually separates
them from what they are supposed to moderate. Very often in life
event research, however, there is little empirical justification
for doing so. Social and socio-demographic variables are a case
in point: "social support" variables have often been shown to be
directly related to psychological and physiological distress
symptoms (see discussion below), and it is quite possible that
this is so because they overlap considerably with items on typ-
ical life event scales (Thoits, 1981). Regarding, for example,
marital status as a moderator variable, and simultaneously
including it in life event lists (by items referring to
separation, divorce, or death of spouse) illustrates this
overlap. What has been subsumed under the label of "social
support variables" may represent the positive pole of a social
asset/liability dimension of which stressful life events

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represent the negative pole.

Furthermore, not only may "stressful life events" and
so-called moderator variables overlap, they may also influence
each other. Thoits (1982a) has argued forcefully that life
events are both influencing, and influenced by, social support
patterns.

As will be discussed in the next chapter, life events have
been shown to be clustered according to areas of work and
leisure activities which may also influence the kind and amount
of social interaction usually entertained by the individual,
and, consequently, the degree of social support available to
him.

Stressful life events, then, cannot be clearly separated,
conceptually or empirically, from social conditions often
regarded as moderating the association between life events and
illness.

Spurious main effects.   Psychological variables generally
have no natural "zero point", i.e., the absence of a trait or
attitude cannot be determined independently from the scale used
to measure it. Cleary & Kessler (1982) have drawn attention to
the fact that the choice of zero points for life event scales
determines the total "conditional effect" of "moderator vari-
ables" on dependent variables while leaving the interaction
effects themselves unchanged. This, essentially, means that the
experimental main effects of moderator variables that also
interact with life events depend on where one assumes the zero

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point of the life event scale to be. The "true" zero point, most probably, does not coincide with a score of zero on the particular life event scale used, for the following reasons:

- Stressful life events, as typically assessed by life event scales, are not representative of all the stressful conditions experienced by an individual (see discussion in Chapter 5). The fact that none of the events in the scale occurred, therefore, does not mean that no stressful situation has been experienced.

- The reliability of reports of life events is rather low. Test-retest coefficients can be as low as .20, and the proportion of reported to actual events is about one-half (see Chapter 5). Consequently, even when an occurred event is on the list, it may not be reported and therefore scored.

Thus, the impossibility to define a scale point where no stress-ful conditions are present, makes experimental main effects of variables, which also interact with life events, arbitrary.

Another condition making moderator (statistical inter-action) effects appear as main effects of moderator variables is a restricted range of "stress" measures in a given sample. In such a case, where the "stress" variable does not vary substantially, variations of the levels of the supposed moderator variable will show as a main effect. This condition, essentially, amounts to examining one level of one variable (e.g., life events, or psychosocial stressors in general), while allowing many levels of interacting variables.

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In sum: when moderator (statistical interaction) effects are present, experimental main effects are not interpretable. A limited range of stress measures will reduce the size of any experimental moderator effects of third variables.

Spurious moderator effects.   The multiple regression data analysis models commonly used in research on stressful life events assume linear relationships between dependent and independent variables. While it appears plausible that the effects of stressful conditions on health are incremental, they have not yet been shown to be linearly additive, and there are indications that they are not (Boyce, 1981; Wildman & Johnson, 1977). Conditions on health may be subject to threshold effects: people may generally be able to compensate rather well for some life events, or some adverse social conditions, but their resistance may suddenly break down when exposed to both. Selye's (1956) concept of the "General Adaptation Syndrome", for example, implicitly recognizes the presence of such thresholds: the transition from the "Resistance" to the "Exhaustion" stage, for example, occurs if the magnitude of the "stressor" exceeds the capacity of the organism to compensate for them.

The simultaneous presence of, say, moderate levels of adverse socio-economical conditions and of some life events may push the total environmental "stress" over a critical threshold. In multiple regression models of data analysis, such an effect would appear as a moderating (statistical interaction) effect, while actually it represents the effect of the "sum" of two

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conditions which, on their own, are not stressful enough to have more than sub-liminal effects.

As long as the linearity of the association between life events and distress measures is not established, moderating effects of third variables may be methodological artifacts.

<u>Summary.</u>   The lack of clear separation of life events from assumed moderator variables, and the uncertain linearity of their effects, together with the unrepresentativeness of life event scales for environmental "stress" in general, blur the distinction between main and moderator effects.

Social support

Generally, a multitude of different conceptualizations of "social support" has been reported in the literature (Carveth & Gottlieb, 1979; Thoits, 1982a), with little systematic research on their relationships to each other. Social support has been be defined in terms of social and interpersonal structures, relationships etc., or more subjectively in terms of the individual's <u>perception</u> of these interpersonal conditions and of their <u>beliefs</u> of being supported. Lin, Simeone, Ensel, & Kou (1979), for instance, define social support as "support accessible to an individual through social ties to other individuals, groups, and the larger community" (p. 109), while Cobb (1976), emphasizing subjective aspects of social support, defined it as:

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information belonging to one of the following three classes:

1. Information leading the subject to believe that he is cared for and loved.
2. Information leading the subject to believe that he is esteemed and valued.
3. Information leading the subject to believe that he belongs to a network of communication and mutual obligations (p. 300).

Kaplan et al. (1977) made a distinction between definitions of social support as a) "metness" of basic social needs, and as b) the presence of social resources from significant others. George (1980) distinguished between "social networks", referring to patterns of social involvement in normal times, and "social support", referring to individuals providing help in times of distress. And Thoits (1982b) distinguished 3 aspects of social support: its amount, its type (e.g., emotional vs instrumental), and its source.

The different definitions of "social support" can be conceptualized as referring to one or more of the following aspects of social relations:

1. A structural, or accessibility aspect, referring to formal or informal available social contacts (number of relatives or friends, membership in clubs, etc.). This is what Kaplan et al. (1977) probably had in mind when they discussed "morphologic" properties of social networks.

2. An everyday interaction aspect, referring to the actual frequency of social contacts in normal times.

3. A crisis interaction aspect, referring to the degree to which social contacts are made, and social/interpersonal resources are used by the individual in times of need.

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4. A _subjective aspect_, referring to the individuals'
perceptions and _feelings_ of being supported.

The distinction between amount, type, and source of social
support proposed by Thoits (1981), as well as Dean & Lin's
(1977) distinction between "expressive" and "instrumental"
aspects, can be regarded as cutting across all of the above
categories. While the first dimension is probably closely
related to social status, community and family structures, and
the like, the second and third depend on the utilization of
these resources by the individual, and can also be assumed to
be, to a large degree, a function of individual characteristics.
They are subsumed by Kaplan et al. (1977) under their category
of "interactional properties cf support". Probably even more
than Categories Two and Three, Category Four is a function of
intra-individual variables.

As Dohrenwend & Dohrenwend (1981) mentioned, all these
aspects may not necessarily be closely related. They may have
different effects on psychological well-being (Lowenthal &
Haven, 1968), and are often not clearly separated in research on
"social support" (Gore, 1981). Consequently, commonly used
indices of "social support" may represent a multitude of
confounded personal and social variables.

With regard to the measurement of "social support", a more
basic distinction can be superimposed on the four categories
detailed above: it is the distinction between variables that can
be measured objectively, at least in principle, and those that

cannot. Categories One and Two, referring to social networks and social activities, deal with observable, countable facts: number of relatives, proportion of friends close by, frequencies of interaction (not, however, subjective evaluations of, for example, how many "close friends" someone has). This holds also for Category Three, although one may predict greater difficulties in its measurement.

While measurement errors, of course, are possible here, they are likely not to be as systematically dependent on psychological status, moods, etc. as are measures of feelings or perceptions of being supported (Category Four). Here, with the inevitable reliance on self-report by the subjects, a response of, say, "having no close friends" is as dependent on the subject's levels of comparison and aspiration, moods, desire for intimacy etc., as on the actual presence or absence of "close friends". This problem of confounded individual and social variables arises each time the quality of "social support" is assessed through the subjects' perceptions.

It appears evident that the subjective feelings and perceptions of being supported are much more immediately relevant for any effects on psychological or physical health (Schaefer et al., 1981), and that for predictive and intervention purposes they represent the operationalization of choice of "social support". For etiological research, however, their being confounded with intra-individual variables makes their interpretation difficult: effects may be due to low actual

social support, or to lack of appreciation thereof, and there is little possibility to tell one from the other.

The above discussion of different aspects of social support is based mainly on theoretical considerations of the relationship of the different aspects to each other. Studies that empirically relate these different aspects to each other are extremely rare. One exception is the one by Norbeck & Tilden (1983), which will be discussed below.

4. The Development of a Multi-Dimensional Model

The basic paradigm for "stress" is often credited to Robert Hooke, who introduced the concept of linear elasticity into the physical sciences in 1678 (Gaitz & Vanner, 1980; Hinkle, 1973; Little, 1973). This paradigm posits the relationship:

$$STRAIN = CONSTANT \times STRESS.$$

Selye's (1950, 1956) stress model, for instance, can be regarded as basically compatible with "Hooke's Law": it assumes the stress reaction as disease ("strain") to be a result both of stressors (Hooke's "stress") and of organismic factors ("constant"). Many researchers, however, found such a simple model insufficient for the explanation of the complex psychological processes that are assumed to mediate the effects of stressful life events, and they have proposed additional variables and effects.

Several authors have proposed elaborate models (e.g., Cobb, 1974; B. S. Dohrenwend & B. P. Dohrenwend, B. P., 1981; Jenkins, 1979; Miller, P. M., & Ingham, 1979; Rahe, 1974) or more limited theoretical formulations (e.g., Lazarus, 1981a; Lin et al.,

1979; Kessler, 1979a) of processes by which life events achieve their pathogenic effects. These models variously emphasize sequences of organismic states (e.g, Cobb, 1974; Rahe, 1974; Selye, 1956), conditions of occurrence of life events (e.g., Gersten, Langner, Bisenberg, & Simcha-Fagan, 1977; Kessler, 1979a), boundary conditions like "social support" (e.g., Gore, 1981), or "personality" (e.g., Cobb, 1974; Rahe, 1974), and/or interactive and recursive processes like "coping" (e.g., Lazarus, 1981b; Pearlin & Schooler, 1978).

This chapter reviews the various variables and processes that are assumed in the literature to influence the relationship between stressful life events and illness. It will also outline a comprehensive model which will accommodate most effects proposed to date, and represent them graphically.

Existing theoretical formulations

Most theoretical models of the effects of stressful life events owe their basic structure to Selye's (1956) model of a sequence of distinguishable organic states within the organism. More recently, conceptualizations have tended to focus more on conditions of occurrence of stressful life events, and on mechanisms that mediate their effects.

Sequences of organismic states.   Selye's stress model (Selye, 1950; Selye, 1956), essentially, consists of a formulation of stages within the organism, leading from an

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environmental condition to a stable organismic outcome (tissue damage/death). The main feature of this model is a one-directional sequence of physiological modes of adaptation to "stressors": "Alarm Reaction" to "Resistance" and then "Exhaustion". It appears salient and elegant since it deals only with one class of variables, i.e., physiological parameters. This restriction makes it widely applicable but also incomplete when used to explain complex processes where other classes of variables, like cognitive evaluations or social conditions, are also important.

Jenkins (1979) elaborated Selye's basic model to span biological, psychological, interpersonal, and socio-cultural levels of each stage of the "general adaptation syndrome". He arrived at an extensive list of examples of stressors, "adaptive capacities", alarm reactions, and "pathological end-states". However, Jenkins did not attempt to link the variables in his model in a systematic way other than maintaining their sequential nature.

Mason (1971,1975b) supplemented Selye's model with what he considers the essential step of cognitive evaluation of environmental stressful conditions, but, again, does not appear to disagree with the sequential nature of Selye's model.

Cobb (1974), focussing upon psychological mechanisms, proposed the sequence 'objective stress' - 'strain' - 'illness' - 'illness behaviour' as a representation of the effect pathway of stressful life events. It supplements Selye's model with the

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stage "illness behaviour" which, essentially, is a reaction subsequent to organismic changes that have already occurred as a result of "stress". (See further discussion of Cobb's model below.)

Using an analogue of an optical system, Rahe (1974) conceptualized a sequence of stages between exposure to life events and illness as a path through a series of lenses and filters: incoming "radiation" (life events) is filtered by "past experiences", partly deflected by "psychological defenses", transformed into "physiological reactions" inside the organism's "black box", filtered by "coping processes", and finally concentrated ("illness behaviour") into a specific syndrome.

Gore (1981) distinguishes an evaluative stage ("subjective stress") in a sequence of reactions of the organism (like "strains") to environmental stressful conditions.

Conditions of occurrence of stressful life events. In most theoretical formulations, life events are regarded as given environmental stimuli, without considering the conditions of their occurrence. However, several authors have proposed that they are dependent on personal or enduring environmental conditions.

Gersten et al. (1977) proposed that life events are symptoms and crude indicators of existing life situations, which are more important than life events per se in determining psychological distress. Kessler (1979a) stressed a similar feature: he postulated that one effect of all social

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environments is to influence exposure to stressful events. Lin et al. (1979), in their discussion of a "structural model" of effects of social support, also acknowledge the possibility of enduring social conditions eliciting life events.

Research on the causal dependence of life events on distress variables sometimes finds life events to be elicited by personal dispositions like mental disorder (Fontana, Marcus, Noel, & Rakusin, 1972). Research on life event clusters (see following chapter) suggest that life styles and perhaps personality variables influence the occurrence of life events.

In summary, although stressful life events are usually thought of as precursors of organismic changes and responses, they may be seen as elicited by certain general characteristics or particular acts of the organism, or they may be a symptom or indicator of more enduring environmental patterns.

Mediated effects of life events. Lin et al. (1979) discuss a "reactive model" of social supports in which life events are assumed to change the social environment in order to effect health changes. A similar hypothesis was put forward by Pearlin, Menaghan, Lieberman, & Mullan (1981). B. S. Dohrenwend and B. P. Dohrenwend (1981) discuss a "Chronic Burden Hypothesis" in which life events are assumed to effect "health changes" by increasing the existing stressfulness of social situations; and Thoits (1982a) presented evidence of life events changing social support patterns. All these formulations have in common the assumption of third variables which act as the link between

stressful life events and illness: it is not the events themselves, it is postulated, that have immediate deleterious effects on health, but the ensuing changes in the social environment at large.

Stable boundary conditions.. Many authors, trying to explain the rather weak association of measurable environmental "stress" and pathology, proposed either relatively stable boundary conditions or certain response categories ("coping behaviour") as moderating the impact of stressful conditions. Into the former category fall both external-environmental (social) and stable internal (e.g., personality) factors.

B. S. Dohrenwend and B. P. Dohrenwend (1981) distinguish six basic paradigms of the relationship between life events and illness which differ in, among other aspects, the role social situations and personal dispositions play in moderating this relationship. They distinguish between two basic ways of influence of these boundary conditions: a) a <u>direct</u> influence on health which is present regardless of the simultaneous presence of stressful life events, and b) an <u>interactive</u> influence "buffering" or exacerbating their effects.

Rabkin & Struening (1976) made the same distinction by differentiating between moderating factors, referring to "characteristics of the individual and his social support system that influence his perception of or sensitivity to stressors", and "predisposing factors", by which they meant "long-term behaviour patterns, childhood experiences, and durable personal

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and social characteristics that may alter the susceptibility of the individual to illness" (p. 194).

Cobb (1974) regarded stable environmental (current life situation, "social support", "attitudes of peers and gate-keepers") and individual (defenses, abilities, needs, genetic predispositions) conditions as influencing each stage of the path from life events to illness. Gore (1981) and Rahe (1974) theorize along similar lines.

The common characteristic of all these theoretical formulations is that they propose third variables unconnected to the occurrence of life events as influencing their effects on health.

The role of cognitive processing. While Selye (1950, 1956), dealing with physiological parameters, did not emphasize cognitive evaluations of "stressors", Mason (1971) considered cognitive evaluation, even of physical environmental stressful conditions, to be paramount for determining their relevance for the organism. Lazarus (1966) convincingly argues that both "primary" (evaluation of the stressful situation) and "secondary" (evaluation of one's resources, including coping options) appraisal are crucial for determining the degree of subjective "threat" a given situation has for an individual. Other authors, implicitly or explicitly, recognize the influence of cognitive processing: Cobb (1974) describes an evaluative stage ("subjective distress") in his sequential model, as does Rahe (1974).

<u>Coping responses.</u> Coping responses may be defined as responses designed to change either environmental conditions or intra-individual characteristics. Pearlin & Schooler (1978) define "coping" as referring to "any response to external life strains that serves to prevent, avoid, or control emotional distress" (p. 3). Lazarus (1981a), who holds that "stress itself as a concept pales in significance for adaptation compared with coping", sees the "major functions of coping" as:

> First, to change the situation for the better if we can, either by changing one's own offending actions (focus on self) or by changing the damaging or threatening environment; and second, to manage the somatic and subjective components of stress-related emotions themselves so they do not get out of hand and do not damage or destroy morale and social functioning.
> (Lazarus, 1981a, p.197)

Pearlin & Schooler (1978) make a similar distinction between coping responses "that modify the situation", "responses that function to control the meaning of the problem" (like "positive comparisons" or "selective ignoring"), and responses that do not alter the situation but serve the (internal) management of stress rather than the removal of the stressor. All coping responses may be regarded as triggered by an unpleasant organismic state, and are one causal step removed from the stressful environmental condition at the beginning. They may be thought of, therefore, as secondary reactions to environmental "stress", as compared to emotional or cognitive reactions that are more immediately triggered by environmental conditions.

Coping modes and functions, as well as cognitive processes, can be assumed to depend on both individual

responsecharacteristics (e.g., the tendency to deny - Lazarus, 1981b) and the social environment (e.g., available resources). It is important here to emphasize again the conceptual difference between relatively stable and independent conditions and actual, ongoing processes or actions (Gore, 1978; Pearlin & Schooler, 1978).

Seen in a larger context, coping responses as specific reactions to specific events are only one class of responses: they are destined or intended to ameliorate the individual's situation. It should be kept in mind, however, that responses may also be maladaptive or incidental with regard to stressful conditions, and that there is no intrinsic difference between coping and other instrumental, autonomic, or cognitive responses other than in purpose and outcome.

Summary. While there appears to exist a typical sequence of organismic reactions to environmental stressful situations, different opinions have been expressed regarding its linearity and the causal relationships between the different stages in this sequence. Cognitive processes probably interfere at all stages of an assumed sequence, and actions and reactions of the organism may alter causal conditions. Also, the causal sequence of events may not originate with the stressful life events, but with enduring environmental conditions, or even within the organism itself, creating circular interdependencies. Life events may even be thought of as only incidental to a pathogenic process originating with these conditions directly. Further,

enduring environmental or internal conditions probably influence specific organismic reactions to stressful life events, and influence the outcome both independently from, and in interaction with, the events.

A comprehensive model

The model proposed here (Figure 1) attempts to be a comprehensive representation of relationships and influences found or considered to be relevant in the complex process leading from environmental stressful conditions to changes in mental of physical health. The model deals with classes of variables, and with general directions and pathways of effects. Any attempt to include specific variables -- for instance, particular personality dimensions, or particular coping responses -- would explode the complexity of the network of relationships and effects beyond all possibilities of graphic representation. (Miller, P. M., & Ingham's (1979) detailed model of iterative and recursive processes which includes a few levels of only two variables, coping effort and health outcome, has a degree of complexity which already comes close to the limits of understandability.) Thus, the model represents a matrix for specific variables and specific processes: it is meant to provide a structure that can be filled by any combination of specific variables, and to provide a network of all possibly relevant effect pathways, which can be emphasized as

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Figure 4-1:
A comprehensive model

STABLE
INDIVIDUAL
PREDISPOSITIONS

Re

Ri

Rc

LIFE
EVENTS

STABLE
ENVIRONMENTAL
CONDITIONS

INDIVIDUAL
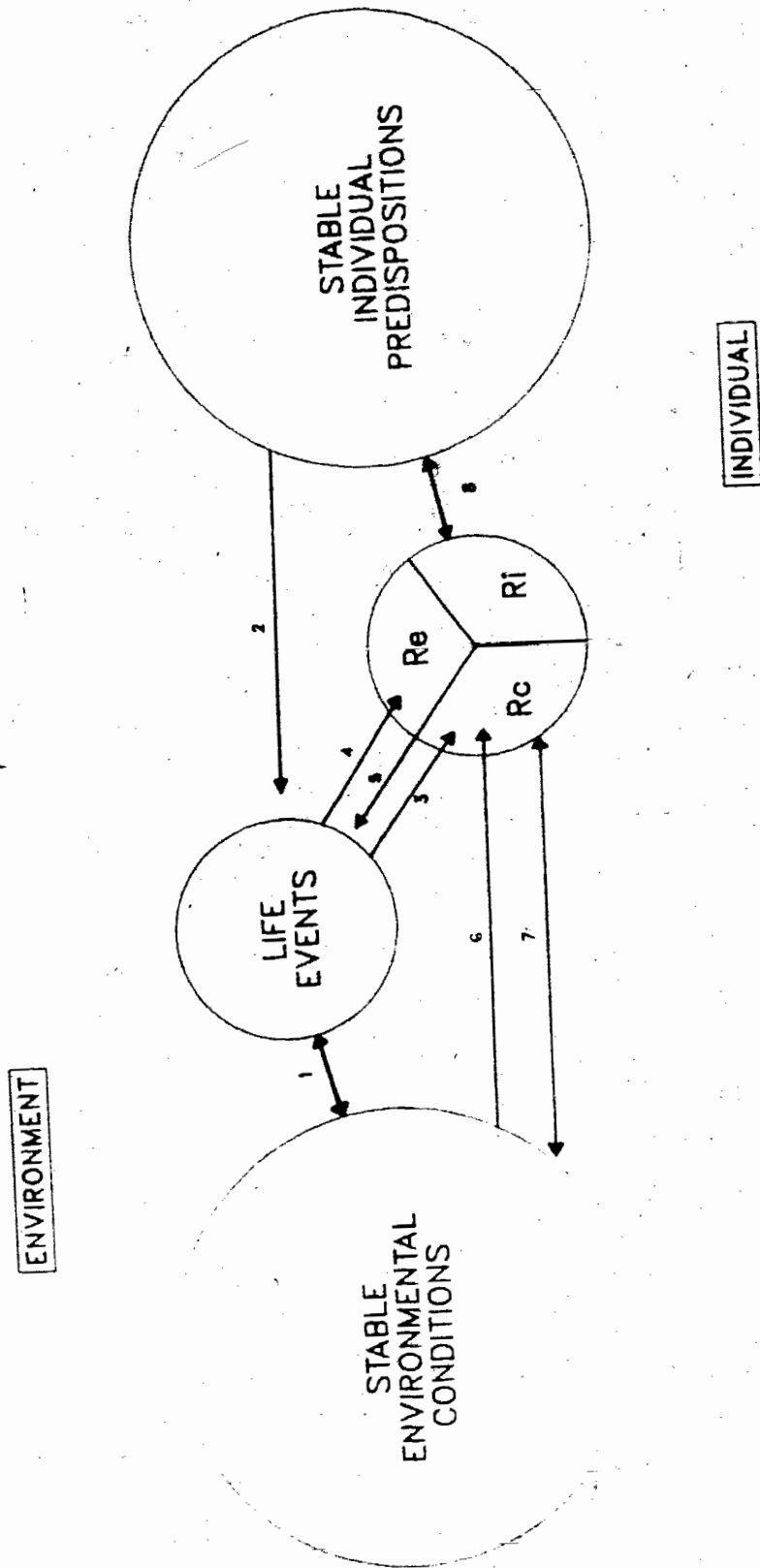
ENVIRONMENT

appropriate.

Two classes of variables are distinguished: relatively stable (general) boundary conditions, and relatively instable (specific) processes. Boundary conditions include the social environment (e.g., "social support" conditions) and enduring individual response characteristics (e.g., personality traits). This distinction is similar to the one made by Pearlin & Schooler (1978) between "what people do" and "what is available to them" in terms of personal resources. Process variables comprise essentially cognitive-evaluative (Rc), emotional - autonomic (Pe), and instrumental - motor (Ri) responses.

In this model, "psychological distress" may be considered a class of cognitive, emotional, and/or instrumental responses which may or may not lead to more enduring changes in individual predispositions either beneficial (immunization) or detrimental ("illness").

Specific functional relationships. Life events may be elicited by typical characteristics of the social environment of an individual (Gersten et al., 1977; Kessler, 1979a; Thoits, 1982b), as indicated by arrow (1); they may be elicited or prevented by individual characteristics (arrow 2); or by specific actions (arrow 5). Life events, in turn, may directly elicit emotional-autonomic responses (Re), as Selye's (1950, 1956) model proposes (arrow 4), or they may first be cognitively evaluated (Rc, arrow 3), as Mason (1971) proposed, before emotional-autonomic (Re) or instrumental (Ri) responses are

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elicited. Alternatively, life events may alter the social support system (Environmental Conditions), as Lin et al. (1979) and also Cobb (1974), and Thoits (1982a), proposed, and elicit distress responses (Re, Rc, and/or Ri) this way (arrows 1,7).

The social environment may influence evaluation (Rc) of life events (arrow 6), or, more generally, the cognitive - emotional - instrumental response complex (arrow 7). Similarly, individual response characteristics influence cognitive, emotional, and/or instrumental responses (arrow 8). Individual and environmental boundary conditions (SE,IC) may influence psychological well-being directly (e.g., by raising base levels of "distress"), or indirectly by changing the sensitivity to life events of the cognitive - emotional - instrumental response system (B. S. Dohrenwend & B. P. Dohrenwend, 1981; Gore, 1978; Rabkin & Struening, 1976).

Responses (Rc, Re, Bi) may change the social environment (for example, by enlisting the help of friends or removing adverse conditions; arrow 7), or may alter individual predis-positions (e.g., by habituation to anxiety-eliciting stimuli; arrow 8).

Summary. Theoretical formulations of the effects of stressful life events have been reviewed and a general functional model of the life event - illness relationship has been proposed with the purpose of providing a comprehensive representation of the classes of variables involved, together with their mutual dependence. Different models discussed in the

literature stress different aspects of this relationship, and
these are illustrated by different effect pathways in the pro-
posed model. The model is meant to provide a matrix of possible
interrelationships that can be filled by any combination of
specific variables.

It is suggested that a distinction must be made between
relatively enduring initial, boundary, and final conditions
(individual response characteristics, social environment, "ill-
ness", etc.) on the one hand, and transitory events, processes
or responses (cognitive processing and coping, for example) on
the other. While the two are closely interdependent, they are
conceptually quite distinct and represent static and dynamic
aspects, respectively, of the life event-illness relationship.

Part II

CLARIFICATION OF KEY VARIABLES

5. Life Event Questionnaires

Validity issues

Life event scales, like other psychometric instruments should meet basic methodological requirements. But it is only during the last five to ten years that research dealing with validity issues of these scales has appeared in the literature, and it remains a relatively neglected area.

The available evidence will be discussed with regard to the representativeness of life event scales, the additivity of "life stress", the reliability of life event reports, and to the problem of confounded measurement in life event research. It will be concluded that

- life event scales represent only limited samples of stressful events;

- the additivity of effects of stressful events, although commonly assumed, is by no means established;

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- the reliability of life event scores is low; and

- existing life event scales are confounded with measures of
   psychological distress.

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Representativeness

The original "Schedule of Recent Experience" (SRE) was a
general scale that was meant to meant to sample different areas
of adjustment (Holmes & Rahe, 1967; Rahe, 1979) and be applic-
able to everyone. B. P. Dohrenwend (1974) examined the adequacy
of a life event checklist similar to the SRE for capturing
individual life experiences. He asked subjects to report the
last major event in their lives and found that, for community
samples, it was not on this list in about 30% - 40% of the
cases. In samples of criminal convicts, this happened in about
eight out of ten instances. He concluded:

> A one-year checklist of the kind we have used is not,
> apparently, a very good way to elicit events that the
> respondents define as major." (B.P. Dohrenwend, 1974,
> p.296.)

B. S. Dohrenwend et al. (1978) constructed their "PERI"
life event scale by drawing events from two item populations:
a) events representing "universals of human experience" (birth,
death etc.), and b) events specific to different cultural and
social settings. The construction of this and other special
scales for particular subpopulations (Coddington, 1972; Marx et
al., 1975; Newcomb et al., 1981; Sarason et al., 1978) under-
score the limited representativeness of general life event

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scales.

The necessity of different scales for different populations makes it likely that even within these populations individual differences leave many events unaccounted for by the items normally included in scales.

Given the above, it appears safe to assume that general life event scales, such as the "Schedule of Recent Experience", tap only a limited portion of individual stressful events. If life event scales were questionnaires measuring, for instance, a homogeneous personality construct their incompleteness would be of little consequence: all items, included or not, would be highly correlated and incompleteness could be dealt with statistically by correcting for length. Life events, however, by definition, happen to the individual and are presumed to be independent of each other. This means that one cannot simply correct for the shortness of the list since the occurrence of other, independent events cannot be predicted.

It should be mentioned that Tausig (1982), in a study comparing life event lists of different lengths, found that the original 42-item SRE predicted depressive symptomatology as well as a 92-item composite scale which included items from other published scales (r = .252 and r = .281, respectively; see also Hurst et al., 1978). But to what degree this is a consequence of differences in content, or of item interactions due to their correlation with the dependent variable, or to confounding of different items, or to deviations from linearity, is not at all

clear.

In sum, life event scales do not represent the population of stressful events very well and they are even less representative for psychosocial "stressors" in general.

Additivity

No study, to my knowledge, has examined the linearity of the relationship between life event scores and dependent (distress) variables, and the problem of additivity is rarely even mentioned in the life event literature. (An exception is Miller & Ingham, 1979.) The construction principle of life event scales and the very concept of non-specific "stress" (Selye, 1936; Selye, 1950; Selye, 1956; Wolff, 1953), however defined, imply that the effects of life events are incremental. Results of numerous studies relating sums of life events to psychological distress seem to confirm this assumption. However, it remains unclear whether the effects are linearly additive, since threshold as well as ceiling effects appear quite possible.

Reliability of reports of events

All life event scales require subjects to recall events that have happened in the more or less recent past. They are therefore subject to distortion by forgetting, selective remembering, rationalization, repression and denial (Cobb, 1974). (Brown (1974) cites Stott's (1958) report that, before

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the chromosomal cause of mongolism was known, mothers of mongoloid children reported almost four times as many "shocks" during pregnancy than mothers of normal children.)

Jenkins, Hurst, & Rose (1979), using the "Social Readjustment Rating Scale" (SRRS; Holmes & Rahe, 1967) as well as a variation thereof by Paykel et al. (1971), examined the stability of life event scores over time in a sample of air traffic controllers. They found a drop in the total score of 34% to 46%, depending on different scoring methods, between the first as sessment, which covered the immediately preceding six months, and the second assessment, which covered the same six month period but was made nine months later. Furthermore, test-retest correlations were between .38 and .45, indicating that the rate of forgetting varied considerably between different individuals.

Thurlow (1971), in a study of brewery employees, found correlations between SRE scores for the same three-year period, but with a test-retest interval of 24 months of .26. The earlier the recall period, he found, the lower the reliabilities. For college students, and with a test-retest interval of two weeks, he found reliability coefficients for SRE scores covering the five previous years of .78.

Sarason et al. (1978) found test-retest correlations after an interval of five to six weeks to be in the order of .60. McDonald, Pugh, Gunderson, & Rahe (1972) report reliability coefficients for the SRE of .48 - .61, with a test-retest

interval of six months.

Yager, Grant, Sweetwood, and Gerst (1981) examined the agreement between psychiatric out-patients and other informants (spouses, relatives) on the SRE. They found that, when controlling for chance, the agreement between partners for single SRE items was less than 40%, for both psychiatric patients and controls. Assuming equal recall rates and independence of recall errors, this would mean that about 60% of all events that had occurred were actually reported. The authors attribute this result to factors external to the scale (the authors used narrow time brackets which made it relatively easy to misplace events in time), and factors pertinent to the scale, among them the vagueness of many items, and the method of assessment (self-report scale). (See also Gerst, Grant, Yager, & Sweetwood, 1974.) Questionnaire data published by Schless & Mendels (1978) allow the calculation of the percentage of total events that were reported by either psychiatric out-patients or other informants (spouses etc) : it is about 60% in both groups, again assuming independence of reporting errors.

Jenkins et al. (1979) cited unclear definitions of some items as a major cause of recall differences with life event questionnaires. The same observation was made by Brown (1974), Yager et al. (1981), and also by Rahe (1974), and Thurlow (1971) who point especially to the use of qualifiers (e.g. "major") in life event scales as a factor in decreasing reliability by allowing subjective judgement and feelings at time of assessment

to influence recall. While both Brown et al. (1973a) and Casey, Masuda, & Holmes (1967) report that the experienced magnitude ("threatening quality" and "saliency", respectively) of events determined the rate of recall.

Hudgens, Robins, & Delong (1970), instead of administering a self-report questionnaire, interviewed subjects individually. They, too, found that both psychiatric patients and other informants considerably under-reported the number of life events experienced by the subject. A rough re-calculation from the numbers given by the authors reveals that patients report only about 70%, and informants only about 75% of events that actually occurred (again assuming mutual independence of reporting errors).

Brown et al. (1973a) also individually interviewed psychiatric patients and additional informants (independently) and reported agreement of about 80% with regard to all life events, and of 92% with regard to "moderately or markedly threatening" events.

On the other hand, Totman (1979), in a study of myo-cardial infarct patients mentioned that there was apparently no indication of a fall-off in reporting events over time. Paykel et al. (1969) also found no recall differences between the beginning and the end of the one-year period covered. Both studies used individual interviews to establish the occurrence of stressful events.

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Neugebauer (1981) has criticized the studies using testretest reliability coefficients by pointing out that they have used a measurement model that was developed for measures of personality traits which consist of intercorrelated items: such a model is not applicable to life event lists consisting of essentially independent occurrences. He also points out that most studies using the agreement rate between different informants as an indicator for the reliability of life event reports fail to account for non-independence of recall errors, which may represent a source of substantial distortion in, for instance, married couples.

In sum it appears that life events are relatively easily forgotten and that the reliability of self-report life event scales may vary considerably. Life event questionnaires, depending on the test-retest interval, have reliability coefficients of between .26 and .80, and even higher. The recall rate of events on SPE type questionnaires is about 60% for moderate recall intervals. Life event reports elicited during interviews seem substantially more reliable than those elicited by self-report scales, with reported recall rates from about 75% to near perfect, and forgetting seems to play a lesser role here.

The results, over-all, show a consistent trend: reliability of life event scales is higher when the intervals between occurrence of events and assessment is short; and the reliability of individual interviews is higher than the reliability of

self-report questionnaires and inventories.

Confounding with dependent measures

The confounding of life event scales with measures of
psychological distress has repeatedly been pointed out since the
first publication by Holmes & Rahe (1967) of the SRE (e.g.,
Brown, 1972; B. S. Dohrenwend et al., 1978; Gersten et al.,
1977; Lazarus, 1978; Miller, P. M., & Ingham, 1979; Rabkin &
Struening, 1976). Rahe (1975) reported elevated scores of life
events in US Navy personnel up to 2 years after a single illness
incident. Gersten et al. (1977) found that life events were
equally correlated with preceding and subsequent mental health
measures.

Williams et al. (1981) report that the inclusion of a prior
(one year earlier) measure of mental health status reduced the
relationship between life events and mental health status
(measured concurrently) considerably: the standard regression
coefficient fell from .383 to .22, suggesting relatedness of
life event scores to prior symptoms. Thurlow (1971) reported
similar findings. Eaton (1978), however, re-analyzed the data of
the longitidinal study by Myers et al. (1972) involving the
measurement of life events and psychological distress twice,
with a two-year interval. He found practically no correlation
between distress measures at time one and life event scores at
time two. This, although life events were slightly (r=.24) and
distress score substantially (r=.55) correlated over time, and

although life events were correlated with psychological distress (about r=.30) if measured at the same time.

Confounding of life event measures with psychological distress measures may result either from imperfect item selection (items not representing independent events but symptoms) or from confounded underlying theoretical constructs (life events may be elicited by individual characteristics also related to psychological distress). These two possibilities will be discussed.

Confounding on the item level.   Life events are often assumed to be independent causes of distress. B. S. Dohrenwend et al. (1978) argued, however, that the experiences of subjects before "disease onset", together with the gradual nature of "disease onset" make it likely that the "Schedule of Recent Experience" includes events that are symptoms or consequences of disease. And indeed, a cursory look reveals that this is the case with a number of items (e.g., "Serious illness", "change of sleeping pattern", "sex difficulties").

B. S. Dohrenwend and B. P. Dohrenwend (1981) proposed that at least three populations of events should be distinguished if etiological insights are to be gained:

> 1. events that may be confounded with the physical health and the psychiatric condition of the subject;
> 2. events consisting of physical illnesses and injuries to the subject;
> 3. events whose occurrences are independent of either the subject's physical health or his psychiatric condition. (p. 8)

Gersten et al. (1977), for instance, who found a very strong correlation of life event scores with measures of psychological distress in a sample of children and adolescents, have been criticized by Link (1978) for using a list of "life events" containing items nearly identical to items on their distress scale.

Thoits (1981) found that health-related items in life event scales are confounded with psycho-physiological symptoms relevant for dependent measures like Langner's (1962) 22-item symptom scale. When she controlled for the influence of health-related events the correlation between life event score and dependent measure dropped to near zero. Health-related events were also correlated with purely psychological (as compared to psychosomatic) distress symptoms, however, indicating that there was a real causal effect of poor health on psychological distress and that partialling out of health-related events may have removed powerful stressors from the life event list. Tausig (1982), however, disputed Thoit's claim and concluded that "health- related events do not have a disproportionate effect on the relationship between life events and depression and physical symptomatology" (p.60).

Strout (1981) discussed the dilemma regarding the requirement for unconfounded and at the same time complete measures of life event "stress": the latter requirement would necessitate inclusion of items that are definitely confounded with dependent variables.

<u>Confounding</u> <u>at</u> <u>the</u> <u>construct</u> <u>level</u>. The above discussion dealt with issues related to the item selection of life event scales: many items on life event scales represent symptoms of illness or distress. Beyond ths measurement issue, there is the possibility that life events or "life stress", even if not representing symptcms, are nevertheless dependent on illness or on individual characteristics that are related to psychological distress.

Several studies have found that when prior health was taken into account, the relationship between stressful life events and illness dropped appreciably (Billings & Moss, 1982; Kobasa, Maddi, & Courington, 1981; Williams et al., 1981). Eaton (1978), however, found only low correlaticns of life event scores with prior health status.

Tausig (1982) factor-analyzed a life event item pool consisting of most items published to date in life event scales of general applicability. He found only one consistent and substantial factor, and this represented items concerning mainly personal habits and activities (e.g., change in sleeping habits). He states that these items are correlated either with other life events or with items in measures of psychological distress suggesting that they may be consequences of or reactions to other events. After he deleted these items from the scale, its correlation with dependent distress measures decreased. (As mentioned earlier, the relationship between life event scores and dependent measures was not very sensitive to

general reductions of the number of items used for calculating the life event score.) He attributes this decrease to a reduction in the degree of confounding.

Skinner & Lei (1980), in another factor-analytic study of the SRE, also found a factor consisting of items related to personal change that was at least as highly correlated with dependent measures of psychological distress as the total score.

Thurlow (1971) reported that the correlation between a subscore of the SRE consisting of "subjective" items (those likely to be influenced by the subjects' outlook and state of health at the time of reporting) and illness measures ranged between .19 and .30, in contrast to the subscore of "objective" items which was not significantly correlated with dependent measures.

This possibility of third factors accounting for the relationship between life events and psychological distress, everpresent in correlational research, has been pointed out.

Brown (1974) mentions the possibility of high general anxiety making life events more stressful and simultaneously raising the probability of mental disorder. Suls, Gastorf, & Witenberg (1979) found the A-B behaviour dimension (Friedman & Rosenman, 1959) related to exposure of stressful events, with "Type A" subjects (college students) experiencing more events.

At the same time, both psychological distress and poor mental health are related to low social status (Hollingshead & Redlich, 1958; Srole, Langner, Michael, Opler, & Rennie, 1962).

Gersten et al. (1977) found that both psychological distress and the experience of life events were a function of socio-economic variables, and that the relationship between life events and distress independent from socio-economic variables was negligible. (As menticned earlier, however, this may have been a result of the confounding of the life event items with distress items, not necessarily a consequence of confounded constructs.) Similarly, the probability of experiencing stressful events is highest during young adulthood, which is also the period of greatest risk for mental disorder (Eaton, 1978).

Newcomb et al. (1981) found that although total life event scores were not correlated over time, scores reflecting life events within specific areas of activity (work, marriage, family, financial etc.) were. Skinner & Lei (1980) report that the reliability of life event sub-scales (also representing areas of activity), when corrected for length, surpassed the reliability of the whole scale. These results point to life-style consistencies underlying consistencies in life event experiences, at least in certain areas. These life-style consistencies may well be independently related to psychological distress, may even be consequences of the latter, and may produce spurious life event - distress correlations.

In sum, life events appear to be partly a consequence of life style, status, personality variables that also happen to be associated with illness or distress.

Effects of confounding. It is apparent that life event scales are confounded to some degree with measures of psychological distress. The evidence is clearest with regard to single items, where it could be dealt with by following more carefully the appropriate test construction procedures. The significance of such confounding, however, varies with the use of the scale.

With regard to the construct "life event stress", there are also indications that this is dependent on life styles and, one can assume, individual characteristics and psychological well-being. It would appear very worthwhile to determine the nature of the dependence, but this would require the prior purification of life event scales in order to render them more representative of the construct they intend to measure, i.e. "life stress". These two efforts may be difficult to separate, however, and could probably proceed in parallel.

Summary

The limited research dealing directly with validity issues of life event scales suggests that several preliminary conclusions can be drawn:

- Life event scales represent only limited samples of stressful events.

- Although it appears that effects of life events are incremental, it is unclear to what degree threshold or ceiling effects play a role.

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- The reliability of life event scales is low. It depends on the temporal distance between occurrence and reports of events, and on the method of assessment -- individual interviews achieve substantially better reliability than self-report scales.

- Existing life event scales are confounded with psychological distress measures. The source of confounding appear to be mainly items related to symptoms of distress, although the occurrence of life events does seem to be dependent on socio-economic and life-style variables. While this does not necessarily invalidate the causal connection between life events and psychological distress - it may well be that these variables have their effect on psychological distress through life events as proximal causes - it does call for a more careful separation and definition of variables.

Conceptualizations of "stressfulness"

Rahe and his co-workers, in compiling their list of stressful events, clearly regarded "stressfulness" of life events as a consequence of the disruption caused in the life of an individual, and as closely related to "the intensity and length of time necessary to accommodate to a life event regardless of the desirability of this event" (Holmes & Rahe, 1967, p.213, original emphasis). The weights assigned to the

items of the "Social Readjustment Rating Scale" (SRRS) are meant
to reflect the average social readjustment necessary for each
item. In this conceptualization of life change as stressful,
Rahe followed the lead of Meyer (1951) and Wolff (1953) who were
among the first to examine social stress factors.

Other researchers adopted Holmes and Rahe's approach and
either used the SRRS or similar instruments for assessment of
life stress, or employed only slightly different concepts in
defining "events", e.g., as involving "role transformations"
(Myers et al., 1972; Myers, Lindenthal & Pepper, 1974). However,
very soon the concept of life change as underlying the "stress-
fulness" of events was questioned and other concepts were
employed to account for "stressfulness", such as "threat" (Brown
1974), "upsettingness" (Paykel et al., 1971; Beck & Worthen,
1972), "turmoil, disturbance, and upheaval" (Cochrane &
Robertson, 1973), "hazard" (Beck & Worthen, 1972), or, simply,
"undesirability" (B.S. Dohrenwend, 1973), with events sometimes
being classified as "positive", "ambiguous", and "negative"
(Ross & Mirowsky, 1979; Tausig, 1982).

While B.S. Dohrenwend (1973) found that "change" measures
of life events were more highly correlated with psychopathology
than "undesirability" measures, and maintained (B. S. Dohrenwend
& B. P. Dohrenwend, 1981) that desirable events may have detri-
mental effects in some situations, most other studies showed
either that "desirable" life events were insignificantly
correlated with psychological distress, or that their

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correlations with distress measures were very much lower than those of "undesirability" measures (Jacobs & Myers, 1976; Johnson & Sarason, 1978; Hammen & Mayol, 1982; McFarlane, Norman, Steiner, Roy, & Scott, 1980; Mueller, Edwards, & Yarvis, 1977; Paykel, 1974; Ross & Mirowsky, 1979; Sarason et al., 1978; Tausig, 1982; Vinokur & Selzer, 1975), or even negative (Grant, Sweetwood, Gerst, & Yager, 1981).

Gersten et al. (1977) argued that the superiority of "change" measures over "undesirability" measures found by B. S. Dohrenwend (1973) was due to the dependent measures which they alleged tapped mainly anxiety.

Also, as might be expected, "undesirability" and "change" weights sometimes differ considerably (Stone & Neale, 1978), the resulting scores are usually highly correlated. Ross & Mirowsky (1979) compared different weighting schemes for the life event data of Myers et al.'s (1972) longitudinal New Haven study of a large, representative population sample and concluded that no index developed by researchers in the past predicted psychological distress better than a sum of undesirable events. They speculate that the predictive power of other indices ("change" scores, "ambiguity" scores, or more complex differential or ratio scores) may be due to their correlation with the "undesirability" score.

While Rahe (1979) argued that one could never get a clear objective measure of desirability or similar construct, and states, "for a clean estimate of environmental stress, vice

subjective stress, it is hard to improve on a simple counting of recent life changes" (Rahe, 1978, p.97; emphasis added), the available impressive evidence would point to non-adverse life events as a source of error when measuring "life event stress".

Scaling issues

The first publication of the content of the "Schedule of Recent Experience" (Holmes & Rahe, 1967) was as a scale (the "Social Readjustment Rating Scale", SRRS) that had differential weights assigned to each item, and differential weights are an integral part of most published life event scales. It appears reasonable to assume that, e.g., the death of a spouse has a greater impact on one's life than taking a vacation, and the average weights assigned to individual items reflected such differences in impact. Originally, the authors of the SRRS (Holmes & Rahe, 1967) let a sample of convenience rate the items as to how much impact they would have on someone's life in proportion to a standard event (marriage). The resulting mean score for each item across all raters was, after linear transformation, taken as the scale score for the item in question. Apparently, different methods of deriving scale weights do not result in very different weighting schemes: Ruch & Holmes (1971) found magnitude estimates generated by proportional and paired-comparison methods to be highly correlated at r = .93.

Cultural differences.   Holmes and Rahe reported
correlation coefficients (Pearson's r) of above .90 between the
average ratings of most cultural and socio-economical subgroups
of their original sample, with the exception of black raters' vs
white raters' scores which correlated at r= .82. Ratings of SRE
items by different national groups (North American, West
European, Japanese, South-East Asian, Latin Americans) have
typically yielded rank order correlations of between .60 and .90
(Hough et al., 1976; Komaroff et al., 1968; Masuda & Holmes,
1967; Masuda & Holmes, 1974; Paykel, McGuinnes, & Gomez, 1976;
Rahe, 1969; Rahe, Lundberg, Bennet, & Theorell, 1971a; Ruch,
1977; see also Fairbank & Hough, 1981). Correlations between
ratings of regionally or otherwise different sub-cultural
samples within North America as reported by Miller, F. T., et
al. (1974), and others (Mendels & Weinstein, 1972; Rahe, 1969;
Ruch, 1977; Ruch & Holmes, 1971; Tennant & Andrews, 1976) fall
mostly in the range of .60 to .97. However, raters from markedly
different cultural and/or existential spheres may differ
drastically in their ratings from raters in stable
industrialized societies (Fairbank & Hough, 1981). Janney,
Masuda, & Holmes (1977), for instance, compared ratings of life
events (on the SRE) by a sample drawn from a rather remote and
mostly purely Indian Peruvian town after a devastating
earthquake and found them correlated with Holmes & Rahe's (1967)
original ratings at only 0.18. As Fairbank & Hough (1981) note,
the cultural differences found by these and various other

authors may be confounded with social status differences.

In addition to rank order differences between different cultural and sub-cultural samples, Miller, Bentz, Aponte, & Brogan (1974) and Paykel et al. (1976) found differences in absolute magnitude of ratings. While Paykel comments on the "remarkable similarity" between his English and North American samples, Miller, who found apparently substantially different mean absolute ratings of events between his northern urban and southern rural samples, cautons against uncritical application of standard weights. Similarly, Askenasy, Dohrenwend, & Dohrenwend (1979), on the basis of a comparison of events by raters of different cultural background in New York, concluded that "intergroup consensus about the relative magnitude of stressful life events has not been proved by previous research on samples of convenience" (p. 438).

It appears, then, as though cultural and sub-cultural differences have a varying but sometimes marked influence on the perception of severity of different life events.

Individual differences.   Compared with most cultural/ subcultural differences, internal consistency measures of rater panels reveal even greater variations between individual raters of culturally and/or nationally homogeneous groups. Holmes & Rahe (1967), in their original sample of raters, report a coefficient of concordance (Kendall's W) of .477 between raters. Similarly, Masuda & Holmes (1974) report $W = .518$ between individual raters in their Japanese and North American samples.

Mendels & Weinstein, (1972), in a sample of medical students, also report intra-group correlations of ratings of SRE items to vary between .50 and .60.

This low concordance between individual raters may be due, to some degree, to difficulties raters have with the scaling procedures. While Komaroff et al. (1968) report that the task of quantifying life change events can be done well even by partially illiterate lower-class subjects, B. S. Dohrenwend et al. (1978) found that many raters of a representative population sample were unable to do the severity ratings. But Redfield and Stone (1979), in an analysis of college students' semantic differentials of stressful life events also found large differences between students' ratings, and stated that "individual differences are so potent a source in life event ratings that averages taken over large samples do not adequately represent individual perceptions of life events" (p. 152). Bradley (1980) reported significant sex differences in magnitude ratings of life events, and Janney et al. (1977) reported that subjects who had recently escaped a devastating earthquake deemphasized events dealing with non-essential matters like personal achievements and rated items dealing with economic matters much higher.

Whatever the reason, it would appear that the marked inter-individual inconsistencies in estimating the impact of life events would greatly reduce the usefulness of standard life events weights, even in (sub)culturally homogeneous samples.

<u>Effects</u> <u>of</u> <u>weighting</u>.   Several studies have examined the
usefulness of different weighting schemes. While B. S.
Dohrenwend (1973) found that the weighting of events according
to the adjustment they require increased the correlation between
life event scores and psychological distress, and still
recommends (Dohrenwend et al., 1978; B. S. Dohrenwend & B. P.
Dohrenwend, 1981) the use of weights as a more accurate way of
assessing the severity of life event stress in some cases, most
other studies found no difference between weighted and
unweighted life event scores as to their association with
symptomatology or distress (Grant et al., 1981; Lorimer,
Justice, McBee, & Weinman, 1979; Mueller et al., 1977; Newcomb
et al., 1981; Ross & Mirovsky, 1979; Tausig, 1982). This finding
was consistent across different conceptualizations of
"stressfulness" ("change", "undesirability"). Rahe (1974), too,
reported correlations between simple event counts and weighted
sums to be as high as .89. Grant et al. (1978), who compared
event counts with general, group-specific, and individual
weighting schemes, concluded that "different scaling procedures
for life events add virtually nothing to an already strong
relationship between events and symptoms..." (p. 527). B. S.
Dohrenwend and B. P. Dohrenwend (1981) acknowledged that simple
counts of life events generally do not fare much worse than
weighted sums, but they argued that weighting is useful if only
subsets of events are examined, or if group differences in the
perception of events can be anticipated. In the light of the

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accumulated evidence, though, it would appear that even in these cases the effects would be less than spectacular.

Agreement on life event weights among individual raters from one cultural or national background is typically lower that agreement between groups from different cultural backgrounds. This suggests that a simple count of events may be as good as differential weights that vary from individual. Indeed, Shrout (1981) mentioned a correlation of .90 between weighted and unweighted indices as typical. This should not come as a surprise: linear regression weights in behavioural research are notoriously unstable across different samples (Maxwell, 1977; Dawes, 1979), and there is no reason why estimates of such weights by raters should be more stable than empirically derived ones (Rahe, 1981). Moreover, weighted sum scores can be expected, on a priori grounds, to be highly correlated with unweighted sum scores, even when the single items are only minimally correlated (Shrout, 1981). Shrout (1981), at the end of a comprehensive discussion of scaling procedures in life event research, concludes: "Although the literature on life-event scaling is more than a decade long, there has not been conclusive proof that weighted life event indices are superior to unweighted counts of life events in predicting health status." (p. 45)

Subjective vs objective weights. The original item weights ("life change units" - LCUs) of the SRRS (Holmes & Rahe, 1967) were derived from estimates by a panel of raters of the

average impact these events would have. These ratings were again averaged over the raters to arrive at the final weights. The weights, therefore, can represent only _averages_ of severity of events across both subjects and situations. As has been shown in the preceding section, the agreement of raters on the relative magnitude of events is very low. It is apparent, and it had been mentioned some time ago, that an average weight would represent the severity of a specific event for a specific individual only very poorly (Mechanic, 1975), and that instead of determining the weight or desirability of an event a priori, it should be left to the respondents to determine the magnitude or desirability of events they have experienced.

Some life event scales (Rahe, 1975; Sarason et al., 1978) require the subject to rate the degree of change or desirability themselves, with the sum of their ratings representing the life event score. A divorce, for instance, may be experienced as the sudden withdrawal of personal, social, and financial support, or it may be welcomed as the termination of a quite unpleasant situation.

Mueller et al. (1977) found that the desirability of events is judged quite differently by different individuals. Hurst et al. (1978) found substantial differences between life event sum scores derived from normative weights and from individual weights, both if scaled for "change" and for "upsettingness". Grant et al. (1981) let subjects determine the desirability of SRE items (categories "desirable" and "undesirable") and found

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"much" variablity with about twenty items. Together with the consistent finding that desirable events do not seem to have much predictive power (see above), this finding would strongly argue against a priori determination of desirability of events.

However, with regard to the predictive value of subjectively vs objectively derived sum scores, published results do not support the superiority of the former: Tausig (1982) found, for example, that the method of determining "desirability" of an event (a priori, or by the subjects themselves) made no difference in the correlation of the resulting "undesirability" score with depressive symptoms. Also, Rahe's (1981) results with Vietnamese refugees showed no clear pattern of superiority of one method over the other. Despite assertions to the contrary (see, for example, McFarlane et al., 1980), it would seem that individual weighting of events confounds external (events) with internal (predispositions, personality) variables (Hurst et al., 1978) as well as singular events with permanent life situations, to a degree that makes it impossible to sort out different contributions to the final impact of events (B. S. Dohrenwend & B. P. Dohrenwend, 1981). This may not matter very much, or may even be desirable (as may be the inclusion of confounded items -- see above) if the purpose of the life event score is prediction of distress or symptoms; in etiological research where the differential contributions and interactions of different variables is the focus, subjective rating of severity seems to have no place (B. S. Dohrenwend, 1974).

Although it appears evident that ratings of _severity_ of
events by the subjects themselves confound several variables, it
is not clear whether this is also the case when subjects are
only asked to indicate whether an event was desirable or
undesirable, without rating the degree. Mueller et al. (1977)
found little difference between the correlations of the two
scores with dependent variables. It may be that here the
confounding effect is smaller: desirability or undesirability of
an event seems less dependent on mood, personality, etc. than
its experienced magnitude. It is still possible, however, that
evaluations of events change between occurence and reporting,
either because, from greater distance, they can be evaluated
more accurately, or because distress or euphoria at time of
reporting uniformly colour the past. The reported differences
between life event scale scores derived from objectively and
subjectively determined desirability (Grant et al., 1981; Hurst
et al., 1978), then, may be due to "real" differences in
magnitude, or to spurious effects of inaccurate reporting, or to
both.

A method that would avoid the pitfalls of both general and
subjective weighting of life events has been proposed by Brown
(Brown, 1972, 1974, 1981a, 1981b; Brown et al., 1973a, 1973b):
here as much contextual information as possible about events
that have actually happened to a particular subject is
collected, both from the subject him- or herself, and from
well-informed third parties. The severity of the event in the

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context of the subject's life circumstances is then evaluated. This method requires, however, a fair amount of time for the lengthy individual interviews, and it appears that it has not been used by researchers outside Brown's group. It is also unclear to what extent it improves on simple event counts.

Summary. With regard to weighting of items on life event scales generally it would follow, both from theoretical considerations and from results of different lines of research, that the best and most robust method is a simple count of the undesirable events that have been checked by the subject, irrespective of their supposed differences in magnitude.

With regard to the issue of a priori vs subjective determination of undesirability -- qualitatively or quantitatively -it is not clear whether it makes any difference with regard to the prediction of distress. It seems prudent, however, to suggest that preference for one or the other would have to depend on the purpose of the assessment. For individual prediction of psychological distress or mental disorder, the most highly correlated method available should be used. For etiological research, on the other hand, the possibility of confounding influences would rule out subjective magnitude rating of events; to what degree this holds also for the mere qualitative determination of undesirability remains unclear.

A theoretically rather ideal method of determining the severity of single events for individual subjects consists of the collection of extensive contextual information about single

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occurrences of events, and the subsequent rating of its
magnitude by independent raters. The validity increase to be
gained by this method is not known, however.

Classification of life events

The very concept of "stress" implies non-specificity of its
effects: diverse stressful circumstances are assumed to elicit
non-specific stress reactions which will predispose to illness.
The general reliance on sum scores of life events, the multi-
plicity of disorders and symptoms they have been found to be
related to, and the historical roots of life event research
would attest to the salience of the non-specificity paradigm
here.

As mentioned earlier, the major psychological theories of
etiology of mental disorder emphasize <u>specific</u> environmental
circumstances as causes or antecedents of disorder. This notion
of specific causes or precipitants and the non-specific stress
concept at the basis of life event research have been brought
together in several attempts to relate <u>classes</u> of events to
psychological distress or to symptom patterns, and to determine
differential effects of different event classes. Underlying this
is the idea that differences in personality or predisposition
interact with different types of events. The theoretical basis
for classifying stressful conditions into specific categories,
with qualitatively homogeneous elements but qualitatively

different effects, however, has never been made explicit.
Essentially, two rather contradictory etiological paradigms have
been combined. The rationale for assuming salience of one para-
digm within event categories and salience of another between,
remains to be explained.

Several different classification principles have been
proposed. Some authors classified events according to the area
of activity in which they happen (e.g., work, family, finances,
household), others have preferred to more functional qualities
like time of occurrence, duration, "loss" of someone or some-
thing, etc. The former apparently regarded external qualities of
events as salient (where, in what context, an event happens),
the latter were concerned with the more person-related qualities
of events (how they relate to needs and to general styles of
interaction with the environment). A third group of researchers
tried to establish empirical clusters of events.

These three classification strategies will be discussed,
and the following conclusions drawn:
- Empirical methods of categorization (cluster analysis, factor
   analysis) yield categories roughly comparable with a priori
   classifications according to areas of activity. They are not
   differentially correlated with dependent variables.
- Personal-functional categories show differential effects on
   general measure of psychological distress, especially "exit"
   and "uncontrollable" events. It is not clear, however, to
   what degree these classifications reflect the dimension

"desirability - undesirability", and no <u>qualitatively</u> different effects are evident.

Personal-functional categories

⟨Life events have been functionally classified in a variety of ways. Most of these classifications involved a one-dimensional ordering of all events on a list into two extreme groups (e.g. "exits" in and "entrances" from the "social field"), sometimes with a residual category for events to which the classification was not applicable. *)

"<u>Exits</u>" <u>vs</u> "<u>entrances</u>". Myers et al. (1972) found that only "exit" events were significantly related to psychological distress. Similarly, Paykel et al. (1969) also found only "exit" events to differentiate significantly between depressive psychiatric patients and controls. B. P. Dohrenwend (1974) reports similar results.

It appears that in most studies which examined differential effects of the two groups of events, only "exits" were significantly related to dependent measures. However, the category of "exits", "loss", etc. is severely confounded with the category of "undesirable events"; similarly, "entrances", like birth, marriage, etc., may just be a sub-category of "desirable" events. Studies that would differentiate these two concepts are

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*) Strictly speaking, the classification of "life change" events into "desirable" and "undesirable" events also represents such a functional classification.

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missing, probably because, on average, most exit events are undesirable and most entrances desirable. Here, I believe, it would pay to let the subjects indicate whether the events they experienced were desirable or not; in this way it would be possible to examine positive "exits" (e.g., long sought divorces) and negative "entrances" (e.g., shotgun marriages) separately.

The reported differential effects of "exit" vs "entrance" events all concerned the magnitude of distress. There are no indications that "exit" events are more closely related to, say, depression than are total life event scores.

Time of occurrence.   Jacobs & Myers (1976), on the basis of their findings, call for differentiation between immediate and distant events. Brown et al. (1973a, 1973b) found that both schizophrenic and depressive psychiatric patients (as groups) showed a peak of life events during the last three weeks before onset of the disorder; with regard to "markedly threatening" events, however, depressives showed a raised level over the whole preceding year. It does not become clear to what degree this is a memory effect (severe events can be expected to be better remembered). Paykel (1974) reported that, in a sample of psychiatric patients, the number of experienced events had risen sharply in the month immediately prior to onset of depression or to suicide attempts. (See also Uhlenhuth & Paykel, 1973b) Christensen (1981), summarizing his and others' findings, concluded that psychiatric problems are more related to events

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that happen within a relatively short time prior to onset, while somatic disorders are more related to life events that happened a year or more prior to onset.

Contrary to the findings of these authors' results, Harder et al. (1980) found no clear time effects when they related events happening one, two, three, and four quarters before admission to a psychiatric facility to severity of symptoms. However, they found only weak over-all relationships between life events and symptom severity. These may have been too weak to be meaningfully partitioned. Also, Andrews et al. (1978) reported that events which occurred 8 - 12 months before the time of assessment had a closer association with psychological distress symptoms at the time of assessment than those symptoms which occurred later. Nevertheless, Rahe (1979), summarizing on this topic, stated that "life changes" have a finite period of influence on a person's life adjustment (about 6 month to one year).

It appears, then, that the time of occurrence is important in two ways: First, events must have happened in the relatively recent past to influence psychological well-being; second, different disorders may perhaps be preceded by events over different typical time periods. Evidence for the latter, however, is sparse (Brown et al., 1973b). Consequently, it seems expedient to limit examinations of life event occurrences to a relatively short time (6 - 12 months), if psychological distress is the dependent variable, especially in the light of the

increasing

unreliability of life event reports with greater time intervals
between occurrence and report.

Control.   Kellam (1974) called for a distinction between
events that are an act of fate and events that involve personal
failure. Hammen & Mayol (1982) examined the relation of dif-
ferent categories of life events to self-reported depression in
college freshmen and found that only those undesirable events
for which the students felt responsible were related to depres-
sive symptoms. Grant et al. (1981), conversely, found only
"uncontrollable" and undesirable events related to a broad
measure of psychological distress. McFarlane et al. (1980) also
found undesirable and uncontrollable events most closely related
to psychological distress.

The difference between Hammen & Mayol's (1982) results and
the results of the two other studies may perhaps be explained by
the different constructs "responsibility" and "control" that
were used, which differ in their degree of self-involvement.
This difference, however, does not seem to be important enough
to account for the contrary findings. Perhaps the dependent
measure used by Hammen and Mayol, the Beck Depression Inventory,
which appears to measure mainly an introjective and self-
critical dimension of depression (Blatt, Quinlan, Chevron,
McDonald, & Zuroff, 1982), may be partly responsible. Also,
specific characteristics of their subject population (college
students) may have played a role.

At any rate, the degree of control an individual has over events seems to mediate the effects of adverse life events. More research would be needed to draw more precise and definite conclusions, especially with regard to qualitatively different effects, for which there is no evidence in the studies cited.

Severity of events. While effects of life events appear to be incremental, and while the different weighting schemes do not seem to improve the predictive power of the life event score very much (see above), Brown et al. (1973a, 1973b) found that depressive psychiatric patients are more likely to have experienced "markedly threatening" events than "mildly" or "moderately" threatening events during the whole year preceding the onset of the disorder, but this difference did not hold for the weeks immediately preceding onset. He maintains (Brown, 1981b) that it is the most "threatening" events that produce most adverse effects on mental and physical health. Jacobs & Myers (1976) report that only moderately "upsetting" events differentiate between schizophrenic and control samples.

Brown's results with regard to depressive patients may be explained by memory effects -- severe events may be remembered longer -- but the results regarding schizophrenic patients call for an explanation. It is of interest here that Harder et al. (1980), on the basis of their findings, conclude that life events are not very closely related to severe psychotic symptoms. It may well be that the relationships found by Jacobs & Myers (1976) and Brown et al., (1973a, 1973b), are due to

those events that are confounded with dependent measures (see above).

Expected vs unexpected events. McFarlane et al. (1980) examined whether life events that have been anticipated had effects on psychological and somatic distress symptoms different from those caused by events not anticipated. They found only a slight difference, and only with uncontrollable events where anticipation of the event enhanced the negative effect.

Duration. Although called "events", many items of life event lists are actually enduring situations (e.g., increase in arguments with spouse, pregnancy, marriage). Kellam (1974) proposed a dimensional differentiation of events in terms of brevity-longevity.

Ilfeld (1976a) maintained that enduring life situations are crucially important in determining psychological well-being. He (Ilfeld, 1976b, 1977) indeed found that present, enduring, adverse situations are significantly related to depressive symptoms in a representative population sample. There is the evident danger, however, that concurrent enduring situations may be greatly influenced by changes in psychological well-being and therefore confounded with dependent measures. With regard to the usual life event lists, there are no studies examining differential effects of brief vs enduring "events".

Classifications according to areas of activity

Several studies partitioned life event scores according to the area of activity in which they occur, for instance marriage, work, school, finances. The results are mixed. Paykel et al. (1969) did not find different patterns in depressive patients and controls. Berkman (1971), in a mail survey of a California county, found no particular distribution patterns to be associated with psychological distress, and Tausig (1982) concluded that the total life event score is a significantly better predictor of distress than any single category of events. Myers et al. (1972) found the same type of relationship between different groups of life events and psychological distress as between total life event score and distress.

Ilfeld (1976b), however, examining the relationship between current and enduring stressful situations and symptoms of mental disorder, found that marital "stressors" showed the closest relationship. The salience of other categories varied with the social and occupational status of the subjects: homemaking stressors were more salient for unemployed married mothers, financial stressors for employed married fathers etc. While the close association of current stressful marital situations with symptom status can most probably be partly explained by a reverse causal relationship, the importance of other life stress areas varied in accordance with the importance of these areas for the individual in general. Ilfeld does not report different associations of categories with symptom patterns.

Chiriboga & Dean (1977) also reported that different life stress areas are differentially salient for different subject groups, and they state that multiple correlations of partial life event scores with measures of psychological impairment is higher than the correlation of a single sum score. Like Ilfeld (1976b), Chiriboga & Dean (1977) did not report the differential association of life event categories with symptom patterns.

Apparently, area of activity per se does not play a role in determining the effect of life event experiences, i.e. the type and severity of symptoms, but it is related to life style consistencies and reflects the individual's main area of activity and involvement. This seems hardly surprising as one can expect people to have more salient experiences, positive or negative, in the areas they spend most time and energy in.

Empirical categories

Empirical classifications are generally derived (via factor or cluster analysis) by analyzing the contiguities of their occurrence in individuals, usually during a limited period of time (6 - 24 months). Events may be clustered either a) because of individual and temporal consistencies (the individual eliciting or reporting related events more often), or b) because of the relatedness of the events per se (one event being the consequence of another), or c) because of environmental consistencies ("bad" work environments may tend to produce more than one workrelated event, "good" ones none). B.P. Dohrenwend

(1974), for instance, found systematic differences in the type of events experienced by different samples of respondents (community samples, psychiatric patients, convicts).

In the case of personal predispositions, the clusters would be a consequence of personal characteristics of the individual; relating them back to different individual characteristics would mean running in circles.

In the case of interrelated events, clusters are a measurement artefact: by counting several consequent events of a primary one, the latter is artificially transformed into a perforce interrelated cluster. However, while the clustering may be artificial, any specific relationship with symptoms or distress should be quite interpretable.

In the case of clustering due to life-style and environmental consistencies, any specific relationship of clusters with symptoms or distress categories should first be examined as to the possibly incidental nature of the related life events: the subject's life-style may be related to the dependent variable more directly.

A cluster analysis done by Rahe, Pugh, Erickson, Gunderson, & Rubin (1971b) of SRE responses by Navy personnel resulted in clusters that were related to different areas of activity (personal/social, marital, disciplinary etc.), with high intra-cluster correlations and low inter-cluster correlations. A factor anaysis by Skinner & Lei (1980) yielded five to six interpretable factors also related to areas of activity. Newcomb

et al. (1981) also found that several primary factors related to attitudes and activities were necessary for explaining the item intercorrelations of their life event list among adolescents. Within these dimensions, life event scores were correlated over time. Tausig (1982) factor-analyzed a large pool of life event items and, other than finding one meaningful and substantial factor related to personal items he suspected of being stress symptoms, found "no internal structure".

With regard to the above discussion it appears that the findings by Rahe et al. (1971b), Newcomb et al. (1981), and Skinner & Lei (1980) represent the case of life events being dependent on life style consistencies, while Tausig's (1982) results point to a confounding of some events with others or with distress symptoms. Also, as might be expected, results by Hurst (1979) suggest that clusters differ significantly according to the life event scale used.

Life events, then, if not confounded with psychological distress, seem to be empirically clustered according to external (where the subject lives, what he does) or methodological conditions(e.g., the particular item pool used), not according to internal ones (needs, predisposition etc.).

The methods chosen in the above-mentioned studies (cluster or factor analysis), however, is not appropriate for determining similarities of effects of life events. Life events, nearly by definition, are intrinsically independent of each other, and therefore any method relying on contiguities of their occurrence

(factor or cluster analysis) will capitalize on regularities extrinsic to stressful life events themselves (life styles etc.). A much more germane method for determining commonalities of _effects_ of life events would be canonical correlation analysis (Maxwell, 1977) which examines similarities of _association_ patterns of variables in one set (life events) with variables in another (symptoms). No study was found which pursued this line of research.

Summary

Several principles have been employed in the classification of life events. Empirical methods (cluster or factor analysis) appear to yield results comparable to a priori partitioning of events into areas of activity of the individual. Partial life event scores achieved by such empirical methods seem to represent life style consistencies and are not differentially related to symptom patterns.

Life event classifications with functional-individual categories seem to increase predictive power of life event scores. While categorization according to magnitude, anticipation, or duration of events, or according to the degree of control subjects have over their occurrence, have been shown to have some relevance, the effects are by no means clear and unequivocal. With regard to time of occurrence of events, it appears that their effects diminish with the passing of time, and they tend to be forgotten more and more easily.

"Loss" or "exit" events apparently are more closely related to psychological distress or symptoms of mental disorder than are "entrances". However, "loss" and "exit" categories are severely confounded with "undesirability" categories and may just represent a sub-category of the latter.

This may also hold, to some degree, for other categories. Even if the effects of categorizations were unequivocal with respect to severity of distress, it would not be clear whether this effect is a qualitative or quantitative one, i.e., whether it is a "true" categorization effect or or whether the categories represent different degrees of magnitude or salience of events.

The above results concern the general severity of psychological distress of mental disorder. With regard to qualitatively different effects of different categories, there are only few studies suggesting it, and their results are subject to alternative interpretations. It would appear that qualitative effects of life event categories are minimal, at best, and that the paradigm of non-specific "stress" effects is best suited for explanation of effects of life events.

Several issues have been raised in this chapter but only a few are sufficiently researched to allow even tentative conclusions. These can be summarized as follows:

1. Life event scales, it appears, represent only a small sample of stressful events possibly encountered by the subject filling out the questionnaire.

2. Life event scales are very unreliable even with regard to the events they address.

3. Life event scales are partly confounded with dependent measures like psychological distress on the item level, and possible on the construct level as well.

4. Only "undesirable" events seem to have any effect on psychological well-being, but it is not clear if "undesirability" is best determined a priori, or left to the subject to indicate.

5. Life event weights seem to have little additional predictive value over simple counts of events, especially since they vary extensively both between individuals and between cultural and sub-cultural groups. For this reason, probably, no substantial differences with regard to prediction of psychological distress, no substantial differences between subjective and objective (a priori) weighting of events have been found albeit, on theoretical grounds, one would expect

subjects' ratings to be heavily confounded with perception of and reaction to events.

6. Classification of life events according to activity areas seems to have empirical support insofar as events are indeed clustered in these areas. However, with regard to dependent measures, general differential effects are not evident.

7. Functional-personal classifications, especially "exits" vs "entrances", have generally been shown to affect the relationship between life events and psychological distress. Apart from exit-entrance categorizations, and apart from the dimension of time of occurrence, and possibly "controllability" of events, however, the effects of functional classifications are not very substantial or general. It is not clear, to what extent these classifications mirror the dimension of severity, or whether they yield only sub-sets of "desirable" and "undesirable" events.

8. There are no convincing indicators that different categories (of whatever kind) have <u>qualitatively</u> different effects, i.e., they are not differentially related to different syndromes of mental disorder.

Seen together, the issues discussed above allow some additional conclusions:

9. With life event questionnaires, it makes apparently little sense to inquire about life events that have happened more than a year before assessment as the rate of forgetting and the dissipating of their effects would make them a source of error or, at most, would not substantially contribute to the reliability of the life event score.

10. Individual prediction of psychological distress or mental disorder with life event scales will not be very successful, given the small number of relevant events sampled in life event questionnaires, and given their low reliabilities. As a consequence, life event lists should be purified by eliminating contaminated items representing distress reactions to make them more suitable for etiological research.

11. Life event scales can probably be shortened considerably without losing much predictive power. It should be rather easy to achieve several short scales specific to particular subpopulations, containing only the most salient events.

6. Moderator Variables

As defined in Chapter 3, the term "moderator variables" is meant to refer to variables that influence the strength of the association between life events and illness or distress. A number of different individual and social conditions have been examined for their potential moderating effects, including socio-demographic variables, social support, and personality. This dissertation deals with the latter two. (For moderator effects of socio-demographic variables, see, for instance, Liem & Liem, 1978, Liem & Liem, 1981)

Social support

The beneficial effect of social conditions subsumed under the term "social support" have long been recognized as having beneficial effects on health (cf. Cassel, 1976; Henderson, 1977). However, while there is an ever-increasing body of literature on social support and its effects on physical and psychological well-being, "there is still no agreement on the

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existence, magnitude, and mechanism of a stress-moderating effect, and there has been no coherent statement of what morepromising research directions might be pursued" (Gore, 1981, p. 202).

In epidemiological research life event stress and social support (i.e., positive and negative aspects of the social environment) have often not been clearly separated (see, for instance, Cassel, 1974; Cobb, 1974; Kaplan et al., 1977; also Gore, 1981). This may be justified if "social support" turns out to be one pole of an experiential dimension of which "life event stress" is the opposite one; social support might then be seen as compensating the effects of stressful life events. The main effect of "social support" on mental health, as has often been reported in the literature (see below), may indicate such an essential equivalence of conditions usually subsumed under low "social support" and those included under "life events" (see Gore, 1978; Schaefer et al., 1981). Dean & Lin (1977) mention numerous studies indicating that "social disorganization may ... be regarded as a stressor" (p. 405). This is not, however, how the relationship between social supports and stressful life events has usually been conceptualized. Studies relating social support variables to psychological distress and life events either show a main effect of social support on psychological distress or physical illness, or a moderating effect on the association between life events and these dependent variables, or both. They typically use either an objective-quantitative

measure of social support (e.g., counts of friends or relatives, activity patterns), or subjective-qualitative ones (e.g., self-ratings of the "quality" of relationships and of emotional support) or, more often, measures containing items of both types (cf. Luborsky, Todo, & Katcher, 1973).

Table 6-1 presents an overview of these studies as published to date, with psychological or psycho-physiological disorders as dependent variables. As can be seen, studies showing moderator effects mainly employed subjective measures of social support, i.e., measures either requiring evaluation of the quality of their social evironment by the subjects themselves, or referring to their feelings of being supported. Conversely, studies showing no moderator effects predominantly used objective measures of social support, referring to observable, countable instances, or measures containing a majority of such items. Eaton's (1978), Kessler's (1979b), and Thoits' (1982b) findings regarding marital status and living arrangements, and Finlayson's (1976) study regarding actual crisis support are exceptions. The latter study is different from the other cnes in that it measured actual crisis support to families of husbands suffering from severe physical illness (myocardial infarction). This result may be taken as an indication that actual crisis support is indeed different, and not predictable, from everyday social patterns. The results of the three studies using the data collected by Myers et al. (1972) show moderating effects only for marital status and

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Table 6-1: Studies examining moderator effects of objective and subjective aspects of social support on the association between environmental stressors and psychological and/or psycho-physiological disorders

Study	Significant moderator effects of "objective"[2] aspects of social support	Significant moderator effects of "subjective"[1] aspects of social support
Eaton (1978), Thoits (1982), Kessler (1979b) [10]	(YES) [3]	--
Wilcox (1981)	--	YES
Lowenthal & Haven (1968)	--	YES
Gore (1978)	--	YES [4]
Lin et al. (1979)	NO [5]	--
LaRocco et al. (1980)	--	YES
Williams et al. (1981)	NO [6]	--
Andrews et al. (1978)	NO [7]	--
Miller & Ingham (1979)	--	YES [8]
Nuckolls et al. (1972)	--	YES
Finlayson (1976)	(YES) [9]	--
Norbeck & Tilden (1983)	--	YES
Pearlin & Johnson (1977)	NO [11]	--
McFarlane et al. (1983)	NO	NO
Schaefer et al. (1981)	NO	NO

(continued)

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Table 6-1 (continued):

1) "Subjective" aspects are measured by instruments dependent on the subjects' evaluation of the quality of of their social contacts, or on their feelings or perceptions of being emotionally supported (e.g., having a confidant).

2) "Objective" aspects are measured with instruments that refer to observable and/or countable instances (e.g., number of relatives, frequency of contact).

3) Only for "living alone/with others" and "married/unmarried" not for other measures referring to social networks and activities.

4) Measure includes approximately 25% "objective" items.

5) Measure includes approximately 30% of "subjective" items.

6) Measure includes less than 20% "subjective" items.

7) includes approximately 10% "subjective" items.

8) The authors also reported moderating effects of "diffuse support" derived from "superficial contacts", without indicating how this measure was obtained.

9) This study is the only one that measured actual crisis support.

10) These three studies all used data from the Myers et al. (1972) New Haven study.

11) With marital status as social support variable.

living arrangements. Eaton (1978) found no interaction when he used other measures of social involvement.

Most studies not showing moderator effects showed significant main effects of the social support measure employed on the dependent variable. Overall, the studies reviewed indicate that substantial differences exist between different aspects of social support, and that patterns of everyday social involvement and relationships, actual crisis support, and subjective feelings of support influence psychological health in different ways.

The distinction between "objective" and "subjective" measures of social support is necessarily crude, however, and most probably conceals important differences within these categories. Also, it leaves open the question of how they are interrelated. Furthermore, it seems appropriate to recall the discussion in Chapter 3: pervasiveness of stressful events in life, and nonlinearity of effects of life events together with possible onedimensionality of social support and life event stress may spuriously create main effects or interaction effects. It should further be kept in mind that the demonstration of statistical interaction also depends on the quality of the measures used to assess the primary variables "social support" and "psychological distress" (Gore, 1981) and on the size of the effect of life events on distress measures. Generally, no information as to the psychometric properties of the employed social support measures is presented in the studies

in Table 1; they are mostly collections of items which the researchers felt represented their particular conceptualizations of social support.

As Gore (1978,1982) pointed out, the confounding of "social support" with other vulnerability factors, made inevitable by the inclusiveness and non-specificity of some social support measures (social roles, statuses, etc.) casts doubt on the validity of reported findings regarding the construct "social support". Similarly , over-specific "objective" measures of "social support" (i.e., specific behaviours) make generalizations of research findings to the construct "social support" equally tenuous (Gore, 1981).

At any rate, it seems, a conceptual and methodological clarification of the construct "social support" should have first priority in further research. As discussed above, the evidence for moderating effects of social support variables is mixed. Some studies show them, some show only main effects on psychological well-being.

Few conclusions can be drawn because of conceptual and methodological shortcomings. It is not clear what "social support" is supposed to mean -- does it refer to objective characteristics of the social network (structure, extensity of contacts) of which the individual is part, or is it manifested by intensive contacts in times of crisis? Also, there appears to be no consensus as to how it can be measured - by subjective ratings of the quality of relationships, or by more actuarial

methods like, for instance, counts of social contacts. As it seems, only subjective-evaluative measures of social support consistently show moderating effects on the association between stressful life events and distress measures.

Personality

As was mentioned in Chapter 3, personality variables play a prominent role of transforming specific events into specific somatic illnesses in psychosomatic theories (Alexander, 1950; Alexander et al., 1968), while "stress" models of physiological disorders underscore the non-specificity of pathogens and the arbitrariness of the resulting dysfunctions with regard to "stressors" (Selye, 1950). It is probably because of the influence of the non-specificity paradigm of stress effects that personality variables as moderating factors of stressful events have received relatively little research attention.

The moderating role of several variables have been examined including: "Locus of Control" (Rotter, 1966), Sensation-seeking (Zuckerman et al., 1964), Self-esteem, and the A-B personality dimension (Engel, 1968; Friedman & Rosenman, 1959). Cobb (1974) mentions the possible role of "denial" as a personality trait in mediating the experience and report of life events (see also Lazarus, 1981b). They all represent relatively narrow personality constructs, and it is not clear how they relate to each other and to more general dimensions like

extraversion-introversion.

The moderating effect of these personality characteristics will be discussed in the light of the available evidence, and a general conclusion will be attempted.

Self-esteem. Several studies have dealt with self-esteem as a moderator variable. Kobasa (1979) examined personality characteristics of business executives who were functioning well under highly stressful situations. She found that they were characterized by a "positive self-image" and a "committment to self" which apparently immunized them against stressful conditions. Pearlin et al. (1981), in a longitudinal study of, among others, the association between life events and depression, imply an important role for self-esteem in moderating the effect of stressful life events. (See also Pearlin & Schooler, 1978, and Pearlin & Schooler, 1979). Rabkin & Struening (1976), in their survey of the field, mention past competence as an important mediator of life event stress. If it can be hypothesized that past competence, apart from imparting coping skills, also builds confidence and self-esteem, this would support the above findings.

The results of these studies suggest that self-esteem may indeed buffer the effects of life events. However, substantial conceptual and methodological problems arise. Specifically, retrospective studies can measure self-esteem only a considerable time after the occurrence of the life events, and it seems quite possible that self-esteem at the time of assessment

is confounded with measures of psychological distress, or is influenced by stressful events experienced in the recent past (Kobasa, 1979).

Locus of control:. Rotter (1966) describes the construct of external/internal locus of control as a "generalized expectancy" dealing with the subject's "belief about the nature of the world". At one pole, the external locus of control, the subject has the tendency to view reinforcement as being "the result of luck, chance, fate, as under the control of powerful others, or as unpredictable". At the other pole, the subject views reinforcement as being contingent on his own behaviour. He published the "I-E Scale" as a measure of this construct.

Tyson (1981) found that subjective evaluations of "stressfulness" of events were significantly correlated ($r = .22$) with scores on Rotter's (1966) Locus of Control Scale: Subjects with external locus of control tended to view the events they experienced as more difficult.

Johnson & Sarason (1978), in a sample of student volunteers, found that only students with external locus of control, as operationalized by Rotter's I-E scale, showed a significant correlation between life event scores and measures of depression and trait anxiety.

Lefcourt (1981), in a sample of college students, found that interaction between life event scores and scores on the I-E scale contributed significantly to the psychological distress variance in a hierarchical multiple regression analysis, over

and above the direct effects of life events and I-E scores.

Kobasa (1979), in her study of successful business executives, reports that they were characterized by internal locus of control, and Pearlin & Schooler (1978) mention the sense of control over events impinging on the subjects as mitigating their detrimental effects. In this context it is of interest to note that actual or believed control over aversive stimulation, in experimental conditions in animals (Weiss, 1971) as well as in humans (Glass, Singer, & Friedman, 1969; Geer et al., 1970; Lefcourt, 1981), lessens their detrimental effects on the subjects.

Cooley & Keesey (1981) found no significant moderating effect on the association between life events and physical symptoms. However, they used a narrower "Health Locus of Control Scale" (Wallston, Wallston, Kaplan, & Maides, 1976).

Although the number of studies relating locus of control variables to the effects of life events is small, the findings are empirically and theoretically consistent, at least with regard to the original I-E Scale: internal locus of control seems to mitigate the effects of stressful life events.

A related, but somewhat inconsistent finding should be mentioned here: Dohrenwend & Martin (1979) found that "personal dispositions ... apparently do not have much influence on perception of control of life events" (p. 465). As the authors note, this finding is even more surprising considering that they selected only those events for their analysis that were

ambiguous with regard to their "controllability".

Stimulation seeking.   Zuckerman et al. (1964) noted that drive reduction theories assume that "the common goal of all primary motivation is to reduce stimulation to a minimum" (Zuckerman et al., 1964, p.477). They developed a "Sensation-Seeking Scale" to measure the concept of "optimal level of stimulation" which they assume to vary widely and to be related to basic personality dimensions.

Smith et al. (1978) found that low scores on "Zuckerman et al.'s (1964) "Sensation Seeking Scale" (meaning low optimal levels of stimulation) increased the level of psychological distress for subjects with high life event scores in a sample of college students.

Mehrabian & Ross (1977) and Cooley & Keesey (1981) reported a similar effect, also in college students, on psychosomatic and physical symptoms.

Johnson & Sarason (1979) speculated:

> Given that individuals seem to vary in the desire for or need to seek out stimulation, and perhaps in their tolerance for stimulation as well, sensation seeking status may well serve as a moderator of life stress ... If so, high sensation seekers might be expected to be relatively unaffected by life changes, particularly if they are not too extreme. (p. 160)

A-B behaviour pattern.   Friedman & Rosenman (1959) described a behaviour pattern which they found to be closely related to the development of coronary heart disease (CHD). They termed it "type A" behaviour pattern, with "type B" representing the converse pattern, and they characterize it as (p. 1286):

1. ... an intense, sustained drive to achieve
   self-selected but usually poorly defined goals,
2. profound inclination and eagerness to compete,
3. persistent desire for recognition and advancement,
4. continuous involvement in multiple and diverse
   functions constantly subject to time restrictions
   (deadlines),
5. habitual propensity to accelerate the rate of
   execution of many physical and mental functions, and
6. extraordinary mental and physical alertness.

Later studies (see, e.g., Glass, 1977) found type A behaviour
pattern as assessed by either structured interviews or
questionnaires to be a reliable predictor for the development of
CHD. Theorell (1976) compared samples of healthy and sick (CHD)
subjects and found that subjects who showed the type A behaviour
pattern and experienced a greater number of life events were at
the greatest rist for CHD. Glass (1977) and also Suls et al.
(1979) reported that type A subjects are more vulnerable to
learned helplessness under uncontrolled "stress" in experimental
situations than type B subjects. Matthews & Glass (1981) specu-
lated that it is particularly the experience of uncontrollable
life events that is associated with CHD.

While the studies cited above strongly indicate that the
A-B dimension moderates the association between life events and
CHD, there seem to be no studies that would directly examine
statistical interaction effects outside the laboratory.

Jungian personality types.   Cooley & Keesey (1981) used
the "Myers-Briggs Type Indicator" (McCaulley, 1981), which is
used to identify personality types according to Jung's (1946)
personality theory as moderator variables of the association
between life events and physical symptoms in college students.

They found significant moderating effects for the Extraversion - Introversion (introverts being more vulnerable) and for the Sensing-Intuition (sensing types being more vulnerable) dimension. These results, although in need of replication in the light of the marginal significance of the results, would suggest that broader personality dimensions may play a substantial moderating role.

Other variables. Garrity, Somes, & Marx (1977) found that the personality variable "intellectualism" (obtained from factor analysis of the "Omnibus Personality Inventory") was correlated significantly with a composite measure of mainly physical health symptoms when the number of experienced events was on an intermediate level. Kobasa et al. (1981) found moderating effects of a complex personality variable "hardiness" on the association between life events and illness and distress.

Dohrenwend & Dohrenwend (1981) speculate that the above-mentioned personality traits may tap a common factor contributing to the vulnerability to stressful life events. All these personality dimensions appear to moderate the relationship between life events and psychological distress. It must be suspected, however, that they are often substantially correlated with dependent measures of distress and it is not sufficiently clear to what extent this may affect the reported moderating effects.

Summary.   Relative to their theoretical importance, few studies have examined the effect of personality variables on the association between life events and psychological distress. Personality constructs used in life event research to date have included self-esteem, locus of control, sensation-seeking, and A-B personality. With few exceptions, they represent relatively narrow concepts, and their relation to each other and to broader personality constructs is not clear.

Some recurrent findings are that high self-esteem, internal locus of control, high stimulation-seeking, and type B behaviour pattern buffer against the effect of stressful life events. The Jungian Extravert and Intuitive types may also be more immune to the effects of life events than their opposites.

Further research should be addressed to the relationship of these variables to each other and to other personality constructs like extraversion-introversion as higher-order personality factors obtained with questionnaire-type personality tests. This seems especially important since all the personality constructs mentioned above effect the life stress - psychological distress relationship.

The preceding discussion of moderator effects of personality and social support dealt with the effects these variables have on their own. It is conceivable that the moderator effects of, say, social support differ between individuals with external and internal locus of control. It is possible that social support variables interact with personality variables in order to influence the association between life events and psychological distress association: some people may need social support for coping effectively with difficult circumstances more than others (Lowenthal & Haven, 1968). Zimbardo & Formica (1963) suggested that people with low self-esteem have a greater need to affiliate than people with high self-esteem. Translated into the present context, one could speculate that lack of "social support" causes greater distress in people with low self-esteem who experience life events than in people with high self-esteem under the same circumstances. This, statistically, would be represented by a 3-way interaction effect between life events, social support, and personality variables. Very few studies have examined such complex moderating effects.

An exception is the study reported by Kobasa (1982), where she found that "perceived family support" interacted with both life events and a complex personality variable "hardiness" to

affect general health in lawyers. In subjects with low
"hardiness", high "perceived family support" increased the
detrimental effects of stressful life events on health; in
subjects with high "hardiness", it decreased the effects
("buffered" against stress). Thus, the "buffering" effect of
social support was itself dependent on the level of "hardiness"
in the subjects. This result was not replicated when "perceived
work support" was substituted for family support.

While it would appear plausible, then, that particular
combinations of personality and social support conditions make
individuals expecially vulnerable or especially immune to
psychosocial "stressors" like life events, the lack of research
allows only speculations on this issue.

7. Implications for current research

Life event questionnaires

The discussion of methodological issues in Chapter 3 allows the drawing of a number of conclusions regarding the utility and future use of life event questionnaires:

1. Life event questionnaires should be purified as much as possible, in order to eliminate confounding with indicators of psychological distress.

2. To eliminate reliability problems as much as possible, care should be taken to formulate scale items unequivocally (especially by eliminating qualifiers like "major", "minor", etc.). Also, the time period covered by the scales should be in the order of six and, at the most, twelve months in order to avoid general and differential effects of forgetting.

3. Weighting of items should only be done if empirically justified. To date, no weighting scheme has been proven

generally better than simple event counts. Objective weights generally do not represent valid indicators of the items' importance for individual subjects; subjective weights confound life events with personal dispositions and other boundary conditions, thereby obscuring etiological relationships between life events and these boundary conditions.

4. For the sake of brevity, clearly desirable events may be omitted in life event questionnaires. These events do not seem to contribute to the quality of the final life event score. Since it is unclear whether "undesirability" of events is better determined a priori or by the subject, items regarding ambivalent events could be provided with a possibility for the subject to indicate their positive or negative quality, and the usefulness of subjective vs objective desirability scores should then be determined.

5. The possible lack of linearity of effects of stressful life events on measures of psychological distress has to be taken into account. While there are reports of ceiling and thresh-old effects in the literature, it has generally been assumed that the effects are linear, and data analyses have usually proceeded accordingly, possibly gravely misrepresenting results.

It can be expected that taking into account moderator variables will raise the low over-all association between life events and psychological distress considerably. Among the many putative moderator variables that have been considered in the literature to date, marital status, social support, and personality variables show the greatest promise.

The conceptual and methodological consideration in Chapters 3 and 4 lead to the following recommendations:

1. Moderating, i.e., statistical interaction, effects should be distinguished from mediating effects. Moderating variables influence the strength of the association between life events and psychological distress; mediating effects result from the correlation of life event scores with third variables which either cause life events to happen, or are caused by life events. Both moderating and mediating variables affect psychological distress, but the latter are necessarily correlated with life events, which is not the case with the former.

2. Relatively stable, environmental or personal dispositions should be conceptually separated from processes (e.g., coping processes) by which these conditions come to bear on the association between life events and distress. Coping processes result from the dynamic interplay of life events and a variety of relatively stable moderating variables (boundary

conditions) and are not comparable with these individual or social boundary conditions which exist rather independently from the occurrence of stressful life events

3. The conceptual relationship of "moderator variables" to life events and distress measures should be clarified. Possibly, some "moderator variables" like "social support" may better be regarded as one-dimensional with "life event stress", cancelling noxious effects of the latter rather than moderating them. If so, non-linearity of the effects of life events on dependent measures may produce spurious interaction effects.

The discussion of empirical findings on moderator variables in Chapter 6 allows the following, more specific, conclusions regarding personality and social support as moderator variables of stressful life events:

Personality. The moderator effects of personality are not yet sufficiently researched. While all variables considered to date (locus of control, sensation seeking, self esteem, A-B behaviour patterns) appear to have clear moderating effects, they are rather narrow, and their relationship to each other and to more general personality dimensions is not very clear. The fact that all the above mentioned personality variables influence association between life events and distress suggests that higher-order dimensions (e.g., Extraversion) may also have moderator effects.

Social support.   The effect of social support variables on the association between life events and psychological distress is not straightforward. They appear both to affect psychological distress directly and to moderate the effects of life events. "Social support", however, has been inconsistently operationalized as structural qualities of social networks, everyday social interaction, or actual or perceived crisis support, or as a conglomerate of all of the above. It has been measured either by objective methods (for example, by the number of social contacts), or by subjective ones (for instance, by ratings of the quality of relationships) without explicit indications as to why the particular method was chosen. This inconsistent and unsystematic use of operationalizations and methods of measurement does not allow the drawing of firm conclusion from the published research data. It appears imperative that measures of social support be clearly defined and, if possible, standardized before results of research on its moderating influence on the effects of life events can be meaningfully interpreted.

General research strategies:

Two areas of application of life event scales should be differentiated: individual clinical prognosis and etiological and epidemiological research. The unreliability and limited representativeness of current life event scales makes them unsuited for individual applications. While this is partly due to their lack of psychometric refinement the main reasons appear to be intrinsic to the method itself: life events tend to be forgotten, perhaps selectively, they represent only a small segment of possibly stressful experiences, and the importance of the events for different individuals can be expected to differ widely.

The same reasons that make life event scales unsuited for individual applications also limit their usefulness for etiological-epidemiological research. The life event approach, however, remains useful here. To remain so, the conditions that moderate the effects of stressful life events should be examined, rather than the type or size of effects. Here, the general stressfulness of life events, despite its weak effects, can be meaningfully employed: to explore individual and social conditions that influence reactions to stressful life events and, by implication, to stressful conditions at large.

In view of the poor conceptual and operational status of several important variables (especially social support

variables, but also life event measures), it appears also premature to focus mainly on researching process variables like coping, as argued by Lazarus and his co-workers (Lazarus, 1966; Lazarus & Launier, 1978; Kanner et al., 1981) and by Gore (1981). Without a more general conceptual framework it would be difficult to assess the importance of even well-researched fragments of the total complex process leading from life events to psychological distress and illness. Since the conceptual clarity and operational precision of many stable boundary conditions of life event effects can still be greatly improved, it appears more promising to determine the extent and conditions of their influence before more detailed issues are adressed. (This holds for etiological research. Intervention research may have different priorities.)

Part III

AN EMPIRICAL INVESTIGATION

8. <u>Overview</u>

The preceding chapters have dealt with theoretical and
empirical issues regarding stressful life events and the kind
and conditions of their effects. The conclusions reached in the
last chapter can be summarized as follows: while there seems to
be a general agreement that stressful life events have some
effects on health, and that social and individual conditions
moderate these effects, there is little consensus in the
literature on the <u>kind</u> of events and social and individual
variables responsible for these effects, on the <u>size</u> of these
effects, on the <u>disorders</u> most likely to be elicited, and on the
<u>mechanism</u> by which these effects come about.

The purpose on this investigation was to test a general
model of the multi-dimensional determination of the effects of
stressful life events. Given the small number of established
findings, and the comparatively large amount of conflicting or
incompatible, and unconnected results reported in the
literature, this investigation necessarily was exploratory in
character. In particular, it was not designed to yield results

that could be immediately translated into clinical or preventive action, but to clarify conceptual and theoretical issues in the social epidemiology of illness.

Hypotheses

With the above objective in mind, the following hypotheses were derived from the theoretical considerations in Part I and the empirical evidence discussed in Part II:

1a. There is a subset of life event questionnaire items that are confounded with measures of distress or illness.

1b. Such confounded items are responsible for a major proportion of the association between life events and measures of distress or illness.

2a. "Social support" is not a homogeneous condition, but represents a multi-dimensional complex.

2b. Different dimensions of social support have different associations with distress and illness.

3a. Dimensions of objective social support moderate the relationship between life events and distress.

3b. The personality traits "Extraversion" and "Psychoticism" moderate the association between life events and distress or illness.

4. The personality traits "Extraversion" and "Psychoticism" interact with social support variables to moderate the effect of life events on distress and illness.

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5. The effects of life events, social and personality variables differ according to whether psychological or physiological distress symptoms are taken as dependent variables.

Data Collection

Due to the exploratory character of this investigation, the choice of subjects was not considered a very crucial aspect of it, as long as they resembled a normal sample with regard to the central tendency and variation of the principal variables involved, i.e., as long as they were not selected on the dimensions over which one wanted to generalize.

A pilot study with about forty students of an introductory psychology course at Simon Fraser University had shown that they did not differ significantly from the general population regarding the variables of interest. Therefore, a random sample of 461 students taking the course "Introduction to Psychology" in Fall 1982 and Spring 1983 at Simon Fraser University and at a community college in the Vancouver, B.C., area was asked to fill out a questionnaire package which took about twenty to twenty-five minutes to complete. The students were contacted in their tutorials one week before the planned assessment date. They were told about the general purpose of the investigation, and the voluntary nature of their cooperation was pointed out to them.

The questionnaires were administered in the classroom. No remuneration was provided, but, after the questionnaires were completed, the subjects were given a general outline of the research project and of the field and, when they so desired, were given feedback or some of their personal scores on the questionnaires and on the general results of the study.

Nine subjects refused to participate in the study, representing 2% of the total sample.

Six questionnaires were eliminated because of irregularities during their administration (frequent conversations with others as to how to answer the questions, admitting to untrue responses etc.) Two questionnaires were eliminated because they did not contain information on either age or sex. Twenty-two questionnaires were eliminated because the subjects were over thirty years old. It was held that these subjects belonged to a population different from the majority of the other students and that, to the degree that population-specific effects were to be found, they might be attenuated by the inclusion of these older subjects.

The percentage of subjects that were asked to participate but who were not included in the data analysis for various reasons was 3.3%. Of the remaining 422 subjects, however, not all were included in all the data analyses due to missing data caused by omission of, or ambiguous responses to, items. Table 8-1 gives an overview of the attrition pattern of subjects.

Table 8-1: Attrition pattern of subjects

	N	Percent
Original sample	461	100 %
Refusal	-9	2 %
Validity problems	-6	1.3%
Missing data	-2	0.2%
Age >30	-22	4.8%
Remaining sample	422	92 %

Variables and Instruments

The questionnaire given to all subjects attempted to measure the following variables (see Appendix A):
- socio-demographic data (age and sex)
- the number of stressful life events that had happened to the subjects during the 6 months previous to the time of assessment,
- the level of subjective distress symptoms,
- the personality variables "Extraversion" and "Psychoticism", and

- objective social support patterns

Dependent Variable: Subjective distress

The 22-item symptom scale by Langner (1962) was chosen as
the dependent variable because of its widespread use in
epidemiological studies and in research on stressful life
events. It is a questionnaire designed to "provide a rough
indication of where people lie on a continuum of impairment in
life functioning due to very common types of psychiatric
symptoms" (Langner, 1962, p. 269). Later authors have generally
agreed with this characterization. While B. P. Dohrenwend (1966)
contends that it is strongly biased by response styles, Johnson
& Meile (1981), reviewing the research on the Langner scale of
the last twenty years, concluded that "studies of both
concurrent and predictive validity ... provide strong evidence
for conceptualizing the index as an indicator of psychological
and physiological manifestations of psychological stress" (p.
415). Johnson & Meile (1981), after analyzing different socio-
demographic sub-groups of their very large population sample
found that their analysis did "not support the view that the
Langner scale is measuring different phenomena in various status
subgroups" (p. 24).

The questionnaire taps a number of symptoms of depression
(e.g., item No. 20: "Nothing turns out for me the way I want it
to."), anxiety or tension (e.g., item No. 10: "Do your hands

ever tremble enough to bother you?"), and of variety of somatic distress symptoms (e.g., item No. 13: "I am bothered by acid (sour) stomach several times a week.") Depending on the item, between two and four response choices are provided ("Yes" - "No", "Often"-"Sometimes"-"Never", etc.).

While the original questionnaire items (Langner, 1962) do not refer to any particular time span, the purpose of this study was to assess the state of distress at the time of assessment only. Also, while the original questionnaire was meant to be administered as part of a structured interview, it was used here as a paper-and-pencil questionnaire. For these reasons, the following changes were made (see Appendix A):

- The response choices ("Yes" - "No" etc.) were spelled out, and the subjects were asked in a short introductory paragraph to mark the responses which they found most descriptive of them.
- The wording of the items was changed to make them apply only to a more recent time period, which was specified in the introduction as "the last couple of weeks". The specific changes took the following form:
  - addition of "recently" to the questions (items No. 1, 2, 3, 7, 8),
  - replacement of "ever" by "recently" (items No. 5, 9, 10, 11, 12, 15, 16, 20, 21),
- Minor changes were made to make the wording more suitable for

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written presentation, e.g. by omission of some explanatory terms in brackets when the remainder was considered sufficiently clear.

In the light of the reports showing no clear advantage of more sophisticated scaling methods (cf. Haese & Meile, 1967) the items were scored "1" for the pathognomonic responses indicated by Langner (1962), and "0" for other choices.

Stressful life events

An extensive list of life events applicable to general population samples, which was compiled by Tausig (1982) from lists published by Holmes & Rahe (1967), Rahe (1975), Myers et al. (1972), and B. S. Dohrenwend, B. S., et al. (1978), was taken as the basic item pool for the life event measure used in this study. It was supplemented by several items referring to schoolrelated events (failing courses etc.; cf. Sarason et al., 1978), while some items that were not applicable to the age group of the subjects (e.g., marriage of children) were omitted.

Several clearly positive items (e.g., "marital reconciliation") were excluded in the light of published research showing little or no relationship between positive life events and dependent measures (see Chapter 5). Some events that are clearly influenced by the psychological state of the subject (e.g., "Sexual difficulties", "change in religious beliefs", "mental illness") were also excluded.

As much as possible, the items were contracted as differential treatment of closely related items was not intended, and multiple endorsement of items was possible. For example, "Death of spouse", "Death of child", "Death of close friend" were contracted to "Death of a close relative or friend".

These changes, even with the additions made necessary by the special characteristics of this sample, reduced the number of items to 36, representing about one-third of Tausig's (1982) total while covering essentially the same events.

The resulting list of life events is shown in Appendix A. Table 8-2 shows the correspondence of items on Tausig's (1982) list with items on the present one.

The responses were coded as to the number of positive and "negative" occurrences, up to a total of three. Items that were marked as having occurred more than three times were scored as three occurrences. This was very rare, however. An exception was item No. 31 ("frequent minor illnesses") which was coded only as "occurred" or "not occurred" (and, of course, as positive or negative) since it implies in itself a greater frequency of occurrence.

Since, in published research, differential weighting schemes for life events have failed to be more closely associated with dependent measures than simple counts of events (see Chapter 5), all occurrences of events were simply summed up for the different event scores.

Table 8-2: Correspondence of items on the life event questionnaire with Tausig's (1982) list of items compiled from the literature.

Item	Item Content	Item No. (Tausig, 1982)
1	Start or change school	1, 5
2	Moving	7-12
3	Divorce, Separation	19, 23, 24
4	Love break-up	16
5	Spouse unfaithful	--
6	Extramarital affair	26
7	Childbirth, Adoption	31-34
8	Pregnancy	54, 55
9	New person in household	35
10	Family member moving away	36-40
11	Illness, injury	43, 44
12	Illness, injury (other)	53
13	Death of close person	45-50
14	Abortion etc.	57, 58, 63
15	Stop/start working	73-75,83,91-93,95
16	Stop/start working other	73,75
17	Financial status	99,100,102,85
18	Borrow money	103,104
19	Victim of crime	111
20	Contact with the Law	105-110
21	Parents' divorce/remarriage ...	51,52
22	Valuable object lost	(111)
23	Temporary sep. from spouse	62
24	Community crisis	116
25	Change of job	74-82
26	Death of pet	62
27 1)	Academic probation	23
28 1)	Fail course	23
29 1)	Dismissal from residence	--
30 1)	Increased arguments	27,29
31 1)	Minor illnesses	59
32 1)	Changed habits	65-69
33 1)	Changed activities	70
34 1)	Problems with professor	--
35 1)	Problems at work	86-88
36	Other problems	--

1) These items were included in the subset of "contingent" items (SLE-CON, see Chapter 10).

Social support

A variety of different conceptualizations and operationalizations of "social support" has been used in research, making comparisons between different studies difficult. Many of the measures used have relied heavily on the subjects' feelings about the quality of their social ties, and others have been restricted to observable aspects of the subjects life; but most of them mixed indiscriminately many different kinds of items. In this investigation, where many different variables were examined for their relationships with each other, a social support measure that confounded objective social patterns with their subjective evaluations was considered highly undesirable. In order to separate intra-individual (personality) and social (social support patterns) conditions as much as possible, a pool of items referring to social relationships and activities was compiled that was to be as objective and quantifiable as possible. The items are shown in Appendix A-2. Some items were taken from Brook, Ware, Davies-Avery, Stewart, Donald, Rogers, Williams, & Johnson (1979) (items No. 1, 2, 3, 4, 5, 6, 7; corresponsing to items No. 99, 102, 103, 104, 105, 107, 108, respectively, in Brook et al., 1979). The following changes to the wording of these items were made: "About how often.." and "About how many ..." was changed into "How often ..." and "How many..", respectively (items No. 2 - 7). In item No. 1 ("About how many people/families in the appartment block or area in which you

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currently live are you well enough acquainted with, that you
visit each other in your home?"), "... how many people/families
in the apartment block or area in which you currently live ..."
replaced "... how many families in your neighbourhood ..." in
order to make the item more suited for the living circumstances
of students. The other items were new and tailored to the
geographical and living circumstances of the subjects ("Lower
Mainland" in items No. 8 and 9 refers to the Greater Vancouver
area).

Personality

It was hypothesized that broad, higher-order personality
traits moderate the association between stressful life events
and psychological and physiological distress symptoms. One of
the most widely known systems of higher-order personality
dimensions is represented by Eysenck's constructs "Extraversion"
and "Neuroticism" as operationalized by the "Eysenck Personality
Inventory" (Eysenck & Eysenck, 1968). This questionnaire was
relatively recently extended to include the dimersion of
"Psychoticism" or "toughmindedness" (H. J. Eysenck & S. B. G.
Eysenck, 1975). One major reason for the inclusion of this new
variable into the E-I dimensional system appears to have been
the criticism levelled against the construct "Extraversion" as
represented by several questionnaires developed by Eysenck and
others that it includes at least two separate components (cf.
Block, 1978): "sociability" and "impulsivity".

The resulting "Eysenck Personality Questionnaire" (EPQ) (H.
J. Eysenck & S. B. G. Eysenck, 1975; see also Block, 1978;
Kline, 1978, Stricker, 1978) was chosen to operationalize the
construct of "Extraversion", in the more narrow sense of
"sociability", and the construct of "Psychoticism", in the sense
of "toughmindedness", or "impulsivity". Although the validity of
the EPQ is often considered o be yet sufficiently documented
(e.g., Kline, 1978), it was chosen for the following reasons:
- If its measure of "Extraversion" differs from such scales on
   earlier, amply validated questionnaires by Eysenck, it
   appears to deviate in the direction of being a purer measure
   of "sociability" (Stricker, 1978) which, if anything,
   increases the interpretability of any results that may be
   found.
- It includes the "Psychoticism" or "toughmindedness" scale
   which appeared related to other personality factors shown to
   influence the association between stressful life events and
   distress and which, intuitively, seems to bear on the
   mechanisms involved in people's reactions to stressful
   events.

     Although S. B. G. Eysenck & H. J. Eysenck (1977) caution
against equating the "Psychoticism" dimension as operationalized
by the EPQ with impulsivity, these constructs are apparently
related (Block, 1978). Tellegen (1978) in his review of the
EPQ, describes individuals scoring high on the P scale as
professing "marked social alienation", as perceiving "themselves

as both a source and a target of malevolent action", and as
describing themselves as "careless, impulsive, spurning
convention, inconsiderate, unfeeling, and also as disliked,
deceived, and mistreated" (p. 814).

Sample characteristics

The remaining sample was distributed with regard to sex as
shown in Figure 8-1. There were more female than male partici-
pants which seems to reflect the sex distribution in
undergraduate psychology courses. Figure 8-1 also shows the age
distribution of the sample. The mean age was 20:8 years.

The distribution of the variables "Extraversion",
"Psychoticism", "Stressful Life Events", and "Total Number of
Distress Symptoms" on the Langner 22-item questionnaire was
compared with the distribution of these variables in general
population or norm samples, as reported in the literature.
(Table 8-3). While the distribution of the personality variables
"Extraversion" and "Psychoticism" mirrored rather closely the
distribution in the norm samples reported in the test manual for
the "Eysenck Personality Questionnaire" (H. J. Eysenck & S. B.
G. Eysenck, 1975), both the life event sum score and the symptom
score were higher than the respective comparison values.

The higher life event score was largely due to the
inclusion of items No. 1 and 2 ("Changing schools or starting to

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Figure 8-1:
Age and Sex Distribution of Subjects
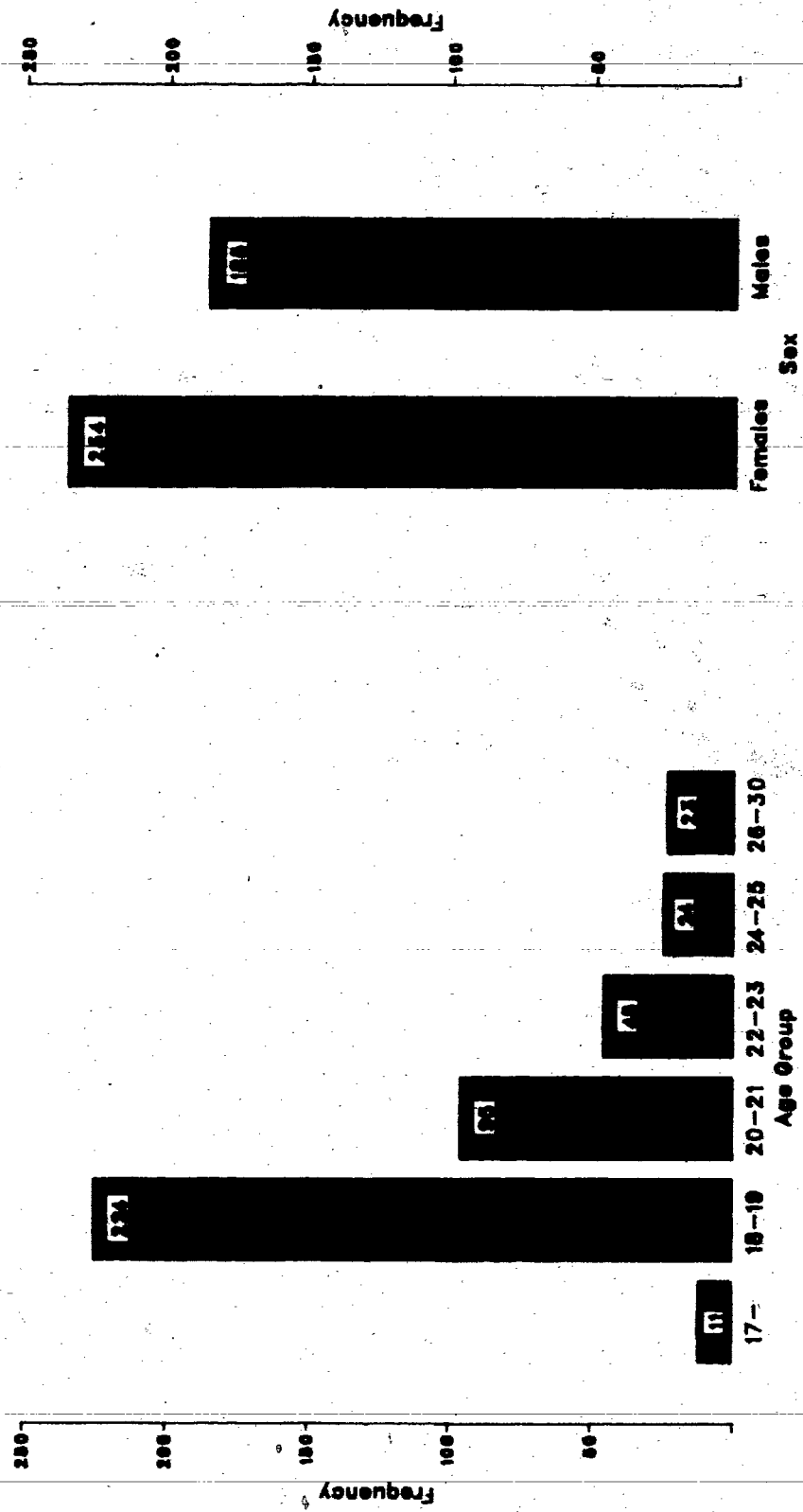
Table 8-3:   Comparison of means and standard deviations of variables in this sample and in comparison samples [1]

	Present sample	Comparison Sample [1]
Langner total [2]		
Mean	4.32	2.83
S.D.	3.46	2.67
SLE total [3]		
S.D.	3.75	--
Mean	6.22	4.5
Corrected Mean [4]	4.95	--
EPQ-P [5]		
Mean (males)	4.24	3.78
Mean (females)	2.28	2.36
S.D. (males)	2.76	3.01
S.D. (females)	2.08	2.36
EPQ-E [6]		
Mean (males)	14.3	13.2
Mean (females)	14.3	12.6
S.D. (males)	4.12	4.91
S.D. (females)	4.62	4.80

[1] For the Langner questionnaire: Langner (1962); for the life event scale: Tausig (1982); For the EPQ: Eysenck & Eysenck (1975).
[2] Sum of all pathognomonic responses (after Langner, 1962)
[3] Total life event score, positive as well as negative
[4] See text
[5] "Psychoticism" score of the Eysenck Personality Questionnaire
[6] "Extraversion" score of the Eysenck Personality Questionnaire

go to school", and "Change of residence"). The former was not included in Tausig's (1981) list of events, whose normal sample was used for comparison in Table 8-3. Since most subjects included in the present sample were college students in their first or second semester, this item contributed .794 to the total mean of 6.24 events during the six months preceding the time of assessment. Item No. 2 was checked by about half of the subjects, increasing the total mean by .472. One can assume this proportion of subjects who move during any given six month period to be very considerably lower in a normal sample like Tausig's (1982). Adjustment of the mean total number of events by the amount contributed by these two items makes it much more comparable to the one reported by Tausig (1982) (see "Corrected mean" in Table 8-3). The residual difference is in line with findings of higher levels of stressful experiences in younger populations (Eaton, 1978; Jacobs & Myers, 1976; Uhlenhuth, Lipman, Balter, & Stern, 1974).

The comparatively elevated symptom score, while in accordance with Wildman & Johnson's (1977) finding of higher ratings of college students on psychological distress measures, is not as easily reconcilable with the level reported by Langner (1962). It may be due, in part, to greater frankness among college students and among their generation than among the original sample. College students also belong to an age group with a higher-than-average incidence of mental disorder (Eaton, 1978) who may also display a higher level of relatively mild

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distress symptoms. Lastly, the increased level of stressful life events may have contributed to the higher symptom score.

For the various "social support" scores discussed later, there were no values available for comparison since the items were partly taken from a questionnaire for which no statistics have been reported in the literature, partly completely new and tailored to the geographical and socio-demographic characteristics of this sample.

Method: General

The lack of conceptual clarity of "social support", as well as the suspected heterogeneity of life events and of common measures of distress symptoms made necessary a number of separate studies to clarify the internal structure of these variable groups before their relationship with each other could be examined.

It was anticipated that the resulting number of different variables to be examined would be considerable. In order to perform sufficiently powerful statistical analyses, therefore, the necessary number of subjects had to be in the order of several hundred. For this reason, and because of the nature of the variables themselves, which lend themselves poorly to other methods of measurement, the variables were measured by questionnaires.

Separate analyses were performed to determine

- the internal structure of the dependent measure (STUDY 1),
- the internal structure of the pool of life events (STUDY 2),
- the internal structure of the social support measure (STUDY 3),
- The moderating effects of social support and personality on the effects of life events on subjective distress (STUDY 4).

The first three studies were concerned with problems of heterogeneity and dimensionality of the various variable groups. With regard to data anlyses examining the relationships **between** variable groups, studies 1 - 3 dealt, therefore, with formal and structural aspects of results; study 4 dealt with content aspects and their implications.

Within each variable group (except personality variables), preliminary analyses regarding the internal structure of the respective item pools were generally performed first. These preliminary analyses yielded different sub-scores which were alternately entered into data anlyses relating the four variable groups (life events, social support, personality, symptoms) to each other. Due to the extensive existing body of research on personality variables, preliminary analyses were not considered necessary here.

9. Study 1: Internal structure of the Langner symptom scale

The symptom scale examined here was described in Chapter 8. The analyses were based on the subject sample also described in Chapter 8.

In consideration of the possibility that psychological mechanisms leading to the development of psychological distress symptoms (depression, anxiety) are different from those leading to physiological distress symptoms (headache, stomach upset etc.), it was thought that a score which contains both types of of symptoms may obscure relationships pertaining only to one type of mechanism.

Several studies have indicated that the Langner scale is not one-dimensional. Crandell & Dohrenwend (1967; see also Meile, 1972), on the basis of consensus ratings of psychiatrists and internists, distinguished four clusters of symptoms: "psychological", "psycho-physiological", "physiological", and "ambiguous" symptoms. (See, however, the critique by Meile & Gregg, 1973.) Roberts, Forthoffer, & Fabrega (1976) reported five symptom clusters in a sample of low status urban Blacks.

Seiler (1973), reviewing the previous literature on the Langner scale, concludes that "the most reasonable interpretation of the 22- item scale is that it is, in fact, two scales, one that indicates psychological stress, the other physiological malaise" (p. 261). Johnson & Meile (1981) factor-analyzed the Langner scale, using as subjects a large community sample. Although they concluded that only 5% of the scale variance was explained by the second and third factors, they found that a 3-factor solution achieved by oblique rotation was the most interpretable.

While there seems to exist a general agreement that the Langner scale is multi-dimensional, the number of suggested dimensions varies considerably; in the studies mentioned above all numbers between two and five were suggested. It seems, however, that the number and content of the dimensions cr item clusters depend on sample characteristics (Roberts et al., 1976). Therefore, and in order to avoid a possibly heterogeneous dependent variable, the item pool was examined for its internal structure in this sample, which would allow the establishment of meaningful symptom subscores.

The dimensionality of the Langner items was examined, and symptom subscores were calculated. The usefulness of the latter was tested by their differential association with presumptive causative variables. Specifically, the following data analysis procedures were employed:

- Factor analysis of the item pool of the Langer symptoms scale. Factors were initially extracted as principal components; 2- and 3-factor solutions were obliquely rotated (Program BMDP4M, "oblimin" rotation, gamma = 0; Dixon et al., 1981).

- Sub-scores were calculated as factor scores of a 3-factor solution; if only one item was missing, the sub-scores were pro-rated by the data estimation program BMDPAM (Dixon et al., 1981).

- Correlation of resulting sub-scores with other variables were performed to examine the presence of differential associations.

Since the objectives of this study were the clarification of structural and formal aspects of the dependent measure, several analyses which will be discussed more in detail in Study 4 (Chapter 12) are discussed here only as far as they are relevant in this context.

Item factor analysis. Item 15 was never endorsed by any subject and could therefore not be included in the calculations. The eigenvalues of, and the cumulative proportion of variance explained by, the first 6 factors are shown in Table 9-1.

Table 9-1: Factor analysis of the Langner (1962) scale [1]: Eigenvalues and cumulative proportion of variance explained by the first 5 factors

Factor	Eigenvalue	Explained Variance
1	4.3589	0.2075
2	1.5205	0.2799
3	1.2778	0.3408
4	1.1683	0.3964
5	1.0914	0.4484
6	1.0486	0.4998

[1] Item No. 15 not included

A 2-factor and a 3-factor solution were explored with oblique rotation of factors (direct oblimin, gamma=0). The factor

loading patterns for the two solutions are shown in Table 9-2.
The first factor was virtually identical in both solutions, and
the second factors resembled each other. However, the 3-factor
solution achieved a better separation of high and low factor
loadings, and represented the total item pool better (sub-
stantial loadings of items No. 4 and No. 5 on the third factor)
and showed lower factor intercorrelations than the 2-factor
solution. (Table 9-3 shows the factor intercorrelations of both
the 2-factor and the 3-factor-solution.)

     Subscores.   The superior interpretability of the 3-factor
solution is in accordance with Johnson & Neile's (1981) finding.
On the basis of the results of the analyses mentioned above, the
factor scores of the 3-factor solution were chosen as dependent
variables to be used further in this study. They were named SY-
DEP (factor 1), SY-PHS (factor 2), and SY-ANX (factor 3),
according to the cluster of symptoms they mainly represented
(DEPression symptoms, PHYSiological symptoms, ANXiety symptoms).
However, in preliminary analyses for the purpose of scoring life
events and "social support" items, the total symptom score was
used because only relatively gross differences in effects were
of interest here which would warrant differential treatment of
different items or subscores in selection and scoring.

     Several times, items on the Langner scale were not answered
(there was no "don't know" response choice given). Twelve
subjects left out one item, one subject left out three items and
two subjects left two items blank. For those subjects that left

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| | | 2-F Solution | | 3-F Solution | | |
Item	Content	F-1	F-2	F-1	F-2	F-3
1	Feeling weak-------	0.477	0.258	0.505	-	-
2	Can't get going----	0.634	-	0.645	-	-
3	High-low spirits---	0.764	-	0.762	-	-
4	Feeling hot--------	-	-	-	0.284	0.442
5	Heart beating------	-	-	-	-	0.556
6	Loss of appetite---	-	0.260	-	-	-
7	Restless-----------	-	0.313	-	-	0.479
8	Worrying-----------	0.559	-	0.571	-	-
9	Short of breath----	-	0.504	-	0.400	0.251
10	Nervous------------	0.502	-	0.505	-	-
11	Fainting spells----	-	-	-	-	-.479
12	Sleeping trouble---	0.345	0.261	0.371	-	-
13	Acid stomach-------	-	0.653	-	0.652	-
14	Memory-------------	-	0.534	-	0.601	-
15[1]	-	-	-	-	-	
16	Hands trembling----	-	0.384	-	-	0.492
17	Head clogged-------	-	0.424	-	0.510	-
18	Worries------------	0.519	-	0.558	-	-
19	Feeling alone------	0.549	-	0.575	-	-
20	Nothing turns out--	0.684	-	0.678	-	-
21	Headaches----------	-	0.510	-	0.485	-
22	Nothing worthwhile-	0.688	-	0.701	-	-

[1] Not included
[2] "direct oblimin" rotation, gamma = 0

Loadings < 0.25 not shown

Table 9-3: Factor analysis of the Langner (1962) scale: Factor intercorrelations of the 2-factor and 3-factor solutions

___

2-factor solution:

	F-1	F-2
F-1	1.0	
F-2	0.360	1.0

3-factor solution:

	F-1	F-2	F-3
F-1	1.0		
F-1	0.303	1.0	
F-3	0.176	0.133	1.0

___

only one item blank, SY-DEP, SY-ANX, and SY-PHS were pro-rated using the data estimation program BMDPAM (Dixon et al., 1981). The resulting estimates were based on squared multiple correlations of the sub-scores with available items of not less than .971 (SYDEP), .748 (SY-PHS), and .871 (SY-ANX).

   Differential correlations of subscores.   In order to test the usefulness of these three subscores for further analyses, their pattern of correlations with other variables was examined. The dependent variables SY-DEP, SY-PHS, and SY-ANX showed distinct patterns of correlations with life events, social support variables, and personality variables. Table 9-4 shows

the correlation of stressful life events (SLE-NEG; see Chapter
10), the social activity (SS-ACT) and the social network
(SS-NET) score, the personality variables Extraversion (EPQ-E)
and Psychoticism (EPQ-P), and SEX with the three dependent
variables. While SLE-TOT is substantially correlated with SY-DEP
and SY- PHS, its correlation with SY-ANX is considerably lower.
The difference between the last correlation and the two others
is highly significant at p ≤ .01 and p ≤ .0001, respectively
(Hotelling's t-test for correlated coefficients of correlation).
High levels of social activity are associated with low levels of
depression symptoms.

SS-ACT is substantially correlated with SY-DEP, but not at
all with the SY-ANX and SY-PHS, the difference being again
highly significant.

EPQ-E shows nearly exactly the same correlation pattern as
SS-ACT.

Similar differences between the dependent variables as in
the correlations with SS-ACT, EPQ-E, and SLE-TOT was found with
some interaction effects of the dependent variables. The two
significant interaction effects, SS-NET x SLE-TOT and EPQ-P
x SEX x SLE-TOT, are significant only with SY-PHS and SY-ANX,
respectively, as dependent variables. (See Tables 12-2, 12-5 and
the detailed discussion in Chapter 12.)

Table 9-4: Correlations of SY-DEP, SY-PHS, and SY-ANX with life events, Sex, social support, and personality variables

	SY-DEP	SY-PHS	SY-ANX
SLE-TOT	0.282 ***	0.338 ***	0.105 *
SS-ACT	-0.243 ***	-0.050	-0.012
SS-NET	-0.003	0.083	0.092
EPQ-E	-0.248 ***	-0.011	0.27
EPQ-P	0.182 ***	0.179 ***	0.117 ●
SEX	0.128 ●	-0.010	0.033

```
*   = p ≤ 0.05
**  = p ≤ 0.01
*** = p ≤ 0.001

SLE-TOT = total negative life events
SS-ACT  = Social activity score
SS-NET  = Social network score
EPQ-E   = Extraversion (EPQ)
EPQ-P   = Psychoticism (EPQ)
```

The analysis of the internal structure of the Langner item
pool clearly demonstrates its multi-dimensionality. While the
distribution of eigenvalues of the principal components (see
Table 9-1) does not necessarily require the assumption of three
substantial factors, the substantial loadings of items No. 4 and
5 on the third factor of the 3-factor solution (as compared to
their negligible loadings in the 2-factor solution) indicates
the usefulness of the third factor. This is also indicated by
the low correlation of this factor with the others after
rotation: it clearly seems to tap an independent dimension of
the item pool. Extraction of more factors, on the other hand,
was not considered justified, given the distribution of
eigenvalues as shown in Table 9-1.

Intercorrelations. The factor intercorrelations of the
3-factor solution are much lower than those reported by Johnson
& Neile (1981) for their 3-factor solution which were all
between .40 and .50. Also, the proportion of variance explained
by the second and third factors in this sample (13%) is
considerably greater than that reported by these two authors
(5%).

The difference between Johnson & Neile's (1981) and the
present results may be explained by the greater homogeneity and
the younger mean age of the present sample. Seiler & Summers

(1974) reported that, while the correlation between their
"psychological" and "physiological" subscales (arrived at by
ratings of "surface meaning" of items) was 0.26 for male
subjects between twenty and thirty years old, it rose to 0.55 in
the thirty to thirty-nine years age group, and up to 0.70 in
sixty to sixty-nine year old males. Female subjects showed a
similar trend. These authors also reported a trend to lower
subscore intercorrelation with higher educational status. Also,
as Crandell & Dohrenwend (1967) have noted, "'shortness of
breath' and 'heart beats hard' show a direct relation with age",
due to their connectedness with cardio-respiratory disease which
is more frequent in older age. By greatly reducing this organic
source, the item "heart beating hard" is allowed to be more
clearly clustered with psychogeric items (on the "Anxiety"
factor).

The relatively clear separation of symptom complexes
achieved in this analysis does not appear to be an accidental
finding, but a logical consequence of the characteristics of the
subject sample.

Factor content and subscores.   The first factor clearly
seems to represent symptoms of depression (feeling low, being
worried, hopeless, without energy, sleeping problems). The
second factor, with its highest loadings on the items "clogged
head", "headaches", "acid stomach", "memory not alright", may
best be interpreted as representing psycho-physiological
symptoms of distress. Factor 3, loading mainly on "heart

beating", "feeling suddenly hot", "hands trembling", and "being restless", was interpreted as representing symptoms of anxiety and tension. While several of its high loading items may well represent symptoms of physical disease (e.g., "hands trembling"), this was considered to be a negligible cause in the present sample. (See the discussion of Crandell & Dohrenwend's, 1967, hypotheses above.) The "psychological" interpretation of factor three is indirectly supported by the unexpected negative loading of item No. 11 ("fainting spells"). Insofar as it is not of organic origin, it may be due to a hysterical mechanism of expressing anxiety that is incompatible with, or alternate to, such overt symptoms as trembling and accelerated heartbeat.

Differential correlations of sub-scores. The mutual independence of the factors is reflected in the correlation patterns with presumptive causative vairables: SS-ACT and the personality variable "Extraversion" are substantially correlated only with the depression score, while the highly significant interaction effects mentioned are only present with either SY-ANX, or SY-PHS.

Summary and conclusions. The results presented above indicate that there is a definite internal structure of the Langner items. While Johnson & Meile (1981) argue that the variance explained by second and third factors is minimal, this was not the case in this analysis. The second and third factor not only explained a significant part of the total variance, they could be rotated onto easily interpretable item clusters

and were only minimally correlated with each other. Furthermore, the third factor, which had the lowest correlations with the others, represented items that were not at all represented by the other factors. It is held that this difference between Johnson and Meile's (1981) findings and the ones in this study is due to the greater homogeneity and lower mean age of this sample.

Three subscores were calculated as the factor scores of the 3-factor solution, which were named SY-DEP, SY-PHS, and SY-ANX, representing mainly depression symptoms, psycho-physiological symptoms, and anxiety/tension symptoms, respectively.

The relevance of the 3-factor solution is further demonstrated by the differential correlations of the three sub-scores with other variables, as well as by the differential effect of combinations of other variables (interactions): the differences between them are frequently highly significant.

Against the background of other reported research discussed at the beginning of this chapter, the results obtained here very clearly demonstrate the dependence of symptom complexes on sample characteristics, and the necessity to construct measures that are adequate for the particular samples used. While the total Langner score may be an adequate measure of subjective distress for older or even for general population samples (which is debatable), this is definitely not the case here. It may be suspected that a great deal of the discrepancy in published results in the life event field stems from the use of such

undifferentiated measures which change their complexity, and possibly their meaning, with the subjects with which they are used.

10. Study 2: Stressful life events

The study reported here used the subject sample described
in Chapter 8. The item composition of the measure used, the life
event questionnaire, was also discussed there. The questionnaire
is shown in Appendix A.

Hypotheses

The purpose of this study was to examine the internal
structure of the pool of life event questionnaire items and to
investigate the degree to which different subsets of it are
confounded with measures of subjective distress. Specifically,
the following hypotheses were tested (See also Chapter 8.):

1. There is a subset of items that are confounded with measures
    of subjective distress.

2. These items are responsible for a major proportion of the
    association between life events and measures of distress.

Scoring. The events indicated by the subject as having occurred during the preceding six months were classified into two groups according to whether he/she had considered them to be positive or negative experiences. Also, following the lead of Birley and Brown (1970) and Harder et al. (1980), the events were separated, on a priori grounds, into a group consisting of events considered mainly independent of the subjects' actions (e.g., death of a relative) and a group consisting of events considered to be possibly contributed to by, and contingent on actions of, the subjects themselves (e.g., trouble at work). As mentioned earlier, however, the most obvious of such items were not included in this list. The "independent" group comprised items 1 to 26, the "contingent" group items 27 to 35 (see Table 8-2). It should be kept in mind, however, that this classifications was at times relatively arbitrary (the item "divorce", for instance, was included among the "independent" items), and that the separation of "contingent" from "independent" events represents a dichotomization of an essentially continuous dimension.

Nine sub-scores were calculated, representing intersections of the dimensions "contingent-independent" ("independent", "contingent", and total of events) and "positive-negative" ("positive", "negative", total events).

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Data analysis.   The following data analysis procedures
were employed:

- Principal component analysis of the pool of "negative" events
    (BMDP4M; Dixon et el., 1981)

- Multiple correlation of single life events with the three
    symptom scores.

- Canonical correlation of the set of negative events with the
    set of the three symptom scores SY-DEP, SY-PHS, and SY-ANX
    (BMDP6M; Dixon et al., 1981)

- Zero-order correlations of the two life event subscores with
    each other and with the symptom scores

Results

Preliminary analyses.   Previously published research (see
Chapter 5) would lead one to expect that positive events would
not be negatively associated with dependent measures.
Correlations of the life event sub-scores with the total number
of symptoms on the Langner 22-item scale resulted in the pattern
shown in Table 10-1: positive events were not correlated with
the number of symptoms, confirming previous findings. They were
also not correlated with the corresponding sums of negative
events. Pooling of negative and positive events yielded slightly
lower correlations with symptoms than negative event scores. It
was therefore decided that only the three "negative" scores were

Table 10-1:   Correlations of different life event subscores
               with total symptoms on the Langner (1962) scale

	IND	CON	Total
POS	- 0.027	0.025	- 0.012
NEG	0.176	0.404	0.337
Total	0.138	0.373	0.288

IND = "independent" events
DEP = "dependent" events
POS = positive events
NEG = negative events

to be used in further analyses. These were named "SLE-CON"
("contingent" events) "SLE-IND" ("independent" events), and
"SLE-TOT" (total events).

   Internal structure.   The Principal Component Analysis of
the pool of negative life events yielded only one substantial
factor, explaining about 7% of the total variance. Table 10-2
shows the eigenvalues and cumulative proportions of variance of
the first five principal components. Among the five items
loading .40 or higher on it, there were four "contingent" items.
(Table 10-3 shows the items with the highest loadings.)

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Table 10-2:   Variance and cumulative proportion of variance
    explained by the first five principal components of the life
    event item pool

P.C.	Explained Variance	Cumulative Proportion
1	2.4623	0.0704
2	1.8446	0.1231
3	1.7413	0.1728
4	1.6767	0.2207
5	1.5794	0.2658

Table 10-3:   Life events with highest loading on first
    principal component

Item [1]	Loading	Item [1]	Loading
32 [2]	0.493	8	0.340
31 [2]	0.478	22	0.335
17	0.476	14	0.333
30 [2]	0.431	12	0.312
35 [2]	0.404	33 [2]	0.301

[1] See Appendix for item content
[2] "Contingent" items

The results of the canonical correlation are presented in Table 10-4.

Table 10-4: Canonical ccrrelation of life events with symptom sub-scores (SY-DEP, SY-PHS, SY-ANX)

Canonical Variable	Eigenvalue	Canonical Corr.	Chi^2 [1]	D.F. [1]	p [1]
0			241.67	105	0.0000
1	0.31813	0.56403	90.99	68	0.0328
2	0.13028	0.36095	36.06	33	0.3273
3	0.08757	0.29593			

[1] Bartlett's test of remaining eigenvalues

Only one canonical variable can be regarded as of practical value, the Bartlett test for the remaining eigenvalues being of marginal significance. The items with the three highest loadings on this variable were items No. 30, 31, and 32, all included in the "contingent" set (Table 10-5).

Table 10-5:   Life events with the highest loadings on the first canonical variable

Item No. [1]	Loading	Item No. [1]	Loading
30 [2]	0.687	23 [2]	0.292
31 [2]	0.628	4	0.221
32 [2]	0.385	20	0.203
17	0.362		

[1] See Appendix for item content
[2] "Contingent" item

Multiple correlations of single items with SY-DEP, SY-PHS, and SY-ANX showed the same items No. 30, 31, and 32 as having the highest correlations, with the correlations of items No. 30 and 31 being most substantial by far (see Table 10-6).

Table 10-6:   Multiple correlations of single life events with SY-DEP, SY-PHS, SY-ANX

Item	R^2	Adjusted R^2	P
30	0.15	0.15	<<0.0001
31	0.13	0.12	<<0.0001
17	0.06	0.05	<0.0001
32	0.05	0.04	≤0.0002
26	0.05	0.04	≤0.0002
34	0.03	0.02	<0.0060
11	0.03	0.02	<0.0090
20	0.03	0.02	<0.0100

<u>Differential associations.</u>   Zero-order correlations of
SLE-IND, SLE-CON, and SLE-TOT with SY-CON, SY-PHS, and SY-ANX
were computed (Table 10-7).

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<u>Table 10-7:</u>   Correlations of different life event subscores
                        with symptom scores

	SY-DEP	SY-PHS	SY-ANX	SLE-IND	SLE-CON
SLE-IND	0.13	0.24	0.01	--	0.34
SLE-CON	0.38	0.31	0.20	--	--
P of diff. 1)	<<0.001	n.s.	<<0.001	--	--
SLE-TOT	0.28	0.34	0.10	0.74	0.66

SY-DEP   = Depression symptoms
SY-PHS   = Physiological symptoms
SY-ANX   = Anxiety/tension symptoms
SLE-IND = "Independent" events (see text)
SLE-CON = "Contingent" events (see text)
SLE-TOT = total negative SLE

1) Hotelling's t-test for correlated coefficients of correlation

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While SY-PHS is about equally correlated with both subscores,
SY-DEP and SY-ANX are much more highly correlated with SLE-CON.

In both cases, the difference between the correlations is highly significant in favor of SLE-CON. This means that the correlation of the total score with psychological symptoms, which is comparable to the scores generally used in the life event literature, is mostly due to the "contingent" subset of stressful life events; this is not the case with psycho-physiological symptoms.

SLE-IND and SLE-CON are correlated with each other at about the level of the highest correlation of either with symptoms. In particular, SLE-IND is more highly correlated with SLE-CON than with any symptom score.

In other analyses to be discussed in detail later (see Chapter 12), the variable "Psychoticism" (H. J. Eysenck & S. B. G. Eysenck, 1975) and a social support variable referring to the size of social networks were found to interact with life events in their effects on anxiety and physiological symptoms, respectively. In both cases, the interaction effect was not significantly different for SLE-CON and SLE-IND.

Summary.   As expected, positive life events showed no correlation with symptoms, and their inclusion in the total life event score lowered its correlation with dependent variables. Two life event subscores were derived a priori: one was derived from events that were thought to be largely independent from the subjects' actions (SLE-IND), the other was derived from events considered substantially contingent on them (SLE-CON).

Principal component analysis of the total life event item pool yielded only one substantial principal component, loading

mainly on items included in SLE-CON. Among this subset were the items with the highest loadings on the only substantial canonical variable relating life events to the three symptom scores; also among this subset were the items with the highest multiple correlations with the symptom scores, which were largely the same items as the ones loading highest on the canonical variable. There is a substantial correlation between SLE-CON and SLE-IND subscores. But, while their correlations with psycho-physiological symptoms are not significantly different from each other, SLE-CON is much more highly correlated with psychological distress symptoms (depression and anxiety) than is SLE-IND.

Discussion

There appears to be a subset of "contingent" life events that is logically identifiable as being dependent on the subjects' actions, that shows a higher level of interconnectedness than the rest of the events, that contains the items with the highest correlations with subjective distress, and that yields a life event subscore responsible for almost all the association of the total life event score with psychological distress symptoms. This empirical separation of SLE-CON and SL-IND, both with regard to their structure and with regard to their effects, raises the question whether both should be included in life event scores, or whether they represent two

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different classes of items.

The results showing that "contingent" events are responsible for the major part of the association between "total" life event scores and psychological distress symptoms may be interpreted as a causal effect of psychological distress on the occurrence of "contingent" events. Such an interpretation would make intuitive sense: being depressed or tense and irritable is likely to increase the probability of bad scholastic performance, of disturbed interpersonal relations, and of negative changes in activity patterns -- events that are all included amongst "contingent" events.

The clustering of the subset of "contingent" events on the only substantial principal component also supports the notion that the major part of the association between "total" event scores and symptoms of psychological distress may be interpreted as a causal effect of psychological distress on the occurrence of "contingent" events: to the degree that there is a common mechanism underlying the causation of "contingent" events, they will tend to be correlated with each other. The primary involvement of "contingent" items in the association between life events and symptoms is even more impressive if one considers that the subset SLE-CON contains about one third the number of items of SLE-IND. Scale unreliability or unrepresentativeness could be expected to lower the associations of SLE-CON much more than of SLE-IND.

The relatively high correlation of SLE-IND with SLE-CON indicates another causal mechanism contributing to the occurrence of "contingent" events: they may be partly elicited by subjects who have already experienced other events. In the light of the difference in the content of the two subscores, the reverse interpretation and also the assumption of causative third variables is not convincing, given the difference in independence between the two sets: the items were explicitly selected according to the assumed degree of randomness of their occurrence. Tausig (1982) reached similar conclusion regarding "personal" events in the "Schedule of Recent Experience" (Holmes & Rahe, 1967): They overlap, he suggested, with other items on the scale and "may be consequences of other reported events rather than events in their own right" (p 85).

The above interpretation appears vulnerable to the criticism of circular reasoning: to prove the influence of SLE-IND on SLE-CON the assumption is made that it cannot be otherwise. However, the logical assumption was only that "independent" events were unlikely to be be dependent on the subjects themselves, and that "contingent" events may be contributed to by the subjects. The premise of independent occurrence of SLE-IND items was only used to decide between two interpretations of the correlation, not to prove the correlation itself.

Whether "contingent" events are "caused" by symptoms or by other events, they are elicited by the subjects themselves, and apparently more so by subjects who are under "stress", or who

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are "distressed".

While SLE-CON and SLE-IND differ in their association with psychological symptoms, they show no significant difference in their effects on psycho-physiological symptoms, nor in their interactions with social support and personality variables. This suggests a functional equivalence of the two life event subsets, and indicates that, whatever their conditions of occurrence, they may have similar effects.

The similar effects of SLE-CON and SLE-IND, it seems, are mainly in the area of physiological dysfunction. (The interaction of life event scores with "Psychoticism", which was present only with anxiety symptoms as dependent variable, is an exception.) Kanner et al. (1981) have proposed that it is daily negative social interchanges ("hassles"), rather than major "life events", that are the most important cause of psychological distress. A look at the subset of "contingent" events shows that many of them refer to such patterns of ongoing daily activities.

It may well be that it is not their being "contingent" on the subjects' actions, but the enduring or repetitive nature of the "contingent" events that makes them more highly correlated with symptoms. This appears a plausible interpretation, but does not explain why other events are almost equally correlated with psycho-physiological symptoms.

Kanner et al.'s concept of daily "hassles", however, does not at all preclude their being caused or contributed to by the

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subjects themselves. "Contingent" events may have a stronger effect on distress symptoms because they represent "hassles", and may also be partly elicited by the subjects. The slightly larger correlation of SLE-CON with psycho-physiological symptoms and their slightly larger interaction with the social network variable (see Table 12-6) may be an indication of their greater relevance. This issue cannot be resolved here, however: the two concepts of "hassles" and "dependence on symptoms" are confounded in the SLE-CON score. The substantial effect of "independent" events on physiological symptoms indicates, however, that not all of the difference between SLE-IND and SLE-CON regarding their association with depression and anxiety symptoms can be explained by the hypothesis that they represent just "hassles".

With regard to the hypotheses derived earlier, the following conclusions can be drawn:

- Hypothesis 1, which postulated confounding of life events with measures of distress, was confirmed. The results allow an even more precise statement: an identifiable subset of items is confounded with psychological (anxiety, depression, tension) distress.

- Hypothesis 2, which postulated that a major proportion of the association of life events with distress measures is due to this confounded subset, has been partly confirmed: it was confirmed for psychological distress measures, but not for physiological ones.

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It is worth mentioning here that the separation of the life events into the subscores SLE-IND and SLE-CON represents a dichotomization of a continuous dimension, and that some clearly "contingent" events ("sexual difficulties", "mental illness") were not included in the item pool. Their inclusion would possibly have resulted in even greater differences between SLE-IND and SLE-CON.

Summary and conclusions.   The pattern of results obtained here suggest that a correlated subset of items of life event scales that can be considered contingent on the subjects' actions and psychological states are probably caused or contributed to by the individuals themselves and are therefore not strictly "events" happening to them. These events are the main source of correlation between scores on life event scales and measures of psychological distress. Events that can be considered relatively independent from the subjects' contributions are not, or much less, correlated with psychological symptoms of distress, but are significantly correlated with psycho-physiological symptoms at about the same level as "contingent" ones. It is suggested that life events in general contribute directly to psycho-physiological symptoms of distress, regardless of their conditions of occurrence, but not substantially so to psychological symptoms.

To the degree that these results hold up in further research, the etiological significance of a host of studies relating stressful life events and psychological disorder has to

be questioned. If it is the individual's psychological state that elicits or contributes to "stressful life events", then the notion of their having general psychopathogenic effects is inaccurate or insufficient.

The results of this study bear on the theoretical issue discussed in Chapter 3: the importance of the concept "stressful life events" for theories of psychological disorder. The lack of causal effects of stressful life events on psychological symptoms, indicated by the results reported above, underscores their lack of theoretical relevance: if they have a substantial effect at all here, it is probably heavily dependent on third, or "moderator", variables (personality, social support, coping etc.; see below). As was discussed in Chapter 3, to the degree that these variables play a decisive role in determining the effects of life events on psychological illness, the conceptual importance of "stressful life events" is reduced. (This does not necessarily hold for clinical or high-risk populations. No generalizations can be made here.)

The results of this study raise the question of possible fruitful uses of life event questionnaires. With B. P. Dohrenwend (1974) one should distinguish between applications of life event scales for prediction purposes, and their use for etiological research. For the former, confounding with dependent measures does not matter. In fact, it may even be desirable since it increases predictive power. For etiological research on direct influences of stressful life events on health, however,

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every effort should be made to obtain as pure a measure of unconfounded environmental "stress" as possible. Otherwise, little can be concluded from the results. To obtain such pure measures would require identification of the most confounded events in a prospective study.

In view of the limited influence of life events on subjective distress in general, and of "independent" events on psychological distress symptoms in particular as indicated in this study, it appears more fruitful not to examine the why and how of the effects of <u>life events</u> per se, but to regard them simply as one set of environmental stressful conditions. Under the assumptions that factors moderating the effects of stressful life events also moderate the effects of other stressful conditions, one can meaningfully employ life event questionnaires for examining general effects of such moderating factors. Here, the low correlations of life events with dependent measures do not matter very much, provided that the sample size and experimental design generate enough statistical power to detect possible effects.

11. STUDY 3: Social support

The study reported here used the subject sample described in Chapter 3. The item composition of the social support measure, which is shown in Appendix A, was also described in Chapter 8.

Hypotheses

The objective of this study was to examine the internal structure of the pool of objective social support items. With the conflicting reports regarding the effects of social support discussed in Chapter 6, it appeared imperative to identify possible dimensions of the items that were to be used in this investigation, and to separate them, if possible, into different subscales. The following hypotheses regarding objective aspects of social support were examined:

1. Objective social support is not a homogeneous variable, but represents a multi-dimensional complex.

2. Different dimensions of objective social support have

different effects on distress symptoms.

Method

The formal differences between the items, and the lack of
information on them, required that a number of transformations
were performed before they could be scored and compared. The
item pool was then analyzed for its internal structure. If
Hypothesis 1 were to be confirmed, social support subscores had
to be calculated to be used in further analyses relating them to
life events and personality variables.

Scoring of items

The purpose of this study was to examine objective
dimensions of social support. Due to the different form of the
items (e.g., different number of response choices), they were
not immediately comparable and had to be pre-scored before their
relationship with each other could be analyzed.

Item No. 12, which refers to very subjective impressions
about available crisis support, was not included in any of the
data analyses reported here. Item No. 9 ("How many close
relatives of yours (parents, siblings, children) live in the
Lower Mainland?") was also omitted from all but the preliminary
factor analyses. As is shown by the high numbers that were often
given as response, its meaning is ambiguous and it was obviously

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misunderstood by a large proportion of subjects to refer to any relative.

Items that provided ordered response choices like references to frequencies (items No. 2, 3, 4, 5, 6) were scored between 0 (choice with the apparent lowest social support value) and 1, with intermediate scores spaced evenly, proportional to the number of the choices in the item. For example, response choice 2 of item No. 4 (telephone conversations with friends several days a week) would have been scored as 5/6.

Items No. 1, 7, and 8 (number of homes visited in neighbourhood, number of organizations of which subject is a member, and number of close relatives) were also scored between 0 and 1, with a response of 9 or more transformed into a score of 1 and the intermediate scores spaced evenly. The same procedure was followed for item No. 8 (how many of the 5 closest friends living in Greater Vancouver,) with 5 as the highest response transformed into a score of 1. Five was taken as the ceiling here because larger numbers were considered to have little additional support value and because the item was to target only very close friends. (It should be noted that although the definition of "close friend" is debatable, ordering friends as to closeness presents much less difficulties and, above all, can be assumed to be less dependent on the psychological state of the subject.)

Items No. 1 to 9 were naturally ordered since they refer to frequencies and other countable instances. This is not the case

with items No. 10 and 11 (social/sexual involvement and living arrangements). To determine whether they were at all ordered and basically similar with regard to their effects on the subjects, dummy variables representing the levels of items No. 10 and 11 were created which were scored "1" when the items were endorsed on this level, and "0" otherwise. They were then correlated with the total symptom score on the Langner scale. The resulting correlations are shown in Table 11-1.

As can be seen by inspection of Table 11-1, the level "not dating" of item No. 10 was significantly correlated with symptoms, while the other levels were not significantly correlated with them. This was considered an indication that, at least on this dimension, this level of item No. 10 was different from the other levels which were not essentially different from each other. No such difference was found between levels of item No. 11. Therefore, item No. 10 was dichotomized, with level 6 ("not dating") rescored as "0", and the others rescored as "1". Item 11 was scored as described earlier for items No. 2 - 6, with the order of levels as presented.

The finding that marital status has no distinguishable effect on distress symptoms is surprising, considering the frequent reports to the contrary (Bachrach, 1975; Bloom et al., 1978; Kessler, 1979b; Pearlin & Johnson, 1977). It may be, however, that marriage, being atypical for young college students, has different concomitants and effects here and does not occupy the same role in the subjects' lives as with older

Table 11-1: Correlations of single levels of social support items No. 10 and 11 with the total symptom score

Item No. and level	Corr. with Symptoms
10: married	-0.046
10: engaged	0.044
10: dating steady	-0.074
10: dating frequently	-0.091 *
10: dating infrequently	-0.046
10: not dating	0.189 ***
11: living with family etc.	0.057
11: living with acquaintance	-0.040
11: living in cooperative etc. ..	-0.046
11: living alone	0.002

*** p ≤ 0.001 (two-tailed)
*   p ≤ 0.05 (two-tailed)

and/or non-student populations.

Data analysis

The following data analysis procedures were employed:

- To determine the internal structure of the pool of "social support" items, a factor analysis of items No. 1 to 11 was performed, with the aim of identifying social dimensions with possibly different effects on distress symptoms. The

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program used was BMDP4M (Dixon et al., 1981) with extraction
of initial factors as principal components, and 4-factor,
3-factor, and 2-factor solutions obliquely rotated (direct
oblimin, gamma = 0).

- Social support subscores were calculated and pro-rated when
  not more than one item was missing (BMDPAM, Dixon et al.,
  1981).

- Zero-order correlations of different social support subscores
  with the three dependent variables were computed and
  examined for differential effects.

- As part of the over-all experimental strategy, multiple
  regressions were performed with each social support
  sub-score, the life event score, and their respective
  products (the interaction term) as independent, and the
  three symptom scores as dependent variables. (See
  explanation of the rationale of this procedure in the
  following chapter.) Discussion, however, will be restricted
  to formal and structural implications for the SS items.

- For the social support variable that showed a significant
  interaction with life events, the same analysis was repeated
  with each of its constituent items, in order to test for
  consistency of the effect.

  Levels of significance. For the testing of interaction
effects, the level of significance was set at p = .001. (See
explanation of the rationale in the following chapter).

Results

The results of this study relate to two issues: the relationship of the social support items to each other, and their differential association with other variables.

<u>Dimensionality</u> of <u>social</u> <u>support</u>.   It had been hypothesized that "social support" is not a homogeneous variable, at least as far as objective data are concerned. The results of the factor analysis of the social support item pool confirmed this hypothesis.

Table 11-2 shows the rotated factor loadings of the items for the different solutions. As can be seen, factor 1 remained constant across the 2- and 3-factor solutions, and was essentially the same in the 4-factor solution. It loaded substantially only on those items which refer to social activity, either directly (items No. 2, 3, 4, 10) or indirectly (item No. 1). Factor 2, loading on items No. 7, 8, 9, and 5, also remained constant across the different solutions, apparently representing social and family ties within the Greater Vancouver area. Factor 3 in the 3-factor solution clearly tapped a dimension not included in the 2-factor solution, loading mainly on items No. 6 (frequency of religious services) and No. 7 (membership in clubs etc.). It appears difficult to interpret, and may indicate community involvement. The 4-factor solution contained more multiple factor loadings

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Table 11-2:   Factor loadings of social support items on
   rotated 1) factors of 2-factor, 3-factor, and 4-factor
   solutions 2)

Item	2-F Sol.		3-F Solution			4-F Solution			
	F-1	F-2	F-1	F-2	F-3	F-1	F-2	F-3	F-4
1	.53	--	.51	--	--	--	--	.75	--
2	.78	--	.79	--	--	.67	--	.32	--
3	.80	--	.80	--	--	.66	--	.39	--
4	.64	--	.63	--	--	.75	--	--	--
5	--	-.6	--	-.6	.28	--	-.5	--	.45
6	--	--	--	--	.73	--	--	--	.80
7	--	--	--	--	.75	--	--	.60	.53
8	--	.76	--	.75	--	--	.75	--	--
9	--	.67	--	.65	--	--	.71	--	--
10 3)	.49	--	.53	--	--	.62	--	--	--
11	--	.67	--	.68	--	--	.71	--	--

1) Direct oblimin, gamma = 0
2) Factor loadings < 0.25 not shown
3) Dichotomized

and was less interpretable than the others.

Since the results of this factor analysis were compatible with the theoretical discussion of different aspects of social support in Chapter 3, it was decided to follow the classification proposed there. Specifically, two subscores of objective social support were calculated: one derived from the items loading substantially on factor 1, namely items No. 1, 2, 3, 4, 10; the other comprising factors 2 and 3 of the 3-factor solution, namely items No. 6, 7, 8, 11 (see Table 11-3). Item No. 9 (close relatives living nearby) was omitted because of its ambiguity (see above), and item No. 5 (frequency of writing letters) was also not included because it was obviously a secondary function of whether the subject had the majority of his/her social connections in the Vancouver area or not.

The two subscores of objecive social support were termed SS-ACT and SS-NET, respectively. They were meant to represent the dimension of social involvement or ACTivity, and the extent and/or the quality of social structures or NETworks. The fact that the latter is not one-dimensional (it comprises factor 2 and factor 3 of the 3-factor solution) is not significant here since the factor structure of the "network" items depends on conditions unrelated to their effects on the subjects. The important feature is that the two "social support" scores are largely independent of each other (their correlation is $r = .12$) and allow independent interpretations.

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Table 11-3: Item composition of the social support scores
SS-ACT and SS-NET

SS-ACT   SS-NET

No. 1: Homes visited   No. 6: Religious services

No. 2: Friends over to visit   No. 7: Memberships in groups

No. 3: Visiting friends   No. 8: Friends living nearby

No. 4: Telephone conversations   No. 11: Living arrangements

No. 10: Dating / not dating

For 21 subjects, SS-ACT was pro-rated, and for 17 subjects SS-NET was pro-rated. The estimations were based on squared multiple correlations with available items of not less than .762 (SS-NET) and .881 (SS-ACT).

Correlations with subjective distress. The two social support variables SS-NET and SS-ACT were differentially correlated with the three dependent variables LA-DEP, LA-PHS, and LA-ANX. (Table 11-4 shows the matrix of correlations.) While SS-NET is not significantly correlated with any of the symptom scores, SS-ACT is substantially correlated with the "Depression" score (LA-DEP), but not with the others.

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Table 11-4: Zero-order correlations of social Support
variables with symptoms

	SY-DEP	SY-PHS	SY-ANX
SS-ACT	-0.25 ***	-0.03	-0.02
SS-NET	-0.00	0.07	0.09

*** $p \leq 0.0001$

SS-NET = social networks
SS-ACT = social activity

SY-DEP = depression symptoms (factor scores)
SY-PHS = psycho-physiological symptoms (factor scores)
SY-ANX = anxiety and tension symptoms (factor scores)

Interactions with stressful life events.   Two interaction

effects were examined: SS-NET * SLE-TOT and SS-ACT * SLE-TOT,

with SY-DEP, SY-PHS, and SY-ANX as dependent variables. Table

11-5 shows the t-values associated with the regression

coefficients of the interaction terms mentioned above. Only the

interaction SS-NET * SLE-NEG showed a significant effect, and

only on the "physiological symptoms" score (LA-PHS). Table 11-6

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Table 11-5: Values of t associated with the interaction terms of SS-ACT and SS-NET with SLE-TOT

	SY-DEP	SY-PHS	SY-ANX
SS-ACT * SLE-TOT	-0.810	0.544	-0.104
SS-NET * SLE-TOT	1.911 *	3.62 ***	1.573

```
*    p = 0.06
***  p ≤ 0.001

SS-ACT  = Social activity subscore
SS-NET  = Social network subscore

SLE-TOT = total negative life events

SY-DEP  = Depression factor score of the Langner scale
SY-PHS  = Physiological symptoms factor score
SY-ANX  = Anxiety/tension symptoms factor score
```

shows the regression weights of the corresponding regression equations. In order to examine whether the effects of SS-NET (which was comprised of items representing more than one factor) were due to an identifiable subset of items, the same type of regression analysis as with the total SS-NET score was performed with its constituent items. Table 11-7 shows the t-values and

Table 11-6: Standard regression weights of SLE-TOT, SS-NET, and
SS-NET * SLE-TOT, with different symptom scores as dependent
variables

	SY-DEP	SY-PHS	SY-ANX
SS-NET	-0.138	-0.165	-0.020
SLE-TOT	-0.280	-0.190	-0.161
SS-NET * SLE-TOT	0.332	0.603	0.281

SS-NET   = Social network size

SLE-TOT = Total negative life events

SY-PHS   = Psychophysiological symptoms
SY-DEP   = Depression symptoms
SY-ANX   = Tension and anxiety symptoms

probabilities associated with the interaction terms of the items

with SLE-TOT. (Dependent variable is again LA-PHS.) As can

easily be seen, the effects are all in the same direction (all

t-values have the same signs), and most are significant. The

over-all effect of SS-NET, then, is not due to some constituent

item of particular and unique significance to the subject

sample, but apparently represents a characteristic of social

networks in general.

Table 11-7: Values of t and probabilities associated with the interaction terms of the constituent items of SS-NET

	t	p
SS6 * SLE-TOT	2.792	0.006
SS7 * SLE-TOT	3.103	0.002
SS8 * SLE-TOT	2.411	0.016
SS11 * SLE-TOT	1.678	0.093

SS6, SS7, SS8, SS11 = social support items (see Appendix A)

SLE-TOT = total score of negative life events.

Discussion

Both hypotheses put forward at the beginning of this chapter were confirmed by the results. SS-ACT and SS-NET are not only orthogonal to each other, they show also quite different associations with distress symptoms. The two scores are independent of each other, have a homogeneous composition and/or homogeneous effects, and differ in the kind of their effects.

SS-ACT is correlated, but does not interact, with depression symptoms, and SS-NET shows only interaction effects, and significantly so only on psycho-physiological symptoms. While it is argdable that the association of SS-ACT with depression symptoms is at least partly produced by the reduction of social activity because of depression symptoms, it does not alter the difference in the association with symptoms between SS-ACT and SS-NET. Whichever way the direction of effect, there is a difference.

SS-ACT represents a measure of social support very similar to the one used by Holahan & Moss (1981) which the authors called a "Traditional Social Support Index". SS-NET may be considered similar to the social support criteria like "presence/ absence of a confidant" (e.g., Miller, P. M., & Ingham, 1979).

With regard to the theoretical classification proposed in Chapter 3, SS-ACT and SS-NET can be regarded as representing Categories 1 and 2 (activity and structural aspects), respectively. Although SS-NET consists of a conglomerate of several empirical dimensions, they nevertheless all represent structural or network aspects of a person's social environment. Although the differentiation of SS-ACT and SS-NET was influenced by the discussion and concepts of Chapter 3, and by the resulting classification scheme, the results can stand on their own and can be taken as an empirical confirmation of the existence of at least two separate and independent aspects of

objective social support which was proposed there.

It is of interest that Norbeck & Tilden (1983), in a study of pregnant women, found evidence that <u>subjective</u> social support measures are equally multi-dimensional: a factor analysis of subjective/evaluative items taken from Schaefer et al. (1981) yielded two dimensions. They were labeled "emotional" and "tangible" support roughly in accordance with the classification proposed by Schaefer et al. (1981), which were correlated at .43. Only "emotional support" showed substantial zero-order correlations with both "emotional disequilibrium" and pregnancy complications, and only "tangible support" interacted with stressful life events, and only with pregnancy complications as dependent variable. According to the description given by the authors, these two dimensions seem to represent perceived potential crisis support and general perceptions and feelings of being supported, and to coincide roughly with Categories Three and Four of the classification in Chapter 3.

In the light of the results of this study, it does not seem to make sense, then, to indiscriminately mix items pertaining to both social activity and social network dimensions in measures of social support. Even researchers who have differentiated between objective and subjective measures (e.g., Schaefer et al., 1981) have usually grouped the two former aspects together.

Examining effects of undifferentiated measures of a vague and general concept of "social support" will either conceal real effects of different aspects of social support or will yield

haphazard and contradictory results due to selectively and inadvertently emphasizing of different dimensions, as the conflicting results obtained in past investigations indicate.

Summary

The finding of a distinct internal structure of objective aspects of social support, represented by the two practically uncorrelated social support scores, together with the internal homogeneity of SS-ACT and the homogeneity of the effects of the constituent items of SS-NET, suggests the futility of using undifferentiated measures of social support and demonstrates the necessity of more differentiated treatment of social support than has been customary. This is underscored by the recent findings of the existence of a dimensional structure of subjective aspects of social support, which parallels the one of objective aspects reported here in a striking way.

12. Study 4: Interactions

The purpose of this study was to test the general model of multiple determination of the effects of stressful life events. It was not the intent to develop a measurement instrument, or a treatment program, but to explore the relationships between the variables derived in the previous chapters that may be of theoretical or epidemiological significance.

Hypotheses

The following hypotheses were tested (see also Chapter 8):

1. The personality traits "Extraversion" and "Psychoticism" moderate the relationship between life events and subjective distress.

2. Objective social support patterns moderate the relationship between life events and subjective distress.

3. The personality traits "Extraversion" and "Psychoticism" interact with social support variables to moderate the effect of life events.

4. The effects of life events, social and personality variables differ according to whether psychological or physiological distress symptoms are taken as dependent variable.

Method

Data analysis relied primarily on multiple regression analyses to examine the presence of interaction effects. While the multiple regression model makes the assumption of linearity of the relationship between the variables themselves, and between variables and relations between variables (for interactions), it provides a more powerful test for such linear relationships than other analytical models.

Data analysis procedures

The following data analysis methods were employed:
- Zero-order correlations of the independent variables with each other and with the dependent variables were performed.
- Two-way interaction effects were examined by including the respective two variables together with their product (the interaction term) in the regression equation. The regression coefficient of the interaction term was then tested for significance.
- Three-way interactions were examined in an analogous manner by including all three variables in question, together with

their two-way and three-way products (interaction terms), in
the equation and by testing the regression coefficient of
the three-way interaction for significance.
- For all significant and close to significant interaction
effects, analyses of variance were performed to further
examine the nature of these effects.
For the testing of two-way interaction effects, the following
general model was assumed (see Cohen, 1978; and Cleary &
Kessler, 1982):

$$Z = a + bX + cY + dX*Y + e$$

where:

Z = dependent variable,

a = regression intercept

b, c, d = regression coefficients

X, Y = independent variables

$X*Y$ = interaction term.

e = error

Both the regression intercept and the regression
coefficients of the original variables are dependent on scale
characteristics. More precisely, regression coefficients of any
given variable in a regression equation that also contains
multiplicative terms depend on the scale zero point of the other
variables. The regression coefficient of the multiplicative
term, however, is invariant to scale transformations and
represents therefore a true interaction effect (Cleary &
Kessler, 1982; Cohen, 1978).

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The model for examination of three-way interaction is analogous to the two-way model.

Linearity of effects. Multiple regression analysis in general, as well as representation of interaction effects by multiplicative terms, assumes linearity of effects. The adoption of the linear model was considered justified for the following reasons:

- Even if the effects of interest were not strictly linear (and threshold effects remain a distinct possibility), they were considered ordered and monotonic, i.e., no U-shaped relationships between stressfu life events and dependent measures were expected. Similarly, no U-shaped relationships between the moderator variables and the association of life events and dependent variables (the interaction effects) were expected. Therefore, if the effects were to be at all substantial, they would have a linear component which would show in multiple regression analyses.

- All significant or close to significant effects were to be re-analyzed in an analysis of variance design which does not assume linearity of effects to detect possible non-linear associations underlying the linear effects detected by multiple regression analysis.

- The residuals of the regression equations containing significant effects were examined for deviations from chance distributions, that would indicate inappropriateness of the linear model employed.

<u>Levels of significance.</u>   The twelve effects described
below were examined with each of the three factor scores of the
Langner symptom scale as dependent variables, resulting in 36
separate test of significance. To preserve an over-all signi-
ficance level of p = .05, the significance level for individual
tests was set at p ≤ 0.001.

Variables and effects of interest

The following variables that were developed in the
preceding three chapters were used:

Dependent variables:

SY-DEP (= "Depression" factor score of the Langner scale).

SY-PHS (= "Physiological symptoms" factor score of the
   Langner scale).

SY-ANX (= "Anxiety" factor score of the Langner scale).

Stressful life events:

SLE-TOT (= sum of all "negative" events).

SLE-IND (= sum of all "independent" negative events)

SLE-CON (= sum of all "contingent" negative events)

   (SLE-TOT only was used for initial testing of effects;

   SLE-IND and SLE-CON were only used for supplementary

   analyses of significant effects.)

Social support variables:

SS-ACT (= Social activity score).

SS-NET (= Social network score).

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Personality Variables:

    EPQ-E (= "Extraversion" score of the Eysenck Personality

        Questionnaire).

    EPQ-P (= "Psychoticism" score of the Eysenck Personality

        Questionnaire).

Other:

    SEX (male/female)

The following two-way interactions were examined (in accordance with the hypotheses established earlier):

SS-ACT * SLE-TOT

SS-NET * SLE-TOT

EPQ-E * SLE-TOT

EPQ-P * SLE-TOT

The above effects were further examined for sex differences, resulting in these 3-way interactions:

SS-ACT * SEX * SLE-TOT

SS-NET * SEX * SLE-TOT

EPQ-E * SEX * SLE-TOT

EPQ-P * SEX * SLE-TOT

Further, the following 3-way interactions of primary interest were examined:

SS-ACT * EPQ-E * SLE-TOT

SS-ACT * EPQ-P * SLE-TOT

SS-NET * EPQ-E * SLE-TOT

SS-NET * EPQ-P * SLE-TOT

The above effects were tested with each of the three
symptom scores as dependent variable.

An attempt was made to test 4-way interaction effects, but
multi-collinearity problems became too great for proper
execution of the statistical programs.

Results

The results of the data analyses will be reported separately
for each group of presumptive moderator variables (personality,
social support). Table 12-1 presents the correlation matrix of
all variables involved.

Personality

The zero-order correlations of the two personality
variables EPQ-E and EPO-P with the three dependent variables are
shown in table 12-1. While "Extraversion" is negatively
correlated with depression symptoms ($r = -0.25$), it appears not
at all correlated with other kinds of distress symptoms.
"Psychoticism" is about evenly correlated with all symptom
scores. (The differences are not significant.)

Neither personality variable is significantly correlated
with any of the three life event scores.

Table 12-1:   Matrix of correlations of all independent and
     dependent variables

	SLE-TOT	SS-ACT	SS-NET	EPQ-P	EPQ-E	SY-DEP	SY-PHS	SY-ANX
SLE-TOT	1.0	0.05	0.00	0.10	0.03	0.28	0.34	0.10
SS-ACT	0.05	1.0	0.12	-0.09	0.39	-0.24	-0.05	-0.01
SS-NET	0.00	0.12	1.0	-0.11	0.01	0.00	0.08	0.09
EPQ-P	0.10	-0.09	-0.11	1.0	0.11	0.18	0.18	0.12
EPQ-E	0.03	0.39	0.01	0.11	1.0	-0.25	-0.01	0.03
SY-DEP	0.28	-0.24	0.00	0.18	-0.25	1.0	0.36	0.18
SY-PHS	0.34	-0.05	0.08	0.18	-0.01	0.36	1.0	0.22
SY-ANX	0.10	-0.01	0.09	0.12	0.03	0.18	0.22	1.0

Significance limits (two-tailed):

$p \leq 0.05$: 0.099 $p \leq 0.01$: 0.130 $p \leq 0.001$: 0.167

SLE-TOT = total negative life events

SS-ACT = social activity score
SS-NET = social network score

EPQ-E   = "Extraversion" score of the EPQ
EPQ-P   = "Psychoticism" score of the EPQ

SY-DEP = depression score
SY-PHS = physiological symptoms score
SY-ANX = anxiety/tension symptoms score

Interaction with stressful life events.   Four interaction
effects were examined:

   EPQ-P * SLE-TOT

   EPQ-E * SLE-TOT

   EPQ-P * SLE-TOT * SEX, and

   EPQ-E * SLE-TOT * SEX.

   Table 12-2 shows the t-values associated with the
regression coefficients of the interaction effects. The
interaction of SLE-TOT, EPQ-P, and SEX was the only one to have
a significant effect, and only on symptoms of tension and
anxiety. The unique contribution of this 3-way interaction to
the squared multiple correlation was .029, corresponding to a
partial correlation between EPQ-P * SLE-TOT * SEX and SY-ANX of
$r = .17$. This partial correlation is larger than the zero-order
correlation between SY-ANX and SLE-TOT ($r = 0.10$; see Table
12-1), and close to the size of the total multiple correlation
between all the variables SEX, SLE-TOT, EPQ-P, all their
interactions, and SY-ANX. Examination of the distribution of the
regression residuals showed no noticeable deviation from a
chance pattern, indicating adequacy of the model employed. Table
12-3 shows the regression weights of the corresponding
regression equations.

   Analysis of variance with the independent variables split
into three (EPQ-P, SLE-TOT) and two (SEX) groups each that were
as equally sized as possible, and with SY-ANX as dependent
variable was performed. The resulting F-value associated with

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Table 12-2: Values of t associated with interaction effects of personality variables with stressful life events

	SY-DEP	SY-PHS	SY-ANX
EPQ-E * SLE-TOT	-0.85	-0.23	0.33
EPQ-E * SLE-TOT * SEX	-0.98	0.25	-1.70
EPQ-P * SLE-TOT	-1.53	1.02	0.64
EPQ-P * SLE-TOT * SEX	-0.64	-0.03	3.54 ***

*** p ≤ 0.001

EPQ-E = "Extraversion" score of the Eysenck Personality Questionnaire

EPQ-P = "Psychoticism" score of the Eysenck Personality Questionnaire

SLE-TOT = total negative life events

Table 12-3: Standard regression weights for EPQ-P, SLE-TOT, SEX, and their interactions with different symptom scores as dependent variables

	SY-DEP	SY-PHS	SY-ANX
EPQ-P	0.059	0.059	0.441
SLE-TOT	0.093	0.186	0.610
SEX	0.019	0.014	0.610
EPQ-P * SEX	0.235	0.036	-0.410
SLE-TOT * SEX	0.269	0.061	-0.783
EPQ-P * SLE-TOT * SEX	-0.222	0.143	1.258

SLE-TOT = Total negative life events

EPQ-P = "Psychoticism" score of the Eysenck Personality
Questionnaire
SY-DEP = Depression symptoms
SY-PHS = Psychophysiological symptoms
SY-ANX = Tension and anxiety symptoms

the 3-way interaction was F = 2.05, which has a chance
probability of p = .087 (df = 4/391). The same analysis with
EPQ-P split into 4 instead of three groups yielded F = 2.80,
p = .011 (df = 6/385).

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Figure 12-1 shows the association of SLE-TOT and SY-ANX on different levels of EPQ-P, sparately for male and female subjects. Women with high EPQ-P-scores show a closer association between tension and anxiety symptoms and stressful life events than men, where there is practically no association. In women with low "Psychoticism" scores, there was a non-significant trend in the oposite direction.

The obvious difference in effect size and associated p-values of the interactions in regression analyses and analyses of variance seems to be the consequence of forced categorization of the independent variables, which are then treated as single values by the model. The highest category of SLE-TOT included in the analysis of variance spans the range from six to eighteen occurrences of events, about twice the range of the other two categories combined. The same disparity in category sizes existed with EPO-P.

This effect is consistent across different life event subscores. Table 12-4 shows the t-values and associated probabilities of the interaction effects of EPQ-P and SEX with SLE-TOT, SLE-DEP, and SLE-IND.

Summary:.   EPQ-E is correlated with SY-DEP, but not with the other symptom scores. EPQ-E did not interact with SLE-TOT, neither on its own nor in conjuction with Sex.

EPQ-P is about equally correlated with all symptom subscores. In women, but not in men, high levels of "Psychoticism", or "toughmindedness" (EPQ-P), combined with high

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Figure 12-2:
Effects of Life Events And Social Network Size (SS-NET)
On Physiological Distress Symptoms (SY-PHS)
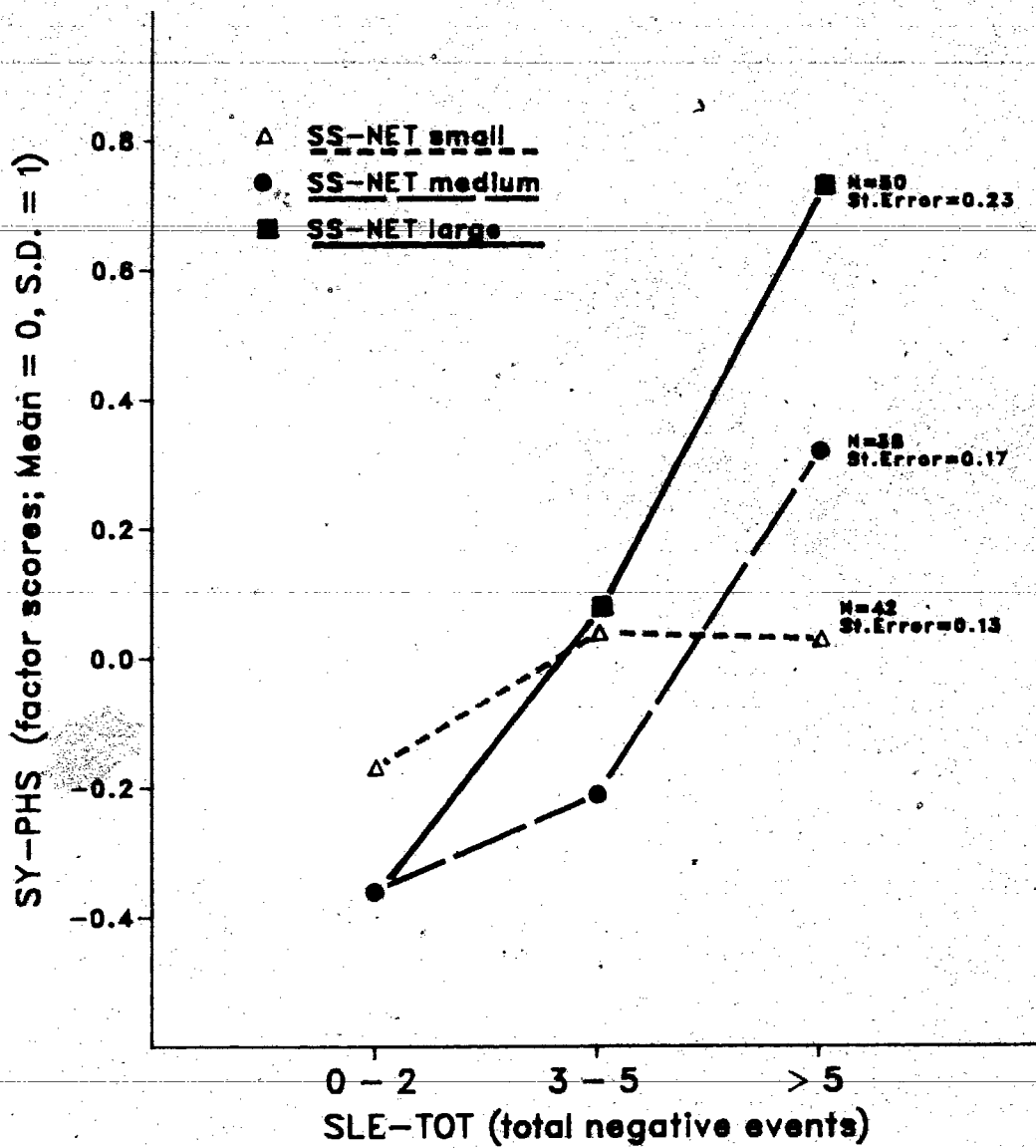
Table 12-4:   Values of t and probabilities associated with
    interaction effects of Sex, "Psychoticism", and different
    life event scores

	t	p
SLE-TOT * EPQ-P * SEX	3.54	0.0004
SLE-IND * EPQ-P * SEX	2.80	0.005
SLE-CON * EPQ-P * SEX	3.09	0.002

SLE-TOT = total negative life events
SLE-IND = sum of all "independent" negative life events
SLE-CON = sum of all "contingent" negative life events

EPQ-P   = "Psychoticism" score of the EPQ

numbers of stressful life events, are associated with a high

level of tension and anxiety symptoms. In low-P women, there was

no such effect. This effect is not present with depression or

physiological symptoms as dependent variables.

Social support

The social support items were chosen to represent objective patterns of social support; they were meant to be as free of subjective evaluations as possible. The social support subscores SS-ACT and SS-NET, whose derivation is discussed in the previous chapter, represent measures of frequency of social activity and of the extensity of social networks, respectively.

Zero-order correlations. The two social support variables SS-NET and SS-ACT were differentially correlated with the three dependent variables SY-DEP, SY-PHS, and SY-ANX (Tables 11-4 and 12-1). While SS-NET is not significantly correlated with any of the symptom scores, SS-ACT is substantially correlated with the "Depression" score (SY-DEP), but not with the others. This correlation is paralleled by the one between EPQ-E and SY-DEP of about equal size ($r = -.27$; see above). Although one could expect parallel associations of a personality variable "Sociability" or "Extraversion" (EPQ-E) and actual social activity, there are independent components in both correlations, as mentioned in the previous section: the partial correlation between SS-ACT and SY-DEP, with EPQ-E held constant, is $r = .17$.

Neither SS-ACT nor SS-NET were significantly correlated with any of the life event scores.

<u>Interactions.</u>   Four effects were examined for signifi-

cance:

SS-ACT * SLE-TOT

SS-ACT * SEX * SLE-TOT

SS-NET * SLE-TOT

SS-NET * SEX * SLE-TOT

Table 12-5 shows the t-values associated with the

regression coefficients of the interaction terms mentioned

above. Only the interaction SS-NET X SLE-NEG showed a

significant effect, and only on the "physiological symptoms"

score (SY-PHS). The unique contribution of this interaction term

to the squared multiple regression of SLE-TOT, SS-NET, and

SLE-TOT * SS-NET on SY-PHS is 0.028, corresponding to a partial

correlation of $r = .17$. Examination of the distribution of

residuals in rela- tion to the predicted values showed again no

significant deviation from a chance pattern, meaning that the

linear model employed was adequate. Table 11-6 shows the

regression coefficients of SLE-TOT, SS-NET, and their

interactions with different symtom scores as dependent

variables.

Examination of this interaction effect in an ANOVA design

where both SS-NET and SLE-TOT were partitioned into three groups

of approximately equal size resulted in an F-value associated

with their interaction of $F = 2.73$ which, at 4 and 397 degrees

of freedom, has an associated probability of $p \leq .03$. (Dependent

variable was again SY-PHS.)

Table 12-5: Values of t associated with the interaction effects of social support variables, Sex, and life events on distress symptoms

	SY-DEP	SY-PHS	SY-ANX
SS-ACT * SLE-TOT	-0.81	0.54	-0.10
SS-ACT * SEX * SLE-TOT	0.36	1.17	0.86
SS-NET * SLE-TOT	1.91	3.62 ***	1.57
SS-NET * SEX * SLE-TOT	0.85	-0.41	0.37

* p < 0.001

SY-DEP = depression symptom score
SY-PHS = physiological symptom score
SY-ANX = anxiety/tension symptom score

SS-ACT = social activity score
SS-NET = social network score

SLE-TOT = total negative life events

This difference regarding the size of the interaction effects between the two different kinds of data analyses is probably again due to the grouping forced on the independent variables by the ANOVA design: The tails of the respective distributions, which sometimes span the greater part of the

total range of the variables, are treated as single values.

Figure 12-2 shows the effects of different levels of SLE-TOT on SY-PHS at each of the three levels of SS-NET. More extensive social networks (higher values of SS-NET) are associated with an _increase_ the number of physiological symptoms reported by the subject when he/she has experienced a large number of events. In order to find out whether ths effect was due to only a subset of items of SS-NET, or whether it was present with all items, the same regression analysis as with the total SS-NET score was performed with its constituent items. As discussed in the preceding chapter, and shown in Table 11-7, the effect was consistent, and mostly significant, across all constituent items of SS-NET, and must therefore be taken as genuine.

A comparison of the interaction of SLE-TOT, SLE-CON, and SLE-IND with SS-NET in Table 12-6 shows that the effect is somewhat stronger with "contingent" events.

Summary. Social activity, but not social network size, is negatively correlated with depression symptoms. The association of life events and physiological symptoms is dependent on the size of the social network available to the individual. It is greater when the available social network is more extensive. This effect disappears when "depression" or "anxiety" scores are taken as dependent variables. Social activity does not moderate the effects of stressful life events.

Table 12-6:   Values of t, probabilities and partial regression
coefficients associated with the interaction effects of
social networks with different SLE scores.

	t	p	Part. r
SS-NET * SLE-TOT	3.62	0.0004	0.18
SS-NET * SLE-IND	2.17	0.031	0.11
SS-NET * SLE-CON	4.03	<0.0001	0.20

SS-NET = social network size

SLE-TOT = sum of total negative life events
SLE-IND = sum of all "independent" life events
SLE-CON = sum of all "contingent" life events

3-way interactions

According to hypothesis No. 3, the following interactions

were examined for their effects on distress symptoms:

EPQ-E * SS-ACT * SLE-TOT, EPQ-E * SS-NET * SLE-TOT

EPQ-P * SS-ACT * SLE-TOT, EPQ-P * SS-NET * SLE-TOT

None of the interactions were significant with any of the

dependent variables.

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Summary of results

Table 12-1 presents an overview of the main effects (zero-order correlations), and Table 12-7 an overview of the interaction effects tested in this investigation.

Discussion

The results to be discussed here center mainly on the interaction effects that were tested, specifically, the main effect of personality variables on symptoms, together with their moderator effects. The main effects of stressful life events and social support on distress symptoms has been discussed in the two previous chapters, and will only briefly be touched upon here.

Personality

As discussed in the previous section, the variable "Extraversion" had only a main effect on depression symptoms, but did not interact with life events, i.e., it did not moderate the effects of life events on distress symptoms.

The association of "Extraversion" with depression symptoms would be predicted by behavioural theories of depression (e.g., Lewinsohn & Amenson, 1978), and it is consistent with a parallel effect of the conceptually related variable social activity (SS-ACT, see Chapter 11). While the effect of "Extraversion" on depression symptoms is partly independent from actual social

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Table 12-7: Overview on all interaction effects tested

	SY-DEP	SY-PHS	SY-ANX
EPQ-E * SLE-TOT	–	–	–
EPQ-E * SEX * SLE-TOT	–	–	–
EPQ-P * SLE-TOT	–	–	
EPQ-P * SEX * SLE-TOT	–	–	***
SS-ACT * SLE-TOT	–	–	–
SS-ACT * SEX * SLE-TOT	–	–	–
SS-NET * SLE-TOT	–	***	–
SS-NET * SEX * SLE-TOT	–	–	–
EPQ-E * SS-ACT * SLE-TOT	–	–	–
EPQ-E * SS-NET * SLE-TOT	–	–	–
EPQ-P * SS-ACT * SLE-TOT	–	–	–
EPQ-P * SS-NET * SLE-TOT	–	*	–

*   0.01 < p < 0.05

*** p < 0.001

activities tapped by SS-ACT (the partial correlation between EPQ-P and SY-DEP is r = .17), it is likely that a high EPQ-E score is reflected in social activities similar to the ones included in SS-ACT, but not included there, and that it is these actual social activities that mediate the effects of EPQ-E. On the other hand, a high EPQ-E score may also reflect a self-image of social competence which may be assumed to counteract depression symptoms (cf. Ellis & Grieger, 1977).

The absence of moderator effects of "Extraversion" on the association between life events and distress symptoms was unexpected. Cooley & Keesey (1981) found that extraverts as defined by the Myers-Briggs Type Indicator (McCaulley, 1981) showed low associations between life events and physical symptoms, and it was expected to find their result repeated here with the more psychological distress symptoms of the Langner scale.

Several possible reasons for this discrepancy can be assumed:

- Cooley & Keesey's (1981) effects are of marginal significance (p ≤ 0.05, with 8 comparisons included in the study), and the over-all correlation between the number of experienced events and number of disorders was r = 0.37 which is higher than the correlations typically reported in the literature and which indicates the possible presence of unique conditions in their study. Furthermore, when I recalculated the significance of their effects it became apparent that

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they had employed a one-tailed test of significance. A two-tailed test would not have yielded significant results.

- Their dependent variable was a score of physical disorders which "began, recurred, or worsened during the [previous] 12 months". One may suspect ample opportunities for confounding effects to occur during this period: the illnesses may have caused a number of life events (see Chapters 4 and 10).

- The dependent variable used by these authors, physical illness, is different from the one used in this study, which referred to psychological and psycho-physiological distress symptoms.

- The variable "Extraversion" as defined by the Myers-Briggs Type Indicator may not be comparable to "Extraversion" as defined by the Eysenck Personality Questionnaire (EPQ). The conceptual differences between Eysenck's and Jung's systems of personality can be expected to reflect on the individual constructs and on the instruments employed to measure them.

In sum, then, while the lack of moderator effects came as a surprise, at close inspection there is no strong emprirical evidence suggesting otherwise. Also, the parallel effect of the social activity score discussed below lends credibility to this result.

Psychoticism. Two different effects of the personality variable "Psychoticism" were found, a zero-order correlation with all three symptom scores, and a 3-way interaction with Sex and SLE-TOT on symptoms of anxiety and tension.

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The significant correlations with the symptom scores are in accordance with findings by H. J. Eysenck & S. B. G. Eysenck (1976) of higher EPQ-P scores in neurotics, and in mental patients in general. Eysenck & Eysenck suggest that "Psychoticism" overlaps with concepts like "psychopathy" and "behaviour disorder", which would also suggest that "Psychoticism" may be correlated with distress symptoms. The correlation with anxiety symptoms, however, should be regarded in the light of the interaction effect discussed below, and no isolated generalization should be made from it. (See Chapter 3 for a discussion of the interpretability of main and moderato effects.)

Only one moderator effect was evident. In women, medium and high "Psychoticism" scores were associated with high anxiety scores, while no such effect was present for women with low P-scores, or for men. The size and the shape (see Figure 12-1) of this interaction effect would suggest that the zero-order correlations between EPQ-P and SY-ANX is only due to the subset of medium- and high-P women and does not represent a general effect. The consistency of this effect across both life event subgroups of "contingent" and "independent" events (Table 12-2) attests to its substance and also indicates that it was, most probably, not a result of reverse causation (i.e., of anxious and tense high-P women creating their own adverse social environments). Careless, impulsive, socially alienated women, then, who feel disliked and mistreated (Tellegen, 1978) appear

especially vulnerable to the impact of stressful life events,
and tend to become tense and/or anxious.

It makes intuitive sense that socially alienated persons
who "perceive themselves as ... a target of malevolent action"
(Tellegen, 1978) would react with tension or anxiety when
adverse events really do happen to them. It is not obvious,
however, why such an effect should not be present in men. It may
be that the meaning of the "Psychoticism" dimension, as defined
by the EPQ, differs between males and females: being "tough",
callous, and impulsive is closer to the male stereotype in our
society, and probably a desirable state of affairs for many men,
but less so for women. High-P men in this non-clinical sample,
therefore, may be conforming to stereotypical expectations and
functioning adequately, while high-P women may not and may show
more of the "personality factors so floridly exposed in
psychotic cases" assumed by H. J. Eysenck & S. B. G. Eysenck
(1976) to be tapped by the P-scale.

However, this does not explain the about-equal correlation
of "Psychoticism" with depression and psycho-physiological
symptoms in both women and men. An alternative explanation would
be that anxiety symptoms are more part of the stereotypical
female distress syndrome than of the male one: while high-P men
under stress may act out, this is a much less socially accepted
reaction for women, who may tend to show more passive symptoms
of distress.

<u>Summary</u>.   The main effects of "Extraversion" on depression symptoms and of "Psychoticism" on all symptoms is in line with previous research or theoretical formulations.

The lack of moderator effects of "Extraversion" on the association of life events with distress symptoms was unexpected, but a reevaluation of previously published results revealed that there is no strong evidence suggesting such an effect.

The moderator effect of medium and high "Psychoticism" scores on the association of life events and anxiety/tension symptoms, which was present only in women, was considered to be partly a consequence of prevalent sex stereotypes. Personality traits subsumed by the concept "Psychoticism" may be more maladaptive and pathological in women than in men, and, conversely, anxiety symptoms may represent a more typically female reaction to "stress".

In general, the specificity and scarcity of moderator effects of the personality variables used in this study suggests that they are too broad to be very relevant for the pathogenic processes involved. This especially since most studies employing narrower personality constructs have generally found significant moderator effects (see the discussion in Chapter 6).

Social support

Three groups of results are to be distinguished and will be discussed separately. First, the main effect of social activity on depression symptoms. Second, the absence of the often reported "buffering" effect of social support in this study. Third, the distress-enhancing effect of social network size.

1. The beneficial main effect of social activity on depression symptoms may be regarded as a replication of the often reported main effect of "social support" on psychological distress symptoms, since depression symptoms make up a large proportion of the non-random variance of scales of psychological impairment. (In the analysis of the Langner scale reported in Chapter 9, the rotated "depression" factor explained as much variance as the other rotated factors together.) Specifically, it replicates results obtained by Williams et al. (1981), who used a social support measure consisting mainly of the same items as were included in our social activity score. It also confirms results by Lowenthal & Haven (1968) who found low social interaction particularly strongly related to depression in an elderly sample. The results are in line with behavioural theories of depression (cf. Lewinsohn & Amenson, 1978) that postulate social interaction as a potent source of reinforcement typically lacking in depressives, but stand in contrast to results reported by Schaefer et al. (1981): these authors reported positive relationships between a composite score containing social network and social activity items, and

depression. Their result is quite surprising but may be related to the similar interaction effect found in this study and discussed below.

2. The discrepancy between the "buffering" effects of social support reported in the literature and the absence of such an effect in this study that were used here may be explained in two ways: by the particularities of the subject sample, and by the kinds of measures used. While there are a number of possible reasons for the absence of a buffering effect in a particular sample, the presence of the opposite effect is not easily explained in terms of hypothetical sample differences. With regard to the difference between measurement instruments, it may be recalled that it was attempted to measure only those aspects of "social support" that are countable and could, in principle, be verified by an independent observer. The discussion of previous studies in Chapter 6 shows that the overwhelming majority of studies that had found "buffering" effects of social support used social support measures that relied on subjective evaluations of the quality of social support. The lack of "buffering" effects found here, then, appears to be well in line with other studies using comparable measures: practically no study using objective measures of social support found a "buffering" effect (see Chapter 6).

These results, together with the pattern of results discussed in Chapter 6, allow a tentative conclusion: it is not the size of social networks, nor the extent of social activity,

that buffers against environmental "stress", but the belief of being supported.

The belief of being supported it appears, is not necessarily related to everyday social patterns: it may arise from experienced support in times of crisis, from other social conditions, or may be unfounded.

Also, it is likely that individual, idiosyncratic characteristics like mood, standards of reference, independence, need for affiliation etc. play an important role as conditions under which subjective perceptions of "social support" emerge. It should be remembered, however, that like the objective aspects of social support dealt with in this investigation, subjective aspects of social support are probably also multidimensional, with different dimensions having different effects on health.

3. With regard to the distress-increasing effect of social network size (Figure 12-2), several possible interpretations present themselves. One possibility is that talking to sympathetic others (friends, God) may not be an effective coping strategy for people tending to develop psycho-physiological symptoms, and precludes more effective ways of coping. It may interfere with the "self-regulation of emotional distress" (Lazarus, 1981b) and with "avoidance-denial modes of coping" (loc. cit.) which are better suited for such inalterable acts of fate as the death of a loved one, or the infidelity of a spouse or lover. Pearlin & Schooler (1978), for instance, report that

"self-reliance is more effective in reducing stress than the seeking of help and advice from others in the two areas in which it is possible to observe its effects, marriage and parenthood" (p. 10). (See also Gore, 1979.)

Another possibility is that talking to sympathetic others elicits or exacerbates psycho-physiological symptoms of distress by reinforcement mechanisms (eliciting sympathy, drawing attention, etc.). Such an interpretation would be in accordance with behaviouristic models of the development of illness behaviour (cf. Wooley, Blackwell, & Winget, 1978) that see it as an operant behaviour dependent on reinforcement contingencies. In this context, a result reported by Schaefer et al. (1981) is of interest: they reported a detrimental main effect of social networks on depression.

Given the difficulties of detecting interaction between two variables if one of them has a severely restricted range (see the discussion in Chapter 3), Schaefer et al's finding may well be due to the same mechanism as brought about the interaction effects of social networks here: their sample was rather homogeneous, consisting of late middle-aged, middle class, white Californians. To the extent that their exposure to stressful life events showed little variation, or was overshadowed by other common stressful conditions, "true" interaction between social networks and life events sould show as a main effect of social networks. (In the sample used in the present investigation, there was a near-significant main effect of

SS-NET on SY-ANX and SY-PHS , and also a close to significant
interaction effect of SLE-TOT and SS-NET on depression
symptoms.)

A provocative finding by Kobasa (1982) deserves mentioning
here: she found that "perceived family support" interacted with
both life events and a complex personality variable "hardiness"
to affect the general incidence of illness in lawyers. In
subjects with low "hardiness", high "perceived family support"
increased the effects of life events on illness, in subjects
with high "hardiness", it decreased the effects ("buffered"
against stress). This result was not replicated when "perceived
work support" was substituted for family support. The results of
Kobasa's study suggest that different sources of support may
have different, even contrary, effects.

The above two explanations (reinforcement mechanisms and
poor coping strategies) are by no means mutually exclusive. A
combination of the two mechanisms may explain both the differ-
ence in this moderating effect with different symptom scores as
dependent variables, and the presence of near-significant
effects in the same direction with SY-DEP and SY-ANX (see Table
11-5): The reinforcement effect may only be present with
psycho-physiological symptoms, while the ineffective coping
strategies provoked by many close social contacts raises the
level of all symptoms. Whatever the cause, physical or
physiological symptoms are something one has, while
psychological symptoms are more part of oneself, and are more

intricately interwoven with thoughts, actions, and social interchanges. Physiological symptoms can easily be made objects of conversations, and reinforcement mechanisms can come into play easily here. On the other hand, inefficient coping strategies probably do not influence the kind of symptoms with which someone reacts to "stress".

Summary.   The absence of a "buffering" effect of social support on the effects of stressful life events is held to be the consequence of employing only objective social variables for measuring social support. It indicates that even close social ties as represented by the items comprised in SS-NET (close friends and family, religious and community involvement) are not necessarily helpful in coping with stressful situations.

The distress-_enhancing_ effect of social network size is held to be due to ineffective coping strategies, furthered close social ties, or to illness behaviour that is reinforced by social contacts.

The symptom-specificity of both main and moderator effects may be taken as a strong indication of different pathogenic mechanisms, and of the necessity to differentiate between different symptom complexes as well as between different aspects of social support when examining the effects of the latter on distress and illness.

Three-way interactions

No interaction of life events, personality, and social support was found. The scarcity of previous research on combined moderator effects of personality and social support makes the lack of effects found here difficult to evaluate. The lack of general moderating effects of the personality variables used in this investigation suggest an explanation: these variables may have been too general to be involved in the mechanisms relating life events and social support to distress symptoms.

The existence of combined moderator effects of personality and social support on the effects of stressful life events is indicated in a study by Kobasa (1982), that was mentioned earlier. She used a complex personality variable "hardiness", consisting of "commitment, control, and challenge", which may be roughly translated into self-esteem, internal locus of control, and flexibility and tolerance of ambiguity. She found that only "hardy" executives of a public utility company are buffered against stress by strong "family support"; for others, family support exacerbates the effect of work stress. The variable "hardiness" appears as a quite complex variable, it appears tailored for the examination of stress-buffering effects. This effect was not present with "work support" instead of "family support", which again indicates that different aspects (here: sources) of social support have different effects on health.

In sum, then, it appears that if personality variables affect the use people make of their social networks in times of

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stress, they are more specific than the very high-level constructs of "Extraversion" and "Psychoticism", and may also differ with different types of networks.

Summary and conclusions

In the beginning of this chapter, general hypothese were put forward regarding the moderator effects of personality and objective social support.

Hypothesis one and two, postulating moderating effects of social support and personality variables were only partly confirmed. Neither "Extraversion" nor social activity moderated the effects of stressful life events, and the effects of "Psychoticism" and social networks were very specific.

Hypothesis 3, postulating 3-way interaction effects, or combined moderating effects of personality and social support on the association between life events and subjective distress, was not confirmed.

Hypothesis 4, postulating different effects for different symptom complexes, was clearly supported by the results. The two substantial interaction effects obtained were specific to only one symptom subscore, which was different in each case.

The specificity of the interaction effects points to a greater specificity of pathogenic mechanisms related to "stress" and stressful life events than has been generally assumed in the literature. This, together with the differentiation between the

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two social support variables could explain why higher-order personality variables do not interact with social support and life events: they may be akin to the broad, undifferentiated measures often employed in research on social support which, as has been demonstrated, tend to obscure effects of more specific dimensions.

Taken together, the results of this study indicate that it is counterproductive to use general and broad concepts of either social support or personality in research on the effects of stressful life events and, one may assume, other stressful situations, and that the pathogenic mechanisms involved may be very specific, depending on equally specific personal and social conditions

13. Summary of results

The preceding chapters described an empirical investigation which was designed to test a number of hypotheses that were established within the framework of the theoretical model outlined in Chapter 4. Their results can be summarized as follows:

Dependent variable: subjective distress.   The Langner 22-item symptom scale which was used as the dependent variable in this investigation was found to be multi-dimensional, representing at least three different symptom complexes: depression symptoms such as hopelessness, worrying, feeling weak; anxiety and tension symptoms such as trembling, accelerated heart-beat, "nervousness"; and psycho-physiological symptoms like headaches, stomach upset, "clogged" head.

Not only were these three symptom complexes relatively independent of each other, they were also differentially correlated with the other variables included in this investigation, and were differentially involved, as dependent variables, in various interaction effects.

Stressful life events.   The pool of life events that was
compiled from published life event scales was found to contain a
subset of items that are, at least partly, elicited by subjects
who show depression and anxiety symptoms, or who have already
experienced other stressful events. This subset accounted for
most of the correlation between the total life event score and
psychological (depression and anxiety) distress symptoms, but
was correlated with psycho-physiological symptoms to about the
same degree as the other items, which were considered to be
largely independent of the subjects' actions. Also, the two
subsets were about equally involved in interactions of life
event scores with other variables, social network size and
"Psychoticism".

        It was concluded that, while the conditions of occurrence
of "contingent" and "independent" subsets of events may differ,
their effects are comparable, and involve mainly psycho-
physiological symptoms.

        Personality variables.   The two personality dimensions
that were included in this investigation, "Extraversion" and
"Psychoticism", showed the following pattern of effects: in
accordance with behavioristic theories of depression, "Extra-
version" was inversely related to depression symptoms but not to
others; it did also not interact with any of the other
variables.

        "Psychoticism", on the other hand, was directly, and about
equally, correlated with all three symptoms complexes, but in

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addition, it interacted with Sex and Stressful Life Events to affect anxiety/tension symptoms: women with high "Psychoticism" scores were found to be more vulnerable to stressful events, reacting stronger with anxiety/tension symptoms.

Social support.   "Social support" was operationalized as objective patterns of social involvement, and all the items included in the measures referred to observable, countable instances. Despite this circumscribed scope, "objective social support" was found to be multi-dimensional, with one dimension representing the frequency of social activity, and the others representing social structures, or aspects of the social network of which the subjects were part.

Two sub-scales were therefore formed, targeting social activity and social network size, respectively, which were not only virtually independent of each other, but had differential effects on symptoms. While social activity was only related to symptoms of depression (paralleling the effects of "Extra-version"), social network size was not directly related to symptoms, but was found to interact with stressful life events so that larger social networks enhanced the effects of life events on psycho-physiological symptoms. This effect was not present with the other symptom scores as dependent variables.

General patterns of results.   If there is a general pattern to the effects of these studies, it is the fraction-alization and specificity of the results, both with regard to dependent and to independent variables. Among the twelve

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interaction effects and five main effects discussed in the preceding chapters, two interaction effects and four main effects were found to be significant, but of these only one main effect (of "Psychoticism") had comparable effects on all three symptom dimensions, and only one (stressful life events) had comparable effects on two; the other effects were specific to just one symptom complex. Further, only one subscore of "objective social support" moderated the effects of life events on symptoms. Conversely, the broad and high-level personality construct "Extraversion" showed no interaction effect, while most studies examining narrower personality constructs did.

The significance of this specificity of effects lies with its theoretical implications, and with its implications for further research; both will be discussed in the final section of this dissertation.

Part IV

CONCLUSIONS

14. Conceptual Implications

The empirical investigation described in Part III was
designed to test a number of hypotheses developed from the
existing literature on stressful life events and on variables
and conditions moderating their effects. These hypotheses
concerned the heterogeneity of the "events" typically included
in life event questionnaires, the dimensionality of "social
support", moderating effects of social support and personality
dimensions, the differentiation of effects according to
different types of symptoms. The results are presented and
discussed in Chapters 8 - 12, and summarized in Chapter 13.

At the same time, the design of the investigation was
derived from the conceptual framework provided by the model
presented in Chapter 3, which dealt with three classes of
variables: stable environmental (social, socio-demographic,
etc.) conditions, stable individual (personality) conditions,
and momentary events and processes. The variables included in
the investigation represented each of the three main categories.
While one can conceive of distress symptoms as either temporary

processes or stable conditions (the choice between the two possibilities would depend on one's theoretical premises), life events are temporary by definition. The personality dimensions "Extraversion" and "Psychoticism", and the social support variables were meant to represent stable individual and environmental conditions, respectively. These variables are by no means exhaustive of their respective categories, nor were they meant to be so: objective social support patterns, as targeted by the social support questionnaires in this investigation, represented one of many environmental conditions; the personality dimensions represented one of many individual conditions.

The model was designed to provide a matrix of possible variables and effects that can be applied to any combination of relevant variables. Thus, it cannot actually be proved; however, its applicability can be demonstrated. The presence of moderator effects of both "Psychoticism" and social network size on the relationship between stressful life events and distress symptoms, together with the different main effects attest to the viability of the model: relevant boundary conditions of the effects of psychosocial stressors can be identified and their effects on the impact of life events specified. The fact that these effects differ according to the symptom scores taken as dependent variables indicates that different pathways of the model are relevant for different variable combinations.

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The model does not assume any direction of moderating effects, indeed, it does not specify particular moderating effects, and can therefore accomodate any kind of theoretical explanations of the effect pathways illustrated by it. It does equally not attempt to show specific variables or effects. The fragmentation of each of the three main classes of variables into meaningful narrow and well-defined concepts would result in a profusion of possible combinations and specific effects that would defy any graphic representation. By remaining on a general level, the model can be adopted to any combination of specific variables and to any formulation of effects: only the particular variables involved in each class would have to be specified, and the postulated effect pathways would have to be pointed out. It does not matter, for example whether the effects of social activity on the occurrence of "contingent" stressful life events and their subsequent effect on symptoms, or the effects of personality characteristics on the occurrence of "independent" stressful life events and their subsequent effect on different symptoms, are to be represented: the structure remains the same, only the contents change.

The same circumstances that necessitate such an abstract comprehensive model require the exact specification of the concepts with which it is to be filled: the specificity of the effects makes imperative the exact definition of the concepts that are to be represented, since even related concepts may show quite different effects: unclear definitions would obscure or

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misrepresent those effects.

In sum, while models such as the one presented in Chapter 3 may serve well as a point of reference, they have to be complemented by well-defined and rather narrow concepts to account for the multitude of possible effects.

The above considerations concern the over-all representation of variables and effects involved in determining the impact of stressful life events. Apart from these general issues, some specific theoretical conclusions regarding the role of life events and of coping processes in the etiology of illness can be drawn:

Effects of stressful life events. The differential involvement of different symptom scores in effects of the independent variables raises the question why this should be so. Four possibilities exist: different coping processes favouring different symptom complexes, different individual proclivities to different symptoms (analogous to the concept of "psychosomatic specificity"), or different environmental influences on the development of different symptoms, or types of symptoms.

To assume different coping processes as being responsible for the differentiation of effects does not appear very plausible to me: coping behaviors are reactive, directed against adverse external conditions (for example, stressful life events), or against adverse internal states (discomfort, anxiety, etc.); it is not obvious how they should influence the type of outcome (symptoms) in the case of their failure.

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On the other hand, the kind of symptoms influenced by social networks (psychophysiological symptoms), and the kind of symptoms influenced by "Psychoticism", or "toughmindedness" (tension/anxiety symptoms) hint at the relevance of both environmental influences and individual proclivities: as mentioned in Chapter 12, psycho-physiological symptoms are likely to be specifically elicited by the environment because they can be better made objects of actions and reinforcement contingencies. Likewise, the anxiety/tension symptoms associated with "Psychoticism" are similar to what one may expect of "tough" and "socially alienated" individuals that have been severely frustrated by adverse circumstance they can't change.

This suggests that one may have to consider the pathogenic role of stressful life events not as eliciting symptoms, but as triggering symptomatic reactions that are already latent in the individual, or that the environment is prone to elicit. While this is not new - psychoanalytic thought has long dealt with the one, behaviourist models with the other, and the concept of "vulnerability" spans both - it has certainly not played a prominent role in research on stressful life events.

It was suggested earlier (Chapter 3) that experimental interaction effects are generally non-directional; which variables moderate, and which are moderated, depends on theoretical considerations. The results of this investigation suggest that current theoretical premises underlying the interpretation of effects of life events may have to be

rethought; personality theories and behavioural models may well have a much more important role to play here than has been acknowledged. Such a recognition of the role of specific predispositions would represent a return to Selye's basic concept of non-specificity of "stress" and "stressors", the effects of which are determined by the adaptive capacities of the organism and its subsystems.

Coping processes. The role of processes and mechanisms of coping with stressful life events and other psychosocial stressors can, in the light of the discussion above, perhaps be conceptualized as follows:

Since coping behaviours deal with external factors that may produce distress symptoms by triggering existing distress mechanisms or latent distress reactions, or, alternately, deal with internal states (anxiety, upset etc.) already manifest, coping behaviours and mechanisms may be considered non-specific with regard to the type of the effects of psychosocial stressors such as stressful life events. They determine the degree of distress but probably not its kind. Thus, they may be regarded as equally non-specific in their effects on illness and distress as was suggested to be the case with stressful life events.

15. Generalizability

In order to determine the importance and generalizability of the specific results of the experimental investigation that has been reported in this dissertation, an examination of its limitations is necessary. Several issues have a bearing here: the methods used, the size of the effects, the sample characteristics, and the nature of the dependent variable.

Methods.   All the variables in this investigation were measured by questionnaire. This posed the danger of a) common measurement variance introducing spurious correlations between variables, and of b) limited generalizability of results to non-verbal manifestations of these variables. However, it is held that the influence of these conditions was minimal in this particular investigation.

It could be expected that the particular method of measurement (questionnaires) might bias the measurement of one or several variables and that the correlation between any two variables may be affected. The main focus of this study, however, was not on absolute amounts of life event "stress",

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psychological distress etc., nor was it mainly on the strength of the associations between variables. This study focussed mainly on differential associations of life events with psychological and physiological distress symptoms on different levels of personality and social dimensions. It is not likely that the common method of measurement has biased these differential effects to any substantial degree. Many analyses involved related variables (e.g., symptoms of depression and of anxiety) where response sets, if they have any effect at all, would be expected to have a levelling effect on differences.

Furthermore, the items of two variable groups ("social support" variables, and life events) referred to actual occurrences in the subjects' life, and care was taken to objectify these measures as much as possible and to eliminate the influence of opinions, feelings, and the like. It is argued that, apart from purposeful misrepresentation of events and patterns of social relations and activities, there was relatively little latitude for response styles and other measurement artifacts to bias the responses, and that the method of measurement for these two variable groups (life events and "social support" measures) is sufficiently different from the more subjective method used for the other two groups (personality variables and distress symptoms) to reduce common measurement variance substantially. To minimize possible biasing influences on the latter two variable groups, their items were presented first in the questionnaire package.

Beyond this, it can only be pointed out that the dangers mentioned above are intrinsic to this area of social research, and the variables in this study could not be reasonably assessed by means other than questionnaires. Personality variables are usually assessed by questionnaire. An alternative method of measuring psychological and physiological distress symptoms would be expert ratings after extensive interviews which, even if feasible, would reduce the sample to a size precluding sophisticated data analyses. It would also introduce representation problems of its own and would most likely have biased the sample beyond recognition due to self-selection. The alternative to questionnaire reports on social patterns and life events would have been to follow the subjects through their lives. This, even if at all feasible, would produce similar and similarly grave problems with regard to sample size and bias as mentioned above.

Previous research on this topic mainly used questionnaires or other verbal measures. This investigation was intended to examine a general model proposed on the basis of previously reported research. Imperfect but comparable methods appear preferable to possibly better ones that would preclude comparisons essential to the purpose of the investigation, even if they could be found.

Effect size. The level of significance of effects adopted in Study 4 (Chapter 12) was p ≤ 0.001. With an approximate number of N = 400 subjects, this translates into a

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correlation of about r = 0.16, and a proportion of variance explained of only 2.6%.

Two issues, however, are to be taken into consideration here. First, the magnitude of the interaction effects found are in the same order as the magnitude of the effects generally reported for stressful life events. In other words, they accounted for a large proportion of the total effects of life events. Second, and most important, this investigation was not intended to search for large effects, but for patterns of effects: no one would seriously doubt that adverse environments, stressful events and social structures, or individual psychological predispositions play an important role in the etiology of psychological illness and distress. It is not, therefore, that the pathogenic role of these variables had to be proved; it is the conditions and combinations making them pathogenic that were to be explored. It has been argued (see Chapter 4) that life events are only very imperfect representation of environmental or psychosocial "stressors". To the degree that the pathogenic effects of life events are generally limited, moderator effects of third variables are necessarily limited, too.

The value and generalizability of the findings of this investigation, then, depend on the generalizability of the effects found with life events to other stressful conditions. To the degree that the effects of other psychosocial "stressors" ressemble the effects of stressful life events, the same

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variables will moderate them. The scope of this investigation, however, allows no statement on the issue of representativeness of life events for other psychosocial stressful conditions; it will have to be explored in a different context, and it appears quite worthwhile to do so. One would guess, however, that the pattern of effects found here will not differ very much when other, perhaps more powerful "stressors" are the focus of study.

Sample. The sample consisted mainly of first- and second-year college students, with all the resulting restrictions in age and other socio-demographic characteristics. One major consequence of the restricted age range, as discussed in Chapter 9, is the probably greater symptom differentiation; older samples may not provide such clearly separated symptom complexes. The effects found here that were specific to only one symptom complex may then either generalize to a more undifferentiated distress symptom complex, or may disappear. Again, the perspective from within this investigation does not allow any statement on this matter. It appears, however, that the specificity of effects may not be replicable in other groups to the same degree.

Further, some variables may assume a different meaning in other populations: The availability of close social contacts, for instance, which were tapped by the variable SS-NET, may assume a different level of importance in older persons who do not have access to a vast pool of potential new social contacts in their fellow students; perhaps, the two social support

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dimensions found here, SS-ACT and SS-NET, are more closely related there.

In sum, there would have to be severe reservations against uncritical generalizations to other populations, especially different age groups. Despite the limited generalizability to other populations, however, the effects found here are relevant. To the extent to which findings are not replicable across sub-populations, studies of "normal" populations will yield fictional results. The effect patterns found here are significant for this particular population, and may be so for other populations: for which other populations, and to what degree, remains to be examined.

Dependent variable. The dependent measure, the Langner symptom questionnaire, refers to relatively mild distress symptoms, and the question of generalizability to more severe clinical conditions arises.

Its items had been chosen so as to optimally differentiate between mental patients and non-patients in a metropolitan population. None of the items, however, had come close to being a marker for either group, and none seems so pathological that it could not be endorsed by an otherwise healthy person. Indeed, the average number of items endorsed by normal subjects was about four. The combination of the relatively mild content of single items, together with their statistical discrimination between patient and non-patient groups, makes generalization of findings to more severe mental disorder dependent on conceptual

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premises: whether one subscribes to the notion of categorical or of quantitative differences between "normal" and "mentally ill" persons. In the former case, one could discount the higher incidence of distress symptoms of the Langner type among mentally ill people as one consequence of their disorder, and not as an essential part of it: a number of other conditions may produce the same consequences. On the other hand, by assuming that the symptoms tapped by the Langner scale constitute an essential part of clinical manifestations of depression etc., generalizations of the findings reported here to clinical conditions would not present any great conceptual problems. This issue, of course, concerns only those symptoms and disorders that are tapped by the context of the Langner items, mainly depression, anxiety, and psycho-physiological symptoms. The specificity of the effects does not allow any generalization to symptoms or disorders not targeted by the Langner scale, such as paranoid, schizophrenic, and psychopathic symptoms.

Summary. If one can subscribe to the notion that stressful life events are a subset of a more general class of psychosocial "stressors", then neither the method employed, nor the relatively small size of the effects should restrict the generalizability of the results.

The dependent variable, relatively mild distress symptoms, allows generalizations to more severe clinical conditions of anxiety, depression, and psycho-physiological symptoms if one can assume continuity between them and the distress symptoms

referred to by the Langner items.

The subject sample, college students, may have resulted in an unusually clear separation of symptom complexes and in an ensuing greater effect specificity than typical for other populations. No generalizations to other populations, especially not to other age groups, should therefore be attempted. The presence of the reported effects, however, should alert researchers to their possible presence in other populations as well.

16. Implications for Further Research

At the end of Part II, several conclusions regarding the consequences of previous research for this investigation were drawn. It seems appropriate to review some of these conclusions in the light of its results, and in the light of the conceptual implications discussed in Chapter 14.

Stressful life events. It was concluded that life event questionnaires should be purified to make them represent only events that are not elicited by the subjects themselves. This was intended to avoid the confounding of cause and effect in the relationship between stressful life events and illness or distress. This recommendation can now be amended: little difference in moderating effects between "contingent" and "independent" subsets of events (which differ in their probability to occur independently from the subjects' actions) was observed, and the effects of "independent" and "contingent" events on health was considered to be similar. Therefore, even confounded life event questionnaires may represent a suitable tool for the examination of combined effects with other variables (coping, personality,

social support). This, it appears, is about the only fruitful use for life event questionnaires. The small size of the effect of life events on illness and distress and its dependence on social and individual boundary conditions reduce their etiological role to near- insignificance. Furthermore, their high degree of unpredictability precludes preventive measures, making intervention difficult. However, life events represent a relively easy way to assess variations in social "stressors" in normal populations, and they can be used as a tool for the examination of effects of intervening and moderator variables that can be assumed to be also relevant with more important "stressors".

With regard to the possible non-linearity of effects, it was not evident in any of the significant analyses, and linear regression analyses generally showed much more significant effects than analyses of variance that do not assume linearity. It appears, therefore, that linear data analysis models are adequate for this subject matter, and that their possible lack of theoretical accuracy is more than compensated for by their greater statistical power to detect the large linear components of effects.

· Personality. Apart from the moderator effect on anxiety symptoms found for "Psychoticism", the theoretical status of which is not clear, no moderator effects were found.

It was held (Chapter 11) that the concept "Extraversion", due to its generality and breadth, missed the specific

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pathogenic processes involved in the effects of stressful life events. Alternately, the effects of "Extraversion" and/or of the concomitant social activity, may not depend on environmental stressful conditions. This, and the frequent reports of moderator effects of more narrow personality constructs (see Chapter 7) would suggest that these represent a more promising line of research.

With regard to the variety of personality variables that have been shown to moderate the effects of life events, two possibilities exist. They may have a common factor, or may have effects independent of each other, or both. In either case, it should be easy to find out by simultaneously examining a number of relevant constructs. In the case of the personality construct having effects independent from each other, it should also be examined whether different constructs affect different symptom complexes; the results of this investigation suggests that they do.

Social support. The multi-dimensionality of objective aspects of social support, and the differential effects of the dimensions, makes a more detailed examination of the construct "social support" appear imperative before employing it in further investigations. Specifically, the internal structure of a pool of items referring to subjective aspects of social support should also be examined, and their effects on different symptom complexes explored. It may well be that the "buffering" effect of subjective aspects of social support so often reported

in the literature is due only to one dimension and may not be
present with all types of symptoms as dependent variables.
Further, the conditions of occurrence of subjective beliefs of
being supported are of interest: it appears worthwhile to find
out under what conditions such subjective beliefs emerge. These
conditions may include objective social support patterns,
personality variables, and cultural variables. At any rate, the
further use of undifferentiated measures of "social support"
seems unproductive.

General research strategies.   The most important finding
of this investigation appears to be the specificity of the
results, with regard to both dependent and independent
variables. The implications of it for the planning of further
research are apparent: a multi-variate framework with relatively
narrow and well-defined variables is a virtual necessity if one
plans to investigate the interaction of stressful life events or
other social stressors with personality and social support
variables.

Given this requirement, the exploration of processes
becomes an attractive alternative to the investigation of ever
narrower aspects of static conditions. As touched upon earlier,
however, it seems that the purpose of the research should
dictate its focus. Epidemiological research, with large-scale
preventive or curative possible applications, will have to deal
with conditions, i.e., states, that can be addressed by a change
in policies at a given point in time. Also, the small relative

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effect size with which this and similar investigations have dealt becomes large, in absolute terms, when multiplied by a large number of people, and may well warrant serious consideration.

Clinical reasearch, on the other hand, with its possible application in a therapeutic process extending over time, and with its narrower scope, may be better served by research on the processes that mediate the effects of psychosocial and other stressful conditions.

APPENDICES

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Appendix A: The Questionnaire package

This package was given to all subjects. It contained an introductory page (p. 247), the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), the modified version of the Langner (1962) 22 item symptom questionnaire (pp. 249-251), the social support questionnaire (pp. 252-255), the life event scale (pp. 256-258), and a concluding page (p. 259).

Due to copyright reservations, the Eysenck Personality Questionnaire is not included here.

This study is part of a Ph.D. dissertation research project. In this package, you'll find a number of questions which will take you about 15 minutes to answer.

Your cooperation is voluntary, and the data collected will be totally anonymous. You are not required to provide any information as to your identity other than your age and sex, and all questionnaires will be destroyed immediately after they have been scored and the scores entered into a large data pool. However, if you would like to know your scores on the questionnaires, you should enter a codeword, number, or pseudonym in the space below.

If you are interested in knowing more about this research project, you are very welcome to see me in Room CC 5205.

Completion of this questionnaire will be taken as your consent to the use of the information as outlined above.

Thank you.

Hans Veiel

Codeword
Codenumber   (optional)
Pseudonym

How old are you? .... ___ YEARS

What is your sex? (please circle) .... M   F

        On the following two pages, please answer each question by
marking an X beside the "YES" or "NO" following the question.
There are no right or wrong answers, and no trick questions.
Work quickly and do not think too long about the exacte meaning
of the questions.

                PLEASE REMEMBER TO ANSWER EACH QUESTION

(The Eysenck Personality Questionnaire was presented to the
subjects on two pages following this one. It is not included
here.)

The following questions deal with how you have been feeling recently (during the last couple of weeks). Please answer them by marking the option that is most appropriate for you, or that describes you best ("YES", "NO", "OFTEN", etc.).

1. I have felt weak all over most of the time
    recently. .... ___YES
                                                        ___NO

2. I have had periods of days recently when I
    could not take care of things because I could
    not "get going". .... ___YES
                                                        ___NO

3. In general, would you say that most of the time
    recently you have been in high spirits, good
    spirits, low spirits, or very low spirits? ... ___HIGH
                                                     ___GOOD
                                                     ___LOW
                                                     ___VERY LOW

4. Every so often, I suddenly feel hot all over. ___YES
                                                    ___NO

5. Have you recently been bothered by your heart
    beating hard? Would you say: .... ___OFTEN
                                                       ___SOMETIMES
                                                       ___NOT AT ALL

6. Would you say your appetite is: .... ___POOR
                                                    ___FAIR
                                                    ___GOOD
                                                    ___TOO GOOD

7. I have had periods of such great restlessness
    recently that I could not sit still very long. ___YES
                                                    ___NO

8. Have you been worrying a lot recently? .... ___YES
                                                    ___NO

9. Have you recently been bothered by shortness
    of breath when you were not exercising or
    working hard? Would you say: .... ___OFTEN
                                                       ___SOMETIMES
                                                       ___NOT AT ALL

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10. Have you recently been bothered by nervousness (irritability, fidgeting, tenseness)? Would you say: .... ___OFTEN
___SOMETIMES
___NOT AT ALL

11. Have you recently had fainting spells (lost consciousness)? Would you say: .... ___NOT AT ALL
___A FEW TIMES
___MORE OFTEN

12. Have you recently had any trouble in getting to sleep or staying asleep? Would you say: .. ___OFTEN
___SOMETIMES
___NOT AT ALL

13. I am bothered by acid (sour) stomach several times a week. .... ___YES
___NO

14. My memory seems to be all right. .... ___YES
___NO

15. Have you recently been bothered by "cold sweats"? Would you say: .... ___OFTEN
___SOMETIMES
___NOT AT ALL

16. Do your hands sometimes tremble enough to bother you? Would you say: .... ___OFTEN
___SOMETIMES
___NOT AT ALL

17. There seems to be a fullness (clogging) in my head or nose most of the time. .... ___YES
___NO

18. I have personal worries that get me down physically (make me physically ill). .... ___YES
___NO

19. Do you feel somewhat apart (isolated, alone) even among friends? .... ___YES
___NO

20. Nothing turns out for me the way I want it to. ___YES
___NO

21. Have you recently been troubled with headaches
    or pains in the head? Would you say: .... ___OFTEN
                                                   ___SOMETIMES
                                                   ___NOT AT ALL

22. You sometimes can't help wondering if anything
    is worthwhile anymore. .... ___YES
                                                    ___NO

1. ABOUT HOW MANY PEOPLE/FAMILIES IN THE APPARTMENT BLOCK OR
   AREA IN WHICH YOU CURRENTLY LIVE ARE YOU WELL ENOUGH
   ACQUAINTED WITH, THAT YOU VISIT EACH OTHER IN YOUR HOMES?

   ___ Homes

2. DURING THE <u>PAST MONTH</u>, ABOUT HOW OFTEN HAVE YOU HAD FRIENDS
   OVER TO YOUR HOME? (DO <u>NOT</u> COUNT RELATIVES.)

   (circle one)
   Every day 1
   Several days a week 2
   About once a week 3
   2 or 3 times in the past month 4
   Once in the past month 5
   Not at all in the past month 6

3. ABOUT HOW OFTEN HAVE YOU VISITED WITH FRIENDS AT <u>THEIR</u> HOMES
   DURING THE <u>PAST MONTH</u>? (DO <u>NOT</u> COUNT RELATIVES.)

   (circle one)
   Every day 1
   Several days a week 2
   About once a week 3
   2 or 3 times in the past month 4
   Once in the past month 5
   Not at all in the past month 6

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4. **ABOUT HOW OFTEN DID YOU HAVE TELEPHONE CONVERSATIONS WITH**

   CLOSE FRIENDS OR RELATIVES DURING THE PAST MONTH?

   (circle one)

   Every day 1
   Several days a week 2
   About once a week 3
   2 or 3 times in the past month 4
   Once in the past month 5
   Not at all in the past month 6

5. **ABOUT HOW OFTEN DID YOU WRITE A LETTER TO A FRIEND OR**

   RELATIVE DURING THE PAST MONTH?

   (circle one)

   Every day 1
   Several days a week 2
   About once a week 3
   2 or 3 times in the past month 4
   Once in the past month 5
   Not at all in the past month 6

6. **HOW OFTEN HAVE YOU ATTENDED A RELIGIOUS SERVICE DURING THE**

   PAST MONTH?

   (circle one)

   Every day 1
   Several days a week 2
   About once a week 3
   2 or 3 times in the past month 4
   Once in the past month 5
   Not at all in the past month 6

7. **HOW MANY VOLUNTARY GROUPS OR ORGANIZATIONS DO YOU BELONG TO**

   - LIKE CHURCH GROUPS, CLUBS, LODGES, PARENT GROUPS ETC.?

   ___ groups or organizations

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8. HOW MANY OF YOUR 5 CLOSEST FRIENDS LIVE IN THE LOWER

    MAINLAND?

        Enter the number: ___

9. HOW MANY CLOSE RELATIVES OF YOURS (PARENTS, SIBLINGS,

    CHILDREN) LIVE IN THE LOWER MAINLAND?

        Enter the number: ___

10. ARE YOU AT PRESENT:

                                                (circle one)
        Married (and not separated) 1
        Engaged 2
        Dating steady boy/girlfriend 3
        Dating frequently several people 4
        Dating infrequently 5
        Not dating at all 6

11. ARE YOU AT PRESENT:

                                                (circle one)
        Living with your spouse, boy/girlfriend,
          or adult falily member(s) 1
        Sharing accomodation with an acquaintance ... 2
        Living alone in a cooperative, boarding home,
          or student housing complex 3
        Living alone in a house or appartment 2

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12. IMAGINE YOU HAD VERY URGENT PERSONAL/EMOTINAL PROBLEMS AND
YOU WOULD DESPERATELY LIKE TO TALK THINGS OVER WITH A CLOSE
FRIEND. HOWEVER, IT IS NIGHTTIME, 2 AM. HOW MANY PEOPLE ARE
THERE (INCLUDING RELATIVES) WHOM YOU COULD TURN TO FOR HELP
AT THIS TIME?

____ people

In the following, you will find a list of events that may have happened to you recently. Please mark, on the left margin, each event that occurred during the last six months.

If an event happened to you more than once, please mark it as many times as it occurred (e.g., x x x).

DURING THE LAST SIX MONTHS:

1. ____ Did you change schools, or did you start going to school (full-time or part-time)?

2. ____ Did you change your residence (move)?

3. ____ Were you divorced, did you separate from your spouse, or was an engagement broken?

4. ____ Did a serious love relationship break up?

5. ____ Did you discover that your spouse or steady boy/girlfriend was unfaithful?

6. ____ Did you start an extra-marital relationship?

7. ____ Did you or your wife/girlfriend give birth to a (live) child, or did you adopt a child?

8. ____ Did you or your wife/girlfriend become pregnant?

9. ____ Did a new person move into your household (other than by birth or adoption)?

10. ____ Did a family member who had been living with you move away?

11. ____ Did you have a serious injury or illness (requiring attention of a medical specialist other than your family doctor, or requiring hospitalization)?

12. ____ Did a family member or close friend have such an illness or injury?

13. ____ Did somebody close to you die (child, spouse, parent, brother, sister, close friend or family member)?

DURING THE LAST 6 MONTHS:

14. ____ Did you or your wife/girlfriend have an abortion, stillbirth, or miscarriage?

15. ____ Did you stop working, permanently of temporarily (laid off, quit, retired)?

16. ____ Did your spouse, common-law spouse, or (if you are still living with your parents) your father or mother stop or start working?

17. ____ Was there a change to the worse in your financial status (e.g., foreclosure of mortgage or loan, loss of income, bankrupcy)?

18. ____ Did you borrow an amount of money necessitating a formal contract?

19. ____ Were you personally the victim of a crime (robbery, assault, rape, vandalism, etc.)?

20. ____ Did you have personal contact with the Law (sought legal advice, arrest, court appearance, lost driver's licence, not just a speeding ticket)?

21. ____ Did your parents divorce of remarry?

22. ____ Did you lose an object that was very valuable to you, or was such an object stolen?

23. ____ Were you separated from your spouse for more than two weeks?

24. ____ Was there a crisis in your community (crime wave, fire, etc.)?

25. ____ Did you change your job, or was there a change in your line of work (transfer, demotion, promotion, different type of work, reorganization in your department, etc.)?

26. ____ Did a pet of yours die?

27. ____ Were you put on academic probation?

28. ____ Did you fail a course, or did you get a course grade two or more grades below your cumulative GPA?

29. ____ Were you dismissed from your dormitory or other residence?

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DURING THE LAST 6 MONTHS:

30. ____ Was there an increase in arguments with your spouse, parents, in-laws, or other close relatives?

31. ____ Did you suffer from frequent minor illnesses?

32. ____ Did you change your personal habits (eating, sleeping, recreation, etc.)?

33. ____ Did you change your social or church activities?

34. ____ Did you have troubles or disturbing problems with a TA or professor?

35. ____ Did you have troubles at work (with your boss, co-workers, or people under your supervision)?

36. ____ Has anything bad happened to you that you haven't mentioned above?

Some events listed on the previous two pages are sometimes positive experiences. Please go over those events that happened to you and mark with a plus (+) sign those events that were positive experiences. (If an event occurred more than once during the last six months, please mark with as many plus signs as appropriate.)

Did you answer all questions to the best of your knowledge?

(please circle) .... YES NO

(please be truthful. If you responded wrongly to one ore more questions, your questionnaire can be eliminated from the study, and no harm will be done.)

THANK YOU VERY MUCH FOR YOUR COOPERATION

Appendix B: Raw Data

The data listed below are the raw data of all the subjects
not eliminated for validity reasons.

The code is to be translated as follows:

Position 1: Age

1 = 17 years or less; 2 = 18-19 years; 3 = 20-21 years; 4 =
22-23 years; 5 = 24-25 years; 6 = 26-30 years; 7 = 31-35
years; 8 = 36-40 years; 9 = 41-50 years; 0 = 51+ years.

Position 2: Sex

1 = male; 2 = female

Positions 3 to 10: EPQ raw scores (2 positions each for P, E, N,
L scales, in this order); a raw score of 2 would be coded as
" 02 ".

Positions 11 to 32: Langner symptom questionnaire, one position
per item. The response choices as shown in Appendix A-1 are
coded so that the first choice is represented as 1, the
others as 2, 3, etc., in their respective order.

Positions 33 to 44: Social support items, one position per item.
The responses are either coded as shown on the questionnaire

or, when subjects were required to write in numbers, the
code is the number, with numbers >9 coded as " 9 ". For item
No. 8, the highest code is 5.

Positions 45 to 80: Life event questionnaire, one position per
    item. The responses were coded as to the number of total and
    of "positive" occurrences:

    0 = 0 total, of which 0 positive occurrences

    1 = 1 total, of which 0 positive occurrences

    2 = 2 total, of which 0 positive occurrences

    3 = 3 or more total, of which 0 positive occurrences

    4 = 1 total, of which 1 positive occurrence

    5 = 2 total, of which 1 positive occurrence

    6 = 2 total, of which 2 positive occurrences

    7 = 3 or more total, of which 1 positive occurrence

    8 = 3 or more total, of which 2 positive occurrences

    9 = 3 or more total, of which 3 positive occurrences

Throughout the data record, blanks represent missing data.
The data are arranged in two contiguous rows per subject, with
40 positions in each row.

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