A Scientific Model for Life Events

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One of the paradoxes surrounding the concept of Life Events (LE) is that it has generated more data than theory so that now progress is hampered by the accumulation of empirical facts that can not be integrated. The purpose of this paper is to try to develop a scientific model or models for encompassing the data already generated, sort out the underlying dimensions and take a look to the future of the endeavor.

The difficulty presented by the Life Event field is that it has grown up like Topsy, emanating from a variety of sources and disciplines, each with its own bias. The present state of the investigation of Life Events is one characterized primarily by dustbowl empiricism without any guiding models for integrating the findings or explaining them in terms of some explanatory principle. The great need at the moment is some theoretical framework for incorporating what has been shown to be the nature of
Life Events and their relations to behavior. One of the first areas in which the Life Event approach appeared involved the concept of stress in the production of physical and mental disorders. The classic work of Wolff, Holmes, Hinkle and others, especially in the psychosomatic field, may be regarded as the opening gambit in the field of Life Events. Social scientists soon became intrigued with the concept and social workers realized that they had dealt with it all along though not under the specific rubric of Life Events. Epidemiologists had also dealt with the issue but again not under the term Life Events but under the general rubric of life history which did not regard Life Events as discrete events but as a continuum in developmental history. Psychologists and psychiatrists were rather late comers in the area but the social psychologists especially and more recently the abnormal and clinical psychologists and clinical and research psychiatrists have begun to enter the arena.

As a result, anyone entering this area in the 70's finds many trails but no highways and no markers and no maps to guide him.
What is the conglomerate of concepts that litter the field? It is difficult to present them chronologically and instead we will list them in what might be regarded as a logical sequence by some and perhaps a random sequence by others.

Some of the questions that need to be answered are:

1. What is a LE; how can one delineate the boundary of a discrete LE as distinct from the matrix in which it is born?

Is a LE a response of the individual to a stimulus in the environment or is it a stimulus itself, or is it a response to a response to the stimulus of the environment.

2. How do LE differ from other responses to the environment and what separates them from the non-LE entities.

3. What type of taxonomy is available for LE and how do they relate to the taxonomy of environmental influences.

4. What are the elements that need to be considered in the formulation of a scientific model for LE? What are the definitions, underlying assumptions and what hypotheses can be elicited from the model?
Let us first turn to the task of defining LE. Perhaps the simplest approach is to take a historical look into scientific terminology. One of the first examples is Young's Modulus based on Hooke's Law in physics. Here the following sequence is postulated. If a load, $L$, is placed on a chain, $C$, a stress will be induced in the molecules of the chain which results in a strain, lengthening of the string by $\Delta S$. The stress induced by the load is not measurable directly but the resulting strain can be measured by $K = \Delta S / S$. In physics, since action and reaction are presumed equal, the strain is taken as a measure of the original stress to which the strain is the response. Furthermore, the stress, though an unmeasured intervening variable, is regarded as proportional to the effect of the load, and hence the strain is taken as a measure of the load. While it is often unprofitable to translate from physical to biological behavior, it might nevertheless clarify matters if we attempted such translation. There are, of course, immediate difficulties since the assumption that action and reaction are equal may not hold for
psychology and the load itself which may be regarded as equivalent for all situations in physics can not be regarded so in psychology. Nevertheless, we shall try to draw a parallel.

The term load can be taken to refer to the LE which impinges altering his prior state.
as a burden on the individual/ The term stress can be retained to refer to the inner readjustment imposed by the LE (load) while the (effect of LE)
term strain can designate the altered behavior/produced by the stress. In this way, LE becomes a stimulus impinging on the individual, producing an internal stress and leading to alteration
which may take the form of a temporary or long term disturbance. in behavior/ We must remember, however, that the original chain
did not exist in a vacuum before the load was imposed. It was responding to gravity, to the ceiling from which it was suspended, to its own vibrations etc. In the same way the individual has internal the externally observable ongoing behavior before the LE strikes and the/stress and/strain will be influenced by the ongoing activity as well as by the residue within the individual of his past experience. How can all of these factors be included in a scientific model for LE. Further-
more, some of the LE produce a temporary effect which disappears
with the removal of the load while others produce a more permanent
effect and still others a complete disruption, even as a load on
a string may lengthen it temporarily or permanently or break it.

What kind of scientific models can one postulate for Life
Events? First of all, we have to remember that the response of
the individual to a Life Event depends upon his wants, needs and
desires and his past experience with similar LE's. Some events
will leave an individual untouched mainly
because they do not engage any of his wants, desires or needs, and
hence do not require any readjustment to the event. E.L. Thorndike
in his book on Human nature and the social order devotes a chapter
to the measurement of wants and satisfactions which really is one
of the forerunners of the current approach to the evaluation of
Life Events. He proposed an evaluation of critical Life Events
in terms of money payments since money payments is a way of buying
satisfactions or avoiding unpleasantness. Another approach is to
measure directly by means of intrinsic units of satisfaction, dis-
comfort, desire and aversion. Unfortunately such measures do not yet exist and need to be developed. The third possibility is to use the technique which Henry Murray developed through his TAT for determining the presence of various needs and satisfactions through projective approaches. In other words, how the needs tend to influence our fantasy life. In order to discover the degree of readjustment that a given Life Event incurs we would need some kind of a common unit for all Life Events expressed in some quantitative way provided by one of these three approaches. Thorndike suggests the money value of an event, and Henry Murray suggests that we explore the fantasy life of the individual with regard to the value an individual invests in the occurrence of a given event or psychophysically based its prevention. Holmes and Rahe have provided a scaling system for evaluating LE's. However, no single unit of measurement is ever going to be satisfactory for all purposes and perhaps the best solution is to have a combined series of scales tapping the monetary value of the event, the projective value, the scaled value
and any other value which we may come up with. With regard to mental health, the significance or meaning of a Life Event, is perhaps the most important aspect and these also could be tapped through scales such as those provided by Holmes and Rahe. The Holmes and Rahe scale has the advantage of being independent of any specified particular framework but simply asks for a relative evaluation of the significance of these Life Events. To this extent we do not know what the basis for the rating is — it may be monetary, projective, a combination or what not. Yet, its reliability and construct validity seems to be worthy of further exploration to determine the underlying components.

The meaning of a Life Event can be evaluated from the following points of view:

The scientific model that we can construct would consist of first of all the structure of the motivational system that the individual is characterized by with regard to any event that may occur. Some events may touch the individual not at all, some may resonate with his basic needs and desires, others with his basic
aversions and annoyances and still others with his philosophy of
life or value system. By providing scales for these three compon-
ents we can see how a given Life Event will be rated along the
continuum provided for these three dimensions. These measures
can be related to any other given event such as occurrence of
illness, development of isolation, anomie, deterioration etc.

Perhaps Osgood's semantic differential approach applied to
Life Events might be of help. For example, we might arrange for
each LE to be rated on each of the needs and presses in Murray's
system, or on each of the Osgood semantic differential scales.
In this way we might get a series of scales for pinpointing a
given LE in value space or in semantic space.

Let us now proceed to construct a scientific model or set of
models for encompassing the realm of LE. The first step is to
try to define the various concepts that thrive in this field.

Perhaps the most focal concept that thrives in this field
is that of stress in its variegated meanings. Levine and Scotch

(Sol Levine and Norman A. Scotch, Eds., Social Stress, Aldine
have done a yeoman's service in collecting and integrating the various definitions, assumptions and scientific models now available for the concept of stress. The chapter in this book by Scott and Howard on Models of Stress is especially illuminating. For our purposes in this paper, we shall identify stress in accordance with the model provided by Hooke's law as we did earlier.

There are a variety of ways of classifying LE's. First is the classification according to its significance to the individual under study. How does he regard its importance, how much change in behavior must be wrought in order to accommodate to it. Second is its classification according to the group in which the person lives. How do the majority or modal subgroup regard the event in question. This is the view adopted by Holmes and Rahe. John Flanagan has approached the problem slightly differently from the point of view of critical events. By critical events, Flanagan means
Another approach is to evaluate LE physiologically. How much alteration is produced in the internal environment of the subject under scrutiny and whether it is reversible or does it produce a new level of dynamic homeostasis, or, does it produce a complete disruption in the internal environment.

Another measure of LE is the degree to which it alters psychological behavior. A good example of a psychological effect produced by a load which went beyond the physiological is the experiment on noise tolerance by Singer et al. In this experiment, two equivalent groups were exposed to a noxious noise. One group had the option of turning off the noise by pressing a button, while the other group had no such option. Although both groups reached a physiologically stable tolerance level which did not differentiate them, the group with the option was more successful in a cognitive task after the noise was eliminated than the group without the option. Apparently, equality in disturbance in internal environment does not guarantee equality in cognitive functioning.
Perhaps the most significant aspect of the Life Event is its relation to etiology of physical or mental disorders. An examination of the etiology of mental disorders reveals that there are at least 6 scientific models for etiology which might be useful for further investigation. Among these are: 1) ecological; 2) developmental; 3) learning; 4) hereditary; 5) internal environment and 6) neurophysiological (explain).

The ecological model requires the finding of the parameters of the ecological niche that have a bearing on adjustment. The various parameters that have been used in the past include such measures as socioeconomic status, educational and vocational level, degree of disorganization in the environment, family characteristics, overcrowding, isolation, etc. The taxonomy that ecologists provide for these parameters varies with the purpose at hand and no universally useful system has been developed. The Life Events which take place in the ecological niche may supply us with the required measure for estimating the effect of the parametric values of the
niche since the Life Events reflect and incorporate the effects of
the ecological parameters. Instead of measuring the parameters
themselves we may utilize the events that take place in the niche
as our measure and in this way get an index of the influence of
the ecological niche on actual adjustment to the pressures and stresses
of the environment.

From the point of view of LE, the ecological model is perhaps
the most interesting etiologically since LE deal with occurrences
in the ecological niche which influence behavior. The effect of
LE, however, is felt in all the other models and its effect on
development and learning are, of course, one of the primary con-
siderations. Its influence on the internal environment and on
the neurophysiological function are, of course, also very impor-
tant, and its interaction with the genetic factor is perhaps one
of the most salient features of LE.

These are some of the underlying concepts involved in the LE
field. The problem now is to integrate them into some kind of a
model which will permit the integration of the known facts in the
field and also permit the emergence of hypotheses for further testing in order to let the LE concept develop its full potential as an etiological force in health and disease.

In the search for such a model we need to be aware of the fact that models are only approximations to reality and in the process of model making certain sacrifices have to be made in order to make the model parsimonious and yet contain most of the fact under its umbrella, and above all, reveal the areas of ignorance which have to be filled in if the model is to prove useful. We shall try to meet these requirements in the best way possible.

In order to simplify the problem, let us examine the LE concept from the point of view of the experimental psychologist who is about to undertake an experiment in vision or audition. He selects his stimulus, sets up his laboratory task, selects his subject, instructs him in the task and then proceeds to deliver the stimuli and records the response. Hull and subsequently Graham and more recently Zubin have evolved the following equation for describing the experimental paradigm:
\[ R = f(S, R_c, O, H, P_1 \ldots P_i) \]

where \( R \) is the response emitted by the subject, \( S \) is the stimulus and its various parameters, \( R_c \) is the receptor organ on which the stimulus impinges, \( O \) is the state of the organism at the time of stimulation, \( H \) is the past history of the organism that has a bearing on the response, \( (P_1 \ldots P_i) \) are personality characteristics which determine the type of response. The personality variables have been introduced to take up the slack in the response which is not explained on the basis of the first four factors, and should also include the error factor. While the experiment is set up to measure a given type of response, say, the reaction time to a light stimulus, the subject emits more responses when the stimulus is applied than the experimenter measures. Thus, in addition to the psychomotor response — reaction time, a physiological, a sensory, a perceptual and conceptual component of the response also occurs even though the experimenter ignores these responses.

Furthermore, the condition of the subject before the stimulus
impinges — his idling state — is also important in determining
his response.

Let us now turn our attention to the LE situation. If we
regard the LE as a stimulus which will elicit a certain type of
response, we can analyze the paradigm for LE in the same way we
analyzed the stimulus in an experiment. Here the experimenter
is life itself and the subject may have a larger or smaller under-
standing of the task that the LE places before him. However, the
LE itself, the stimulus, can be analyzed into its parameters and
classified even as Holmes and Rahe have done on the basis of some
value system independent of the actual response it elicits in a
given individual. Whether the Holmes-Rahe system is the most
valid for assessing the nature of the LE remains open to question
and we have suggested at least two more methods of evaluation —
Murray's needs and Osgood's semantic differential. One problem
we must face is the fact that LE's are an ongoing activity as long
as the person is awake (whether dreams are LE's is an interesting
question, although the fact that dreams influence waking activity is certainly true). How do we separate the LE from the background of ongoing activity? Since ongoing activity usually evokes no major change in response, one criterion we can adopt for a LE is that it should produce a change in the ongoing activity.

The LE must present some kind of situation requiring a re-adjustment on the part of the subject under scrutiny. It may be regarded as Scott and Howard have postulated for stress, a problem to solve. Unlike the situation in the psychological laboratory, no instructions are given to guide the response, the subject must find his own solution. What determines the choice of response or solution? We have already pointed out that the wants, needs etc. are the determiners of what kind of a response will be elicited including no response.
The problem of defining a discrete event is sometimes relatively simple if certain criteria are available for making such a definition. For example, the Social Security Administration defines events which are crucial in determining the size of the monthly check of a recipient as follows:

"You or someone acting for you -- must notify the Social Security Administration promptly if any event occurs which may have some effect on your monthly payments." Events like change of address, death of a spouse, divorce, change in earnings, are some of the events that are reportable, and a catalogue of such events is included in a brochure. The criteria for LE that we are concerned with are not as easy to arrive at, and that is part of our problem. To find events which are related to the occurrence of physical or mental illness, it is necessary to include all types of possible events and determine empirically whether they are related or not. The total universe of LE will consist of some events that are antecedent to illness, some which are independent of subsequent illness and some which may be the
result of an incipient but not yet detected illness. How to differentiate between these three types is indeed a difficult question and only further empirical research can cast light on it. Regardless of how we classify the events, once we select an event for study, we can begin to find its stimulus characteristics in terms of the parameters that characterize it, e.g., its social aspects, its physical aspects, its meaning in terms of gains or losses and significance for the future. The particular parts of the individual — his organ system, his social network, his other characteristics which are influenced by the event come in next for analysis. Then follows his status at the time the event occurs — his age, sex, mental status, children, state of health etc.

The prior history of the individual with regard to similar events must also be investigated and finally his personality characteristics which may play a role in his ability to cope with the changes induced by the event.

Adopting our model based on Hooke's law as a paradigm, we can, following Scott and Howard speak of the state of tension (stress) produced by the inability to find a proper response —
a satisfying solution to the problem presented by the LE. It would then follow that an accumulation of such tensions would finally bring about an impasse in the form of a physical or mental disturbance.

In trying to apply the LE paradigm to the aged we need to inquire what are the primary LE that are important in this age range. In other words, what are the particular needs, wants and desires that are the mainsprings of the motivation of the elderly and which LE are likely to frustrate these motivations and which are likely to enhance and satisfy them. In this way, we might be prepared to intervene in a manner which may prevent the deteriorative process sometimes accompanying aging and even take advantage of some of the potentialities of the aging process.

Aside from the organic and vegetative needs that the aged have in common with all ages, what are the special needs and desires, especially those that now go unheeded which may lay the basis for the devastating response the aged often give to ordinary LE.

We need a catalogue of these needs and desires in order to build our LE inventory.
We also need to standardize these LE on an aging population in order to establish ratings suitable for the elderly. Certainly marriage at age 65 does not play the same role as it does at 25 and the same holds true for the weights of the other LE.

We also need to determine what types of classification of LE have proved useful in the past.

We need also a convenient way for getting the information. Should we start with the most important LE that happened during the past year -- or -- should we attempt a historical retrospective survey by asking -- Where were you living last year in August -- what were you doing for a living, Who were your closest friends etc. Then follow up with the question, what has changed in this regard. Are you still living in the same place -- are you as comfortable there now as you were last year -- what has changed etc.
References

Chap. 6: Wants. Pp. 96-143.
Chap. 8: Mental Dynamics. Pp. 184-218.