INTEGRATIVE COMPLEXITY OF ENGLISH LITERARY FIGURES
AS A FUNCTION OF ENVIRONMENTAL FACTORS

by

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The integrative complexity of various literary figures was examined as a function of certain personal and social stressors operating across their own life spans. Previous research concerned with the complexity of information processing as a response to the changing demands of the environment has focused on the strategies employed by individuals in political and/or decision-making contexts. The current study was designed specifically to investigate the information processing complexity of individuals who are unencumbered by the responsibilities associated with high-level decision making.

The lives and personal correspondence of five eminent English novelists of the nineteenth and twentieth centuries were analyzed. It was hypothesized that the following factors should influence integrative complexity: stressful life events, changes in health, war intensity, and civil unrest. Each individual's life was divided into consecutive five-year time periods, and for each period personal correspondence was scored for integrative complexity. Using multiple regression analysis, the following results emerged: information processing complexity is positively related to age; illness and war intensity are both negatively related to complexity; and there is a positive correlation between civil unrest and complexity. In interpreting the relationship between complexity and both war intensity and civil unrest, it was suggested that the information flow in the environment is an influential factor in determining the ways in which individuals respond to these situations.

In addition, a variable called terminal years was initially introduced into the analysis to control for possible biases resulting
from the five-year analytical framework employed. It was subsequently
determined that this variable served a function other than that which
was originally intended. It emerged as a significant predictor of
integrative complexity, the relationship indicating that complexity of
information processing decreased shortly prior to death. This result
was explained with reference to life-span developmental research that
has shown marked performance decrements that appear to occur in close
proximity to the death of those individuals studied.

The current research has supported the general hypothesis that
information processing complexity is affected by changing aspects of
one's environment. The findings suggest not only that factors such as
stress and information input affect cognitive processes, but that
physiological factors such as ill-health also appear to be related to
integrative complexity. It was advised that the results of this work
should be interpreted with a certain degree of caution, particularly
in light of the small sample investigated. This research however points
to a number of interesting directions of inquiry that future studies
in the area of complexity might pursue.
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INTRODUCTION

The objective of this archival study was to search for possible relationships between the changing integrative complexity in the writings of various literary figures and the presence of various personal and social stressors operating across their own life spans. In order to locate this research effort in the context in which it was developed, an attempt will be made to set out briefly a recent history of theory and research in the area of conceptual complexity as it was first articulated in the work of Harvey, Hunt and Schroder (1961). This initial work was further refined by Schroder, Driver and Streufert (1967) and later extended in scope and adapted for archival analysis by Suedfeld and his colleagues (e.g., Suedfeld & Tetlock, 1977).

Rather than analyzing these theoretical positions in detail, these works will be selectively reviewed in order to highlight those ideas and research findings which support the rationale for the study which follows. In addition a brief description of various archival research methodologies will be presented in order to demonstrate the utility of this approach as an alternative to more traditional experimental techniques.

The theoretical orientation of Harvey et al. set them apart from other researchers concerned with topics related to conceptual complexity in that it focused on stylistic modes of information processing as dimensions of personality organization. Rather than viewing individual differences from the point of view of the content and directionality of thought processes—attitudes, needs, values, and so on—Harvey et al. recognized that the ways in which people combine and use information
in their environment varied extensively in degree of abstraction and structural complexity. Both content and structural variables, however, were considered to be important in understanding an individual's specific orientation toward his environment. Content variables such as attitudes and beliefs can be used much like a set of rules which determine the ways in which a person organizes information (Schroder et al., 1967).

In a relatively early examination of organizational style as a personality variable, Harvey et al. (1961) proposed that a concept be viewed as a system for ordering information that determines in large part how a person relates to the objects in his environment. Concepts, according to these authors, evolve through a process of increasing differentiation and integration. Differentiation, in this view, refers to the number of categories or kinds of information a person is able to process in a given situation, while integration refers to the development of complex connections among these differentiated characteristics. According to Harvey et al., the most important structural characteristic of a concept is its degree of concreteness or abstractness. People who are concretely organized are characterized by rigid evaluations of events and an inability to consider situations from more than a single perspective. As conceptual structure becomes more abstract there is an increased availability of alternative perceptions of the same event which when interrelated may lead to new conceptual organizations and increasingly complex judgment strategies.

In developing the theory that individuals differ in the way in which their conceptual systems are organized, Harvey et al. (1961) proposed that conceptual structure progresses in stages along the dimension of concreteness-abstractness. They assumed that "phases occur in most forms of development in the process of trying to adapt
or to make sense out of any novel and relevant situation" (p.19). This assumption rested on earlier developmental models (e.g., Werner, 1957, cited in Harvey et al., 1961) which proposed that conceptual development advances through stages, from the simpler to more complex, or from the less differentiated to the more highly integrated stage. In proposing that conceptual structure likewise progresses in stages, Harvey et al. contended that the extent to which stimuli are differentiated and integrated at one stage will determine whether a person proceeds to the next structural level.

For instance, an individual functioning at a concrete stage is assumed to rely on external authority and control and to be characterized by absolutistic thinking. To progress beyond this level, Harvey et al. suggested that a person must learn to discriminate between, for example, the opposing poles of internal and external control and to successfully integrate these discrepant evaluations. Learning is viewed in terms of the acquisition of such increasingly differentiated and integrated concepts. Training conditions which promote such development are therefore assumed to be a major factor in the formation of more mature conceptual structure. If environmental conditions do not promote the development of appropriate levels of differentiation and integration at each stage, growth may become arrested. This theory proposes that individual systems of organization that have become fixated at a given structural level are viewed as typifying some degree of closedness to further progression and are considered to be relatively inflexible.

Harvey et al. posited that once formed in the course of development, conceptual structures do not change in any major way in adulthood. This assumption however has not been subjected to any empirical tests. It
should be noted that these theorists studied conceptual structure within particular domains, for example, with reference to interpersonal or religious stimuli. They proposed that individuals could become more complex with increasing familiarity in a given domain. This assertion was more applicable to persons whose conceptual structure had already attained a relatively high degree of complexity than for those persons for whom development had become arrested at a more concrete stage. In other words, with increasing experience, "simple" people may advance slightly but their structure is essentially closed, whereas "complex" individuals are more capable of becoming increasingly abstract.

While these theorists have maintained that their primary interest was in the organizational and structural properties of concepts, their theory evolved into one that treated both structural and content variables as interrelated aspects of conceptual systems. One of the basic properties of concepts emphasized was their directionality, or the tendency to evaluate objects in the environment either positively or negatively. In addition conceptual development was described in content-oriented terms such as dependence on external authority and a concern with interpersonal relationships. Further, development was assumed to proceed along a continuous dimension of abstractness but central to the theory was a delineation of discontinuous stages of conceptual systems where progression required developmental "leaps" from one level to the next.

Schroder et al. (1967) later drew on the initial theoretical orientation of Harvey et al. (1961) with the intention of more clearly distinguishing between the content and structure of information processing. They focused specifically on the number and interconnectedness of rules used by individuals to combine and organize information. In
this approach conceptual structure refers to integrative conceptual rules; the number of different ways an individual learns to combine and relate a set of information items determines the level of conceptual complexity. In their research Schroder et al. defined experimental environments in terms of degree of complexity in order to study conceptual and environmental factors in interaction. As the study to be discussed in this thesis stems more directly from the theory of conceptual complexity as presented by Schroder et al. the following discussion is based on their orientation rather than that of Harvey et al.

Two interdependent properties of information processing structures are postulated in this conceptual complexity model: the parts or dimensions and the integrating rules. A category or characteristic of a stimulus object recognized by an individual may be regarded as an independent attribute along which the stimulus can be scaled, e.g., degree of brightness. The dimensional attributes of a stimulus may then be weighted and combined according to one or many conceptual rules that give rise to different perspectives of the stimulus object. These perspectives may in turn be related or connected in making evaluations and judgments. An example from Schroder (1971) may clarify the above. An individual might perceive two kinds of information as relevant to a stimulus person: creativity and orderliness. Along each of these dimensions the stimulus person is scaled by the observer. These scale values are weighted and combined in such a way as to generate a perspective about the stimulus (e.g., low creativity is more important than high orderliness, etc.). However the observer might also use a different combinatory rule to generate a perspective where a situation or style called for a heavier emphasis on orderliness than on creativity,
and so on. "In higher-level structures with more rules and interconnecting linkages, the individual has more ways to relate to persons and objects and to generate new aspects of relating" (Schroder et al., 1967, p. 9). The number of dimensions perceived in a stimulus is not necessarily related to complexity of processing, as a person using two dimensions may combine them in different ways and compare outcomes, whereas a person using three dimensions may have only one fixed rule to generate a perspective. In general, however, more complex information processors differentiate a larger number of characteristics in a given stimulus domain.

Schroder et al. (1967) suggested that many gradations or structural levels could be described along the conceptual complexity dimension. In simple or concrete structures stimuli are interpreted in a unidimensional manner and the rules of integration are generally fixed. Individuals who function at this level are characterized by rigid evaluations of stimuli and rejection of dissonant information in order to minimize conflict. With a fixed set of rules, the problems of choice and error arise less frequently. Individuals tend to engage in categorical black-white thinking; conflict is minimized by fitting stimuli into existing categories or excluding them from consideration; there is a general inability to understand another's perspective. For instance if an individual holds an extremely concrete view of a particular minority group, all members of that group will tend to be lumped into one category (for example, "bad") and contrasted to others. Dissonant information about the group will be either excluded from consideration or distorted to fit the existing attitude.

As the abstractness of structure increases, the system becomes less
determinate. Decisions are made on the basis of more information, but there is less certainty involved as more alternatives are recognized and taken into account. Rather than categorizing a stimulus on one dimension under one set of conditions, an individual might interpret the same stimulus at two places on the same dimension by using alternate rules at the same time. For example a person might view the purpose of societal rules from the point of view of those governed as well as the governing agents, how these purposes are related and influence one another in such a way as to promote effective change.

At the complex end of the continuum the system is open and flexible; there is a search for novelty and further information; new interpretations of the same event may be made; more complex rules are used to interrelate the perspectives; and multiple points of view are considered simultaneously. As Schroder (1971) noted, "this ability to generate multiple perspectives by weighting similar dimensional scale values of information differently represents a critical step in personality development in any stimulus domain. In the interpersonal domain, it may be observed as a reduction in absolutistic thinking. It represents the ability to view and understand events from another person's perspective and to arrive at alternative judgments or opinions about people or events. It represents a marked advance in the complexity of thinking, in providing the foundation for an individual to generate conflict and ambiguity for himself" (Schroder, 1971, p. 253).

The Paragraph Completion test (Schroder et al., 1967) is one of the tests devised to measure individual differences in modes of information processing, and has been frequently used and validated in a number of studies. The subject in this test is asked to write two or
three sentences in response to each of a series of sentence stems (e.g., "When I don't know what to do . . ."). These completions are scored for level of conceptual complexity on a seven point scale. This is done by considering the number of alternative dimensions apparent in the completion and the ways in which the dimensions are combined and related to each other. High complexity is associated with more dimensions, conditional relationships, integrated choices, and positive search for information from several sources. A very simple response to the stem given above might be "I look for my wife" or "I sit down and think things over." A more complex completion would indicate that the subject consults different sources, considers different solutions and combines the best components of each. For instance, "I try to figure out a reasonable course of action, considering all the available evidence. I often have doubts after this, and consult other people in order to consider their opinions. The result is hardly a final solution, but it usually serves as a springboard for further consideration" (Schroder et al., 1967). Higher complexity also implies that the situation is not necessarily stressful and undesirable, and that conflict may lead to excitement and new information.

By utilizing a number of different research strategies and measurement techniques, Schroder et al. have shown that conceptual level does vary among individuals and in addition varies within the same individual under certain conditions, for example, under stress. It should be noted that both Harvey et al. (1961) and Schroder et al. (1967) were interested in conceptual structure as a personality trait. An important emphasis of the theory however is that information processing complexity is an interactive consequence of environmental and dispositional factors.
The term "integrative complexity" has been used to distinguish between the dependent variable of information processing (which may change as the situation changes) and measures of conceptual complexity as a personality characteristic (Suedfeld & Tetlock, 1977).

In order to investigate the level of information processing that persons use in particular situations, Schroder et al. (1967) defined their experimental environments in terms compatible with complexity theory. Specific properties of the environment that were believed to be relevant to the differentiation and integration of information were utilized in a variety of experimental situations. For example, the complexity of an environment is a central factor, in that an overly simple environment would fail to present sufficient information to stimulate integration processes. In addition to the sheer number of information units in an environment, the authors suggested that the dimensions of uncertainty, severity of the adverse consequences of behaviour, and the amount of reward or promise given by an environment also affect cognitive functioning. These latter two are alternately referred to as "cost-reward", "interest-threat", etc.

By engaging subjects in a tactical game task, Schroder and his colleagues found that increasing environmental complexity and load has the effect of first increasing the degree of flexibility and integration involved in decision making to an optimal point, then causing it to diminish as overload occurs. Thus a general inverted U curve relationship was found between level of information processing and environmental complexity. In these particular experiments the "cost-reward" factors were held constant. In another series of experiments that used an inter-nation simulation game, the hypothesis
was that integrative complexity is related in a curvilinear fashion to cost-reward dimensions, whether they act alone or in combination. Increasing cost and/or reward from zero to optimum should increase integrative abstractness, while increases beyond optimal levels should cause regression toward more concrete levels.

With complexity and interest level high in the inter-nation simulation, increasing cost (defined here as a function of military threat) decreased the level of differentiation and integration. Complexity of information processing was measured in these experiments by multidimensional scaling of the perception of participants in rating the other nations in the simulated world. War and threat "produced decrements in individual perceptions with respect to dimensionality weighting and the relative weight of internally generated dimensions" (Schroder et al., 1967, p. 85). Furthermore, it was reported that "too much (cost) can adversely affect conceptual structure in both the informational and social areas by inducing reduced processing of existing information and resistance to new inputs. More succinctly, overnoxious conditions can produce oversimple, hierarchic cognitive structure" (p. 87). It should be noted that the changes in level of information processing were, according to these theorists, supposedly normal, temporary adaptations to stress.

The results cited above were obtained for the most part from experiments that involved decision-making in simulated situations. Both the environment and the modes of response were therefore under strict experimental control, which of course is not the case in real life crisis situations. Suedfeld and his coworkers have recently enlarged the scope of complexity theory in the analysis of archival
material. This approach is particularly valuable in that it provides the opportunity to investigate the integrative complexity of individuals in non-laboratory situations.

In one study, Suedfeld and Rank (1976) investigated the importance of adapting one's processing mode to the demands of the environment. The study was concerned with the characteristics that make for successful revolutionary leaders both before and after the revolutionary movement. Communications of individuals prominent in a number of different revolutions were scored for complexity. The hypothesis was that those individuals who retained power after the struggle would be able to move from a simple processing mode during the revolutionary phase to a more complex mode necessitated by the diverse problems of governmental administration. It was believed that a successful pretakeover revolutionist should express himself in relatively simple ways, emphasizing the ultimate good of the revolution versus the evil of its opponents, seeing problems and solutions in absolutistic terms and refusing to compromise on any point. Conversely, a government in power needs individuals who are flexible decision-makers, particularly after a political struggle when various factions have to be reconciled and conciliated. Administrative policies must be based on diverse considerations and interactions; in short, to be successful leaders of government requires complex information processing strategies.

Published communications of revolutionary leaders taken from materials produced during the struggle and from the phase of consolidation after takeover were scored for complexity. The basic scoring system for the Paragraph Completion test was used. Suedfeld and Rank (1976) noted that although the scoring system was developed for the
particular material of the test, it is equally appropriate for any other connected verbal material of sufficient length. The results showed a highly significant relationship between an individual's ability to remain in power after the victory and the degree to which the complexity of his productions increased from before to after the takeover. "This lends support to the hypothesis, which was based on the changing demands of the environment as one progresses from rebel to ruler, and on the necessity for different problem-solving characteristics to meet these changing demands" (p. 173). As Suedfeld and Rank were measuring information processing as a response to the environment, rather than as changes in "chronic" modes of processing, they interpreted their results to reflect information processing complexity as a "style that individuals can change when they desire to do so or when the environment appears to require such change" (p. 171).

In studies of real life decision making in international crises, Suedfeld and Tetlock (1977) investigated the relationship between communication complexity and the way in which crises were resolved. This work was motivated in part by the analyses of international crises by political scientists and historians (e.g., Holsti, 1972). Viewed from the perspective of decision makers under stress, crisis situations often involve information overload combined with an imperative demand for crucial decisions to be made quickly and correctly, resulting in a reduction of the information processing complexity of the individuals involved. Analyzing documents from national decision makers in a number of crisis situations, Holsti found several trends which he related to the eventual outcome of the crisis. For example in a comparative analysis of documents associated with policy makers
in World War I versus those from the 1962 Cuban Missile crisis, Holsti (1964) noted that more flexible and complex information processing was characteristic of leading decision makers in the 1962 crisis. It was suggested that the ability to cope with stress might help to distinguish crises that lead to violent or extreme solutions from those that are resolved more moderately (Suedfeld & Tetlock, 1977).

These analyses led Suedfeld and Tetlock (1977) to hypothesize that international crises ending in war are preceded by governmental communications that are integratively simpler than messages preceding peaceful resolutions of conflict. Records of speeches, diplomatic communications, and official statements of government policy from a number of crisis situations were scored for complexity. The findings supported the general predictions; for example, the 1914 crisis was characterized by significantly lower levels of communicative complexity than was the 1962 crisis. In addition complexity of information processing declined between earlier and later phases of the 1914 crisis and increased in a similar comparison in 1962.

Suedfeld and Tetlock (1977) concluded that their findings supported the general predictions concerning reductions in information processing complexity as a function of environmental stress. However they emphasized that the data could not specify whether a decline in complexity prior to war was due "solely to situational factors--i.e., that in 1914, conditions became less and less favorable for complex processing, while this was not the case in 1962 . . .--or to personality differences interacting with the situation (so that in 1962, but not in 1914, individuals in decision-making roles were people who could maintain complexity even under adverse conditions)" (p. 176).
In referring to the work of Holsti et al. (1964), these authors noted that in 1962 conscious attempts were apparently made to avoid the danger of simplification—by considering a number of alternative solutions, seeking out all relevant information, estimating the possible outcomes of alternatives while avoiding any premature decisions. This implies, as the authors suggested, that it would be possible to maximize integrative complexity in crisis situations.

In a more recent study, Suedfeld, Tetlock and Ramirez (1977) traced the integrative complexity of speeches made in the United Nations on the subject of the Arab-Israeli confrontation. The major hypothesis being tested was similar to that of the Suedfeld and Tetlock study, in that it was predicted that the outbreak of war would be preceded by integrative simplification in the speeches made by representatives of the United Arab Republic and Israel. A distinguishing feature of this research lies in its investigation of this hypothesis in a situation where repeated outbreaks of armed conflict occurred between the same set of opponents over a long period of time.

In addition to looking for changes in integrative complexity in the speeches of the major opponents, Suedfeld et al. (1977) were also interested in whether the speeches made by representatives of these countries' "primary Great Power patrons" would exhibit similar changes. In other words, an attempt was made to assess the closeness of the relationship between Israel and the U.S., as well as that between the Arabs and the Soviet Union by examining the patterns of change in the speeches of the respective countries.

Also investigated was the hypothesis that changes in the level of complexity as a crisis approaches would be affected by the extent to
which each country was involved in the conflict. As Israel had more at stake in a major conflict than did the other countries being studied, it was predicted that changes in complexity as a function of imminent crisis would be more dramatic for Israel, followed (in order) by Israel's major Arab neighbors, the United States and the USSR.

War in the Middle East was defined operationally as an armed conflict in which the regular military forces of more than one nation were involved. Four war years were defined using this criterion; other years during the period spanning 1947-1976 were randomly sampled so that a total of twenty time points was obtained. For each year in the study, the official English-language versions of speeches made in the UN General Assembly and Security Council dealing with the Middle East situation were sampled.

The results of the data analysis indicated that complexity decreased significantly during the times immediately preceding the outbreak of war. The decline in complexity from peacetime to war was greatest for Israel, followed by the Arab countries and the US, as predicted. The integrative complexity of speeches made by delegates of the USSR increased prior to war. In addition the pattern of changes in the speeches was more similar between Israel and the U.S. than between the Arabs and the Soviet Union, suggesting a more consistent tie between the former two countries than the latter.

In summarizing their findings the authors stated that "even in a hostile confrontation that goes on for a long period of time, major outbreaks of violence are preceded by unusually low levels of complexity in international debates. Between such outbreaks, the protagonists—although still hostile—evidence higher levels of complexity. These
changes occur within the same general time periods for the two direct opponents" (p. 436-437).

In discussing a number of implications of this research concerning the relevance of integrative complexity to the study of international events, Suedfeld et al. (1977) pointed out a particularly compelling aspect of this study. Given that the predicted pattern of changes in complexity was found, the authors suggested that this approach could be used in the future to predict an imminent outbreak of war between the Arabs and Israelis. Rather than offering such scores as explanations for past events, which has been a criticism of many approaches to the psychological study of history and international relations (Suedfeld et al., 1977), this study points to ways of using integrative complexity as a predictive tool in future research.

The research cited above supports the validity of changes in information processing complexity as a function of environmental pressures. As noted previously, Schroder et al. (1967) stated that the results of their research supposedly reflected reductions in integrative complexity as normal, temporary adaptations to stress. The work of Suedfeld and his coworkers has shown that in some situations the adaptive response of individuals has been towards increasing, rather than decreasing complexity. However, the response modes of these individuals may be seen as reactions to stressful situations in combination with the stress of decision making. The demand for crucial decisions to be made correctly as well as the implications attendant on those decisions in crisis situations undoubtedly affect the coping strategies adopted by the individuals involved. The study to be presented in this thesis represents
an extension of the research on information processing complexity from a somewhat different perspective; its purpose was to examine complexity as a response to stressful situations in contexts other than those involving high-level national decision making.

Archival Analyses

The research by Suedfeld and his coworkers, cited above, demonstrates the usefulness of Schroder et al.'s (1967) theory and techniques as adapted to historical, archival research. In addition to the value of the research in extending conceptual complexity theory, it is also timely from a methodological perspective in that archival analyses have recently received more attention in psychological literature as alternatives to strict laboratory experimentation.

Social psychologists are by now very familiar with the criticisms that have been leveled at laboratory experimentation. The potential artifacts associated with the traditional way in which hypotheses have been tested (such as experimenter bias, demand characteristics, etc.) have received considerable attention in the literature, as have ethical issues relevant to laboratory social experiments. Suedfeld and Rank (1976) felt that some of these problems had been avoided in their research. With respect to the usefulness of adapting the Paragraph Completion test to archival scoring, they noted that "it is a nonreactive measure and avoids the problems of equipment, facilities, subject recruitment, etc., and their concomitant artifacts. Thus, it enables the researcher to avoid some of the temporal, geographic, and cultural restrictions" (p. 177) of laboratory experimentation.

Alternatives to laboratory experimentation have also been sought
for reasons other than the artifactual problems with traditional methodologies. Several authors (e.g., Elms, 1975; McGuire, 1973) have argued that the established theories and experimental methods in social psychology have failed to tap the complexities inherent in the cognitive and social systems that researchers in the field are trying to describe. In particular, McGuire (1973) contended that theories and methods have been "based on a simple linear process model, a sequential chain of cause and effect" (p. 448). This approach, according to McGuire, has been inadequate in describing the ways in which variables are organized in the individual and social systems.

In proposing that social psychology is suffering from a "crisis of confidence," Elms (1975) concurred with McGuire in noting that "the most influential theories in modern social psychology have been sweeping single-factor or two-factor propositions, attempting to account for a wide range of variables with as little acknowledgment of human complexity as possible" (p. 970). Yet when subjected to intensive empirical study these theories have not fared well, a fact that has contributed to the general malaise felt by many in the field. According to Elms, there has been an expectation that research should be relatively easy to conduct, despite the overall complexity of the field, and these high expectations have been contradicted by "harsh reality."

In proposing alternative research strategies that would enable social psychologists to deal more effectively with some of the difficulties outlined above, both McGuire and Elms have suggested an increased use of longitudinal studies, time-series data, and various kinds of multivariate analyses. In addition they have proposed that archival data be used more extensively than it has in the past in social
Although the position taken by Gergen (1973) is more radical than others concerned with the theoretical and methodological basis of social psychology, he also argued for the utilization of a broader range of research methods in the area. Gergen asserted that social psychological research is "primarily the systematic study of contemporary history" (p. 319) in that it deals with phenomena that are "largely nonrepeatable and which fluctuate markedly over time" (p. 310). He contended that laboratory experimentation is an inappropriate method by which to assess the durability of these phenomena, i.e., the extent to which they may be subject to historical change. Content analytic techniques, in Gergen's view, should be employed to examine earlier historical periods, just as the vast quantities of information regarding behavior patterns in the past should be utilized.

The analysis of archival material, particularly content-analytic techniques, has been employed frequently in such disciplines as sociology, anthropology, communications, and political science. Holsti (1968) noted that the most discernible trend to date in content-analysis research has been towards wider application within a variety of spheres of inquiry such as folkloristics, biography, history, psychoanalysis, linguistics, propaganda, cognitive organization, and psychotherapy.

A glance at research devoted to psychological issues reveals that content analyses and other techniques that involve the analysis of archival material are by no means new to the field. Admittedly, such studies are few in number, but they provide examples of the ways in which archival data can be utilized in addressing questions of psychological relevance. Cox (1926), in a biographical analysis of 301 geniuses,
used a sample spanning four centuries and sixteen nations in an attempt to determine the effects of intelligence and personality in the early years upon achieved eminence in the adult years. Lehman (1953), in a longitudinal analysis covering entire life spans, attempted to set forth the relationship between chronological age and outstanding performance. McClelland (1961) measured need for achievement by content analysis of a number of archival sources including folktales and imaginative literature, in order to relate achievement and other psychological variables to economic development.

Historians and political scientists have become increasingly interested in studying the relationship between psychological variables and political decision-making. For example, in research previously referred to, Holsti (1972) applied content-analytic techniques in investigating the effects of stress on policy making in 1914. He was particularly interested in how foreign policy officials perceived and interpreted the crisis situation leading up to the first World War. A wide range of sources was used in gathering data: documents written by policy makers, histories, biographies, diaries and memoirs, contemporary newspapers and journals. The results of the analyses were referred to briefly in discussing Suedfeld and Tetlock's (1977) research. As the crisis approached its peak, decision makers increasingly perceived that they were under time pressure. The actions of other participants appeared to become more hostile, and there was a drastic increase in the perceived need to make rapid decisions.

Axelrod's (1976) research on cognitive maps provides another method by which to examine the cognitive processes of decision-makers. A cognitive map, as defined by Axelrod, is a specific way of representing
a person's assertions about a particular issue, such as a policy problem. It attempts to set down the structural relationship between perceived alternatives, the consequences caused by a given choice, policy goals, and so on. This method was devised by Axelrod to be used in conjunction with suitable documentary material (e.g., verbatim transcripts of policy groups) in order to obtain individuals' assertions in an unobtrusive manner. He believed that in order to understand the decision-making process, "one must examine the whole structure of the concepts and linkages that are used to bridge the gap between choice and outcome" (Axelrod, 1976, p. 78).

In a related area of research, Hermann (1974) examined how the personal characteristics of political leaders affect their political behaviour. Methodologically, Hermann's study is relevant to the present discussion in that she attempted to devise methods of measuring personality characteristics of leaders who were inaccessible for taking tests or being interviewed. In addition, her research represents an attempt to measure cognitive complexity, but by means quite different from those previously discussed here. It should be pointed out that Hermann used "complexity" as a personality variable, without studying the effects of situational influences.

Press interviews of ten heads of state between 1962 and 1968 were analyzed for complexity by counting the appearance of words thought to indicate high complexity (e.g., perhaps) and others low complexity (e.g., never). Complexity, so defined, was highly correlated with the use of deeds (e.g., use or regulation of national resources) as opposed to words (press releases, messages) in the conduct of foreign policy, but only for heads of state who had little training in diplomatic affairs.
Recently, Simonton has done an extensive amount of archival research, much of which attempts to address some of the issues raised by Elms and McGuire (among others). In addition to exploring theoretical questions of interest to psychology, this work was intended to demonstrate the usefulness of applying multivariate designs and nonexperimental designs such as time series to archival data.

In one study, Simonton (1975a) hypothesized that creativity may be influenced by a number of variables that operate on different periods of a person's life. Dividing the lives of creative individuals into phases (e.g., developmental, productive) he predicted that creativity during a person's productive period is influenced by certain experiences in their developmental phase. Information from cultural and political archival sources was collected to form time series spanning 127 generations of European history. The results of multiple regression analyses indicated that creative development was affected by role model availability and political instability. Using cross-cultural and transtemporal data, Simonton (1975b) also investigated the relation between age and creative achievement. A sample of 420 literary creators was drawn from histories, anthologies, and biographical dictionaries. The results derived from regression analyses confirmed that (a) poets produce their greatest work at an earlier age than do writers of prose, and (b) eminent literary figures tend to make their most significant contributions at more advanced ages than those who are less eminent.

In exploring the relationship among various scientific endeavours and military activity, Simonton (1976a) gathered European historical data from 1500 to 1900 A.D. Cross-lagged correlational analyses revealed that medical discoveries are negatively correlated with war casualties.
In another study (1976b), the relationship between war and scientific discovery and invention was investigated in seven European nations. Inconsistencies among different countries were found; for example, war appeared to encourage science in the following generation in England and Russia, but discouraged it in Spain.

The study to be presented in this paper was motivated in part by a recent study of Simonton's (1977) dealing with creative productivity, age, and stress. The lives and works of ten classical composers were analyzed in order to investigate longitudinal fluctuations in productivity. It was hypothesized that productivity is an inverted U function of age, and is affected by social reinforcement, stressful life events, war intensity and civil unrest.

The relationship between productivity and stressful life events was proposed based on research suggesting a curvilinear relation between emotional arousal and performance, which led Simonton to predict that productivity is an inverted U function of stress. He reasoned that under low stress conditions there would be insufficient motivation behind the creative process; increasing stress beyond optimum would also have adverse consequences for productivity. With respect to war intensity and productivity, Simonton noted that no consistent relationship has been found between war and creativity. He suggested however that no study to date has investigated whether war has an immediate impact on productivity within the life history of individual creators. If such a relationship exists it may have been obscured by bursts of productivity in peacetime that compensated for a decline in output during war years. His hypothesis that productivity is a negative linear function of war intensity was based on the belief that warfare
may discourage creative activities, whether through economic hardship, political repression, or militaristic regimentation. Civil unrest was also postulated to be negatively related to productivity, assuming that civil and political instability probably result in excessive economic, political and personal strains that would not be conducive to the creative process.

Each composer's productive life was divided into consecutive five-year age periods, the total number of these time periods across all composers being used as the statistical units of analysis. The results of the multiple regression analysis indicated that, rather than being an inverted U function of age, productivity did tend to rise and then fall, but the decline did not tend to reach the level of the initial ascent (described by Simonton as a slight "inverted-backward-J" curve). Furthermore, "total productivity, while affected by age and physical illness is otherwise free of external influences (viz., social reinforcement, biographical stress, war intensity and internal disturbances)" (Simonton, 1977, p. 791).

The current research stemmed from a desire to incorporate questions relevant to information processing complexity into a methodology similar to that used by Simonton (1977). As previously noted, archival analyses provide an opportunity to study the ways in which individuals respond to stress in non-laboratory situations. One of the major questions addressed in the present research was how individuals in other than political and/or decision-making contexts respond to environmental pressures. If changes in complexity are adaptations to the changing demands of the environment, this assertion should be examined in an
investigation of personal coping strategies that are unencumbered by the responsibilities associated with high-level decision making. To this end, Simonton's (1977) research is of value to the present investigation as several variables examined in his study may be viewed as examples of environmental pressures that could influence information processing complexity.

The study to be reported here analyzed the lives and correspondence of eminent novelists. The rationale underlying the choice of novelists stemmed from several considerations. The assumption that this subset of individuals tends to be more verbal than some others contributed to the decision, as the design of the study necessitated written material that could be scored for complexity. Furthermore, it was believed that eminent writers would be sensitive to societal and political issues, an important criterion when attempting to assess responses to the tensions associated with large scale issues (as opposed to stressors of a more personal nature).

Rather than reviewing the vast amount of literature related to stress in order to determine what sorts of events are perceived as stressful, one may make some assumptions concerning several types of situations that probably induce stress and concomitant coping behaviour. Holmes and Rahe (1967) define as "social stressors" any set of circumstances "the advent of which signifies or requires change in the individual's ongoing life pattern" (Rabkin & Struening, 1976, p. 1014). Moos and Tsu (1976) note that "changing one's physical environment, changing interpersonal relationships, changing jobs, and so on, all involve some stress and thus necessitate new patterns of coping and adaptation" (p. 4). Although a crisis generally connotes a
more extreme situation than those mentioned above, the assumptions upon which "crisis theory" rests might be seen to generalize to many situations perceived by an individual to be stressful. "Crisis theory asserts that people generally operate in consistent patterns, in equilibrium with their environment, solving problems with minimal delay by habitual mechanisms and reactions... A crisis is essentially a disturbance of the equilibrium, an 'upset in a steady state'" (Moos & Tsu, 1976, p. 13).

Operating on the premise that a stressor should have some of the characteristics mentioned above, two situations were hypothesized in the present research to require adaptation primarily on an individual level: life events necessitating adjustment, and changes in an individual's health.

On a more global level, it seemed clear that some political events, whether intra- or international, would be perceived as stressors by the residents of the nation in conflict. Two variables, War Intensity and Civil Unrest, were introduced in order to examine this hypothesis. The two variables were treated separately in order to distinguish the "inner tension... of one part of the same social system against another" (Sorokin, 1937, p. 407) from phenomena of international tension and disturbance. Pressure associated with such events could come from a number of sources including fear for the lives of those involved or for family and friends becoming involved, economic hardship, the perceived threat of the situation to important values, and the manner in which the conflict situation was being handled by those in power.

Holsti (1972) recognized that international events are salient not only for political leaders. He found for instance that changes in various financial indices during the period of crisis in 1914 were
matched by the pattern of changes in decision-makers' perceptions of hostility, used in his research as a measure of stress. In other words, financial indices reflected the state of international tension. These results suggest that the public's response to an unstable political situation could be influenced by a number of sources, all of which reflect the tension produced by the particular event.

Another relationship to be examined in an extension of complexity research was that between age and complexity. Although it has been asserted (Harvey et al., 1961) that an individual's level of information processing remains relatively stable throughout his adult life, this has not been empirically tested in a longitudinal framework.

Simonton (1977) suggested that the results of his research with composers should be replicated on samples of creators in other fields of endeavour. Given the similarity of the design of the research to that reported here and that of Simonton's, as well as the choice of individuals studied, it was reasoned that the inclusion of a measure of productivity would be appropriate in order to explore further the relationships among age, productivity, and stress.

Because of the exploratory nature of this research, no specific hypotheses were formulated as to the direction of change in integrative complexity as a response to stress.
METHOD

Sample

Five 19th and 20th century English novelists were chosen for the current inquiry. Several criteria were used in making the selection. Simonton (1977) noted that there is a high correlation between eminence and the reliability of biographical data; eminence was therefore used as one sampling criterion. A number of sources that included encyclopedias, biographical dictionaries, and cultural histories, as well as members of the English Department at the University of British Columbia, were consulted in order to identify, first, ten novelists considered to be the most eminent in the past century and a half. The availability of biographical material then determined the final choice. Although a larger sample would have been preferable, the final decision on the number of novelists to be analyzed was a practical consideration in view of the amount of time required to compile the necessary data.

Simonton (1977) also pointed out that the reliability of biographical data tends to increase over time; it was therefore decided to restrict the sample in time to more recent novelists. As the present author proposed to focus on entire life spans of individuals, only those writers who are no longer living could be included in the sample. The restriction to English novelists was made in order to avoid any problems in scoring complexity that might arise from using translated material (although Suedfeld and Rank (1976) have stated that differences in original language do not seem to invalidate the scoring procedure). Those writers included in the study were Charles Dickens, George Eliot, George Meredith, Arnold Bennett, and Virginia Woolf.
Time Unit

Each novelist's life was divided into consecutive five-year age periods, a procedure adopted from Simonton (1977). The initial period of observation for any novelist was that period for which personal correspondence was first available. In no case did a writer's first major published work (e.g., novel) predate his or her first letters. With one exception, the novelists' first work appeared in the first five years of the analysis, so that, in effect, the life spans being analyzed were the productive lives of these individuals. The last period analyzed was the one in which the individual died. Each five-year period was used as a separate case in the analysis, so that summing across all novelists the total number of cases was 43, while the time period covered was from 1835 to 1941.

Independent Variables

Age

The age of each novelist at each five-year period was defined as his or her age at the onset of that period. In order to determine whether any curvilinear relationship exists between age and complexity, as well as between age and productivity, a variable called Age Quadratic was introduced, which was simply age squared. In order to generate the curvilinear function, the values of the Age variable had to be measured as distance from each writer's mean "productive" age before squaring them. For example, if a given novelist was age 23 in the first five-year interval, and 53 in the last, these values when measured as distance from the mean would be -15 and 15, respectively. Thus when squared, the values in the first and last period would be large, declining toward zero at the mean, producing a U-shape. This of course would not
result from simply squaring the linear progression of age values from 23 to 53. The mean-deviated age values were used in the analysis to represent the variable Age.

Stressful Life Events

Holmes and his colleagues (e.g., Holmes & Rahe, 1967) developed the Social Readjustment Rating Scale which consists of different life events, the occurrence of which usually evokes, according to these theorists, some adaptive or coping behaviour on the part of the involved individual. Each event was given a weight (empirically determined) according to the amount of readjustment it was judged to require. The sum of these weighted events in a given time period constitutes an individual's life-change score.

Simonton (1977) modified this scale in order to make it applicable for use with biographical data, and proposed that his version could be applied objectively in archival research. This same scale was therefore utilized in the current study as a measure of stressful life events (see Appendix A). Representative life changes (with weights in parentheses) are: litigations and lawsuits (30), troubles with creditors (30), job change (20), change in permanent residence--city or town (30), change in permanent residence--nation (40), beginning and/or end of a reciprocated love affair (30), death of a close family member (63), marriage (50), divorce (73), and death of spouse (100). The total number of life-change points accumulated during each five-year period was tabulated and then deviated from an individual's overall mean (as was the case with the Age variable) to yield a measure of stressful life events. These values were also squared to determine whether the relationship between life events and the dependent variable of interest was curvilinear.
In order to assure that no event appropriate to this measure was omitted, and that the data obtained were as reliable as possible, a number of biographical sources for each novelist were utilized, at least one of which was cited in literary references as a "definitive" biography. These sources were also employed for the next measure.

Illness

Simonton (1977) also constructed a scale that could be applied to biographical data in order to assess various changes in an individual's state of health, e.g., major illness, serious injury, physical paralysis (see Appendix B). The number of points ascribed to each seemed to reflect degree of impairment to an individual caused by the given event. For the most part this scale seemed appropriate for use in the present research. It was, however, modified slightly in order to incorporate some states of health difficult to score using Simonton's procedure, yet clearly important to this investigation. The most salient example necessitating a revised scoring system were the changes in mental health of Virginia Woolf. In addition, other writers in the sample often suffered from various psychosomatic disorders that did not readily correspond to Simonton's illness categorization.

The Global Assessment Scale (GAS) by Spitzer, Gibbon, and Endicott (1975) (see Appendix B) was used to derive scores for the types of disorders mentioned above. This scale is a single rating scale for evaluating the overall functioning of a subject on a continuum of psychological or psychiatric health-sickness. As Simonton's scoring system ranged from 1 to 10 points, and that of the GAS from 1 to 100 (with ten clearly defined anchor points) it was relatively easy to modify a score that an individual might obtain on the GAS in order to incorporate it into Simonton's scheme.
War Intensity

To assess the effect of a country's involvement in war on its residents, number of war casualties was used as an index of war intensity, assuming that this indicator might reflect a number of war associated stressors. The way in which this measure was operationalized differed slightly from similar attempts (e.g., Simonton, 1976a; Sorokin, 1937; Wright, 1965). A comprehensive listing of all warfare in which England was involved was compiled using The Encyclopedia of Military History by Dupuy and Dupuy (1970). Several historical and military references were then consulted to ascertain casualty figures of England's forces (in this case, number killed rather than killed and wounded). As these figures were in some cases inconsistent, an attempt was made to arrive at a best estimate based on the most reliable sources available.

As England was involved in a great deal of warfare in the time period of interest, ranging from very small imperialistic conflicts to world wars, a criterion for inclusion that seemed reasonable for the present analysis was adopted. Only those conflicts resulting in at least 1000 casualties per year were included in the study, a criterion deemed reasonable and used by Singer and Small in The Wages of War 1816-1965: A Statistical Handbook (1972). Furthermore, in view of the emphasis of the current research on the stressful components of war involvement, civilian deaths were weighted twice as heavily as military deaths. Thus, for each five-year period of a subject's life, war intensity was coded by the following scheme: one point for every 1000 military deaths in that period, and two points for every 1000 civilian deaths. Those wars included in the analysis are detailed in Appendix C.
Civil Unrest

The "Appendix to Part Three" of Sorokin's *Social and Cultural Dynamics* (1937) lists such events as revolutions, revolts, coups d'etat, and the like for a number of countries over a span of several centuries. Each event is weighted (by a geometric average) according to social area, duration, the social masses involved, and amount of violence. As pointed out earlier, Sorokin makes a distinction between these events and crises of international magnitude. For the present investigation, Sorokin's listing of England's disturbances was checked against those events outlined in Langer's *Encyclopedia of World History* (1972) to insure that nothing relevant was omitted. The weighted values assigned to these events by Sorokin were then tabulated into the corresponding five-year interval for each novelist (See Appendix C).

**Dependent Variables**

**Integrative Complexity**

All available personal correspondence for each novelist was collected and samples chosen to be scored for integrative complexity. The material to be analyzed was randomly selected from the correspondence covering a given five-year interval. Ten to twenty scorable paragraphs were selected from each time period of each individual's life span. (In scoring archival material for complexity, Suedfeld and his coworkers have generally used the paragraph as the basic unit.) Occasionally a selected paragraph was unscorable, primarily because it was purely descriptive, in which case it was replaced by the next paragraph in the correspondence. This is standard procedure with the Paragraph Completion test, since straight description--e.g., "We arrived in Paris on Thursday"--does not reflect on the integrative complexity of the source. As Suedfeld and Tetlock (1977) noted, however,
"well under 10% of connected discourse, whether in speech or in writing, fits into the unscorable category" (p. 178). In the current investigation a total of 529 paragraphs were scored for complexity.

The scoring system used was adapted from the Paragraph Completion test as previously described, with points ranging from 1 (low complexity) to 7. The average score for each time period was then used as the measure of complexity. The general manual devised by Schroder et al. (1967) for scoring structural properties of responses is presented in Appendix D. Each paragraph was independently scored by the investigator who had been trained in an intensive workshop and had obtained a reliability of .94 with the trainer. In addition, a representative sample of paragraphs (one paragraph per five-year period, which gave a total of 43) was scored by another trained scorer to assess the reliability in the present study.

Productivity

As the attempt to replicate Simonton's (1977) findings with respect to productivity, age, and stress was considered to be of secondary importance to this investigation, the operationalization of the productivity measure was done less thoroughly than a major examination of this variable would warrant. However it was thought that at least a gross indication of the novelists' creative endeavours would be worthwhile as an exploratory measure. A number of literary and biographical sources were consulted in order to obtain the total number of published works for each author. Besides novels, these works included collected poems, lectures, magazine serials, and so on, so that in general a large proportion of each novelist's productive endeavours was represented. The works were weighted equally, with one point assigned to each.
Within-subjects mean deviations

Following the procedure used by Simonton, both productivity and complexity scores for each novelist were measured as deviations from the individual's mean score on these variables. The rationale for this transformation was that the hypotheses being tested were concerned with fluctuations in complexity and productivity within each novelist and not with variations across all novelists. The effect of this mean-deviating is to preserve the within-subjects variance in the dependent measures while concomitantly making the between-subjects variance zero.

Control Variables

Three control variables defined by Simonton (1977) to avoid possible methodological artifacts were thought to be relevant to the current research and therefore introduced into the analyses. The first was used in conjunction with the productivity measure but was omitted in the analysis of complexity.

Preproductive excess years

It was often the case that a novelist's first production did not coincide with the first year of the initial five-year period. Because of a possible bias resulting from the lack of fit between the onset of the analysis and that of actual productivity, a dummy variable was operationalized as follows: (a) for the initial five-year period, the dummy equaled -1 point for each year prior to the onset of the first published work and (b) for all succeeding periods, the dummy equaled zero. Simonton called this variable preproductive excess.

Because of the five-year time period framework imposed on the data, this variable was designed to control for the fact that a given
period of time included in the analysis did not correspond to any actual data points for productivity. For instance, although Bennett's analysis began in 1900, his first published work did not appear until 1902. The control variable should purportedly reflect whether productivity in the initial period(s) of analysis was spuriously deflated due to the analytical framework of the study. (In Bennett's case, a value of -2 was assigned to the first time period.)

As the correspondence used in the analysis of complexity determined the data of the initial time period, there was no lack of fit and therefore no need to include this control when analyzing the complexity data.

**Terminal Years**

Similarly, some of the individuals in the sample died before the last time period had been completed. As Simonton noted, productivity generally ceases after death; a dummy variable called "posthumous excess" by Simonton, but referred to here as **Terminal Years**, was defined as follows: (a) for the terminal five-year period the dummy equaled -1 point for each year left after the death year and (b) 0 points for all periods prior to the last. With this variable Simonton reasoned that it should be possible to ascertain whether an individual who died before the completion of the last age period produced fewer works than might be expected on the basis of the previous periods.

For example, in the current study, Eliot died in the first year of the last period of her analysis. A value of -4 was thus assigned to this time period. If a significant relationship between **Terminal Years and Productivity** were to emerge, this would suggest, according to Simonton, that productivity in the final period was not necessarily
indicative of an individual's overall performance. In other words, using Eliot as an example, the fact that she produced no work in the last period of her life may have been due to her death, rather than to a general decline in her productive capabilities.

For one of the two productivity measures defined and used by Simonton (1977), this dummy variable was significant in the analysis, which led him to conclude that "only in the case of the last years of life can the superimposed analytical framework look artificial" (p. 802). In the analysis of novelists' correspondence, it was frequently the case that only a few letters were available toward the end of the individual's life, particularly if he or she died shortly after the beginning of the last period of analysis. The inclusion of this "terminal" control variable therefore seemed appropriate, as the amount of material to be scored from which a representative sample could be drawn seemed less than optimal.

Date

Simonton suggested that "time" should be incorporated in analyses of transhistorical data to control for spurious relationships that may emerge due to timewise trends in the variables under study. For example, because of the extended time period being analyzed, changes in integrative complexity may be attributable to differences in historical era or to stylistic changes in the novelists' correspondence over time. A control variable called Date was defined for each five-year period as the date that the five year interval began.
RESULTS AND DISCUSSION

Multiple regressions were performed on the two dependent variables, Complexity and Productivity. It is worth noting for purposes of discussion that the terminology typically associated with regression analysis, e.g., "predictor" and "criterion" variables, does not seem particularly applicable to this research as the study was intended to be theoretical rather than predictive. Although Kerlinger and Pedhazur (1973) have pointed out that prediction is really a special case of explanation, it is not clear that the present investigation can properly be termed explanatory. The focus of the data analysis was essentially one of investigating the existence and nature of relationships between variables. In this context the traditional concepts of independent and dependent variables seem similarly inapplicable as the study involved no manipulations of conditions. However in order to keep the discussion of the results as unambiguous as possible, while appreciating the difficulties associated with selecting appropriate terminology, the author will refer to the variables in the study as independent and dependent, as outlined in the previous chapter.

Before regression analyses were performed, the interrater reliability of the scoring procedure for integrative complexity was computed using an analysis of variance design with repeated measures. The results indicated a reliability coefficient of .97 between the two scorers, which justified any subsequent analyses involving the complexity data.

**Multiple Regression Analyses**

**Integrative Complexity**

The dependent measure of Integrative Complexity was regressed on
the seven independent variables and the two control variables, Date and Terminal Years. The regression equation was of borderline significance \( (F = 2.098, p = .0585) \) with a multiple \( R \) of .60, the equation thus accounting for 36% of the variance in complexity (see Table 1). Several significant factors emerged, supporting the hypothesis that changes in integrative complexity do occur as a response to stressful events in an individual's life.

A significant positive relationship was found between Age and Complexity \( (\beta = .46, F = 4.5, p < .05) \). This would suggest that the position taken by Harvey et al. (1961) with respect to the stabilization of conceptual structure in adulthood may not be entirely valid. As their assumption had never been empirically tested, the current results provide evidence that structural complexity continues to develop with increasing age. An alternative explanation to this could be entertained, because of the sample of individuals examined in this research. Harvey et al. proposed that abstract conceptual structure is associated with creativity. Clearly, the novelists sampled were creative individuals and may therefore have attained a higher degree of structural complexity in early adulthood than their less creative counterparts. As previously noted, Harvey and his colleagues suggested that conceptually complex individuals are more open to further progression than are those persons characterized by concrete conceptual structure. The relationship found between Age and Complexity may thus be a function of the sample selected, and may not generalize beyond creative, and perhaps exceptional, individuals.

As a personal stressor, degree of illness was negatively related to Complexity \( (\beta = -.495, F = 5.6, p < .05) \). It would appear that the
| Independent Variable | $r_{yi}$ | $r_{yi}^2$ | Eighth-order partial $r$ | $\beta_1$ |
|----------------------|---------|============|-------------------|--------|
| Date                 | .05     | .0025      | .12               | .12    |
| Age                  | .12     | .0144      | .35               | .46 ** |
| Age$^2$              | -.12    | .0144      | .20               | .21    |
| Life Events          | -.05    | .0025      | -.19              | -.19   |
| Life Events$^2$      | -.05    | .0025      | -.15              | -.14   |
| Illness              | -.06    | .0036      | -.38              | -.50 **|
| War Intensity        | -.20    | .0400      | -.34              | -.34 **|
| Civil Unrest         | .15     | .0225      | .31               | .32 *  |
| Terminal Years       | .28     | .0784      | .49               | .59 ***|

$R = .60; R^2 = .36; F = 2.098; p = .0585$

* $p < .07$
** $p < .05$
*** $p < .005$

Note: the above p values represent the significance level for testing the null hypothesis that the Beta coefficient is zero.
adjustment required of individuals in coping with adverse changes in their state of health is characterized by lower levels of information processing than would be the case when they were in good health. Life events necessitating adaptation, however, did not seem to affect the complexity of the individuals in this sample, a result which is open to a number of interpretations. The first, and perhaps most obvious to critics of life events research, is that the checklists used to assess life change scores have not been subjected to rigorous examinations of their reliability and validity. The evidence that does pertain suggests weaknesses in the checklists in both these respects (Rabkin & Struening, 1976).

Of particular concern to the present investigation are the criticisms that have been leveled at the content validity and scoring procedures of life events research, especially as the scale utilized in the current study was a modification of a previous one. Although a number of methods have been used to determine appropriate weights for different events, it is unclear whether these weights can effectively take into account the subjective evaluation of the significance of a life event to a given respondent.

This problem becomes even more salient when life change scores are assigned on the basis of biographical source material. The Social Readjustment Rating Scale (Holmes & Rahe, 1967) and other similar checklists were intended to represent "fairly common situations arising from family, personal, occupational, and financial events that require or signify change in ongoing adjustment" (Rabkin & Struening, 1976, p. 1014). The problem posed in applying these weighted events to historical material is clearly reflected in the phrase "fairly common
situations." For instance, divorce was undoubtedly less common a century ago than it is today. The weights assigned to each item in these checklists were based on judges' ratings of the relative degree of necessary readjustment thought to be required of a given event. One may safely assume that in the case of divorce, for example, prevailing social pressures necessarily dictate to a large extent the ease with which an individual might cope with the situation. In brief, the stress associated with particular life events probably changes over time. To assume that one can validly apply a life events measure devised for contemporary usage to historical material may be a tenuous assumption.

The bivariate correlations of the data used in this study indicated that the Life Events variable was negatively related to Age (r = -.46, p < .01, see Table 2). This implies that life changes, as currently operationalized, occur for the most part during the earlier years of the life span, a finding that is compatible with some of the research directly concerned with life events and illness onset. Rabkin and Struening (1976) cited results common to several studies indicating that "young adults aged 20 to 30 reported twice as many life changes as those over 60, and throughout the age range a significant inverse relationship prevails" (p. 1016). They went on to note that it is unclear whether these results are due to the character of the scale or to greater degrees of stress in early adulthood. In view of the problems associated with evaluating the "significance" of the life events (i.e., whether or not they are perceived as stressful), it may well be the case that these scales measure "changes" more so than they do stress.

Another interpretation that is not wholly independent of the problems
outlined above is based on the role of mediating factors that influence an individual's response to life changes. Rabkin and Struening emphasize that a critical factor in evaluating the impact of stressful events is the individual's perception of them. These authors suggest that personal factors such as intelligence, verbal skills, and morale, as well as demographic characteristics such as age, education and occupation may contribute to an individual's evaluation of stressful conditions and their response to them. More specifically, it is assumed that persons with more skills, assets and resources tend to fare better and cope more effectively with events that would be perceived as more stressful by others. It seems reasonable to suggest that the current sample of novelists had many of the "assets" mentioned above, enabling them to cope more adaptively with changes in their life. And furthermore, as previously pointed out, they may not have perceived these changes as stressful.

Such an interpretation does not seem to hold for the effects of War Intensity and Civil Unrest. A significant negative relationship was found between Integrative Complexity and War Intensity ($\rho = -0.34$, $F = 4.4, p < .05$) while a positive relationship was found between the dependent variable and Civil Unrest ($\rho = 0.32$, $F = 3.5, p < .07$). Although the latter did not quite reach statistical significance, it seemed close enough to warrant discussion.

As stated in the Introduction, it was believed that eminent novelists would probably be sensitive to societal and political issues. The work of writers often involves social and/or political commentaries on the historical period in which they live, which necessitates an active interest in ongoing external events. It therefore seems
reasonable that sociopolitical stressors would be a salient aspect of the environment for those novelists studied in this research.

The negative relationship between Integrative Complexity and War Intensity implies that international conflict is characterized by relatively low levels of information processing complexity on the part of the resident literary figures in the country involved. This may be due to previously suggested factors such as fear for those involved or for one's own life, a threat to one's values, and economic hardship, particularly in the case of major wars (e.g., the World Wars) in which England was involved. The polarizing effect of propaganda (resulting, for example, from the promotion of blind faith in one's country and patriotic fervor) often associated with international conflict could be expressed in low levels of complexity, characterized by rejection of dissonant information, categorical thinking, and so on.

Similarly, information emanating from government sources and through the press reflecting how a conflict was being handled would affect the way in which residents of the country reacted to the situation. On the one hand, if individuals believed, for example, that alternative perceptions of the situation weren't being considered, this could potentially heighten their own stress reaction to the conflict situation. Such an explanation seems especially relevant to imperialistic conflicts of international magnitude that were relatively removed from close public scrutiny. In these instances, it may have been the case that the information received by the English public gave the impression of continuous warfare and disputes, while there was only minimal awareness of the details of negotiations and compromises taking place.
One could also entertain the possibility that low levels of information processing on the part of decision-makers (as reflected for example in their speeches) were simply transferred to the public so that their response in effect mirrored that of the government. This seems unlikely with a sample of eminent literary figures, as one might expect that their reactions to a situation would be mediated by their own perceptions of decisions made, the implications of these policies, and so on.

In hypothesizing that the information flow in the environment is related to changes in complexity, some plausible explanations can be offered as to why civil unrest is positively related to complexity while the opposite holds for war intensity. In discussing this with regard to the current data, one should take into account the fact that over 80% of the events cited by Sorokin (1937, see Appendix C) that were incorporated into this study as measures of civil unrest involved rebellions and riots associated with the status of Ireland in the Commonwealth. In effect, the uprisings in Ireland were similar to other imperialistic conflicts involving England; the Irish were fighting for freedom from English rule.

In contrast to those imperialistic wars waged far from home, the English were probably much more aware of the reality of events in disputes over the Irish question. They also would have had more access to both sides of the issue in civil disturbances, resulting in more open-ended flexible information processing. For example, it is likely that both in Parliament and among the public, supporters of the Irish cause were on hand to insure that alternative interpretations of the issues at stake were made available. Since Irish home rule has been a recurring
theme in the history of Great Britain, dating back several centuries, this implies the presence of ongoing debates, prolonged consideration of possible solutions, in short, an atmosphere that could foster relatively high degrees of information processing complexity.

In a study of the causal relation between intellectual and political movements, Simonton (1976c) found that the frequent occurrence of popular revolts and rebellions seemed to foster the emergence of "ideological conflict." At least in the case of young people, such events caused them to take sides on major philosophical questions (e.g., the individual versus society, fate versus free will). Perhaps a generalization from this research can be made to the present study. The events constituting the variable of Civil Unrest no doubt inspired controversy over philosophical issues, which may well relate to high level conceptual structures, characterized by relativism and abstractness. It could be argued that the same situation might prevail in international conflict, but other results suggest that war (versus civil disturbance) may inhibit the development of certain beliefs such as individualism and empiricism (Simonton, 1976c). This was attributed to wartime propaganda in its attempt to reinforce self-sacrifice and submission to the general will, thus concurring with one of the explanations offered above for the negative relationship found between war and complexity.

An initially puzzling result which emerged from the regression analysis was the positive and highly significant relationship between Complexity and the Terminal Years control variable ($\beta = .59$, $F = 10.2$, $p < .005$). Almost 45% of the variance in Complexity accounted for by the regression equation can be attributed to this variable. As noted earlier, Simonton (1977) included this variable in his study of productivity
as a correction for the possibility that absolute level of productivity per five year age period might be spuriously deflated during the terminal five year period of each composer's life. This control was initially included in the analysis of Complexity as a routine extension of Simonton's methodology. On a closer inspection of the rationale for its inclusion, it became clear that this variable did not serve the same purpose as a control for Complexity as it had for Productivity. Complexity was computed as an average of the separate complexity scores from the correspondence available in a given five year period. The fact of any author's death in the last of these periods reduced the potential sample size of scorable material and perhaps also the reliability of any average score. But it should not have systematically distorted this measure as was the case with Productivity.

In brief then, this control variable was not what it was intended to be. But whatever misadventure may have led to its inclusion, its predictive power requires some post hoc effort to account for the significant portion of variance in Complexity which it controls.

The nature of the relationship suggests that the level of integrative complexity of the individuals in the sample decreased significantly in the last five year period of their lives. The interpretation of this serendipitous finding at first seemed counterintuitive, in view of the fact that a positive relationship was found between Complexity and Age. This led to the conclusion that while this control variable was a statement about the proximity of death, which itself seems intuitively related to age, it carried a meaning in this research different from one explained by age alone. Moreover, the nature of this change in complexity cannot be attributed to a decline in health, as the relationship appears even after controlling for Illness.
The work of Riegel and Riegel (1972) on life-span developmental changes may provide a possible explanation of this phenomenon. They contended that the results of many developmental studies showing a slow decline in functioning during the adult years may be invalid. The results of their research indicated that declines in performance with age can be attributed to a sudden drop in performance occurring within five years prior to the death of subjects. According to these authors, previously observed changes might be due to the behaviour of those persons who do not survive the next few years following test administrations, and whose number increases with age.

Without elaborating the details of this research, a few of the findings and conclusions reached by Riegel and Riegel that seem relevant to the present investigation will be noted. They proposed that "there exist lower limits in performance or behaviour attained by subjects shortly before their death" (Riegel and Riegel, 1972, p. 310). Subjects were measured on a number of variables including intelligence, verbal abilities, rigidity and dogmatism. The occurrence of "lethal limits" in performance were particularly well documented for the attitude scales. Shortly before their death, individuals scored consistently higher on measures of rigidity than did those subjects who were tested at the same time but lived longer. To clarify this, if tests were given to two persons aged 60, one of whom subsequently died at the age of 62 and the other at 70, the score of the former person was higher (more rigid) than that of the latter. These and other results (for example that an increase in dogmatism distinguished "nonsurvivors" from "survivors") have particular appeal when one attempts to generalize the findings to complexity research, as it has been empirically demonstrated that a relationship exists between complexity and dogmatism.
The phenomenon of a "developmental drop" prior to death is compelling, inasmuch as the potential exists for incorporating a new and interesting dimension into research on complexity. It would be inadvisable to place too much emphasis on this interpretation in explaining the role of the Terminal control variable in the present research, particularly in light of the size of the sample. Nevertheless, a closer examination of the data seemed desirable in order to substantiate any proposal that subsequent research in complexity might benefit from an exploration of this phenomenon.

To this end, a number of post hoc manipulations of the data were undertaken in an attempt to clarify features of the control variable that would have lent themselves to interpretation within the paradigm presented by Riegel and Riegel. At first glance, the way in which Terminal Years was operationalized signalled an individual's death by virtue of the fact that for some subjects the last five year period had a numerical value different from all preceding periods. For the final period of each novelist's life, the control variable equalled $-1$ point for each year left after the death year and 0 points for all periods prior to the last. Since some authors died in the last year of the final period, these values ranged from 0 to $-4$. If in fact the control variable was measuring proximity to death it was reasoned that perhaps a simple dichotomization of the variable (zeros in all periods prior to the last and 1 point in the final period) would suffice to underscore approaching death. However when entered into the regression equation in this manner, with all other variables left unchanged, the regression equation did not reach statistical significance.

Another approach involves a closer examination of the complexity
scores for each novelist, comparing the score for the last period with the mean of all previous scores. In three of the five comparisons, complexity dropped in the last period. When analyzed by using a correlated t-test the computation did not reach statistical significance, attributable in part to the size of the sample and the associated low power of the test.

The complexity data for each novelist were then examined in conjunction with the numerical value of the control variable assigned to their respective final time periods. The age at which each individual died was also taken into consideration, as this was a central factor in the research of Riegel and Riegel (1972). Specifically, the "developmental drop" prior to death was found more consistently in subjects below the age of 65 than in those subjects older than 65. In other words, "age differences in the predictability of survival indicate that at the earlier ages death strikes subjects who are psychologically distinctly different from the survivors . . . . At the higher age levels death strikes more randomly and psychological differences between survivors and nonsurvivors are less marked" (Riegel & Riegel, 1972, p. 308-309). According to these authors, their results indicated that the performance of older subjects did not appear to have changed during the major portion of their adult lives. Thus, although some of the older individuals may have suffered declines in performance prior to death, this was not a consistent phenomenon.

Returning to the five novelists, the two for whom terminal complexity scores increased rather than decreased were Virginia Woolf and George Meredith. Without trying to extend any explanation beyond the bounds of reason, one could take the position that Woolf was unique relative
to the rest of the sample in that she took her own life. Meredith can also be distinguished from the others in that he lived to the age of 81, compared to the oldest of the remaining four who died at the age of 64. The absence of a decline in Meredith's complexity scores is thus consistent with the findings of Riegel and Riegel. In examining the change scores for each novelist (the difference between the last five-year period score and the mean of all previous complexity ratings), the magnitude of change was relatively consistent with proximity to death as measured by the control variable. In other words, individuals who died in the first or second year of the final time period analyzed were characterized by greater changes in complexity than those who had longer to live. Woolf was the one notable exception to this pattern.

It must be emphasized again that an interpretation of the results of the current study based on the theory proposed by Riegel and Riegel must be made with caution. The small sample size poses a problem with respect to the specific values assigned to the Terminal Years variable. From the standpoint of the statistics involved in the analysis, it should be emphasized that only three of the 43 data points for Terminal Years were values other than zero. The possibility exists that if these three points corresponded to changes in complexity of a sizeable magnitude, a significant correlation would emerge between this control variable and Complexity. This fact alone casts some doubt on the reliability of the relationship found between Complexity and Terminal Years. A larger sample would no doubt provide additional evidence as to whether or not the significant relationship that emerged from this research is in fact a valid one.

Nevertheless, it is clear from the data available in this study that
the changes in complexity associated with proximity to death emerged as an important and powerful relationship in this research. Because of the correlational nature of the analysis one cannot presume the directionality of cause and effect. Whether a decline in the complexity of cognitive functioning decreases the probability of survival or whether, conversely, the "shadow of death" has an adverse effect on cognitive processes remains unclear.

Touching briefly on the contributions of the remaining independent variables, neither quadratic term associated with Age or Life Events was significant. One can conclude then that there is no apparent curvilinear trend in complexity that relates to either of these variables.

Furthermore, the effect of the control variable Date was not significant, implying that changes in information processing complexity could not be attributed to different historical eras or stylistic changes in the novelists' correspondence over time.

Partial Correlations. As one can see from Table 1, the bivariate (or zero-order) correlations of the independent variables with Complexity are quite small, with the possible exception of the Terminal Years variable, which although more highly correlated with the dependent variable, did not quite reach statistical significance. The discrepancies between several of these correlations and the relative importance attained in the regression equation by the associated independent variables requires some explanation.

The partial correlation of each variable in the regression analysis with the dependent variable, all other variables being held constant, was computed as shown in Table 1. Since these eighth-order partial correlations differ (in some cases quite dramatically) from
the zero-order $r$'s, an effort was made to identify those variables, the control of which substantially contributed to an increased correlation between Complexity and the independent variables of interest.

For example, the zero-order correlation between Age and Complexity is .12 whereas the eighth-order partial $r$ is .35 ($p < .03$). When the Terminal Years variable is partialled out, the first-order partial $r$ is .24 ($p < .10$); and when the effects of both the control variable and Illness are removed, the second-order partial correlation is .38 ($p < .01$). In this example it is clear that the increased correlation from zero to eighth-order partial is not unidirectional; holding the effects of the other independent variables constant has the effect of both increasing and decreasing the partial correlations, but not substantially. It would appear that the variance in complexity "caused" by both Illness and Terminal Years considerably suppressed the relationship between Complexity and Age.

This is not altogether surprising when one examines the intercorrelations among the independent variables (see Table 2). As might be expected, Age is highly correlated with Illness ($r = .52$, $p < .01$) and negatively related to the control variable, Terminal Years ($r = -.36$, $p < .05$). Thus, for example, a portion of the variance in complexity that could be accounted for by Age was shared with Illness; with the effects of Illness removed, the relationship between Complexity and Age alone became clearer.

Although Illness and the control variable are not significantly related, when both Age and Terminal Years are partialled out of the correlation between Illness and Complexity ($r = -.06$), the second-order partial is -.32 ($p < .03$), compared with the eighth-order $r$ of -.38
(p < .03). Similarly, the r between Complexity and the control jumped from .28 to .49 (p < .005), zero- and eighth-order partials, respectively. When partialed on Age and Illness, the correlation was .44 (p < .005). The nature of the intercorrelations between these three independent variables thus had the effect of suppressing what emerged as significant relationships between these variables and integrative complexity.

A similar phenomenon seems to be operating with War Intensity and Civil Unrest as related to the dependent variable. The bivariate correlation between these two independent variables is .47 (p < .01). This relationship no doubt contributed to the discrepancies found between their respective bivariate correlations with Complexity and the higher-order partial correlations. The bivariate r between War Intensity and Complexity (r = -.20) increased as an eighth-order partial to -.34 (p < .03), much of that due to the control of Civil Unrest (first-order partial r = -.31, p < .03). When War Intensity was controlled, the correlation between Civil Unrest and the dependent variable was .28 (p < .05), compared to a zero-order correlation of .15 and much closer to the eighth-order .31 (p < .05).

The relationship between Complexity and the variables discussed above can be clarified when one sorts out and controls the effects of other interrelated variables. It must be stressed however that the relatively weak bivariate correlations communicate the fact that the variables that emerged in this research as important "predictors" of changes in information processing complexity are not valid predictors if used alone. (See Table 1 for the values of r^2 which indicate the contribution of each independent variable as a predictor if used by itself.)
Productivity

The Productivity measure was regressed on the seven independent variables and three control variables (Table 3). The regression equation was not significant ($F = 1.58, p > .1$) which precluded any further examination of the contribution made by the independent variables. One could conclude from this that these data do not support Simonton's (1977) findings. However, caution should be taken in interpreting the present results in this manner. As noted in the previous chapter, the way in which productivity was measured was not conducive to an in-depth study of this variable. In comparison to the thoroughness with which Simonton documented the productivity of composers (see Simonton, 1977), the current research examined the work produced by novelists in what might be described as a superficial manner. As the focus of this research effort was on integrative complexity, less effort was expended in detailing in a codifiable format every productive pursuit of the novelists studied. As Simonton reasoned, the "comparative single-mindedness of composers immensely simplifies the longitudinal assessment of productivity, since it is not necessary to worry about the composer's having laid aside music in order to devote full time to an ambitious effort in an unrelated discipline" (1977, p. 795). This single-mindedness was not characteristic of the novelists examined here, and consequently the task of adequately assessing their productivity seemed beyond the scope, practically speaking, of the present inquiry. The reasons for attempting to do so in a very general way were outlined in the previous chapter.

In addition to the way in which productivity was measured, two of the independent variables used in the current research, War Intensity and Illness, although theoretically the same as those incorporated into
<table>
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<th>War Intensity</th>
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* p < .05
** p < .01
TABLE 3

Multiple Regression Analysis of Productivity

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<th>Independent Variable</th>
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$R = .57; R^2 = .33; F = 1.58; p > .10$
Simonton's research, were operationally defined in a manner somewhat different from that employed by Simonton. Any comparison of the results of the two studies should therefore take these considerations into account.

General Discussion

The guiding purpose of this research was to explore the relationship between the integrative complexity of individuals and various personal and social stressors operating in their environment. Not only has this work supported the general hypothesis that information processing complexity is affected by changing aspects of one's environment, it has, in addition, provided further evidence that in some situations the adaptive response of individuals is towards increasing rather than decreasing complexity. In examining information processing strategies in contexts different from those previously investigated, the current research has shown that the extent to which the information in the environment demands a response is only one of several factors that influence integrative complexity. More specifically, it appears that an individual's response to stressful situations is mediated by factors other than the explicit responsibilities associated with decision-making. This conclusion warrants a brief discussion, with respect to the specific findings of the current investigation.

It was hypothesized that a number of factors might influence the response of individuals to unstable sociopolitical situations. In comparing the effects of war intensity versus civil unrest, it was suggested that the information flow in the environment was an influential factor in determining the way in which individuals responded
to these situations. Civil unrest appeared to evoke a more flexible, integrative outlook on the part of the individuals in this sample than did war intensity. The historical period from which these data were drawn, however, in some ways biased the nature of the Civil Unrest variable, in that most of the events analyzed were associated with disturbances in Ireland. As pointed out earlier, this variable was in many respects similar to War Intensity, the distinguishing feature being that the conflicts in Ireland were "closer to home" than other imperialistic wars waged by England. This is not to say that the differential response to these two variables is invalid; rather it suggests that future research should be directed toward more clearly distinguishing between international wars and civil events that are more representative of internal tensions (e.g., reactions to unpopular legislation, strikes, etc.). Further, the (possible) differential impact of imperialistic wars versus what Wright (1965) describes as "balance-of-power" wars (e.g., the World Wars) warrants investigation.

Another aspect of the current study that has important and interesting implications for complexity research is the finding that specific factors other than those related to the information in the environment affect cognitive processes. This has been demonstrated specifically by the effect of illness on information processing, as well as factors yet to be explained that appear to be operating in close proximity to the time of an individual's death.

The focus of past research has been directed toward the ways in which factors such as stress and information input affect cognitive processes. The fact that physiological factors such as ill-health are related to relatively undifferentiated and inflexible processing
of information clearly warrants closer examination in future research. The most reasonable explanation of this phenomenon is that habitual patterns of coping are interrupted by reduced energy levels, anxieties associated with the specific ailment, and so on. An extended inquiry into this relationship might be directed toward distinguishing how specific types of illness relate to complexity, e.g., physical versus psychological impairments.

Further research should explore the "developmental drop" phenomenon in order to verify this finding and additionally should explore the connection between complexity and other variables that exhibit developmental trends over the life spans of individuals. It should be emphasized once more that the results of this research should be extended and validated with a larger sample of individuals. Moreover an attempt should be made to examine persons who are more representative of the general population than were the novelists in this study.

In extending the work of Suedfeld and his coworkers, this study has also shown that the integrative simplification hypothesis holds true for private as well as public communications (see Suedfeld et al., 1977). In addition, it has provided evidence that conceptual structure may, in fact, become increasingly complex over an individual's adult life. As previously pointed out, the theory of conceptual complexity as posited by Harvey et al. (1961) assumed a stabilization of information processing complexity in the adult years. The current findings point to the need for more longitudinal analyses of personological constructs such as conceptual structure. Methodologically, the research reported here offers another illustration of the ways in which archival data can be utilized in studying issues of psychological relevance.

It should also be noted that the precautions mentioned with respect
to statistical issues must not be taken lightly. The fact that the variables which emerged as significant determinants of integrative complexity are not valid predictors if used alone illustrates the difficulties often encountered in nonexperimental research. It is often the case that the independent variables are substantially correlated, and the task of untangling the effects of these variables is a difficult one (Kerlinger & Pedhazur, 1973). However, as McGuire (1973) argued, "in our actual cognitive and social systems, effects are the outcome of multiple causes which are often in complex interactions" (p. 452). It is these data with which our research efforts should be increasingly concerned.
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Appendix A

Coding Scheme for Stressful Life Events
Sources of life change stress (weights in parentheses):

I. Legal difficulties:
   A. Litigations and lawsuits (30)
   B. Detention in jail or exile to avoid arrest (63)

II. Economic problems:
   A. Major loan (20)
   B. Troubles with creditors (30)
   C. Adversive change in financial state (or business readjustment) (38)

III. Educational changes:
   A. Change in schools (20)
   B. Beginning or ceasing formal schooling (26)

IV. Vocational changes or problems:
   A. Job change (20)
   B. Trouble with boss or superiors (23)
   C. Change in responsibilities at work (29)
   D. Begin or end work (not fired or retired) (36)
   E. Retirement (45)
   F. Being fired from work (47)

V. Mobility
   A. Change in permanent residence--city or town (per move) (30)
   B. Change in permanent residence--nation (per move) (40)

VI. Interpersonal problems:
   A. Duels, fights, and other physical confrontations (10)
   B. Argument with friend (10)
   C. Disappointed or unreciprocated love (15)
   D. Beginning and/or end of a reciprocated love affair (30)
   E. Death of close friend (37)

VII. Family problems:
   A. Gain of a new family member (including adoption) (39)
   B. Change in health or behavior of family member (44)
   C. Death of close family member (not infants under 3) (63)

VIII. Marital difficulties:
   A. Marital reconciliation (45)
   B. Marriage (50)
   C. Marital separation (65)
   D. Divorce (73)
   E. Death of spouse (unless separated) (100)
Appendix B

Coding Scheme for Illness
Coding Scheme for Illness
Simonton (1977)

Major illness (1 point each, 1 extra per year)
Special treatment or cure (1 point)
Serious injury (2 points)
Operation (2 points)
Physical impairment or handicap (3 points per year)
Heart attack or stroke (4 points)
Serious impairment of vision or hearing (5 points per year)
Physical paralysis (5 points per year)
Total blindness or deafness (10 points per year)

Selected examples of states of health incorporated into Simonton's (1977) categorization with associated weights (modified from Global Assessment Scale—see next page):

Anxiety attacks; health requires special care (4 points)
Suicide attempt (5 points)
Nervous breakdown requiring constant supervision due to violent behaviour (10 points)
Global Assessment Scale (GAS)
Spitzer, Gibbon and Endicott (1975)

91-100 No symptoms, superior functioning in a wide range of activities, life's problems never seem to get out of hand, is sought out by others because of his warmth and integrity.

81-90 Transient symptoms may occur, but good functioning in all areas, interested and involved in a wide range of activities, socially effective, generally satisfied with life, "everyday" worries that only occasionally get out of hand.

71-80 Minimal symptoms may be present but no more than slight impairment in functioning, varying degrees of "everyday" worries and problems that sometimes get out of hand.

61-70 Some mild symptoms (e.g., depressive mood and mild insomnia) OR some difficulty in several areas of functioning, but generally functioning pretty well, has some meaningful interpersonal relationships and most untrained people would not consider him "sick."

51-60 Moderate symptoms OR generally functioning with some difficulty (e.g., few friends and flat affect, depressed mood and pathological self-doubt, euphoric mood and pressure of speech, moderately severe antisocial behavior.

41-50 Any serious symptomatology or impairment in functioning that most clinicians would think obviously requires treatment or attention (e.g., suicidal preoccupation or gesture, severe obsessional rituals, frequent anxiety attacks, serious antisocial behavior, compulsive drinking.)

31-40 Major impairment in several areas, such as work, family relations, judgment, thinking or mood (e.g., depressed woman avoids friends, neglects family, unable to do housework), OR some impairment in reality testing or communication (e.g., speech is at times obscure, illogical or irrelevant), OR single serious suicide attempt.

21-30 Unable to function in almost all areas (e.g., stays in bed all day) OR behavior is considerably influenced by either delusions or hallucinations OR serious impairment in communication (e.g., sometimes incoherent or unresponsive) or judgment (e.g., acts grossly inappropriately).

11-20 Needs some supervision to prevent hurting self or others, or to maintain minimal personal hygiene (e.g., repeated suicide attempts, frequently violent, manic excitement, smears feces), OR gross impairment in communication (e.g., largely incoherent or mute).
Global Assessment Scale (continued)

1-10 Needs constant supervision for several days to prevent hurting self or others, or makes no attempt to maintain minimal personal hygiene (e.g., requires intensive care unit with special observation by staff).
Appendix C

Sociopolitical Events

(War Intensity and Civil Unrest)
## War Intensity

<table>
<thead>
<tr>
<th>Date</th>
<th>War</th>
<th>British Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1842</td>
<td>First Afghan War</td>
<td>20,000</td>
</tr>
<tr>
<td>1845-49</td>
<td>First and Second Sikh Wars</td>
<td>3,800</td>
</tr>
<tr>
<td>1853-54</td>
<td>Crimean War</td>
<td>24,000</td>
</tr>
<tr>
<td>1857-59</td>
<td>Sepoy Mutiny</td>
<td>2,500</td>
</tr>
<tr>
<td>1879</td>
<td>Zulu War</td>
<td>2,000</td>
</tr>
<tr>
<td>1880</td>
<td>Second Afghan War</td>
<td>3,000</td>
</tr>
<tr>
<td>1882-84</td>
<td>Mahdist War</td>
<td>20,000</td>
</tr>
<tr>
<td>1900-02</td>
<td>Boer War</td>
<td>22,000</td>
</tr>
<tr>
<td>1914</td>
<td>World War I</td>
<td>22,000</td>
</tr>
<tr>
<td>1915-18</td>
<td>World War I</td>
<td>900,000</td>
</tr>
<tr>
<td>1940-41</td>
<td>World War II</td>
<td>12,000 (military)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20,000 (civilian)</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Weight</td>
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<td>----------</td>
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<tr>
<td>1839</td>
<td>Chartist agitation</td>
<td>9.66</td>
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<tr>
<td>1848</td>
<td>Young Ireland Rebellion</td>
<td>4.69</td>
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<tr>
<td>1867</td>
<td>Uprising at Dublin and Kerry</td>
<td>6.70</td>
</tr>
<tr>
<td>1886</td>
<td>Disturbances in Ireland</td>
<td>9.08</td>
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<tr>
<td>1916</td>
<td>Irish Rebellion</td>
<td>12.79</td>
</tr>
<tr>
<td>1919-21</td>
<td>Anglo-Irish War</td>
<td>16.52</td>
</tr>
</tbody>
</table>
Appendix D

General Manual for Scoring Structural Properties of Responses
Princeton Manual Guidelines
Schroder, Driver and Streufert (1967)

Score 1: Response could be generated by single fixed rule; no alternative interpretations were considered; subtle conditional changes would produce no changes in the response. Responses which fit the event into a category (inclusion vs. exclusion) with a high degree of certainty, which unambiguously reduce conflict, and avoid the use of gradations (shades of gray and continua) are typically generated by simple structure.

a. Viewing conflict, uncertainty or ambiguity as unpleasant or as a flaw or weakness in people or functioning.

b. Seeking fast and unambiguous closure or resolution, and reacting in such a way as to engage internally consistent processes which reduce incongruity or dissonance.

c. Offering a specific guide or rule for reducing conflict.

d. Stating that effects are compartmentalized, are all one way or all another way.

e. Implying that an absolute solution can be found.

f. Presenting only one side of a problem ignoring differences and similarities with other views.

Score 2: When the response signifies a qualification of an absolute rule but is not clearly identified as an alternative interpretation.

Score 3: Clear representation of availability of alternative rule structures for perceiving the event. The response must indicate the simultaneous generation of alternate and different perceptions of the same information. It also includes a conditional rule for specifying when each interpretation is used.

a. Listing similarities and differences between view, without considering relationships.

b. Specification of at least two different interpretations of the event in the stem.

c. Presence of "either-or" type responses expressing a possible conditional rule about two ways of categorizing.

d. Probability statements about the occurrence of different views or outcomes.
e. Reactions against absolutism in general (implying more than one view is not necessarily being "anti" a particular view which could indicate a low level fixed rule structure).

f. The avoidance of dependency on external imposition, i.e., clearly implying the availability of alternatives.

Score 4: When confident that the response implies alternate interpretations and also implies that both can interact, but the interaction is expressed as qualification rather than as the emergence of comparison rules.

Score 5: Response must give evidence not only of alternative interpretations but of the use of comparison rules for considering the joint as opposed to the conditional outcome of these different perceptions. At this level differences can be held in focus simultaneously and viewed as having interactive effects...expresses the joint operation directly and the other processes must be inferred.

a. The integration of two conflicting or different interpretations so as to preserve and not "ward off" the conflict.

b. The generation of various meanings of alternate perceptions, e.g., various meanings of the perception of conflicting views about a person.

c. Evidence that the completion implies the ability to take another person's intentions (or perceptions) into account and to relate different perceptions of different people.

d. Implication that one's behavior is effected by the way another behaves as in a give-and-take strategy game.

e. A view of social relationships anchored in mutual responsibility (as opposed to fixed beliefs or rules) in which each person can "place himself in the other person's shoes" (relate alternate schema).

Score 6: Indication of the simultaneous operation of alternatives and some evidence of the consideration of functional relations between them.

Score 7: Not only states or implies that alternative perceptions occurred and were simultaneously held in focus and compared but also indicates that the outcomes of various comparisons can be considered in producing causal statements about the functional relations between "ways of viewing the world."

a. Conflicting alternatives which were viewed as leading to new organizations and information.
b. The utilization of alternatives through exploratory action in order to obtain new information.

c. Generation of functional relations between alternatives.

d. Consideration of relationships among similarities and differences between the sides of a problem or question and the development of relationships between alternate reasons as to why these differences and similarities exist. The production of more "connectedness" between alternatives by theorizing as to why these reasons exist.
Appendix E

Chronology of Societal Events and Representative Life Events of Novelists During Time Period Studied
<table>
<thead>
<tr>
<th>Period</th>
<th>Societal Events</th>
<th>Dickens</th>
<th>Eliot</th>
<th>Meredith</th>
</tr>
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<tbody>
<tr>
<td>1835-39</td>
<td>Chartist agitation</td>
<td>- married</td>
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<td></td>
<td></td>
<td>- editor of journal</td>
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<td></td>
<td></td>
<td>- death of sister-in-law</td>
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<td></td>
<td></td>
<td>- 3 children born</td>
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<td></td>
<td></td>
<td>- break with publisher</td>
<td></td>
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<tr>
<td>1840-44</td>
<td>First Afghan War</td>
<td>- in debt</td>
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<td></td>
<td></td>
<td>- operation</td>
<td></td>
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<td></td>
<td></td>
<td>- 2 children born</td>
<td></td>
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<tr>
<td>1845-49</td>
<td>First &amp; Second Sikh Wars</td>
<td>- 3 children born</td>
<td>- death of father</td>
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<tr>
<td></td>
<td>Young Ireland Rebellion</td>
<td>- death of sister</td>
<td></td>
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<tr>
<td>1850-54</td>
<td>Crimean War</td>
<td>- started new journal</td>
<td>- new job</td>
<td>- son born</td>
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<tr>
<td></td>
<td></td>
<td>- death of father</td>
<td>- unrequited love</td>
<td></td>
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<td></td>
<td></td>
<td>- 2 children born</td>
<td>- started living with G. Lewes</td>
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<tr>
<td></td>
<td></td>
<td>- broke with publisher</td>
<td>- break with close friend</td>
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<tr>
<td>1855-59</td>
<td>Sepoy Mutiny</td>
<td>- separated from wife</td>
<td>- death of sister</td>
<td>- in debt</td>
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<td></td>
<td></td>
<td>- began public readings</td>
<td>- family broke off relations</td>
<td>- discord with wife</td>
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<td>- broke with publisher</td>
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<td>- separated from wife</td>
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<td></td>
<td>- wife eloped</td>
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<td>1860-64</td>
<td></td>
<td>- 3 family members died</td>
<td>- moved, locally</td>
<td>- new employment</td>
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<td>- ill health</td>
<td>- debts</td>
<td>- remarried</td>
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<td>1865-69</td>
<td>Uprising at Dublin and Kerry</td>
<td>- heart trouble</td>
<td>- Lewes in bad health</td>
<td>- child born</td>
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<td>- paralysis attack</td>
<td>- &quot;stepson&quot; dies</td>
<td>- war correspondent</td>
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<tr>
<td>Period</td>
<td>Societal Events</td>
<td>Eliot</td>
<td>Meredith</td>
<td>Bennett</td>
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<td>1870-74</td>
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<td>Kidney attack</td>
<td>child born</td>
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<td>Zulu War</td>
<td>&quot;stepson&quot; dies</td>
<td>death of father</td>
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<td>Lewes dies</td>
<td>ill health</td>
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<td>Second Afghan War</td>
<td>marriage</td>
<td>son very ill</td>
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<td>Mahdist War</td>
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<td>grave health</td>
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<td>paraplegia beginning</td>
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<td>impaired hearing</td>
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<td>liver attack</td>
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<td>serious illness</td>
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<td>Woolf</td>
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<td>1915-19</td>
<td>World War I</td>
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<td>Irish Rebellion</td>
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<td>1920-24</td>
<td>Anglo-Irish War</td>
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<td>- adverse financial state</td>
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<td>1925-29</td>
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<td>- child born</td>
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<td>- nervous breakdown</td>
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<td>(&quot;in miniature&quot;)</td>
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<td>1930-34</td>
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<td>- financial loss</td>
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<td>1935-39</td>
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<td>- on verge of madness</td>
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<td>- nephew killed</td>
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<td>1940-41</td>
<td>World War II</td>
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Appendix F

Bibliography
Bibliography


