

***Motivation and personality:  
Handbook of thematic content  
analysis***

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*Edited by*  
CHARLES P. SMITH  
*City University of New York, Graduate School*

*In association with*  
John W. Atkinson  
David C. McClelland  
Joseph Veroff

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## **27 Conceptual/integrative complexity**

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PETER SUEDFELD, PHILIP E. TETLOCK,  
AND SIEGFRIED STREUFERT

### THE DEVELOPMENT AND CURRENT STATE OF THE CONSTRUCT

#### *Theoretical origins*

The conceptual/integrative complexity construct is a descendant of Kelly's (1955) personal construct theory. Generally, it fits within the cognitive styles approach. Because the emphasis of the work is on the structure of thought rather than on its content, the closest relatives of integrative complexity are cognitive complexity (Bieri, 1971) and cognitive structure (Scott, Osgood, & Peterson, 1979). More remote kinship – the remoteness being empirically demonstrated by low correlations (Schroder, Driver, & Streufert, 1967; Suedfeld, Tomkins, & Tucker, 1969; Vannoy, 1965) – exists with content-laden cognitive traits such as authoritarianism (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950), dogmatism (Rokeach, 1960), and field independence (Witkin, Dyk, Faterson, Goodenough, & Karp, 1962). The direct line of development proceeds through conceptual systems (Harvey, Hunt, & Schroder, 1961), conceptual complexity (Schroder et al., 1967), interactive complexity (Streufert & Streufert, 1978; Streufert & Swezey, 1987), to integrative complexity (Suedfeld & Tetlock, 1990) and meta-complexity (Streufert & Nogami, 1989).

Briefly, the successive versions of the theory focus on the complexity of information processing and decision making, complexity being defined and measured (usually on a 1-7 scale) in terms of degrees of differentiation and integration (cf. Streufert, 1970). Differentiation refers to the perception of different dimensions within a stimulus domain, and to the taking of different perspectives when considering the domain. It is a necessary but not sufficient prerequisite for integration, which is the development of conceptual connections among differentiated dimensions or perspectives. Such connections are inferred from references to trade-offs between alternatives, a synthesis between them, a reference to a higher-order concept that subsumes them,

and the like. The next chapter will present examples that illustrate different levels of integrative complexity.

#### *State and trait complexity*

Conceptual systems theory and early conceptual complexity theory considered complexity to be a relatively stable personality characteristic or ability. The research concentrated on how this trait should be measured, and how individuals who differed in complexity behaved in various situations. *Systems theory* (Harvey et al., 1961) proposed that normal development progressed through four stages of increasing complexity (but characterized by content-related as well as structural factors), with different kinds of child-rearing practices fostering each one. Fixation at any level below Stage IV could occur as a result of particular developmental experiences. *Conceptual complexity theory* (Schroder et al., 1967) abandoned the idea of discrete stages in favor of a continuum, deemphasized developmental aspects, and began to focus on the relations between the information processing complexity exhibited by the individual and characteristics of the task environment.

Later versions of conceptual complexity theory (e.g., *interactive complexity theories*; see Streufert & Streufert, 1978; Streufert & Swezey, 1986) tend to view complexity as specific to various experiential domains. Further, they show increasingly more interest in environmental mediators between potential (i.e., trait) complexity and behavior, in refining the construct of complexity (e.g., into flexible and hierarchical integration), and in the relevance of complexity to social psychology (e.g., attitudes, social perception), industrial/organizational psychology, and health psychology. Explicit or implicit assumptions have held that complexity can be modified over the short run by concurrent experience and motivation (affecting primarily state complexity) or in the long run by certain experiences (including training in adulthood), as well as by organizational climates that foster one or another level of complexity. Thus, complexity may, in part, be a trait; but not necessarily an unchangeable one.

The *integrative complexity* viewpoint has to a great extent ignored the trait complexity question (not rejecting it, but holding it in abeyance) in favor of studying state complexity: the level of differentiation and integration shown in thought and behavior in a particular situation and context, and in the relations between such complexity and a wide variety of environmental, interpersonal, and internal factors. Here, complexity is seen as changing in response to fatigue, stress, intrapsychic conflict, social factors (such as accountability and self-presentation), audience characteristics, and so on. The extent to which such changes are unconscious adjustments to circumstances and/or deliberate adaptations is currently a controversial topic (Suedfeld & Tetlock, 1990).

The *metacomplexity* approach attempts to join various cognitive processes into a single, parsimonious theoretical structure. Metacomplexity theory applies differentiated and integration, as well as other concepts from the complexity theories, at three different levels of human functioning: (a) judgmental dimensions of individuals (cognitive complexity); (b) the interaction and interrelationship among cognitive processes such as styles, controls, abilities, and cognitive complexity (process complexity); and (c) dimensions of group and organizational functioning (organizational complexity). The theory also seeks to elucidate the interplay among these three levels of complexity (Streufert & Nogami, 1989). Both state and trait characteristics are considered. Somewhat related approaches have been suggested by Schroder (1989).

#### *Higher-order strategies*

Theorists have just begun to grapple with another interesting issue, that of state or trait characteristics related to the metastrategy of complexity. For example, are some people more flexible in changing their complexity level to fit a given situation (again, whether consciously or not); is such flexibility symmetrical for shifts toward and away from complexity; are there differences in perceiving that the environment will reward complex or simple behavior; to what extent are such differences learned or innate; and so on? The most recent research indicates that differences of this sort do exist and do significantly affect decisions and careers (e.g., Streufert, 1989; Streufert & Swezey, 1986; Tetlock & Boettger, 1989; Wallace & Suedfeld, 1988), but many of their parameters are as yet unknown.

#### *Key studies*

With the removal of the constraints imposed by the paper-and-pencil test format, the range of research applications has expanded enormously. In fact, so many problems have been addressed in complexity research that no summary can do justice to the literature. Nonarchival research has been directed toward the general topics of social perception, attitude and attitude change, attribution, cross-cultural communication, and interpersonal attraction; performance in complex simulation and actual work situations, word games, Peace Corps training, restricted environmental stimulation, preparing speeches for presentation to an audience, and solving real-life (e.g., organizational) problems; and attitudes concerning war crimes, social policy decisions, group leaders, capital punishment, and moral dilemmas. Archival work has addressed the prediction of international crises and their outcomes, the effects of social and political roles, the success and duration of leader careers, the impact of societal and personal stress, aging and the

approach of death, theoretical positions in science, political ideology and political climate, and aspects of mass media.

A recent and very promising development is the interplay of archival, case study, and experimental research, deriving hypotheses from the one that can be tested by the other. This work began with Tetlock's (1979) attempt to use content analytic techniques, including the scoring of integrative complexity, to test the theory of groupthink. Since then, this convergent approach has been applied to the study of complexity, value conflict, and political ideology (e.g., Tetlock, 1983b, 1986) and the effects of accountability on complexity (Tetlock 1983a; Tetlock & Kim, 1987; Tetlock, Skitka, & Boettger, 1989).

## MEASUREMENT

### *The Sentence/Paragraph Completion Test*

In the early years of conceptual complexity studies, the Sentence Completion Test (SCT), another version of which is called the Paragraph Completion Test (PCT), became the method of choice (the test is described in more detail in the next chapter). The S/PCT has undergone several revisions. In its original version, it obtained from each subject six to nine brief essays, each written in 1 to 3 minutes and based on a "stem" (topic sentence) phrased so as to tap an important social domain (e.g., relations to authority). Because of various problems with the S/PCT format (e.g., the fact that in most studies the majority of scores were in the lower range of the scale, between 1 and 2), later versions have modified the number of paragraphs to be written, the amount of time allowed, or the topic sentences beginning the paragraphs. In some versions, topics were specifically selected to focus on diverse domains of cognitive functioning. Longer essays, written explicitly for the experiment and dealing with a specific topic (e.g., capital punishment: de Vries & Walker, 1988) have also been used. In general, we now advocate the use of longer time periods (up to 10 minutes per stem), with a reduction in the number of stems if that is necessary in order to avoid subject fatigue and excessive total time investment.

The S/PCT and its essay variant can be administered in either group or individual sessions. No special equipment is required, except for something to write on and something to write with. The measures have been used with both student (mostly secondary and postsecondary levels) and adult samples, both sexes, and all ethnic groups. Beyond obvious basic qualifications (e.g., literacy in whatever language is being used), there have been no particular prerequisites for taking the tests. Except for allowances in case of language or writing skill problems, instructions and stimuli can remain constant across subject groups.

### *Archival analyses*

As the broad usefulness of this theoretical approach became more obvious, questions arose as to its generalizability to materials that were not necessarily written for the purpose of being scored for complexity. Suedfeld and Rank (1976) initiated the use of the 1-7 scale of differentiation and integration with archival materials, which is the basis of much of the current work on historical events, individual lives, and international relations. These studies have shown the scoring technique to encompass essentially any connected verbal discourse to which the researcher has access. This greatly extends the range of researchable sources, audiences, occasions, historical eras, topics, and cultures. The scoring of essays on complicated and controversial topics, written to present and defend one's opinions or to carry out some similar assignment, is a variant of this approach.

The materials used for archival studies are generally taken from books or newspapers. The number of paragraphs needed from each particular condition (e.g., from specific sources, from given time periods) is determined in advance. The library researcher selects each paragraph randomly from the total available and makes a photoduplicate. All information that could be used to identify the condition is removed insofar as possible, and the paragraphs are then scored blind by other researchers. In such studies, "conditions of administration" do not apply, and there are no data indicating that number of paragraphs scored, paragraph length, or similar variables influence the outcome significantly. Neither, apparently, does the scoring of the material in the original language versus an expert translation. Sources, both men and women, have been drawn from a varied pool: from the 16th to the late 20th century; from the Soviet Union, many European countries, North and South America, the Near East, and Asia; ages from the 20s to the 70s; and from among both successful and disgraced revolutionaries, victorious and defeated politicians, famous novelists, monarchs, scientists, judges, military officers, and the leaders who have governed and are now governing the world's superpowers.

### *Measurement of metacomplexity*

Streufert (1989; Streufert & Swezey, 1986) has switched from written essays to a guided interview format, scored in accordance with his interactive complexity theory (see Streufert & Streufert, 1978). Respondents are encouraged to provide sufficient material (with time available determined by the interviewer) to permit scoring for complexity in multiple domains on a 25-point scale.

Streufert's research group has effected major changes in the early simulation scenarios (cf. Schroder et al., 1967). The current quasi-experimental simulation techniques permit continuous control of task environments and

make it possible to measure multistyle determined complex functioning in task settings resembling the real world. A computer-assisted system provides sequences of information that permit multiple actions by participants. After 6 to 8 hours of task participation, 40 to 60 measures based on metacomplexity propositions are obtained. Some measures correlate highly with the S/PCT; others relate to other cognitive styles, controls, or abilities, or to their joint effects (Streufert, Pogash, & Piasecki, 1988). Research has been to a great extent directed toward performance in organizational settings.

#### *Variables affecting complexity scores*

One kind of variable that influences the complexity score is internal to the testing situation. For example, it is highly probable that time pressure, information overload, distraction, and some subject states (e.g., excessive or insufficient motivation, fatigue, or illness) will reduce scores. The exact stems used in the S/PCT, or the topic set for an essay, may also have some effect (see Reliability).

Another type of relevant variable is that which shapes the subject's expression. There has been a prolonged discussion of the extent to which writing style and related factors influence the score. Schroder et al. (1967) reported low to moderate correlations between verbal fluency, verbal IQ, and complexity. More recent research has shown the complexity score to be correlated significantly with the total number of words, sentence length, and words with more than three syllables. However, these associations were responsible for only a small portion of the total variance. Other stylistic variables were essentially unrelated to complexity (Coren & Suedfeld, 1990). Metacomplexity views base joint predictions of human functioning upon multiple stylistic constructs to increase predictive accuracy. Limited intercorrelations among those styles, however, suggest that complexity scoring cannot be replaced by mechanical assessments of writing style.

Comparisons of data-generating techniques such as PCT, essays, or guided interviews show only minor variations in mean complexity scores. In general, higher complexity scores are found in material that has been generated after some thought or planning has taken place and under conditions of little or no time constraint. Lower complexity scores are found in material that was generated with little prior thought and under strict time-limiting conditions. Written accounts tend to have higher scores than oral material (i.e., transcriptions of interviews).

In the scoring of prepared speeches, the question of who actually wrote the material – and therefore, of whose complexity is being assessed – appears to pose a problem for the validity of the score. However, there is

reason to believe that (at least in the case of important speeches) “ghost-written” materials are not accepted for presentation unless they reflect the complexity of the speaker. For example, Ballard (1983) found no difference in mean complexity between prepared and spontaneous speeches given by C and A in priming interviews. Thus, the problem may not be as serious as has been feared. Nevertheless, it is obviously preferable to score passages known to have been written by the purported source, unless the goal is to obtain a score for an identified group – for example, the cabinet, or advisors to the president – rather than an individual.

Evidence for age and sex differences in integrative complexity is mixed. Porter and Suedfeld (1981) and de Vries and Walker (1988) found increases in complexity across the life-span (but only up to a point) and over various age groups. Other studies (by some of the same authors), however, found older participants to be more simplistic than younger participants. Each sex has been found to be higher in complexity in one or more studies, and no sex differences have been found in still others.

Implicit in the idea that verbal material can be scored for integrative complexity is the assumption that the source/author is linguistically competent. Otherwise, people who lack the ability to express themselves adequately in whatever language they are using may receive an invalid complexity score. Scores of English translations, incidentally, do not differ significantly from the scores assigned to the same passage in the original language.

#### *Reliability*

The issue of reliability is a difficult one when dealing with a construct that has both trait and state aspects. Schroder et al. (1967) report a split-half correlation of .70 for the S/PCT. Test-retest reliability differs for stems from the same domain as opposed to varied domains (in the .80s to .90s versus the .40s to .70s). Integrative complexity measures within the simulation-based metacomplexity approach show test-retest reliabilities of .62 to .94, as well as considerable predictive power. However, these results are obtained at the cost of an expensive methodology and an all-day measurement of participant (group or individual) functioning under a range of task demands (Streufert, Pogash, Piasecki, Nogami, & Swezey, 1988).

Interscorer agreement can be assessed without concern for the factors that may affect the source's complexity level. Coders are considered qualified when they reach 85% agreement or alternatively, a correlation of .85, with an expert. This usually occurs at the completion of a training workshop lasting up to 2 weeks and led by someone very experienced in both the theory and scoring of integrative complexity. In archival studies, the coder's familiarity with the historical context may influence the scores assigned; so

may his or her reaction to the thoughts expressed – that is, the content. Concurrent complexity measurement and content analysis of the same materials need to be performed to assess this possibility (as well as the more important theoretical issue of the independence of structural and content variables).