COGNITIVE CENTRALITY AND IT'S RELATION TO INFORMATION PROCESSING

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COGNITIVE CENTRALITY AND ITS RELATION TO INFORMATION PROCESSING

by

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ABSTRACT

The present study examined the personal constructs that people employ to construe behavior. It was hypothesized that personal constructs and the self-concept facilitate the processing of personally and socially relevant information. It was hypothesized that the more central a construct is, as measured by the Role Construct Repertory Grid (Kelly, 1955), the more efficient it would be in encoding information. To the extent that the 'self' is more central or elaborate than specific personal constructs, it was expected to be superior in processing information.

The levels of processing paradigm (Craik & Lockhart, 1972) was employed. Subjects performed various operations on trait adjectives and the degree of elaboration produced in memory was inferred from the level of memory performance. In Experiment I, subjects performed five tasks with trait adjectives. These were: (1) a structural task; (2) a phonemic task; (3) a noncentral construct-reference task; (4) a central construct-reference task; and (5) a self-reference task. Incidental recall for the trait adjectives was assessed following a retention interval. The construct and self-reference tasks produced significantly higher recall than the structural or phonemic tasks. Recall for these two latter tasks was not significantly different.

Recall for adjectives in the self-reference task was superior to recall for adjectives in the noncentral but not the central construct-reference task. There was no significant difference between recall for adjectives in the central and noncentral construct-reference tasks.

The second experiment was similar to the first except that the phonemic task was excluded and recognition rather than free-recall was measured to assess memory performance. The construct and self-reference tasks produced superior recognition to the structural task. Recognition for the self-reference task was superior to that for both the central and noncentral construct-reference tasks. There was no significant difference in recognition level between the central and noncentral construct-reference tasks.

The results of the two experiments converged to demonstrate that reference to personal constructs and the 'self' are efficient mnemonic strategies for processing personally and socially relevant information. It was demonstrated that the 'self' is generally more efficient than specific personal constructs in processing relevant information. At the same time, reference to personal constructs was almost as effective as self-reference in facilitating the encoding of relevant information.

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INTRODUCTION

The term personality has been endowed with many meanings by both the psychologist and layman. For the layman, the term personality may refer to what a person is like or the characteristics of a person that make him/her different from others. Webster's (1973) dictionary refers to personality as ". . . the complex of characteristics that distinguishes an individual or a nation or a group . . . the totality of an individual's behavioral and emotional tendencies . . . the organization of the individual's distinguishing character traits, attitudes, or habits" (p. 855). While there are many ways to describe personality, the notion of traits has been popular in the layman's understanding of personality (Hastorf, Schneider, & Polefka, 1970) and there are about 18,000 trait or trait-like terms in our language (Allport & Odbert, 1936).

In the formal psychological literature, the topic of personality is regarded as the study of individual differences. Generally, there are four approaches to the study of personality. These are the trait, situationist, interactionist, and phenomenological approaches. Each of these approaches will be briefly described and evidence supporting or disconfirming each will be discussed. For purposes of this thesis, a phenomenological approach will be adopted and research conducted within that framework.

(1) The Trait Approach

Reference to traits as the enduring characteristics of an individual which enable the prediction of behavior has been fundamental to the study of personality. Traits have been viewed as global personality dispositions (e.g., honesty, friendliness) which cause a person to behave consistently across situations relevant to the given traits. These traits vary in the extent to which they influence behavior. Allport (1937), the father figure of trait psychology, distinguished between cardinal, central, and secondary traits. A cardinal trait is highly generalized and influences a person's behavior in many situations. Central traits exert a wide influence but are somewhat less generalized. Secondary traits are narrow in their influence on behavior. Rather than representing three unique types of traits, this distinction is mostly relevant to the various degrees of association and influence that a trait may have upon behavior.

Trait theorists view traits either nomothetically or idiographically. With the nomothetic approach, it is assumed that traits are common to all people, with individuals varying in the extent to which they possess a given trait. Within traditional trait approaches, traits are viewed in a nomothetic manner. For example, Charters and Waples (1929) defined a number of traits thought to be relevant to the effectiveness of a teacher. They discussed how the magnitude of each could be assessed in student

teachers and training could be provided to increase any given trait. The counter to this nomothetic approach was clear in Allport's (1937) idiographic view of traits. Allport stressed that not all traits are common to all individuals and thus distinguished between traits which are unique to an individual and common traits which are possessed by many people to varying degrees. While some psychologists have taken an interest in particular traits and have focused on their distribution in groups of people (e.g., extroversion-introversion (Eysenck & Eysenck, 1975)), Allport (1937) preferred not to study common traits as they are applied to groups, but to study the individual's unique characteristics.

While various trait theorists conceptualized traits differently and employed different methods for studying them, they all assumed that traits were relatively enduring and influenced behavior over a range of situations. The term temporal stability refers to the assumption that traits are enduring over time and the term cross-situational consistency refers to the consistency of behavior across situations. The present review will focus upon the issue of cross-situational consistency. The most direct way of testing the cross-situational consistency hypothesis has been to observe the behavior of individuals with respect to a given trait in one situation and then in another. A correlation is calculated between the data for each situation with the hypothesis being that the relative rank order

of individuals' behavioral ratings will be similar across situations. For example, if Fred is friendlier (i.e., smiles more) than John in one situation (e.g., coffee break), then he is predicted to be friendlier than John in another situation (e.g., at a party).

Some of the earliest research aimed at demonstrating the cross-situational consistency of traits came from the work of Hartshorne and May (1928, 1929) and Hartshorne, May, and Shuttleworth (1930). The behaviors of 8,000 children were observed in various situations regarded as relevant to the trait of honesty. Some of the behaviors looked for were: cheating on a take-home exam, cheating during a game, stealing money, and lying. The average correlation between behavior in the various situations was .23. Dudycha (1936) observed various behaviors thought to be relevant to the trait of punctuality in 300 students. There were some significant correlations with the highest being .44. The average intercorrelation was .19.

While the observed correlations between behavior in various situations are frequently low, they are often significantly greater than that expected by chance. With a large sample of subjects, an obtained correlation of .30, while accounting for only 9% of the variance in behavior, may still be significant at the .05 level. Significant correlations of this magnitude between objective observations of behavior across situations provide evidence for the existence of traits.

An argument frequently made in accounting for low cross-situational correlation coefficients is that there are underlying dispositions (genotypes), but the overt expression of these (phenotypes) is variable. Allport (1966) stated: "Traits are cortical, subcortical or postural disposition having the capacity to gate or guide specific phasic reactions. It is only the phasic aspect that is visible; the tonic is carried somewhere in the still mysterious realm of neurodynamic structure . . ." (p. 3). In addition, Allport (1937) argued that a given trait is rarely applicable to all individuals and thus it is not adequate to study traits by applying a given trait concept to a group of people. Low cross-situational correlation coefficients would be expected with studies conducted in this manner.

Another argument made in defence of low cross-situational correlation coefficients is that we should not expect high correlations between single instances of behavior and that adequate correlations may be obtained only when the principle of aggregation is employed (Epstein, 1979, 1980). Rushton, Jackson, and Pounonen (1981) stated: "The error is to believe that correlations between two items or behavioral events are stable and representative - they very rarely are. Prediction usually occurs when dimensions of behavior are represented as the sum or mean of multiple measurements" (p. 583). As the authors pointed out, the principle of aggregation is explicit in classical

reliability theory (Cronbach, Gleser, Nanda, & Rejoratnum, 1972). With aggregation, systematic effects are brought out while the remaining variance (labelled as error variance) is reduced. This principle has been employed in combining ratings from a single judge (Block, 1971), combining ratings over a number of judges (Olweus, 1973, 1974, 1977a, and 1977b) and combining various measures of a trait into a broader one (Block, 1977). In the studies of Hartshorne and May (1928, 1929) and Hartshorne, May, and Shuttleworth (1930), correlations were substantially increased when measures for several tests of a given trait were combined.

In summary, the trait approach emphasizes that behavior is most meaningfully understood by studying trait dispositions within individuals. Studies citing low cross-situational correlation coefficients are seen by some as flawed, involving a too general, nomothetic application of the trait concept.

(2) The Situational Approach

Theorists adopting a situationist approach argue that behavior is mostly determined by situational factors and that for this reason there is little cross-situational consistency in behavior (Mischel, 1968). The main source of evidence supporting this view is drawn from the large body of studies reporting low cross-situational correlation coefficients. The results of most studies conducted in the

above manner show that behavior is not always consistent and when it is, the correlations are almost always modest ($.20 < r < .50$). As Mischel (1968) pointed out:

> Individuals show far less cross-situational consistency in their behavior than has been assumed by trait-state theories. The more dissimilar evoking situations, the less likely they are to produce similar or consistent responses from the same individual. Even seemingly trivial situational differences may reduce correlations to zero. (p. 177)

According to Mischel (1968), without cross-situational consistency of some kind, the trait approach may reasonably be rejected as an accurate framework from which to predict behavior and an argument can be made for the situational determinants of behavior. While Allport (1966) employed the genotype/phenotype distinction to account for inconsistencies in behavior, this argument is similar to the psychodynamic approach in that it views overt behaviors as signs of internal dispositions. As Mischel (1968) pointed out, such a view depends on clinical judgement and studies have found little correlation between clinicians in inferring trait dispositions. The trait theorist's rejection of correlating single behavioral observations for an emphasis upon aggregation (Rushton, Jackson, & Paunomen, 1981) does not solve the cross-situational consistency problem. Higher correlations may be obtained, but then predictions are only relevant to samples of behavior. This puts aside questions regarding the complex determinants of single instances of behavior and labels those interesting effects as randomness or error variance.

Another source of evidence for the situationist position is from the apportionment of variance in analysis of variance designs (Epstein, 1979). In these studies, persons are analyzed as one factor and situations are analyzed as another. Analysis of variance is employed to assess the amount of variance in behavior that is accounted for by the person, situation, and the person x situation interaction. As Epstein (1979) pointed out, this method was independently introduced for the assessment of the stability of behavior by Raush and his colleagues (e.g., Raush, 1965; Raush, Dittman, & Taylor, 1959) and Endler and Hunt and their colleagues (e.g., Endler, Hunt, & Rosenstein, 1962). These and other studies (e.g., Argyle & Little, 1972) have reported that individual differences account for less variance than either the situation or person x situation interaction. Bowers (1973) found that the variance accounted for by person and situation variables was generally equal.

While theorists adopting the situationist position have argued against the importance or the very existence of traits, the notion of traits is important in the layman's understanding of others (Bem & Allen, 1974). There is a body of research supporting the situationist position that intuition is incorrect in emphasizing traits as the determinants of behavior. It has often been pointed out that in rating the behavior of others, people frequently attribute more stability to the person over situations than is

objectively warranted (Epstein, 1979; Bem & Allen, 1974; Jones & Nisbett, 1971; Jones & Harris, 1967; Mischel, 1968; Kelley, 1967; Shweder, 1975). In person perception research, the concept of lay personality theory has been employed to focus on how a person has preconceptions of which traits or behaviors go together (Schneider, 1973). There is a tendency for people to elaborate on these preconceptions in erroneous ways (Passini & Norman, 1966), perceiving positive correlations which do not really exist (Chapman & Chapman, 1969; Newcomb, 1929). There is a bias towards initial impressions and people show relatively little accommodation to objective information which is inconsistent with their initial impressions. From a broader perspective, Fischoff and Slovic (1980) described various lines of research on the psychology of multicue discrimination tasks and the opportunities that exist for overconfidence in the ability to predict events. Following a series of experiments in which subjects were extremely overconfident in their ability (in one case with an impossible task), the authors concluded:

> It would seem as though the very ability to generate an applicable rule for discrimination carries with it a conviction that the rule has some validity. Because it is almost always possible to generate some rule . . . overconfidence should be the rule rather than the exception. (p. 799)

In summary, it has been argued from a situationist position that personality traits, if they exist, do not exert much, if any influence upon behavior and that

situational factors are most important. Traits are recognized as concepts that people employ in understanding the behavior of others but these theories are regarded as mostly false or unnecessary in explaining behavior.

(3) The Interactionist Approach

Theorists adopting the interactionist position have stressed the importance of taking into account both person and situation variables, and most importantly, the interaction of the two in determining behavior (Argyle & Little, 1972; Bowers, 1973; Endler, 1975; Mischel, 1973). As previously noted, one of the strategies employed to address the issue of cross-situational consistency has been to conduct an experiment with persons as one factor and situations as another and to employ analysis of variance to assess the relative contribution of the person, situation, and person x situation interaction in determining behavior. In a review of 11 such studies, Bowers (1973) observed that in practically all cases it was the person x situation interaction that accounted for the most variance. In pointing out a difference between the situationist and interactionist viewpoint, Bowers (1973) stated:

> The emphasis upon cognition as an organizing structure that determines our perception and knowledge of reality distinguishes it from a situationist account. The latter position views cognition as an implicit response that mediates the impact of an "objective" environment on objective behavior. (p. 333)

While the analysis of variance studies cited by Bowers (1973) are useful in demonstrating the importance of person

x situation interactions, they do not tell us what the nature of the interaction is (Bowers, 1973).

Ekehammer (1974) pointed out that recent interactionist viewpoints (Argyle & Little, 1972; Bowers, 1973; Mischel, 1973) arising from the cross-situational consistency versus situational specificity issue are very similar to those of Kantor (1926) and Lewin (1936), whom he cited as the probable founders of interactionism. Ekehammer (1974) characterized this early work followed by Angyal (1941), Murray (1938), and Sullivan (1952) as well developed theoretically, but lacking in methodology. He characterized the modern interactionist approaches as more endowed with methodology, but less theoretically elaborate.

Magnusson and Endler (1977) proposed an interactional model of personality emphasizing that: (1) behavior is a function of the continuous interaction between a person and his/her environment; (2) the person is self-directed and active in this process; (3) cognitive and motivational factors are the primary influences from the person upon his/her behavior; and (4) regarding situational factors, it is the perceived meaning of situations for a given individual that is important in influencing behavior. Investigations conducted within an interactional approach have included studies into models of effective leadership (Fiedler, 1971), models of aggression (Moyer, 1973), and models of anxiety (Hodges, 1968; Spielberger, 1972; Endler & Shedlesky, 1973). With the interactionist model as

advocated by Endler (1976), anxiety was seen as a function of trait anxiety interacting with situational stress.

In summary, it has been argued from an interactionist position that taking into account both person and situation variables is the best strategy for understanding and predicting behavior. Some studies have included reference to traits as an interacting factor (e.g., Endler, 1976).

(4) The Phenomenological Approach

The phenomenological approach is characterized by an emphasis upon the meaning that an individual attaches to his/her experiences. Misiak and Sexton (1973) provided the following definition of phenomenological psychology:

". . . an approach or orientation in psychology consisting of an unbiased exploration of consciousness and experience. The phenomenon are intuited, analyzed, and described as they appear in consciousness without any preconceptions" (p. 42). Liebert and Spiegler (1978) noted that with phenomenological personality assessment strategies "behavior is neither the basic unit of personality nor the exclusive means used to get at personality" (p. 319). To illustrate this perspective, Liebert and Spiegler (1978) pointed to the example of a student who does not speak up in class when a question is asked. Possible reasons for this behavior included: (1) the student had not read the assignment and was not prepared, and (2) the student was well prepared and knew the

answer but was afraid of being viewed as a show-off. A similar point was well made by Allport (1937). With reference to Hartshorne and May's (1928) work, he pointed to how a child may lie to avoid hurting the feelings of a teacher and how in this case the behavior would not be an adequate indicator of honesty. Thus, there are definite limitations in restricting our observations to overt behavior.

Carl Rogers (1951) developed a phenomenological theory of personality and behavior. As a basic proposition, he emphasized the phenomenal or experiential field of the individual as the focus of study. This includes all that which is being experienced by the individual, regardless of whether it is fully conscious or symbolized. A person does not respond directly to the objective physical world but rather to the phenomenal field or private world in which the objective world is experienced. Rogers (1951) argued that behavior is best understood by focusing on the internal frame of reference of the person and attempting to see the world through his/her eyes. He postulated the 'self' as the central theme of a person's internal frame of reference. In elaborating on how the structure of the 'self' becomes organized, Rogers (1951) stated:

> As a result of interaction with the environment, and particularly as a result of evaluational interaction with others, the structure of self is formed - an organized, fluid, but consistent conceptual pattern of perceptions of characteristics and relationships of the "I" or "me", together with the values attached to the concepts. (p. 498)

Rogers (1951) pointed out how a child may come to see him or herself as a good child and when faced with the contradiction of enjoying something that is "bad", distort the favorable experience as being unfavorable. Thus, while the self does become elaborate, this is regulated by motivation towards internal consistency. Rogers (1951) stated:

> As experiences occur in the life of the individual, they are either (a) symbolized, perceived, and organized into some relationship with the self, (b) ignored because there is no perceived relationship to the self-structure, (d) denied symbolization because the experience is inconsistent with the structure of the self. (p. 503)

Thus, Rogers' (1951) phenomenological approach emphasizes investigation of the manner in which the individual views his or her world, and stresses that the central theme of this information is relevance to the self.

Another example of a phenomenological personality theory is that of George Kelly (1955). Kelly (1955) viewed the individual as a prototype of the scientist, entertaining various theories or constructions of events in the world and being guided by the ability to anticipate these events. Kelly (1955) presented 11 corollaries in the elaboration of his theory. The Individuality Corollary stressed that people differ in the ways they construe events. "People can be seen as differing from each other, not only because there may have been differences in the events that they wish to predict but also because there are different approaches to the anticipation of these events"

(Kelly, 1955, p. 55). The Organization Corollary states: "Each person characteristically evolves, for his own convenience, in anticipating events, a construction system embracing ordinal relationships between constructs" (Kelly, 1955, p. 56).

Constructs are seen as subsuming and being subsumed by other constructs, being termed superordinate and subordinate, respectively. For example, with concrete objects, the term room might be subordinate to the term house, being included in the meaning of the latter. Bannister and Fransella (1971) pointed out that:

> If we accept that the more superordinate construct will have more implications and a wider range of convenience than their subordinate constructs, then "climbing up the system" may be a way of finding strategies for cross referring subordinate constructs which cannot be directly related to each other across the system. Thus, the old adage that you can't add horses and cows is nonsense as soon as you climb up the system and subsume them both as farm animals. (p. 23)

People differ not only in the constructs they develop to construe events, but they also differ in the ways their constructs are organized. While it is intuitively clear how concrete objects in the world might be classified in hierarchical categories, when one considers this application for trait concepts, the potential for individual differences is phenomenal.

Theoretically, then, cognitive schemata have formed an integral component of the theorizing of both George Kelly and Carl Rogers. While Carl Rogers (1951) specified the

'self' as the most central construct, with the extent of particular construct elaboration depending on the degree of perceived relevance to the self-concept, Kelly (1955) did not specify the 'self' as the most central theme of personal constructs. Kelly (1955) emphasized that constructs become elaborated if this is perceived as promoting the anticipation of events without overfragmenting the existing system of constructs. An elaborate or central construct was viewed as being widely applicable to the interpretation or prediction of events and as subsuming other less central constructs.

In the above tradition, contemporary research has shown an increased emphasis upon how a person organizes his/her world psychologically. This has included two distinct approaches, one emphasizing traits as concepts and the other emphasizing the 'self' as the memory structure involved in the organization of personally and socially relevant information.

Within the first approach, attention is given to the trait concepts that people employ to construe the behavior of themselves and others. Cantor and Mischel (1977) provided evidence for the existence of traits as conceptual prototypes. They provided subjects with trait descriptions of fictitious characters. The description had or did not have a majority of words related to the concept of extroversion or introversion. When there was a majority of these words in the acquisition set, prompting subjects to

invoke an introversion-extroversion prototype, recognition of words in the set was superior and errors were biased towards words related to the introversion-extroversion dimension.

Further research has shown that personality relevant cognitive schemata can relate to levels of performance on tasks of memory. For example, Markus (1977) defined schematics as people with coherent schemata on the personality dimension of dependence-independence. This was determined by selecting subjects who had given themselves extreme ratings on scales related to dependence-independence and saw this as important to their self-description. Schematics were found to be faster at processing information related to the independence-dependence dimension than subjects without coherent schemata on that dimension. Schematics were also able to supply more examples of behavior relevant to the dimension and were resistent to the information that ran counter to their schemata.

Within the 'self' approach, Rogers, Kuiper, and Kirker (1977) provided evidence for the 'self' as an elaborate memory structure which facilitates the processing of personally and socially relevant information. Using the levels of processing paradigm of Craik and Lockhart (1972), they found that when subjects rated themselves on trait adjectives, incidental recall for the adjectives was greater than recall produced by a more conventional semantic task

such as rating the meaningfulness of the word. The high level of recall produced by the self-reference task was attributed to the elaborateness of the 'self'.

This emphasis by Rogers (Tim as opposed to Carl) and his colleagues upon the 'self' has led to various productive avenues of research. Rogers, Rogers, and Kuiper (1979) demonstrated that the 'self' functions in ways similar to cognitive schemata or prototypes, producing a 'false alarms effect' where 'new' adjectives relevant to the 'self' were thought to be previously presented. Other work has focused upon unique properties of the 'self' which distinguish it from other prototype models (Rogers, Kuiper, & Rogers, 1979).

Further research has demonstrated how the 'self' can be involved in the processing of information about others (Kuiper, 1981). Subjects' recall of adjectives on which they had rated an unknown other was related to the degree to which the adjective was related to the subject's own 'self'.

While the 'self' is involved in the processing of information pertaining to others, this processing may involve rules that are different than those involved in processing information related to the 'self'. Kuiper and Rogers (1979) observed that when subjects were instructed to rate unfamiliar persons on trait dimensions, words with long reaction times were recalled the best. The opposite pattern was observed when words had been referred to the 'self'.

From an empirical perspective, Cantor and Mischel (1977), Markus (1977), and Rogers, Kuiper, and Kirker (1977) have all claimed to have demonstrated that there are personality relevant cognitive structures which are utilized in the processing of personally and socially relevant information. However, the 'self' and trait concepts have never been compared in the same experiment.

The purpose of the present study is to utilize idiographic procedures in identifying trait concepts (or rather personal constructs) that subjects personally employ, and to compare these to the 'self' in terms of the extent to which they facilitate the processing of relevant information. It was argued that, besides the 'self', there are elaborate personal constructs which are very much involved in the processing of personally and socially relevant information.

INTENTIONS AND GENERAL METHODOLOGY

One of the approaches that researchers in cognitive psychology have taken to understand how people encode, store, and retrieve information, is the levels of processing framework (Craik & Lockhart, 1972). According to this approach, the greater the 'depth' to which information is processed, the more likely the information is to be recalled. Levels of processing is seen as proceeding through a fixed sequence of steps, from a structural analysis focusing on the physical attributes of the stimulus (e.g., the word friend), through a phonemic analysis focusing on pronunciation, to a 'deeper', more elaborate, semantic analysis focusing on the meaning of the word. Craik and Lockhart (1972) had subjects perform these various operations on words and then assessed memory for the words in an incidental recall paradigm. Level of recall was found to be a function of the 'depth' of processing resulting from the operation performed on the word.

Subsequent research has suggested that these levels of processing do not represent fixed and sequential stages (Craik & Tulving, 1975), but rather domains from which information may be elaborated in various ways (Baddeley, 1982). Research also has attempted to avoid circular definitions by seeking to define 'depth' of processing in terms other than the observed differences in recall (Reed, 1982).

The primary intention of the present study was to demonstrate that personal constructs, in addition to the 'self', can function as elaborate memory structures which facilitate the encoding of personally and socially relevant information. More specifically, an attempt was made to demonstrate that it is the degree of elaboration or centrality of these constructs that enhances the encoding and subsequent recall of relevant information.

A version of the Role Construct Repertory Grid (Kelly, 1955) was utilized to identify some of the personal constructs or schemata that people personally employ in construing the behavior of themselves and others. This assessment technique also provided a measure of the relative centrality of each construct. Construct centrality has been operationally defined as the mean variance in common possessed by a single construct with other constructs in the set examined (Norris, Jones, & Norris, 1970). It was operationalized this way in the present study. The least and most central constructs for each subject were selected and the relationship of centrality to recall was investigated.

In utilizing the levels of processing paradigm, subjects were instructed to perform various operations on trait adjectives provided. Two of these tasks involved rating the extent to which the trait adjectives implied the characteristic named by the least and most central constructs selected from the Reportory Grid. For example, if

the construct was 'honest-dishonest' and the trait adjective to be processed was 'friendly', then the subject was questioned as to what extent the characteristic friendly implied that a person so described would be honest, and so on for each adjective to be processed. In the self-reference task, subjects rated the extent to which various trait adjectives described themselves. For comparison, a structural and phonemic task were employed. Following performance of the various tasks and a retention interval, memory for the trait adjectives was assessed by free-recall.

From a levels of processing perspective, level of recall was seen as a function of the degree of stimulus elaboration produced by the operation performed on the word. In turn, the degree of elaboration produced by an operation was viewed as a function of the elaborateness of the memory structure employed.

It was hypothesized that the 'self' is a highly elaborate schemata involved in the processing of personally and socially relevant information. It was hypothesized that, besides the 'self', there are highly elaborate personal constructs involved in the processing of relevant information. While personal constructs are generally quite elaborate, there are differences among them. Some are quite central, being related to many constructs, and other constructs are more specific and isolated from other constructs. In contrast, operations focusing on structural characteristics (e.g., number of vowels or consonants) or

phonemic qualities (e.g., rhyming with another word) lead to relatively little elaboration of information and produce low retrieval levels (Craik & Lockhart, 1972).

The three following predictions were made: (1) Recall for trait adjectives processed in both the construct-reference tasks and the self-reference task would be greater than recall of words processed in the structural and phonemic tasks; (2) Recall for words processed in the central construct-reference task would be greater than that for words processed in the noncentral construct-reference task; (3) To the extent that the 'self' is a more elaborate memory structure than specific personal constructs, it was expected to produce greater recall than reference to personal constructs.

EXPERIMENT I

Method

Subjects. Seventy-five Memorial University students were employed as subjects. Participation was voluntary and subjects were paid. The sex distribution was approximately even across all experimental conditions.

Procedure. All experimental phases were conducted in the same session. They were conducted in the following order: (1) administration of a version of the Role Construct Repertory Grid; (2) performance of the rating tasks; (3) a filled retention interval; and (4) incidental recall of the words in the rating tasks.

(1) Repertory Grid: Each subject was administered a version of the Role Construct Repertory Grid (Bannister & Mair, 1968). The subject was instructed to provide the names or initials of 15 people that he/she was familiar with. Subjects were instructed to include one or two people not liked very much.

The subject was then presented with the names arranged in 10 groups of three. With each group of three the subject was asked to think of some way in which the first two people are alike and different from the third. Subjects were instructed to look for characteristics

related to personality and not to physical traits such as tall-short or light-heavy. Subjects were instructed to produce 10 different characteristics, one from each set of three names. The subject was then instructed to circle that side of each characteristic that he/she preferred in people. For example, if the dimension produced was honest-dishonest, the subject would circle honest if that side was preferred.

The subject was then instructed to rank the 15 names on the first characteristic and then for each of the nine remaining characteristics, a forced choice ranking procedure was used.

When rankings were completed, a commonality score was computed for each of the 10 constructs. The Spearman correlations between the rankings for each construct with every other construct were calculated, yielding a 10 x 10 correlation matrix. For each construct, the commonality score was computed by squaring each correlation of the construct with every other construct and adding them. This commonality score reflects the relative amount of variance that the construct accounts for in the overall Repertory Grid. The constructs with the highest and lowest commonality scores were selected for inclusion in the next phase of the experiment. These represented the central and noncentral constructs, respectively. The mean commonality scores for the central and noncentral constructs, over the 75 subjects, were 3.83 (S.D.=1.03) and 1.66 (S.D.= .44), respectively.

(2) Performance of the rating or processing tasks: The purpose of this phase was to have subjects perform different operations on trait adjectives and to observe the level of recall of the adjectives as a function of the particular task. The subject performed five ratings tasks or operations. There was a structural, phonemic, non-central construct-reference, central construct-reference, and self-reference task (Appendix 1).

The structural task required the subject to focus on physical attributes of the trait adjective. For each adjective, the subject counted either the number of vowels or consonants. Cues were provided to indicate whether vowels or consonants should be counted (see Appendix 2). Approximately half the adjectives required counting of vowels and half required counting of consonants with the ordering being random. The phonemic task required the subject to focus on the sound produced from pronouncing each trait adjective and determine whether or not each adjective had the target sound. The construct and self-reference tasks required the subject to rate the extent to which each trait adjective was related to his/her construct or self schemata.[1]

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[1]The methodology of this thesis might be criticized on the grounds that the number of rating alternatives for the construct reference tasks was 5 whereas the self-reference task involved 9 rating alternatives. However, such a view would not be valid. Both the construct-reference and self-reference task involved 5 rating alternatives with the self-reference task employing a bidirectional scale from 0 to 4. The structural task involved considerably more rating alternatives depending on the particular adjective

The rating tasks were performed on words selected from Anderson's (1968) list of 555 trait adjectives. Adjectives were selected for the present experiment so that the desirability of the words (using Anderson's estimates) was varied and medium on the average for each task. For each task there was a block of 15 adjectives, for a total of 75 words in all.

The subject was given each task instruction on a separate sheet with an attached sheet of adjectives and instructed to do them one at a time in the order given. The order of rating task presentation was counterbalanced using a Latin square design, yielding five orders of the tasks: 12345, 23451, 34512, 45123, and 51234. The five different blocks of trait adjectives were also counterbalanced using a Latin square design, yielding five orderings. Each ordering of the tasks was combined with each ordering of the trait adjective blocks, yielding 25 combinations. In this way, each task was presented in each position and each task was combined with all five adjective blocks. Each of these 25 combinations were used three times with each of the 75 subjects receiving a single combination.

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examined. There were two alternatives (vowel/consonant) for each letter of an adjective. The phonemic task involved two rating alternatives (yes/no). These differences in number of rating alternatives were not regarded important since there was no literature found on information processing indicating an effect of the number of rating alternatives on level of retrieval.

(3) Filler task: When the subject had completed the tasks, he/she was given a sheet of paper with a block of random single digit integers and instructed to circle repetitions of any number in any direction. This lasted 10 minutes. The purpose of this task was to provide a retention interval of sufficient length for recall to depend on long-term memory. A digit task was selected so that it would not interfere with memory for the trait adjectives as a verbal task might, while at the same time it would prevent the subject from thinking about the rating tasks.

(4) Incidental recall: At the end of the retention interval, the subject was instructed to write down as many words as possible from the five tasks previously performed and was given 5 minutes to do this.

Results and Discussion

The mean number of words recalled in the structural, phenemic, and noncentral construct-reference, central construct-reference, and self-reference tasks were .66, .42, 1.49, 1.94, and 3.02, respectively (see Table 1). The variance of the scores for the means were quite different. A statistical test for homogeneity of variance was not performed since the validity of such tests themselves is affected by lack of homogeneity of variance (Linton & Galla, 1975). There was a relatively high frequency of zero scores with the lower means, representing a 'floor' effect.

For example, with the structural task having a mean recall of .66 words, the frequency of subjects recalling 0, 1, 2, 3, and 4 words was 44, 19, 7, 3, and 2, respectively. Due to these distribution characteristics, a nonparametric analysis was employed. The Friedman Test, a conventional and powerful nonparametric statistic, was the appropriate substitute for the analysis of variance and the Nemenyi Test was similarly the appropriate test for specific comparisons (Linton & Gallo, 1975).

For each subject, the five tasks were rank ordered according to the number of words recalled. The mean ranking for the structural, phonemic, noncentral construct-reference, central construct-reference, and self-reference tasks were 2.26, 1.98, 3.18, 3.51, and 4.06, respectively. The Friedman Test showed these means to be significantly different ($\chi^2 = 89.39$, $df = 4$, $p < .05$). Pairwise comparisons with an experiment-wise error rate were performed employing Nemenyi's Test. The mean rankings for both of the construct reference tasks and the self-reference task were all significantly greater than that for the structural and phonemic tasks ($p < .05$). The mean rankings for the structural and phonemic tasks were not significantly different. The mean ranking for the central construct-reference task was not significantly greater than that for the noncentral construct-reference task. The mean ranking for the self-reference task was significantly greater than that for the non-central ($p < .05$) but not for the central

Table 1

Mean Number of Words Recalled for the Tasks in Experiment I

	TASK				
	Structural	Phonemic	Noncentral construct-reference	Central construct-reference	Self-reference
M	.66	.42	1.49	1.94	3.02
SD	.98	.87	1.31	2.72	2.47

construct-reference task.

Thus, the results demonstrated that the recall of personality relevant information is facilitated by reference to the 'self' and specific personal constructs. The results supported the findings of Rogers, Kuiper, and Kirker (1977) that the 'self' is an effective encoding device.

The hypothesized superiority of recall for the central construct-reference task over the noncentral construct-reference was not obtained. In the present study, 'floor' effects were encountered with the structural and phonemic tasks. Subsequently, it was decided to carry out the experiment again with some modification to avoid the 'floor' effect.

EXPERIMENT II

Method

Subjects. Forty-eight Memorial University students were employed as subjects. Participation was voluntary and subjects were paid. The sex distribution was approximately even across all experimental conditions.

Design. The phonemic task was excluded from this experiment since it had previously shown lower recall than the structural task. Each subject performed four tasks, these being the structural, noncentral construct-reference, central construct-reference, and self-reference. There were 15 items for each task. The order of task presentation was counterbalanced with a Latin square design yielding four orderings of the tasks. The first four blocks of trait adjectives from Experiment I were employed and counterbalanced using a Latin square design yielding four orderings. Each ordering of the tasks was combined with each ordering of the trait adjective blocks yielding 16 combinations. Each of these 16 combinations was used three times with each of the 48 subjects receiving a single combination.

Procedure. This experiment employed the same procedure as the first with the exception that an incidental recognition test was employed rather than a recall test.

The experimental phases were: (1) administration of the Role Construct Repertory Grid (the mean commonality scores for the central and noncentral constructs over the 48 subjects were 3.96 (S.D.=1.11) and 1.68 (S.D.=.46), respectively); (2) performance of the rating tasks; (3) a filled retention interval; and (4) a recognition test employing the words from the tasks. Only the fourth phase will be described since it is the only major change from the first experiment.

In the recognition task, the subject was given two sheets of paper with a total of 60 rows of words. There were five words in each row with the target word randomly placed in one of these five positions for each row. All 15 words from each of the four tasks were included and mixed in order. The nontarget words were selected from Anderson's (1968) list of 555 trait adjectives. The subject was instructed to identify the word from each row that had been in the previous tasks and was informed that there was one and only one such word in every row.

Results and Discussion

The mean number of words recognized in the structural, noncentral construct-reference, central construct-reference, and self-reference tasks were 7.27, 11.47, 11.33, and 12.52, respectively (see Table 2). These means were significantly different ($F(3, 141) = 74.71$, $p < .01$). Specific comparisons were performed employing a Newman-Keuls

Table 2

Mean Number of Words Recognized for the Four Tasks in Experiment II

	TASK			
	Structural	Noncentral construct-reference	Central construct-reference	Self-reference
M	7.27	11.47	11.33	12.52
SD	2.49	3.4	3.27	3.03

analysis. The means for the self-reference and construct-reference tasks were all significantly greater than that for the structural task ($p < .05$). There was no significant difference between the means for the central and non-central construct-reference tasks. There were significantly more words recognized in the self-reference task than in both the construct-reference tasks ($p < .05$).

GENERAL DISCUSSION

The present thesis examined various approaches to the study of personality. Approaches within the trait, situationist, interactionist, and phenomological perspectives were examined and the evidence supporting or disconfirming each was discussed. Within the phenomenological approach, particular attention was given to the theories of Carl Rogers (1951) emphasizing the self and George Kelly (1955) emphasizing personal constructs. The relevance of these theories to contemporary research, on the manner in which people organize personally and socially relevant information was noted.

While existing research has examined either personal constructs or the self as cognitive schemata involved in processing information, the mnemonic effectiveness of personal constructs and the self never have been compared in the same experiment. The present experiments extended previous knowledge by providing comparisons of incidental retrieval between self-reference and construct-reference conditions in an idiographic paradigm. Three predictions were made: (1) that reference of information to personal constructs or the self would yield higher retrieval of the information than performance of a task requiring attention to structural characteristics of the information: (2) that reference of information to a central construct would

produce higher retrieval of the information than reference to a noncentral construct; and (3) that the self-reference task would lead to higher retrieval than the construct-reference tasks.

The findings from Experiment I and Experiment II may be summarized as follows. Firstly, retrieval levels obtained with the self-reference and construct-reference tasks were appreciably higher than those obtained with tasks of a more structural nature. Secondly, retrieval with the self-reference task was generally higher than with the construct-reference tasks. Although statistical significance was achieved with this finding, differences in the number of words recalled between tasks were not extreme (i.e., 1-1.5 items). Thirdly, the anticipated differences in retrieval between the central and noncentral construct-reference tasks was not obtained. Consequently, two of the three predictions were confirmed.

With regard to the nonconfirmed prediction, post hoc reasoning might suggest that all constructs obtained via the Repertory Grid procedure are very elaborate schemata, with differential elaboration between them being of a minor nature. After all, constructs obtained from the Repertory Grid are ones that the subject demonstrated the use of for person classification. Thus, by definition, they are important constructs. A more critical test of the construct centrality prediction might involve the comparison of retrieval between construct-reference conditions

where constructs were idiographically obtained and thus meaningful to the subject, or were 'trivial' ones provided by the experimenter (e.g., physical characteristics).

Implications of Findings

From the numerous implications that the findings have for present research, two stand out as being central. Firstly, the findings demonstrate that the self is a powerful device for processing personally and socially relevant information. This supports previous work by Rogers and his colleagues who found self-reference to be a powerful vehicle with which to enhance levels of incidental recall as compared with structural tasks (Rogers, Kuiger, & Kirker, 1977). Theoretically, the 'self' was interpreted by these authors as a highly elaborate memory schemata.

Secondly, retrieval levels with the construct-reference tasks were only slightly lower (albeit significantly) than for the self-reference task. This is consistent with the notion that trait-like adjectives also function as elaborate memory schemata (Cantor & Mischel, 1977; Markus, 1977).

Methodological Issues

There are a number of methodological issues pertaining to the present study which need to be addressed. These concern (1) the number of rating alternatives for each task; (2) the levels of processing paradigm; (3) the

massing of trials for a given task; and (4) the differential implications of recall versus recognition measures.

1. Number of rating alternatives. As emphasized in the method section, the number of rating alternatives involved in the various tasks was not judged to be an important determinant of level of retrieval. That the number of rating alternatives was not important is supported by the robustness of the difference in retrieval between the structural and self-reference tasks, despite the fact that the structural task involved considerably more rating decisions.

2. The levels of processing paradigm. It has been pointed out that most levels of processing experiments do not employ conditions which facilitate organization or its assessment (Battis & Belleza, 1979). Much of the work has rested upon inference that it is elaboration that facilitates retrieval and experiments have been conducted to observe retrieval as a function of this elaboration which is not directly observed. The absence of measures indicating the manner in which material has been elaborated upon presents difficulties in accounting for differences in retrieval produced by various tasks. This is especially apparent when ambiguous tasks such as rating the meaningfulness of a word are employed (Ferguson, Rule, & Carlson, 1983). Research into the detailed properties of the self or personal constructs would benefit from

adoption of procedures employed to study organization (Bower & Gillisan, 1979; Ferguson, Rule, & Carlson, 1983).

3. Massing of trials for a given task. Studies employing the levels of processing paradigm (e.g., Craik & Tulving, 1975; Rogers, Kuiper, & Kirker, 1977) have utilized a repeated measures design whereby each subject performs all the task strategies with the particular task varying from word to word in random ordering. It has been argued that asking subjects to respond to individual items in this manner does little to facilitate the type of organization implied by the schemata notion (Battis & Belleza, 1979; Ferguson, Rule, & Carlson, 1983). The present study utilized a repeated measures design. However, improving on the above procedure, the task was not varied from word to word but was constant for a given block of words, with the task order being fixed for a given subject and balanced over subjects. This removed the difficulty of subjects having to change task strategy for each word and also increased the possibility of a subject's schemata facilitating associations between adjacent words in a given set.

4. Recall versus recognition. Levels of processing research has examined free recall (Rogers, Kuiger, & Kirker, 1977) or recognition (Keenan & Paillet, 1980) alone as a function of task strategy. Other researchers have studied the effect of task strategy on both free recall and

recognition (Ferguson, Rule, & Carlson, 1983). These latter authors observed differential effects for free recall and recognition. Free recall was superior for words referred to the self over words rated for meaningfulness or descriptiveness of a well liked person. There were no significant differences observed in recognition levels among these tasks. The authors argued that free recall is a poorer measure than recognition of the strength of the memory trace produced by a task and that recall is largely facilitated by the pre-experimental association between the schemata and the rated material. Placing emphasis upon their recognition data, the authors concluded that the self does not represent a uniquely powerful mnemonic device. The purpose of the present experiment was not to determine just how unique the self is but rather to compare it with personal constructs. Supporting Rogers, Kuiper, & Kirker (1977), the present experiment clearly demonstrated, with both free recall and recognition measures, that the self is a powerful mnemonic device. Comparison of self-reference and other strategies such as reference to a well known other person (Bower & Gillisan, 1979) or rating according to desirability (Ferguson, Rule, & Carlson, 1983), has demonstrated comparable facilitation of retrieval. Experimental methods which provide for observation of the nature of elaboration/organization afforded by the self or other schemata (Battis & Belleza, 1979) may throw light on properties of these devices which determine their effectiveness.

Conclusion

The present study demonstrated the operation of personal constructs and the self as information processing devices. The degree of elaboration of these devices was inferred from the level of retrieval they produced. Further research might examine the operation of these devices in a manner which demonstrates the details of how they organize information. One way of doing this might involve simulation of the development of a personal construct.

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APPENDIX 1: Task instructions

Task

structural

For each of the words on the following page, write down the number of vowels or consonants as indicated.

Reminder: vowels - a, e, i, o, u
consonants - remainder of the alphabet

phonemic

For each of the following words, indicate (yes/no) whether the word contains the sound 'i' as in the word 'it'.

central and noncentral construct reference

For each of the words on the following page, indicate the extent to which the word tells you whether a person so described (by the word) is likely to have the following characteristic: _____

Indicate your answer with one of the following ratings:

1	2	3	4	5
tells me nothing	a little	a fair amount	quite a bit	tells me a great deal

self-reference

For each of the following words, indicate the extent to which the word described you.

Indicate your answer with one of the ratings below:

-4	-3	-2	-1	0	+1	+2	+3	+4
Not at all like me				not relevant				very much like me

NOTE: For the construct reference tasks the appropriate construct from the Repertory Grid was inserted. Each task instruction was presented on a separate sheet.

APPENDIX 2: Example of a trait adjective block and how it is modified for the structural task.

thoughtful	_____	vowels
clever	_____	vowels
clear-headed	_____	consonants
tolerant	_____	vowels
vigorous	_____	consonants
imitative	_____	consonants
unwise	_____	consonants
neglectful	_____	vowels
wishy-washy	_____	vowels
meddlesome	_____	consonants
boring	_____	vowels
charming	_____	vowels
hopeful	_____	vowels
sophisticated	_____	consonants
suave	_____	consonants