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COGNITIVE COMPLEXITY MEASURES AND THE RELATIONSHIP OF COGNITIVE COMPLEXITY TO COMMUNICATION

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This review assesses the adequacy of several commonly employed cognitive complexity measures on the basis of five criteria: high test-retest reliability with adults, association with chronological age across childhood and adolescence, independence from intelligence and verbal abilities, association with other indices of developed social cognition, and association with measures of developed communicative functioning. Extant research indicates that only one complexity measure—Crockett's Role Category Questionnaire—is satisfactory on all these criteria, whereas Bieri's widely used measure is deficient on most. However, research to date concerning the relationship of cognitive complexity (as assessed by Crockett's measure) to communication has failed to illuminate the specific role played by complexity as opposed to other social-cognitive factors with which it is associated.

Cognitive complexity, a variable that describes persons' social-cognitive systems, has been argued to be an important determinant of sophisticated interpersonal functioning. However, research on cognitive complexity is clouded by the existence of a large number of different assessment procedures, and it is not clear which (if any) of these instruments are adequate indices of cognitive complexity. Moreover, there is at present no comprehensive and current review that assesses alternative measures of cognitive complexity and explores their relationships to communication-relevant functioning.

In this review we sketch personal construct theory and explicate the general concept of cognitive complexity, describe alternative complexity measures and their interrelationships, and review research relevant to the evaluation of existing complexity instruments. On the basis of that review we then discuss the status of cognitive complexity as a social-cognitive factor influencing communicative conduct.

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PERSONAL CONSTRUCT THEORY AND COGNITIVE COMPLEXITY

Personal Construct Theory

The concept of "cognitive complexity" has been associated most closely with Kelly's (1955) personal construct theory. In this theory, individuals are seen to be "scientist-like" inasmuch as they attempt to understand, predict, and control events. To these ends, persons erect systems of personal constructs—cognitive "templates" through which they seek to understand the world. A construct is fundamentally a bipolar dimension of judgment (e.g., tall-short, friendly-unfriendly, good-bad, etc.). These constructs are systematically organized and interrelated, permitting inferences to be drawn and predictions to be made.

Kelly explored individuals' systems of personal constructs through an assessment instrument known as the Role Construct Repertory Test (Reptest), in which a client (or subject) supplies persons' names for a number of different roles; in the original Reptest, 24 roles were used (such as

father, mother, etc.). After the subject names one person for each role, the names are written on separate cards. The examiner then picks out three cards and asks the subject to indicate how two of the persons are alike and different from the third (e.g., "these two are honest and that one is dishonest"). The examiner records this construct (honest-dishonest) and continues with another sort (triad). Bannister and Mair (1968) suggest that between 10 and 25 sorts constitute a common range for this procedure, but Fransella and Bannister (1977, p. 15) note that there are no set rules concerning an optimum number of sorts.

The repertory grid instrument (Repgrid) is an extension of the Reptest. After completing a standard Reptest, the subject is presented with a construct-by-person grid and is asked to indicate (using checkmarks and voids) which construct pole applies to each person named in the Reptest. This procedure is followed for each of the constructs, yielding a completed construct-by-person grid. In his original method, Kelly suggested a nonparametric factor analysis technique for extracting the central dimensions underlying an individual's pattern of responses in the grid.

These procedures can be applied to cognitive domains other than persons, but the main focus of attention has been social cognition. Correspondingly, although there has been research concerning complexity in the cognition of such things as vocations (Bodden, 1969; Winer, Cesari, Haase, & Bodden, 1979), consumer goods (Durand, 1978, 1979), political figures (Mihevc, 1978), social issues (Epting, Wilkins, & Margulis, 1972), and grocery stores (Hudson, 1974), this review focuses solely on cognitive complexity in the cognition of other persons in general. Interested readers can find the issue of the cross-domain generality of cognitive complexity discussed in Allard and Carlson (1963), Bieri and Blacker (1956), Gardner and Schoen (1962), Scott (1962, 1963), and Sechrest and Jackson (1961).

Cognitive Complexity

Shortly after the publication of Kelly's work, Bieri (1955) introduced the concept of "cognitive complexity." From the outset, complexity was defined by Bieri in terms of the differentiation of (number of constructs in) an individual's construct system: "Cognitive complexity refers to the degree of differentiation in an individual's construct system, i.e., the relative number of different dimensions of judgment used by a person" (Tripodi & Bieri, 1964, p. 122; see also Bieri, 1955, and Bieri, Atkins, Briar, Leaman, Miller, & Tripodi, 1966, p. 185). In hindsight, the phrase "cognitive complexity" may have been badly chosen; one can imagine a number of bases other than differentiation on which a construct system might be judged "complex" or "noncomplex"—aspects of the content and the interrelation of constructs most readily come to mind. But from Bieri's initial conceptualization to the present (e.g., Adams-Webber, 1979), construct differentiation has been the central focus of cognitive complexity theory and research, and hence in this review the phrases "cognitive complexity" and "construct differentiation" are used synonymously.

Cognitive complexity is a concept explicitly focused on "developmental aspects of cognitive structure" (Bieri et al., 1966, p. 185). The general idea is that as the construct system develops, it becomes more differentiated. Sometimes this idea is expressed by reference to more particular developmental principles or theories (e.g., Lewin, 1951; Werner, 1948), but the notion that development involves the "progressive differentiation" (Adams-Webber, 1979, p. 42) of the construct system is common to theoretical treatments of cognitive complexity. This suggests that a cognitive complexity measure should be positively associated with chronological age across childhood and adolescence. By the time of adulthood, however, cognitive complexity is conceived to be relatively stable, which suggests that an adequate measure should display high test-retest reliability with adults over short periods of time. Cognitive complexity is an "individual difference" variable that is taken to distinguish persons whose social-cognitive systems differ in relative development; this implies not only that an acceptable complexity

measure will be positively associated with other indices of developed social-cognitive orientations and abilities, but also that an adequate measure will be largely independent of general intellectual and verbal abilities (which presumably are conceptually distinct from social-cognitive factors). Finally, individual differences in complexity are expected to be reflected in differences in interpersonal functioning (Crockett, 1965; Goldstein & Blackman, 1978), and hence a complexity measure should be related to theoretically relevant communicative behaviors.

Obviously, embedded in this discussion of the concept of cognitive complexity are several desiderata for a complexity measure: association with chronological age across childhood, high test-retest reliability among adults, association with other measures of social-cognitive development, independence from intelligence and verbal abilities, and association with communicative functioning. These may usefully be thought of as criteria against which to assess the adequacy of a given complexity measure. These various criteria may appear to combine matters of definition and matters of theoretical expectation (hypotheses) about complexity's effects, but such intermingling is to be expected; our concepts of many things include the idea that those things have certain effects (consider, e.g., "poison" or "gene"). This suggests that to the extent that no complexity instrument satisfies all the criteria, some conceptual revision may be called for; for instance, a complexity measure that satisfied all the criteria save that it was not independent of intelligence might be taken as an indication that social cognition is not in fact independent of general intellectual factors. Ideally, of course, one might hope that a complexity instrument could be found that would meet all the criteria—which would indicate that our present conceptualization of complexity accords well with the facts. But in any event, these criteria appear to provide an avenue to achieving a better fit between our conceptual equipment and the world, by providing standards against which alternative complexity instruments can be compared.

ALTERNATIVE COMPLEXITY MEASURES AND THEIR INTERRELATIONS

Alternative Measures

Even a cursory survey of the literature will reveal that a host of candidates have been offered as "cognitive complexity" measures. Indeed, such instruments as Budner's (1962) intolerance of ambiguity scale (Lichtenberg & Heck, 1979), Steiner and Johnson's (1963) intolerance of trait inconsistency scale (Vannoy, 1965), Harvey, Hunt, and Schroder's (1961) abstractness-concreteness measure (Amernic & Enns, 1979), and Fiedler's (1967) least preferred co-worker (LPC) scale (Foa, Mitchell, & Fiedler, 1971; Mitchell, 1970; Vecchio, 1979) have all been treated as potential measures of cognitive complexity. Other measures of "complexity" or differentiation" have been suggested by Boynton (1979), Honess (1979), Landfield (1971), Schroder, Driver, and Streufert (1967; also, Streufert & Streufert, 1978), Scott (1962), Scott, Osgood, and Peterson (1979), and Zajonc (1960). However, the present review focuses on instruments that are directly related to personal construct theory and the idea of interpersonal construct differentiation, and for which relatively more research evidence exists: Bieri's measure, Crockett's (1965) Role Category Questionnaire (RCQ), the number of different factors extracted from the Repgrid (e.g., Jones, 1954; Kuusinen & Nystedt, 1975), the explanatory power of the first Repgrid factor (e.g., Jaspars, 1963; Ohbuchi & Horike, 1978), Smith and Leach's (1972) use of Johnson's (1967) hierarchical clustering technique to determine the number of clusters underlying Repgrid responses, and Mayo's (1960) technique of repeated Reptest elicitation of constructs. Of these measures, Bieri's and Crockett's instruments have been employed most frequently and thus deserve special note.

Bieri's measure. Bieri and his co-workers have proposed and employed several related methods for assessing cognitive complexity. The most

widely used method is that described by Bieri et al. (1966; see also Tripodi & Bieri, 1963). This measure requires subjects to supply names fitting a series of role descriptions and then complete a 10 × 10 construct-by-person grid. Unlike Kelly's Repgrid procedure, however, this method has the investigator supply the constructs to the subject; and the subject does not simply indicate which construct pole applies to a given role person, but the degree to which it applies using a six-point scale. Cognitive complexity is determined by a comparison of ratings between rows (constructs). Each time a role person receives identical ratings on the two constructs being compared, the subject is given a score of 1; dissimilar ratings are scored as zero. After all possible comparisons between constructs have been made, scores are summed to yield a total score which is taken to represent the subject's cognitive complexity: the higher the score, the lower the complexity.

The guiding idea behind this procedure is that genuinely different constructs should be differentially applied to the persons being judged; that is, in this measure "concurrence in usage is taken as the basis for estimates of conceptual differentiation" (A. Miller & Wilson, 1979, p. 19). If every role person is given the same rating on a given pair of constructs, then those two constructs do not differ functionally; thus, the larger the number of "matches" between constructs, the higher the subject's total score (and the lower the cognitive complexity).

Other versions of this measure have used the numerical rating scale with constructs elicited from the subject (e.g., Leitner, Landfield, & Barr, 1975); elicited constructs with Kelly's original check-and-void procedure, in which the subject simply indicates which construct pole applies to each role person (e.g., Bieri, 1955; Kuusinen & Nystedt, 1975); and supplied constructs with the check-and-void ratings (e.g., Wachter, Kohler, & Schneider, 1976). The scoring procedure, and the underlying logic of the measurement, is similar in these other versions; thus the remainder of this review will not distinguish these various species of Bieri's measure. Although some investigations have found these various versions not to correlate highly (e.g., Alban Metcalfe, 1974; Coleman, 1975; Tripodi & Bieri, 1963; Vacc & Vacc, 1973), we hope it will become clear that the evidence concerning Bieri's measure is rather univocal across the variations and hence that to distinguish the several species would only unnecessarily complicate matters.

Crockett's measure. In Crockett's (1965) RCQ instrument, the subject identifies persons fitting several (usually two, though sometimes four to eight) role descriptions such as "liked peer," "disliked older person," etc. Each subject is then given five minutes to write an impression of each role person; standard instructions require subjects to describe the person as fully as possible and to "pay particular attention to the person's habits, beliefs, ways of treating others, mannerisms, and similar attributes." Using procedures detailed by Crockett, Press, Delia, and Kenny (1974), the number of different constructs used to describe each target person is counted; aspects of the other's personality and behavior are counted (e.g., "domineering," "wants to succeed"), while physical characteristics are not. The subject's total complexity score consists of the sum across the several descriptions; the higher the score, the more cognitively complex the subject is taken to be. Interrater reliability correlations for RCQ-based complexity scores commonly exceed .90 (e.g., Delia, Clark & Switzer, 1974; Delia, Kline, & Burleson, 1979; D. O'Keefe & Brady, 1980). The logic of this procedure is that the number of constructs a subject uses in the free-description task should reflect the number of constructs in the subject's construct system.

Interrelations of Complexity Measures[2]

Bieri's and Crockett's measures appear to be essentially unrelated: Most reported correlations fall between −.19 and .14 (Applegate, Kline, & Delia,

1980; Delia, Kline, Burleson, Clark, Applegate, & Burke, 1980; Delia, Kline, & Pelias, 1980; Epting & Wilkins, 1974; Irwin, Tripodi, & Bieri, 1967; Jackson, 1978; Little, 1969; A. Miller, 1969; Sypher & O'Keefe, 1980), with the exceptions being correlations of .38 (Horsfall, 1969), .42 (Jackson, 1978), and −.33 (Horike, 1978). Bieri's measure has been found to be unrelated to the number of Repgrid factors, with correlations ranging from −.28 to .28 (Bavelas, Chan, & Guthrie, 1976; Honess, 1976; Kuusinen & Nystedt, 1975; Wachter, Kohler, & Schneider, 1976). Although several researchers have reported substantial correlations between versions of Bieri's measure and indices of the explanatory power of the first Repgrid factor, with correlations from .58 to .90 (Adams-Webber, 1970; Bieri et al., 1966; Laucht & Krohne, 1978), other investigators have found large negative correlations of −.59 and −.84 (Leitner, Landfield, & Barr, 1975), and most reported correlations range from −.35 to .35 (Kuusinen & Nystedt, 1975; Leitner et al., 1975; Ohbuchi & Horike, 1978; Reker, 1974; Wachter et al., 1976). Smith and Leach's (1972) hierarchical clustering measure has been found to be unrelated to Bieri's measure (Alban Metcalfe, 1974, 1978; Honess, 1976; Smith & Leach, 1972), to the number of Repgrid factors (Alban Metcalfe, 1978; Honess, 1976), and to the explanatory power of the first Repgrid factor (Alban Metcalfe, 1978). This dismal picture is not improved, incidentally, by considering still other potential complexity measures (see Vannoy, 1965). For example, Bieri's measure is not highly correlated with the LPC scale (Larson & Rowland, 1974; Schneier, 1979b; Seaman & Koenig, 1974) or with Scott's (1962) measure (Reker, 1974; Schneier, 1979b); Crockett's measure is not significantly correlated with the LPC (Burleson, 1978; Nightingale, Sypher, Vielhaber, & Sypher, 1979); and Scott's measure is not consistently highly correlated with any of several versions of the LPC scale (Larson & Rowland, 1974; Mitchell, 1970; Schneier, 1979b; Seaman & Koenig, 1974) or with the explanatory power of the first Repgrid factor (Reker, 1974).

If one avoids complicating assumptions such as the possibility of nonlinear relationships between differentiation measures (Streufert & Streufert, 1978, p. 69), then these findings would indicate that these various "measures of cognitive complexity" cannot all be assessing construct differentiation. A detailed consideration of what each instrument *is* assessing is beyond the scope of this review. But a clearer understanding of the role of cognitive complexity in communicative functioning obviously requires a careful assessment of the degree to which each measure captures the notion of "cognitive complexity" as described previously. Hence the next section reviews research relevant to such assessment.

EVALUATION OF COMPLEXITY MEASURES

Any measurement procedure should display reliability and validity. But, as discussed previously, we have identified five specific criteria for the evaluation of complexity measures. First, a complexity measure should display acceptable levels of test-retest reliability among adults. Second, the measure should be significantly associated with chronological age across childhood and adolescence. Third, since complexity is conceived as conceptually distinct from general intellectual factors (vocabulary, fluency, intelligence, etc.), a complexity measure should be demonstrated to possess such independence. Fourth, a differentiation measure should be found to be related to other indices of developed social cognition. Fifth, a complexity measure should predict theoretically relevant communicative behaviors.

Reliability

For Bieri's measure, one-week test-retest reliabilities in samples of adults have ranged from .46 to .85 (Bieri, 1955; Kapp, 1971; Smith & Leach, 1972); a two-week adult reliability of only .26 was reported by Ohbuchi and Horike (1978); Bavelas, Chan, and Guthrie (1976) found a .67 reliability among adults over short randomly varied time intervals of one to three weeks; and Schaff (1975) obtained three-week test-retest reliabilities

of .79 (males) and .84 (females) in a sample of adults. In a sample of elementary school children, a children's version of Bieri's measure was found to have a four-week test-retest reliability of .82 (Vacc & Vacc, 1973). Although Alban Metcalfe (1978) reported a 30-month test-retest reliability of .25 for a version of Bieri's measure in a sample of children and adolescents, this finding is not especially damaging given that the respondents were not adults and that there was a long interval between testings: The longer the time interval, the greater the probability that test-retest reliability figures will be attenuated by differential rates of development.

Crockett (1965) reported a four-month test-retest reliability estimate of .95 in a sample of adults for his measure based on an eight-role RCQ; and D. O'Keefe, Shepherd, and Streeter (1981) obtained four-week reliability estimates of .84 and .86 for complexity indices based on alternative versions of the two-role RCQ in their samples of adults. For the number of Repgrid factors, studies of adults have found identical one-week (Kapp, 1971) and two-week (Pedersen, 1958) reliabilities of .19. For indices of the explanatory power of the first grid factor, two-week reliabilities among adults of .48 (Pedersen, 1958) and .79 (Ohbuchi & Horike, 1978) have been reported, and Kapp (1971) found a one-week reliability of .66 in a sample of adults. Smith and Leach (1972), in their study of adults, found a one-week test-retest reliability of .76 for their measure; Alban Metcalfe (1978) found Smith and Leach's measure to have a 30-month reliability of .57 in a sample of children and adolescents, but (as noted previously) the utility of complexity test-retest reliability figures under such conditions is limited.

Given that, among adults, cognitive complexity is conceived as a relatively stable individual difference, one might demand rather high test-retest reliability over short intervals from a complexity measure. Yet test-retest reliabilities below .70 have been reported for most complexity measures, even with testing intervals as short as one week. Only Smith and Leach's measure and Crockett's measure appear to have satisfactory reliability, but only one reliability estimate for adults has been reported for the former.

It might be mentioned here that, because complexity is taken to be an "individual difference" variable, an adequate measure of complexity should display not only high adult test-retest reliability, but a related characteristic as well: Variability in scores on the instrument should be largely attributable to respondents (i.e., the individuals whose "individual differences" are putatively being assessed) rather than to, e.g., variations in test forms or conditions. The one investigation of this feature of complexity measures (Horsfall, 1969) found that most of the variance in Bieri's measure was allocated to the evaluative valence of the role figures being rated, but most of the variance in Crockett's measure was attributable to the respondents. Horsfall's results suggest that Crockett's instrument is, while Bieri's is not, a genuine individual-difference assessment technique, and may help to explain the low test-retest reliabilities that have sometimes been obtained with Bieri's measure. Further, there is some related evidence that Bieri's measure is unusually sensitive to variations in administration and procedure: Different results obtain with variations in the familiarity of role figures, the order of presentation of construct poles, the source (investigator or subject) of the constructs, etc. (e.g., Burgoyne & Pietrushka, 1979; Gibson, 1975; Sappenfield & Fisher, 1977; Schneier, 1979b).

Association with Age

A number of studies of childhood developments in social cognition have found chronological age to be significantly associated with Crockett's measure, with correlations in the range of .30 to .60 in samples of children ranging from kindergarteners to twelfth-graders (Burleson, 1980; Clark & Delia, 1977; Delia, Burleson, & Kline, in press; Delia, Kline, & Burleson, 1979; Ritter, 1979; Scarlett, Press, & Crockett, 1971). Bieri's measure does not seem to display this magnitude of association. Alban Metcalfe (1978) and Barratt (1977b) found versions of Bieri's measure to be unrelated to age

in samples of children ranging from 8 to 15 years old. Vacc and Greenleaf (1975), using a children's version of Bieri's measure in a study of third- through ninth-graders and adults, did report that "with maturity children become cognitively more complex" (p. 321), but no correlation coefficient was reported. In a similar study, however, Vacc, Loesch, and Burt (1980) found only a small, but significant, correlation ($r = .14$) between age and the children's version of Bieri's measure in a sample of children ranging from 8 to 18 years old. Goldstein and Blackman (1976) found Bieri's measure to be related to age ($r = .44$), but the sample was composed of college students, not children; and Olson and Partington (1977) failed to replicate this result in a sample of 14- to 26-year olds ($r = .10$). Alban Metcalfe (1978) found age to be unrelated to Smith and Leach's (1972) hierarchical clustering measure, the number of Repgrid factors, and the explanatory power of the first grid factor. Barratt (1977a), using the explanatory power of the first three grid factors, found a nonsignificant trend for this measure to indicate that children's complexity decreased as they grew older. Thus, as Adams-Webber (1979, p. 50) notes, the research evidence suggests that, in general, "repertory-grid-based measures of differentiation . . . do not exhibit 'developmental' changes in the expected direction." Only Crockett's measure appears to display consistently the desired association with age across childhood and adolescence.

Independence from Verbal Abilities and Intelligence

Because Crockett's RCQ is a "free-response" instrument, it is natural that questions have been raised about the extent to which RCQ scores are influenced by factors such as verbal ability and intelligence (Leitner et al., 1975; A. Miller & Wilson, 1979; Powers, Jordan, & Street, 1979). However, the empirical evidence to date indicates that Crockett's measure is largely independent of such extraneous influences. A number of independent assessments of verbal intelligence, verbal fluency, writing speed, vocabulary, intellectual achievement, and intelligence have been found to be unrelated to RCQ scores, with nonsignificant correlations in the range of $-.20$ to $.25$ (Applegate, Kline, & Delia, 1980; Burleson, Applegate, & Neuwirth, 1981; Crockett, 1965; Delia, 1978; Delia & Crockett, 1973; Delia, Kline, Burleson, et. al., 1980; Hale, 1980; Press, Crockett, & Rosenkrantz, 1969; Rosenkrantz, 1961; Scarlett, Press, & Crockett, 1971). The exceptions to this generalization are Burleson et al.'s (1981) finding that first- and third-graders' RCQ scores were significantly related ($r = .32$) to verbal fluency, and Scarlett et al.'s (1971) finding that first-graders' RCQ scores were signifcantly related to two measures of children's ability to reconstruct stories (correlations of .44 and .45). The results of both studies, however, parallel other findings which indicate that among younger children a number of social-cognitive and communicative abilities are often related to general verbal and intellectual skills, but that this relationship fades by middle childhood (e.g., Applegate, 1978; Biskin & Crano, 1977). Indeed, Scarlett et al. (1971) reported that their measures of ability to reconstruct stories were not related to RCQ scores among third- or fifth-graders (nonsignificant correlations ranged from $-.14$ to $.23$). Thus, these results can be interpreted as an indication of the gradual emergence of interpersonal cognitive systems that are independent of general intellectual maturation (see Delia & O'Keefe, 1979), rather than as findings seriously compromising the validity of Crockett's measure.

While these studies have used independent assessments of possible extraneous factors (e.g., WAIS vocabulary subscales, grade-point average, SAT scores), several other investigations have examined the relationship between RCQ scores and verbal indices that were also derived from the RCQ. Significant correlations in the range of .40 to .60 have been reported between the number of words written in the RCQ task and RCQ scores (Burleson et al., 1981; Delia, 1978; Powers et al., 1979). These correlations have sometimes been interpreted as evidence of the influence of "loquacity" on RCQ-based complexity scores

(Powers et al., 1979), but upon closer inspection these results are not surprising. Since the RCQ-based complexity score involves counting the number of characteristics ascribed to the persons being described, one would expect that those respondents who mention a large number of characteristics would naturally use somewhat more words to do so (for further discussion of this issue, see Burleson et al., 1981). Presumably the critical evidence concerning the relationship of Crockett's measure to extraneous factors is the evidence that relies upon independent assessments of the potentially contaminating variables, and the extant research evidence of this sort gives solid grounds for believing that, on the whole, Crockett's complexity measure is unrelated to verbal abilities (fluency, vocabulary, etc.) or intelligence.

Bieri's measure is also apparently independent of these extraneous factors. Applegate (1978), Bieri (1955), Bieri and Blacker (1956), Jaspars (1966), Laucht and Krohne (1978), Smith and Leach (1972), Vacc (1974), Vacc and Vacc (1973), and Vannoy (1965) have reported nonsignificant correlations in the range of $-.20$ to .20 between Bieri's measure and various independent indices of verbal abilities, intellectual achievement, and intelligence.

Evidence concerning complexity measures other than Bieri's and Crockett's is unfortunately scant. Mayo (1960) reported that the number of different constructs produced in repeated Reptest elicitations was unrelated to intelligence. Smith and Leach (1972) found their hierarchical clustering measure to be nonsignificantly correlated ($r=.29$) with a measure of reasoning ability. Chetwynd (1977) and Laucht and Krohne (1978) have found indices of the explanatory power of the first factor to be unrelated to intelligence, although Bavelas et al. (1976) found a significant association between explanatory power and intelligence.

Association with Other Social-Cognitive Measures[3]

Since cognitive complexity is theoretically conceived as a developmental aspect of an individual's social-cognitive system, a cognitive complexity index should be positively associated with other measures of developed social cognition. However, research into developmental aspects of social cognition is rather inchoate and diffuse, and thus there is no well-defined set of other indices that mandate attention. Hence we here review relevant work on four aspects of developed social cognition whose relationships to cognitive complexity have received relatively extensive empirical attention: (1) the general abstractness of an individual's interpersonal functioning, (2) qualitative aspects of construct system development, such as construct abstractness and construct comprehensiveness, (3) the movement away from evaluative consistency as an organizing principle for social cognition and conduct, and (4) developed social perspective-taking abilities.

Interpersonal concreteness-abstractness. In Harvey, Hunt, and Schroder's (1961) Conceptual Systems Theory (see also Harvey, 1966), persons' social-cognitive systems are seen as varying along a dimension from relative concreteness to relative abstractness of interpersonal functioning. To assess an individual's general level of interpersonal functioning, Harvey et al. (1961) devised the "This I Believe" test (TIB), in which the respondent describes his or her beliefs about a number of topics (e.g., "this I believe about friendship," "about rules," etc.). These answers are scored for the level of system functioning they represent, on the basis of a four-level scoring system described by Harvey et al. (1961). Individual differences in the concreteness-abstractness of interpersonal functioning have been found to be related to a variety of indices of sophisticated interpersonal functioning (see Harvey, 1966, for details).

Several studies have examined the relationship of complexity measures to the TIB. Smith and Leach (1972) found a positive relationship between complexity scores on their hierarchical clustering measure and TIB scores, but found no relationship between the TIB and Bieri's measure. Leitner et al. (1975) also reported no relationship ($r=-.02$, $-.08$) between versions of Bieri's measure and the

TIB. Delia, Kline, and Pelias (1980) found that Crockett's measure was significantly related to the TIB ($r = .40$), but, again, Bieri's measure was not ($r = -.06$).

Construct abstractness and comprehensiveness. Construct differentiation is only one axis along which construct systems are expected to develop. Developmentally advanced construct systems are also expected to contain more abstract (vs. concrete) and more comprehensive (vs. restricted) constructs. Applegate (1978) and Stringer and Terry (1978) have provided measures of abstractness; B. O'Keefe and Delia (1978) have provided a measure of comprehensiveness.

Several studies have found Crockett's measure to be significantly associated with construct comprehensiveness in adults, with correlations ranging from .39 to .55 (B. O.'Keefe & Delia, 1978, 1979). Two studies of children have found Crockett's measure to be significantly related to construct abstractness, even when age has been partialled from the correlation: (1) Delia, Kline, and Burleson (1979), in a study of kindergarteners through twelfth-graders, found a correlation of .77 (.64 with age partialled); and (2) Burleson (1980), with a sample of first- through twelfth-graders, obtained a correlation of .47 (.28 with age partialled). In studies of adults, Burleson (1980) found Crockett's measure to be unrelated ($r = .17$) to construct abstractness, but significant correlations of .82 (Burke, 1979), .33 (Applegate, Kline, & Delia, 1980) and .30 (Delia, Kline, Burleson, et al., 1980) have been reported in other investigations. These latter two studies also found that versions of Bieri's measure were not significantly associated with construct abstractness in samples of adults ($r = -.17$, .12, and .25). Stringer and Terry (1978) reported that an index of the explanatory power of the first grid factor was not related to the use of abstract constructs.

Reliance on evaluative consistency principles. In a series of studies using the RCQ, Crockett and his associates investigated the hypothesis that complex perceivers are more likely than noncomplex perceivers to form bivalent, well-integrated impressions from potentially contradictory information about another person. These studies generally relied upon some form of a trait-presentation paradigm, in which the subject reads a list of six or eight personality traits (with an equal number of positive and negative traits) ascribed to some putatively real stimulus person, and then writes an impression of the stimulus person. The impression is analyzed using a "level of organization" coding system (see Crockett et al., 1974; Delia, 1972; Kaplan & Crockett, 1968) in which the impression is assigned to one of 15 levels depending upon the extent to which (and manner in which) the bivalent stimulus information is reconciled and integrated; impressions organized at lower levels either reproduce the stimulus information with little elaboration or utilize only one valence of the information so as to produce an evaluatively one-sided impression, whereas at higher levels of organization the inconsistency is managed through the use of integrative strategies involving (for example) the attribution of underlying motivational characteristics that lead the stimulus person to have both positive and negative qualities. In a number of studies, higher RCQ scores have been found to be associated with higher levels of impression organization (Crockett, Gonyea, & Delia, 1970; Delia, Clark, & Switzer, 1974; Nidorf & Crockett, 1965; B. O'Keefe, Delia, & O'Keefe, 1977; Rosenkrantz & Crockett, 1965), although a recent study found impression organization to be unrelated to either Crockett's ($r = .14$) or Bieri's (.04) measures (Sypher & O'Keefe, 1980).[4]

Crockett's RCQ has also been shown to be related to individuals' use of balance schemas (Heider, 1958), which are based on principles of evaluative consistency. Press, Crockett, and Rosenkrantz (1969) found that noncomplex subjects were more dependent on balance schemas for learning social relationships than were their noncomplex counterparts. Similar results were reported by Delia and Crockett (1973), who also found that complex subjects demonstrated a greater

ability to abandon the use of balance schemas when those schemas interfered with the learning of the social relationships. A bias toward balanced relationships is only one of several biases operative in the cognition of social relationships, however, and under certain conditions complex subjects have been found to display greater "balance bias" than noncomplex perceivers. Mower White (1977) found that when subjects were asked to cognize very complicated sets of social relationships, high-RCQ subjects continued to use balance schemas while low-RCQ subjects, apparently "overloaded" with information, resorted to other (simpler) forms of bias. This finding has been explained in terms of "cognitively complex subjects being able to take account of more information before the balance bias is 'swamped'" (Mower White, 1979, p. 143).

Research on the relationship of Crockett's index to attitude-behavior consistency also suggests the relationship of the instrument to individual differences in reliance on evaluative consistency principles. Attitude-behavior consistency is ordinarily conceived of as evaluative consistency between attitude and act, and in several studies RCQ-complex individuals have been found to be less likely to display such consistency between their attitude toward another person and their behavioral intentions toward the other than RCQ-noncomplex individuals (DeLancey & Swanson, 1981; D. O'Keefe, 1980b; D. O'Keefe & Delia, in press). Thus, in several areas of research the RCQ has displayed the desired association with reliance on evaluative consistency principles.

Two studies have found Bieri et al.'s (1966) measure to be related to the use of evaluative consistency principles. Mueller (1974) investigated person perception using Carroll and Chang's (1970) individual differences multidimensional scaling model (INDSCAL), and found that the perceptual judgments of complex subjects were less dominated by the evaluative dimension than were those of noncomplex perceivers. In Wojciszke's (1979) study, each subject's judgments about each role figure in the Repgrid were assessed for their degree of "affective homogeneity": the dominant valence of the judgments about a given role figure was determined, and the greater the proportion of judgments in the dominant valence, the greater the affective homogeneity of the subject's judgments. Wojciszke (1979) found that complex perceivers (on Bieri's index) were less likely to display such affective homogeneity than less complex perceivers.

Social perspective-taking. Social perspective-taking (the ability of a person to represent another's perspective or point of view) has been argued by many theorists to be a basic social-cognitive ability underlying communication (e.g., Mead, 1934; Piaget, 1959). Thus a measure of cognitive complexity might well be expected to be positively associated with indices of perspective-taking ability.

In a study of adults, Hale and Delia (1976) found the RCQ to be significantly related ($r = .61$) to perspective-taking ability as assessed by a "Social Perspectives Task" they developed. Both Losee (1976) and Sarver (1976) replicated this result ($r = .39$ and .64, respectively) in samples of adults. In samples of children, significant correlations between the two measures, even with age partialled, have been reported by Clark and Delia (1977; $r = .48$; with age partialled, .39), Delia, Kline, Burleson, et al. (1980; $r = .71$; with age partialled, .63), and Burleson (1980; $r = .68$; with age partialled, .53). Sarver (1976) found the measures to be nonsignificantly related in a sample of second-graders (.32) but significantly correlated in a sample of seventh-graders (.41). Rothenberg's (1970) affective social perspective-taking task was found to be significantly associated with children's scores on Crockett's measure, even when age was partialled, in studies by Burleson (1980; $r = .61$; with age partialled, .42) and Delia, Kline, Burleson, et al. (1980; $r = .61$; with age partialled, .40). Olson and Partington (1977) reported a significant correlation (.52) between Bieri's measure and Feffer's (1959) Role-Taking Task in a sample of adults. In samples of adults, Sypher and

O'Keefe (1980) and Delia, Kline, and Pelias (1980) both found Pelias' (1979) perspective-taking measure to be marginally ($p<.10$) related ($r=.20$ and .19, respectively) to Crockett's measure and unrelated ($r=.05$, .08) to Bieri's measure.

Communication Behavior

Cognitive complexity is presumably a determinant of sophisticated communicative conduct in situations requiring differentiated understandings of others' perspectives and motivational dynamics, and hence a cognitive complexity measure should be positively associated with indices of such communication in both children (with the effects of age removed) and adults.

Children and adolescents. In a study of second- to ninth-graders, Clark and Delia (1977) examined the relationship between Crockett's measure and persuasive communication skills as assessed by Clark and Delia's (1976) listener-adapted persuasive communication task. In this task, children produce a number of persuasive messages concerning familiar situations, and the messages are scored using a hierarchical coding system for the degree to which the child's message reflects acknowledgment of and adaptation to the perspective of the persuadee. Clark and Delia (1977) reported significant correlations ($r=.53$; with age partialled, .45) between Crockett's measure and the listener-adapted persuasive communication index. Sarver (1976) found that the highest level of persuasive strategy used on the same task was significantly related to Crockett's RCQ among second-graders ($r=.51$) but not among seventh-graders (.17).

Delia and Clark (1977) studied the performance of 6-, 8-, 10-, and 12-year-old boys on a version of Alvy's (1973) listener-adapted communication task. Although there were strong age-related developments in the recognition of and adaptation to communication-relevant listener characteristics, complex children (as assessed by the RCQ) outperformed noncomplex ones across the developmental span, with the amount of variance attributable to complexity differences frequently greater than that attributable to age differences. In fact, complex children of one age performed at approximately the same level as noncomplex children two years older.

Delia, Kline, Burleson, Clark, Applegate, and Burke (1980) examined the relationship of Crockett's RCQ to the communicative behavior of first- and third-graders, using a variety of criterion tasks: Clark and Delia's (1976) listener-adapted persuasive communication task, Delia and Clark's (1977) version of Alvy's (1973) listener-adapted persuasive communication task, a "feeling-centered" communication task calling on the child to perceive and respond appropriately to the feelings of peers in several social situations, Baldwin and Garvey's (1973) distinguishing-features referential communication task, and Krauss and Glucksberg's (1969) referential communication task. The RCQ was significantly related to all the dependent measures (correlations ranged from .46 to .67), even with age partialled (partial correlations ranged from .36 to .52). However, Sarver (1976) reported that the quality of referential messages on Krauss and Glucksberg's (1969) task was significantly related to the RCQ among seventh-graders ($r=.56$) but not among second-graders ($-.12$).

The feeling-centered communication portion of Delia, Kline, Burleson, et al.'s (1980) study was replicated by Burleson (1980) with first- through twelfth-graders. RCQ scores were found to be significantly associated with the number of different message strategies used ($r=.75$), the highest level of strategy employed (.78), and the highest level of listener-adaptation displayed in message rationales (.74). When age was partialled, all correlations remained significant (respectively, .64, .69, and .62). Crockett's measure was found to be a good predictor across the age span: For first- and second-graders the correlations with the three dependent measures ranged from .50 to .59 (with age partialled, .43 to .57), for third- through sixth-graders from .58 to .61 (with age partialled, .54 to

.59), and for seventh- through twelfth-graders from .68 to .81 (with age partialled, .68 to .80). However, construct abstractness became an increasingly powerful predictor over the course of development: Among first- and second-graders abstractness was not significantly related to the dependent measures, but with third- through sixth-graders the correlations ranged from .30 to .45 (with age partialled, .27 to .43), and among seventh- through twelfth-graders the correlations ranged from .46 to .67 (with age partialled, .45 to .67). In a high school sample, however, Ritter (1979) found no significant relationships between RCQ scores and listener-adaptation on either an empathetic or persuasive communication task; Ritter also noted that the sample had a restricted range of complexity scores.

Delia, Kline, and Burleson (1979) investigated the relationship of Crockett's complexity measure to persuasive communication skills in kindergarteners through twelfth-graders, using a refined version of Clark and Delia's (1976) persuasive message task. Crockett's measure was significantly correlated with the highest level of persuasive strategy used ($r = .64$; with age partialled, .45), with the number of reasons the child saw for the persuadee's possible refusal (.48; with age partialled, .32), and with the child's ability to refute possible rationales for refusal (.45; with age partialled, .30). Although Ritter (1979) failed to find a relationship between Crockett's measure and persuasive strategies in a sample of adolescents, Delia, Kline, and Burleson (1979) reported significant correlations (.43; with age partialled, .40) in their high school student subsample. Crockett's measure was found to be significantly related to persuasive strategy throughout the age range sampled, but over the course of development the measure became a progressively poorer predictor: Among kindergarteners and first-graders, the correlation was .61 (with age partialled, .61), among second- to sixth-graders it was .52 (.51 with age partialled), and among seventh- to twelfth-graders it was .36 (.29 with age partialled); across the same age groups, however, an index of construct abstractness became a progressively better predictor, with correlations, respectively, of .15 (with age partialled, .15), .36 (with age partialled, .32), and .50 (.45 with age partialled).

Adults. Delia, Kline, Burleson, Clark, Applegate, and Burke (1980) investigated the relationship of cognitive complexity indices to various communication skills, focusing on mothers' communication with their children. Both "regulative" (where the mother is required to modify the child's behavior) and "feeling-centered" (where the mother is called on to respond appropriately to the child's feelings) communication situations were studied. Subjects' messages and rationales for the messages were analyzed using several hierarchical coding systems (see Applegate, 1978; Applegate & Delia, 1980), all of which reflected in some way the communicator's degree of sensitivity and adaptation to the other. Crockett's complexity measure was significantly related to the highest ($r = .34$) and the dominant (.44) level of regulative strategy employed, and to the rationale given for the regulative (.45) and feeling-centered (.36) messages, but not to the highest (.21) or dominant (.13) level of feeling-centered strategy. Neither regulative nor feeling-centered messages or rationales were correlated significantly with Bieri's complexity measure (correlations ranged from .02 to .28). However, a measure of construct abstractness was significantly correlated with both regulative and feeling-centered messages and rationales (correlations ranged from .31 to .52).

In a related study, Applegate, Kline, and Delia (1980) investigated regulative and feeling-centered messages, focusing on college students' communication with peers. Crockett's RCQ was marginally ($p < .10$) related to the highest level of regulative strategy employed ($r = .28$), and was significantly related to the dominant regulative strategy employed (.37), the highest level of feeling-centered strategy used (.34), and the dominant feeling-centered strategy used (.39). Versions of Bieri's measures were unrelated to any of these dependent measures (correlations ranged from $-.11$ to .17),

but an index of construct abstractness was significantly related to all the indices (correlations ranged from .45 to .62).

Burleson (1980) investigated feeling-centered messages using tasks and procedures similar to those of Applegate, Kline, and Delia (1980), and found that the highest level of listener-adaptation in feeling-centered messages was significantly related to Crockett's complexity measure ($r = .24$), though the correlation with a measure of construct abstractness was much higher (.68). In a similar study, Delia, Kline, and Pelias (1980) found that the highest level of communicative strategy used across several feeling-centered communication situations was significantly related to Crockett's measure ($r = .49$), but was unrelated to Bieri's instrument ($r = .03$).

In B. O'Keefe and Delia's (1979) study, subjects wrote persuasive messages directed at a fictitious target person and gave written justifications for each argument or appeal made in the message. Crockett's measure was significantly related to the number of arguments made ($r = .69$) and to the degree of strategic adaptation reflected in the argument justifications (.38); a measure of construct comprehensiveness (B. O'Keefe & Delia, 1978) was not related to the number of arguments ($r = .18$), but was significantly related to the level of argument justification (.70). In a related study, Sypher and O'Keefe (1980) found that the number of arguments produced on the same persuasive message task was significantly related to Crockett's measure ($r = .39$), but not to Bieri's (.03).

Burke (1979) had subjects produce two persuasive messages and list the possible motivations for the persuadee to agree with and to disagree with the persuasive message. The messages were scored for listener-adaptation using Delia, Kline, and Burleson's (1979) coding system. Crockett's measure was significantly related to the highest level of persuasive strategy used ($r = .47$) and to the number of agreement motivations identified (.24), but not to the number of disagreement motivations (.13). A measure of construct abstractness correlated .47, .22, and .19 with these respective measures. Sarver (1976), however, reported that in a sample of adults Crockett's measure was not significantly related ($r = .28$) to the highest level of persuasive strategy employed on an adult version of Clark and Delia's (1976) persuasive communication task.

Burleson (1978) studied listener-adapted communication in six work-related situations involving regulative, persuasive, and feeling-centered communication. Subjects' messages were scored for listener-adaptation using the scoring systems of Applegate (1978) and Delia, Kline, and Burleson (1979), and the scores across the six situations were summed to yield an overall index of listener-adapted communication. A version of Crockett's RCQ was found to be significantly related to the communication index ($r = .44$).

Hale (1980) studied referential communication abilities using Baldwin and Garvey's (1973) tinker-toy task and Feffer and Suchotliff's (1966) password task. Crockett's RCQ was found to be significantly related to various measures of communicative efficiency and effectiveness in the two tasks. In related studies, Sarver (1976) found the RCQ to be significantly related ($r = .39$) to the quality of referential messages in Krauss and Glucksberg's (1969) referential communication task, but Losee (1976) found Crockett's measure to be unrelated to referential communication efficiency on a version of Goodman and Ofshe's (1968) password task.

Using Bieri's measure in a study of female undergraduates, Domangue (1978) examined the effects of inconsistency between verbal and nonverbal messages on subjects' ratings of communicator attitude and on subjects' detection of the inconsistency. Contrary to expectation, Domangue found that complex subjects were not more sensitive to verbal-nonverbal inconsistency than were noncomplex subjects, and that complex and noncomplex subjects did not differ significantly in reliance on verbal or nonverbal cues in rating the communicator's attitude. Rosenthal, Hall, DiMatteo, Rogers, and Archer (1979, p. 244) reported that across two studies of the relationship between their PONS test of nonverbal sensitivity and Bieri's complexity measure, the median r was .28, but no

further details were provided. McMahan (1974), using Crockett's RCQ measure, found that RCQ-complex and noncomplex subjects did not differ in extent of reliance on verbal or nonverbal information in constructing impressions of a communicator, but RCQ-complex subjects found it easier to reconcile and integrate conflicting verbal and nonverbal messages than did their noncomplex counterparts.

Summary

Only Crockett's RCQ measure appears to satisfy all the criteria for an adequate complexity measure. The RCQ has consistently displayed the desired association with chronological age across childhood and adolescence; it has exhibited satisfactory adult test-retest reliability; past early childhood, it is unrelated to independent assessments of verbal abilities and intelligence; it has been found to be associated with a variety of other indices of developed social cognition; and there is considerable evidence showing a relationship between the measure and indices of sophisticated communicative functioning, with this evidence ranging across age groups (children, adolescents, adults), communication situations (persuasive, feeling-centered, referential, regulative), and specific dependent measures (message strategies, message rationales, number of persuasive arguments, etc.).

Even though Bieri's measure (in one or another form) continues to be offered and used as the "standard" complexity measure (see, e.g., Basuray & Scherling, 1979; Burgoyne & Pietrushka, 1979; Hogan & Mookherjee, 1980; Mattenklott & Luutz, 1980; Reker, 1980; Schneier, 1979a, 1979b; Vacc et al., 1980; Wojciszke, 1979), that instrument does not appear to be an adequate index of differentiation: The measure is at best only poorly associated with age across childhood and adolescence; low test-retest reliabilities in samples of adults are not uncommon; variability in scores on the measure are apparently not primarily attributable to individual differences among respondents; the instrument is not consistently associated with other indices of developed social-cognitive functioning; and research has repeatedly failed to find associations of the measure with indices of advanced communicative functioning.

There is, on the whole, relatively little empirical evidence concerning the worth of complexity measures other than Bieri's and Crockett's. Still, these other measures do not fare very well with respect to the several criteria. None of the other measures has been shown to be associated with age across childhood; the number of Repgrid factors has been found to have very low test-retest reliability in adults; the explanatory power of the first grid factor may be related to intelligence; and there is little evidence that any of these measures is associated with other indices of sophisticated social-cognitive functioning or with indices of advanced communicative performance.

COGNITIVE COMPLEXITY AND COMMUNICATION

Although the research reviewed here provides good grounds for preferring Crockett's instrument over other extant complexity measures, the light that these results shed on the determinants of communicative conduct is somewhat shaded. The reason is that construct differentiation (i.e., Crockett's measure) is positively correlated with other aspects of construct system development such as construct abstractness and construct comprehensiveness. Although these relationships indicate that Crockett's instrument may be taken to be "a good overall index of the developmental status of the construct system" (B. O'Keefe & Delia, 1979, p. 232), they also mean that results involving Crockett's measure may be interpreted as speaking to either the effects of the overall level of construct system development or the effects of construct differentiation in particular.

Hence at a minimum one can confidently say that the relative overall developmental status of an individual's construct system has been shown to have important consequences for the kinds of communicative strategies the individual employs in regulative, feeling-centered, and persuasive

communicative situations; for the sorts of rationales the individual provides for regulative, feeling-centered, and persuasive messages; for the quality of the individual's referential communication; for the number of persuasive arguments used and the number of possible reasons given for potential success or failure; and so on. But which of these effects are due specifically to the influence of construct differentiation? We are not in a very good position to answer this question, because communication researchers using Crockett's measure have typically used the RCQ as a "litmus test" for the existence of relationships between construct system development and communicative functioning—and have not specifically examined the distinct particular contributions of construct differentiation, abstractness, comprehensiveness, etc.

However, two recent studies of children have reported findings that bear on the specific role played by differentiation. Delia, Kline, and Burleson's (1979) study found that as children grow older, construct differentiation becomes a less and less powerful predictor of persuasive strategy, while construct abstractness becomes a progressively stronger predictor. And Burleson's (1980) study found that although differentiation is strongly related to feeling-centered message strategies and rationales from first- through twelfth-graders, abstractness becomes an increasingly powerful predictor over the course of development.

Complementary results have been reported in studies of adults. Burke (1979) found that differentiation and abstractness were equally good predictors of the highest level of persuasive strategy used. B. O'Keefe and Delia (1979) reported that although differentiation was significantly related both to the number of persuasive arguments made and to the level of strategic adaptation reflected in argument justifications, the level of argument justification was much more strongly related to construct comprehensiveness (which is, like abstractness, an index of the quality—not number—of constructs in the individual's system). And several studies of adults have found that regulative and feeling-centered strategies and rationales are more strongly related to construct abstractness than to differentiation (Applegate, Kline, & Delia, 1980; Burleson, 1980; Delia, Kline, Burleson, et al., 1980).

These various studies suggest that the *number* of interpersonal constructs in an individual's construct system (differentiation) and the *quality* (e.g., abstractness, comprehensiveness) of those constructs play different (and shifting) roles as determinants of communicative functioning. Among younger children, the degree of sophistication in communicative functioning seems very much influenced by differentiation, while qualitative aspects of the construct system are comparatively uninfluential. But as the child ages, the quality of the child's constructs progressively plays a more important role—such that by adulthood, characteristics such as construct abstractness are often superior predictors of sophisticated communicative functioning. However, differentiation remains (even among adults) significantly related to various indices of communicative conduct, and it appears that some aspects of communicative behavior (e.g., the number of persuasive arguments used) may be more strongly related to differentiation than to qualitative aspects of the construct system.

It thus seems important that, at least in some research areas, investigators move beyond the "litmus test" type of research mentioned previously, so that the particular roles played by the various specific aspects of construct system development can be more firmly established. This is not to suggest that the litmus-test variety of research is uninformative or intrinsically unwise. Crockett's differentiation measure, because of its association with other aspects of construct system development, is "a convenient and economical way to get a general reading of possible relationships between construct system development and other variables of interest" (D. O'Keefe, 1980a, p. 7), and hence in initial investigations the use of Crockett's instrument as a litmus test seems appropriate. But once such initial work has yielded positive results,

then additional research is mandated to pin down the specific contributions of differentiation, abstractness, etc. Of course, it is possible that in this additional research a given communication variable turn out not to be primarily related to some single aspect of construct system development, but instead to the joint effects of two (or more) dimensions, or indeed to just the *overall* level of construct system development (i.e., no dimension or set of dimensions in particular). But these sorts of possibilities can be examined only through empirical work that follows the initial exploratory research.

NOTES

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1. Bieri's complexity measure and the explanatory power of the first grid factor are instruments on which high scores represent low complexity. To permit a more uniform (and conventional) reading of results, in this review the signs of correlations involving one of these measures have been changed so that high scores represent high complexity (and so, for example, positive correlations with criterion measures represent evidence supporting the predictive validity of a measure).
2. In the present review, a good deal of extant cognitive complexity research is not discussed; our focus concerns relationships between complexity instruments and other indices of developed social cognition and communicative conduct. Such relationships seem to us to be especially important in assessing the status of alternative complexity measures, both because of the close conceptual connection with the notion of cognitive complexity and because of the relatively sustained empirical attention given to these matters. Thus, the present review excludes research concerning the relationship of complexity indices to such things as the similarity-attraction relationship (Leonard, 1976), thought-induced attitude polarization (Brady & O'Keefe, 1980; D. O'Keefe & Brady, 1980), attitude toward self-disclosure (Delia, 1974), amount and type of gestural behavior (Baxter Winters, & Hammer, 1968), responses of theatre audiences to plays and characters (Gourd, 1977), teacher directness-indirectness (Reynolds, 1970), the content of informal interactions (Delia, Clark, & Switzer, 1979), information-seeking in inital interactions (Rubin, 1975), the "vigilance vs. frequency-of-interaction" controversy (e.g., Koenig & Seaman, 1974; Kuna & Williams, 1976; H. Miller & Bieri, 1965; Soucar, 1971; Soucar & Ducette, 1971, 1972; Supnick, 1964; Zalot & Adams-Webber, 1977), susceptibility to prosocial appeals (Burleson & Fennelly, in press), childhood socialization factors (Hogan & Mookherjee, 1980), ego development (Vetter, 1980), career choice (e.g., Bodden, 1970; Harren, Kass, Tinsley, & Moreland, 1979), interpersonal accuracy (e.g., Adams-Webber, 1969; Leventhal, 1957; Vacc, 1974), sex-typing (Lessem, 1979), ego identity formation (Cote & Reker, 1979), traffic accident proneness (von Eye & Hussy, 1979), and personality variables such as conservatism (Schneider, Kohler, & Wachter, 1979), dogmatism (Starbird & Biller, 1976), field dependence (Elliott, 1961), Machiavellianism (Delia & O'Keefe, 1976; Sypher, Nightingale, Vielhaber, & Sypher, 1981), authoritarianism (Pyron, 1966), repression-sensitization (Wilkins, Epting, & Van De Riet, 1972), and extraversion (Bryson & Driver, 1972).
3. Research has indicated that several factors can attentuate differences in impression organization between RCQ-complex and RCQ-noncomplex perceivers: If the stimulus person is portrayed as having basic values different from the perceiver's (Meltzer, Crockett, & Rosenkrantz, 1966) or as having a dissimilar speech dialect (Delia, 1972), or if the perceiver is operating under an evaluative set (Crockett, Mahood, & Press, 1975; Press, Crockett, & Delia, 1975), then RCQ-complex and RCQ-noncomplex perceivers typically exhibit little difference in the organization of their impressions. These findings have been interpreted as indicating the role that particular situational factors play in depressing the level of functioning ordinarily achieved by developmentally advanced perceivers (see, e.g., Press et al., 1975; Rosenbach, Crockett, & Wapner, 1973).

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