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The Relationship between Abstract and Social Intelligence

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THE RELATIONSHIP BETWEEN ABSTRACT AND SOCIAL INTELLIGENCE

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Life

Marcia Mulder Pavlou was born in Evanston, Illinois on September 5, 1947. She graduated from Riverside-Brookfield High School in 1965 and began study at the University of Illinois, Champaign, in September of that year, graduating in 1968 with a major in psychology and an election to Phi Beta Kappa honorary fraternity.

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THE RELATIONSHIP BETWEEN ABSTRACT AND SOCIAL INTELLIGENCE

Marcia Pavlou

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Investigators have long been concerned with individual differences in ability to correctly perceive the thoughts, feelings, and intentions of others. Some have examined stylistic differences in person perception and have correlated such differences with personality characteristics. A second approach views social sensitivity as an ability, of which a given individual possesses a particular amount. Exploring this latter view, the present investigation summarizes that body of research which establishes the existence and relevance of a construct of social intelligence (SIQ) along which individuals may vary. Such research asks whether the construct behaves as theory dictates, whether it relates to important active social skills, and whether it represents one or several abilities. Refining the construct, then, this investigation asks whether social intelligence contributes significantly to the dimension of ability, whether it can be conceptualized and measured as an ability independent or partially independent from general intellectual ability. This study will be particularly concerned with the social intelligence tests recently devised by O'Sullivan, Guilford, and DeMille (1965).

Existence and Relevance of a Construct of Social Intelligence

In accordance with theoretical expectation, developmental psychologists have noted an increase in interpersonal sensitivity with

increase in age, from the diffuse visceral perception of infancy to the empathic abilities of adulthood; as with other developmentally acquired skills, individuals presumably reach varying degrees of maturity and therefore exhibit varying abilities in adulthood. Spitz (1965) reported that infants respond on a visceral level to differential affective patterns of the mother, displaying thereby a primitive ability to discriminate maternal emotions. Beyond the age of seven months, youngsters respond negatively to strangers, apparently aware of differences between "mother style" and "other style". Gates (1923) noted that the ability of children to recognize pictorially displayed emotions increases with age. Children of three can recognize photographs denoting laughter; recognition of pain, anger, fear, horror, surprise, and contempt follow at steps of about two years. Levy-Schoen (1969) discovered that younger children tend to use external and physical cues in the description of the stimulus person, while older children note inner "personality" cues and crucially important facial expressions. Bridges (1931) cited increasingly realistic imitation as evidence of increasing social sensitivity. Burns and Cavey (1957) asked two groups of children to describe the feelings of children responding in an unusual manner; for instance, subjects were asked to describe the feelings of children pictured as laughing while receiving an injection. Burns and Cavey reported that younger children did not perceive the discrepancy, that they described only how they themselves might respond in a similar situation. Older children, no longer limited by the egocentric thinking described by Piaget (Flavell, 1963), did detect differences between their own emotions and those of another. Shanley, Walker, and Foley (1971) ascertained

that indeed 18-year-olds scored significantly higher on Guilford's tests of social intelligence (O'Sullivan, et al., 1965) than did either 14-year-olds or 11-year-olds.

Researchers have asked whether passive perceptive abilities relate to important active social skills. In an early attempt, Stauter and Hunting (1933) obtained significant differences between socially active and socially inactive students on a measure of range of acquaintanceship, admittedly a rather unsophisticated indicator of social sensitivity. The George Washington Social Intelligence Test (Hunt, 1928; Thorndike, 1936), despite its numerous psychometric difficulties, differentiated between students participating to various degrees in extracurricular activities. Bronfenbrenner, Harding, and Gallwey (1958) noted positive correlations between leadership skills and high idiosyncratic sensitivity. More recently, Suran (1970) found that successful T group trainers scored higher on Guilford's recently devised tests of social intelligence (O'Sullivan, et al., 1965) than did less successful trainers. Tenopyr (1967), on the other hand, found that the addition of the SIQ score to a multiple regression equation did not significantly improve upon prediction of school success in high school students. Related to these studies of observable active behavior are the findings of a number of investigators that social intelligence scores differentiate between, for instance, laborers and teachers (Hunt, 1928).

Attempting to refine the construct, a number of researchers have asked whether social intelligence is a single and generalized ability or whether it is more appropriately conceptualized as a number of independent abilities. Studying the abilities of university students

to judge fellow members of small discussion groups, Taft (1956) discovered distinct groups of good judges and bad judges. This author noted important personality differences in his two groups. Rogers (1957) and Dymond (1953) similarly discussed differences in general abilities of counselors to predict Q-sort data of their clients. On the other hand, other investigators suggest at least two independent abilities--an ability to characterize the "generalized other" and an ability to discriminate between specific persons. Bronfenbrenner, et al. (1958) reported that women high in stereotypic accuracy did not necessarily score highly on measures of idiosyncratic accuracy. Guilford (1959, 1966, 1967) postulated at least 30 independent social sensitivities.

Evidence suggests, in conclusion, that social intelligence may be a useful and valid construct; it seems to behave as theory might dictate, to relate to important active behavior, and to allow clear conceptualization as either a generalized ability or a group of abilities. Future researchers have yet to establish, however, that social intelligence contributes significantly to the construct of ability and that it is therefore usefully measured independently.

Social Intelligence and General Ability

Indeed, a number of researchers and theoreticians believe that general intelligence and social intelligence are in reality interdependent and therefore highly correlated. Piaget (Flavell, 1963) postulated that social intelligence develops only as other complex cognitive skills develop, that skills of social perception emerge automatically in the presence of high IQ and as thinking moves from the "egocentric" to the "sociocentric"; Piaget, of course, views

social sensitivity as a cognitive event uninfluenced by emotional or personality factors. Thus Strang (1930) stated that the ability to understand people should correlate highly with the ability to understand things. Rothenberg (1970) asked third and fifth grade youngsters to describe the feelings and motives of adults participating in taped happy, anxious, and sad interactions. Rothenberg obtained correlations of .23-.28 between these measures of social sensitivity, the Wechsler Intelligence Scale for Children Block Design subtest, and the Peabody Picture Vocabulary Test. While Rothenberg concluded that the .28 correlation supported the postulated IQ-SIQ interdependence, the critical reviewer must note that this correlation is not particularly high. Supporting the view that social intelligence relates to general intelligence are the numerous findings of early researchers that intelligence correlates highly with various measures of social sensitivity. Thus Thorndike (1936, 1940, 1959; Thorndike and Stein, 1937) devised an apparently reliable and practically useful scale which correlated .75 with measures of general intelligence. Chapin (1942) constructed a 25-item verbal scale asking for insight in a number of interpersonal situations drawn from novels and case histories; this scale likewise correlated .40-.50 with general intelligence (Gough, 1965). Woodrow (1939) noted the importance of abstract verbal ability in all of these early social intelligence tests.

A number of theoretically relevant notions might explain IQ-SIQ correlations. Most directly, the reviewer might conclude as did Piaget that intelligent people simply develop better perceptive skills than do less intelligent individuals; the IQ-SIQ correlations reflect a true correspondence in nature. The observer might postulate that early tests

ignore non-verbal sensitivity and measure only that formal variety of psychological understanding required of such generally studied subject groups as graduate students in clinical psychology; the tests tell only part of the story. Finally, the reviewer might conclude that early tests simply have not tapped those independent social intelligence factors which exist in nature.

Guilford's Assertion of SIQ Independence

Guilford (1966, 1967; O'Sullivan, et al., 1965) chose this latter interpretation and inferred that it should be possible to devise a measure of social intelligence totally independent of general intelligence. Guilford placed social intelligence into his structure-of-intellect model and, as with previously studied intellectual acts in the semantic, symbolic, and figural content areas, postulated the existence of 30 distinct and independent social intelligence factors. Thus he proposed that an individual could perform one of five different intellectual operations in the behavioral content area. Most simply he could perform an act of cognition, or an immediate discovery, awareness, or recognition. He might remember. He might think divergently and generate a variety of output, or he might think convergently and generate a single correct solution. Finally, he could evaluate, or judge in terms of criteria. As Guilford conceptualized, use of each of these five operations culminated in one of six increasingly complex intellectual products. Most simply, thought might involve a unit product, or the perception of things, segregated wholes, figures on grounds, or "chunks". It might deal with formation of classes, or aggregates, the members of which share common properties. Moving toward greater complexity, an intellectual operation could relate units or classes,

finding connections between them. It could make transformations or redefinitions of known information. At the most complex level, an intellectual operation might draw implications or extrapolations in the form of predictions or antecedents.

Guilford's scheme requires that behavioral factors demonstrate independence from factors in the other three content areas. Thus while social intelligence could theoretically be measured with verbal materials, Guilford felt that such a verbal vehicle might well maximize confounds with semantic reasoning factors. He enlarged, therefore, upon the work of Wedeck (1947), who used auditory and pictorial stimuli to construct eight psychological ability tests. Use of such stimuli assumes that such expressive behavior as facial expressions and vocal inflections are the cues from which intentional states are inferred. Challenging this format, Taft (1956) charged that emotions so portrayed are stereotypic rather than idiosyncratic. Unfortunately, Guilford's model cannot adequately meet such a criticism, as it deals essentially with formal skills and does not differentiate between abilities to deal with such varying behavior content as, for instance, the generalized other and the specific other or the angry individual and the happy individual; such a differentiation at a later date might allow for the greater consideration within the Guilford model of individual personality factors.

This difficulty notwithstanding, Guilford devised 23 SIQ tests, all dealing with that operation of behavioral cognition Guilford felt to be basic to other behavioral operations. Thus these tests do not tap abilities to evaluate or deal creatively with social situations and, rather, tests skills of basic social perception and understanding.

Guilford reported that six of his 23 tests were sufficiently reliable and factor pure for general use (O'Sullivan, et al., 1965). SIQ scores of initial groups of 11th graders reportedly were essentially uncorrelated with tests of a large number of other abilities. Thus the experimenter demonstrated the absence of significant correlations with tests of visual-figural abilities and with tests using a similar cartoon format. He investigated the importance of general problem solving set, correlating behavioral tests with tests of general reasoning or of cognition of semantic systems. Guilford reported low correlations with skills of semantic labeling of non-verbal stimuli; SIQ tests apparently do not measure exclusively skills of formal psychological labeling of the type acquired with training in psychology. Finally, the experimenter reported no significant correlation with tests of general verbal ability. Cronbach (1970) pointed out, however, that tests of verbal ability were factorially complex and that therefore the low correlation does not conclusively demonstrate the independence of Guilford's behavioral factors from his own verbal factors.

Some independent work has supported Guilford's assertions of the independence of his tests from other intellectual factors. Examining SIQ and IQ scores of a group of 250 10th graders, Tenopyr (1967) reported that factor analysis did reveal a behavioral factor. Suran (1970) reported no correlation between social intelligence and general intelligence in a group of sensitivity trainers. Testing groups of 300 6th, 9th, and 12th graders, Shanley, et al. (1971) noted small, but significant correlations between Otis intelligence scores and a number of SIQ measures in the 6th and 12th grade samples.

Other investigators have reported less encouraging findings, however. Cronbach (1970) re-analyzed Guilford's findings and concluded that some tests did not even tap a behavioral factor, much less a behavioral factor independent of general intelligence. Estimating the correlations which might be found by combining a large number of tests for that factor, Cronbach discovered that the factor of cognition of behavioral transformations had far too much variance in common with other tests to merit further study. More optimistically, Cronbach reported that correlations among tests of cognition of behavioral relations ran higher than did those between this factor and other tests. He suggested similar analyses of other behavioral factors. Hoepfner and O'Sullivan (1968) reported correlations in the range of .35-.45 between IQ and SIQ in groups of 11th graders. Shanley, et al. (1971) likewise found a number of .50-.67 correlations in the group of 9th graders.

The present investigation rejected the theoretical IQ-SIQ interdependence and sought to replicate and explain these latter correlations in terms of psychometric difficulties, leaving the construct of social intelligence as potentially viable and independent from general intelligence. More specifically, the investigator postulated that previously obtained IQ-SIQ correlations of .30-.40 would be replicated in an adult sample; correlations previously obtained are not a chance happening and will be found reliably in most samples. Secondly, the researcher proposed that these correlations reflect a restriction in range of SIQ scores in the upper IQ range, that this restriction is reflected in a curvilinear relationship between IQ and SIQ. Range restriction in one of the variables, of course, generally reduces rather than increases

correlations. In this case, however, the investigator proposed that, while IQ has no relation to SIQ in the normal and bright normal intelligence ranges, individuals in superior IQ ranges uniformly earn high SIQ scores; the IQ-SIQ coefficient is deceptively high, and the elimination of high IQ individuals from the sample should be expected to reduce correlations to a degree greater than that normally expected from the elimination of a similar portion of a distribution. Most of the IQ-SIQ correspondence is absorbed by upper IQ subjects. Support for this proposal is seen in the fact that higher correlations, not lower, have been found in subject groups limited to higher IQ individuals; more moderate correlations have been noted in samples in which the numbers of high IQ individuals are more limited. Thus while Shanley, et al. (1971) recorded correlations in the range of .35 in the 6th and 12th grade groups, they obtained somewhat higher correlations in the higher IQ group of 9th graders. Similarly, when Hoepfner and O'Sullivan (1968) tested an equally bright group with a mean IQ of 118, they likewise noted high IQ-SIQ correlations. More importantly, these researchers noted a restriction in SIQ range in the higher abstract ability ranges. While the present study did not experimentally investigate possible reasons for the proposed restriction in SIQ range at high IQ levels, the investigator suspected that high IQ individuals might be able to use their greater verbal, labeling, problem solving, and other intellectual skills to compensate on SIQ tests for low social sensitivity. Lower IQ individuals might be less able to do so, their SIQ scores reflecting a truer picture of real social awareness. Finally, this investigator proposed that the validity of Guilford's tests would be reflected in an increase, as postulated by developmental theory, in the SIQ scores

of adult subjects; the present study is the first to examine adult SIQ test behavior.

In conclusion, the present investigation proposed the following:

1. That IQ-SIQ correlations of .30-.40 are found in an adult sample.
2. That the IQ-SIQ relationship is curvilinear, reflecting restriction of SIQ scores in higher IQ ranges.
3. That adults earn higher SIQ scores than do adolescents.

Method

Subjects

This study examined SIQ and intelligence data in four groups of subjects, the first three of which were tested by Shanley et al. (1971) as a part of an earlier investigation. Group 1 consisted of 50 male and 50 female 6th graders, Groups 2 and 3 of 50 male and 50 female 9th and 12th graders respectively. These subjects were randomly selected from class lists in two Chicago high schools serving primarily the white lower middle and middle middle socio-economic classes, the latter determined on the basis of Coleman's (1959) classification. Under this system an individual receives a socio-economic rating of one point if he lives in an upper class neighborhood, has a very high income, and is a graduate of a prestigious university. A subject receives a three point rating if he has completed one to three years of college and earns a moderate income, four points if he has finished high school and earns less money. Six and seven point ratings apply to subjects who have very low or unstable incomes, have completed 7th grade or less, and live in a poor neighborhood. High school students were so classified on the basis of parent status. Thus in Group 1 the mean socio-economic rating was 4.6 with a standard deviation of .94; Group 2 averaged 4.64 with a standard deviation of .88; the Group 3 mean was 4.22 with a standard deviation of 1.11.

Adult volunteers from the community comprised a 67 member Group 4. Such volunteers emerged from women's groups, from husbands and

friends of women in these initial groups, from church groups, from business acquaintances and secretaries of individuals already tested. Approximately one individual declined testing for every five individuals approached, and several such organizations as the fire and police departments refused to participate on a group basis. Generally individuals were not even contacted unless some acquaintance felt that they might wish to participate. The special nature of this adult group is obvious. It is limited largely to individuals having some interest in research and education, to individuals having spare time in which to participate, and to individuals having sufficient social and intellectual confidence to consent to testing. On the other hand, the group has the merit of being comprised of functioning, non-student adults. Mean age in this group was 30.01 years with a standard deviation of 11.22, and the average socio-economic rating was 3.02 with a standard deviation of .85. The examiner eliminated from data analysis the profiles of several adults who, because of various states of alcoholic and drug intoxication, did not offer valid test protocols.

Test Materials

The investigator secured intelligence and social intelligence scores for each subject. Individuals in Groups 1, 2, and 3 completed the Otis IQ test, a standard school group test (Otis, 1954). The adult subjects completed the Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 1955). The WAIS demonstrates somewhat greater reliability than group tests, yields verbal (VIQ) and performance (PIQ) subscores, and generally provides more information than does the Otis. Subjects in the first three groups completed Guilford's six SIQ tests (O'Sullivan,

et al., 1965). Group 4 subjects took only the first four of the six tests listed below.

Cartoon Predictions (CP). On the basis of perception of the thoughts, feelings, and emotions of cartoon characters, the subject chooses one of four cartoons which correctly provides a consequence for an event pictured in the first cartoon. This test has a Kuder-Richardson reliability of .79 with a loading of .55 on the factor of cognition of behavioral implications (CBI) (O'Sullivan, et al., 1965).

Expression Grouping (EG). The subject chooses one of four drawings which depicts the same expression as is depicted in a group of three other pictures; facial expressions, hand gestures, and body postures represent the various expressions. Kuder-Richardson reliability of this test is .62, with a .59 loading on Guilford's factor of cognition of behavioral classes (CBC) (O'Sullivan, et al., 1965). This factor is said to measure the ability to see similarity of behavioral information in different expressional modes (Guilford, 1967).

Missing Cartoons (MC). The subject chooses one picture to correctly fit into a four-picture cartoon series. The Kuder-Richardson reliability of this test is .77. This test loads on the factor of cognition of behavioral systems (CBS) and on cognition of behavioral implications (CBI) (O'Sullivan, et al., 1965). Guilford (1967) postulated that CBS measures an ability to comprehend a social situation, CBI an ability to draw implications regarding the social situation.

Social Translations (ST). The subject chooses one of three pairs of people between whom the given verbal statement will have a different intention or meaning than it had between the stimulus persons. With a Kuder-Richardson reliability of .86, this test is said to measure

cognition of behavioral transformations (CBT), or the ability to flexibly reinterpret behavior in view of circumstance (Guilford, 1967; O'Sullivan, et al., 1965).

Picture Exchange (PE). The subject chooses a photograph which, if substituted in a four-picture series, changes the meaning of the story. This test, with a Kuder-Richardson reliability of .43, loads .51 on the factor of cognition of behavioral transformations, discussed above (O'Sullivan, et al., 1965).

Missing Pictures (MP). The subject chooses a photograph which correctly completes a series of four pictures. With a Kuder-Richardson reliability of .53, this test loads .58 on the factor of cognition of behavioral systems (CBS), discussed above (O'Sullivan, et al., 1965).

Data for the first three groups included Otis IQ scores; scores on CP, EG, MC, ST, MP, PE; Composite 1 (Comp. 1), consisting of a sum of scores on ST, MC, CP, and EG; Composite 2 (Comp. 2), consisting of a sum of scores on all six SIQ tests. Group 4 data included WAIS total IQ; VIQ and PIQ subtotals; scores on CP, EG, MC, ST; and Composite 1.

Procedure

Subjects in Groups 1, 2, and 3 were administered both the Otis and the six SIQ tests in their own classrooms and in accordance with specifications prescribed in the manuals. The investigator tested adult subjects in either their own homes or in one of several available professional settings. Assuring them of confidentiality of scores, the experimenter informed subjects that they were providing data for adult norms on a new test and material regarding the relationship between the new SIQ tests and older instruments.

Analysis of Data

Three experimental hypotheses, listed previously, were tested with the following statistical tools respectively:

1. The examiner computed Pearson product-moment correlations for IQ-SIQ relationships in each of the four experimental groups. Significance of correlations was ascertained.
2. The experimenter postulated that the regression of SIQ on IQ takes a curvilinear form. The investigator used a method of least squares to fit to the data polynomial curves in the form $Y = b_1x + b_2x^2 + c$. F ratios were calculated for both linear and quadratic terms. Significance of the F ratio for the quadratic term would support the thesis that a curvilinear line better describes the data than does a linear function alone (Cooley and Lohnes, 1971).
3. The experimenter compared adult scores with scores of adolescents in each of the three age groups.

Results

The experimenter postulated IQ-SIQ correlations of .30-.40. As coefficients in Tables 1 - 4 indicate, this hypothesis was only partially supported. Thus in the 6th and 12th grade samples, most correlations fell around .25-.30, and none surpassed .46. However, a number of disturbingly high coefficients appeared in samples of 9th graders and adults; IQ correlated .64 and .67 with SIQ Composites 1 and 2 in 9th graders, .55 with Composite 1 in the adult group. MC correlated .61 with IQ in the adult sample. While considerable variability existed among the child groups, there was some indication that MP, PE, and EG correlated to a lesser degree with abstract intelligence than did the other three subtests. EG, said by Guilford (1967) to be the most basic measure of social intelligence, also correlated to a low degree with IQ in the adult group.

The experimenter likewise proposed, by way of explanation of these correlations, a curvilinear relationship between IQ and SIQ such that SIQ scores are uniformly high in upper IQ ranges. Tables 5 and 6 summarize F values and beta weights. As is seen in Table 5, the 30 second order regressions of ST, CP, ME, EG, MP, PE, MC+MP, PE+ST, Composite 1, and Composite 2 against IQ revealed no significant quadratic terms in any of the three student groups. Slightly better than half of the cases exhibited the hypothesized negative curvature coefficient. Figures in Table 6 indicate that the eighteen similar regressions of ST, MC, CP, EG, ST+CP, and Composite 1 against verbal,

Table 1

Pearson r^s on Variables for Grade 6 Subjects*

	Otis IQ	CP	EG	MC	MP	PE	ST	MC+ MP	ST+ PE	Comp.1	Comp.2
Otis IQ		.35 ^d	.20 ^b	.22 ^b	.28 ^d	-.01	.34 ^d	.29 ^d	.36 ^d	.45 ^d	.46 ^d
CP			.18 ^a	.40 ^d	.30 ^d	.13	.21 ^b	.43 ^d	.30 ^d	.71 ^d	.70 ^d
EG				.41 ^d	.27 ^d	-.02	-.03	.50 ^d	-.03	.51 ^d	.48 ^d
MC					.39 ^d	-.02	.18 ^a	.90 ^d	.19 ^a	.74 ^d	.74 ^d
MP						.06	.30 ^d	.75 ^d	.31 ^d	.49 ^d	.63 ^d
PE							.06	.01	.30 ^d	.07	.18 ^a
ST								.27 ^d	.93 ^d	.61 ^d	.60 ^d
MC+MP									.28 ^d	.76 ^d	.80 ^d
ST+PE										.62 ^d	.67 ^d
Comp.1											.97 ^d

a = $p < .05$
b = $p < .025$
c = $p < .010$
d = $p < .005$

*N=100

Table 2
 Pearson r^s on Variables for Grade 9 Subjects*

	Otis IQ	CP	EG	MC	MP	PE	ST	MC+MP	ST+PE	Comp.1	Comp.2
Otis IQ		.48 ^d	.45 ^d	.51 ^d	.27 ^d	.56 ^d	.43 ^d	.46 ^d	.62 ^d	.64 ^d	.67 ^d
CP			.32 ^d	.53 ^d	.43 ^d	.20 ^b	.41 ^d	.56 ^d	.43 ^d	.74 ^d	.73 ^d
EG				.39 ^d	.36 ^d	.52 ^d	.23 ^c	.43 ^d	.42 ^d	.62 ^d	.67 ^d
MC					.45 ^d	.29 ^d	.23 ^c	.90 ^d	.39 ^d	.76 ^d	.76 ^d
MP						.18 ^a	.31 ^d	.74 ^d	.30 ^d	.50 ^d	.63 ^d
PE							.28 ^d	.32 ^d	.61 ^d	.43 ^d	.55 ^d
ST								.29 ^d	.76 ^d	.61 ^d	.60 ^d
MC+MP									.35 ^d	.75 ^d	.81 ^d
ST+PE										.75 ^d	.76 ^d
Comp.1											.97 ^d

a = $p \leq .05$
 b = $p \leq .025$
 c = $p \leq .010$
 d = $p \leq .005$

*N=100

Table 3

Pearson r^S on Variables for Grade 12 Subjects*

	Otis IQ	CP	EG	MC	MP	PE	ST	MC+MP	ST+PE	Comp. 1	Comp. 2
Otis IQ		.35 ^d	.15	.30 ^d	.08	.22 ^b	.24 ^c	.21 ^b	.29 ^d	.37 ^d	.36 ^d
CP			.26 ^d	.43 ^d	.16	.24 ^c	.22 ^d	.40 ^d	.28 ^d	.66 ^d	.61 ^d
EG				.42 ^d	.33 ^d	.27 ^d	.20 ^b	.46 ^d	.29 ^d	.66 ^d	.65 ^d
MC					.33 ^d	.35 ^d	.29 ^d	.89 ^d	.39 ^d	.81 ^d	.79 ^d
MP						.25 ^d	.24 ^c	.64 ^d	.31 ^d	.39 ^d	.56 ^d
PE							.21 ^b	.45 ^d	.64 ^d	.39 ^d	.55 ^d
ST								.35 ^d	.89 ^d	.63 ^d	.60 ^d
MC+MP									.49 ^d	.79 ^d	.85 ^d
ST+PE										.68 ^d	.73 ^d
Comp. 1											.97 ^d

a = $p \leq .05$
b = $p \leq .025$
c = $p \leq .010$
d = $p \leq .005$

*N=100

Table 4

Pearson r^S on Variables for Adult Subjects*

	IQ	VIQ	PIQ	ST	MC	CP	EG	Comp. 1
IQ		.87 ^d	.87 ^d	.48 ^d	.61 ^d	.32 ^d	.35 ^d	.55 ^d
VIQ			.50 ^d	.44 ^d	.54 ^d	.20 ^a	.29 ^c	.43 ^d
PIQ				.37 ^d	.51 ^d	.34 ^d	.30 ^d	.50 ^d
ST					.46 ^d	.27 ^c	.30 ^d	.64 ^d
MC						.53 ^d	.33 ^d	.78 ^d
CP							.51 ^d	.81 ^d
EG								.66 ^d
Comp. 1								

a = $p \leq .05$
b = $p \leq .025$
c = $p \leq .010$
d = $p \leq .005$

*N=67

Table 5
 F Values* and Beta Weights for Quadratic Terms
 Utilizing 6th, 9th, and 12th Grade Subjects

	Grade 6		Grade 9		Grade 12	
	F	B	F	B	F	B
IQ·ST	.01	.0005	3.35	-.0055	.01	-.0004
IQ·CP	.15	-.0015	2.76	-.0029	.00	.0000
IQ·MC	.35	-.0022	1.12	.0027	1.13	.0040
IQ·EG	1.81	-.0042	.02	.0026	.02	.0004
IQ·MP	.02	.0004	.27	.0008	.95	.0021
IQ·PE	.26	.0019	1.01	.0012	.18	.0008
IQ·MC+MP	.13	-.0019	.19	.0015	.00	-.0001
IQ·PC+ST	.03	.0010	.86	-.1128	.09	-.0012
IQ·Comp.1	.63	-.0074	1.49	-.0068	.22	-.0039
IQ·Comp.2	.37	-.0069	.83	-.0060	.07	-.0027

*df=2,97

Table 6
 F Values* and Beta Weights for Quadratic Terms
 Utilizing Adult Subjects

	Verbal IQ		Performance IQ		Total IQ	
	F	B	F	B	F	B
IQ·ST	.32	.0014	.06	-.0004	.52	.0016
IQ·CP	1.18	-.0047	1.58	-.0032	3.72	-.0073
IQ·MC	.98	-.0040	1.26	-.0029	.69	-.0029
IQ·EG	2.83	-.0077	.37	-.0017	3.02	-.0072
IQ·Comp.1	1.29	-.0127	2.19	-.0098	3.09	-.0167
IQ·ST+CP	.36	-.0032	1.23	-.0036	1.43	-.0056

*df=2,64

performance, and total IQ likewise revealed insignificant quadratic terms in the adult group. However, 16 of the 18 terms were negative and suggested a possible tendency toward curvilinearity. Offering some support for the hypothesis of curvilinearity is the fact that the tendency in the hypothesized direction appeared more clearly in that group of adults in which greater numbers of subjects fell in upper IQ ranges and in which IQ correlated most highly with SIQ.

Finally, the investigator proposed that adults would score higher on SIQ tests than would children. As scores in Tables 7 and 8 indicate, adult Composite 1 scores were significantly superior to 6th grade ($\underline{t} = 14.3, p < .005$), 9th grade ($\underline{t} = 6.00, p < .005$), and 12th grade ($\underline{t} = 2.43, p < .01$) Composite 1 scores. However, actual differences between adult and 12th grade composite scores were very small, and adult-12th grade differences on the EG subtest were insignificant ($\underline{t} = .56, p < .30$). It should be noted that the adult mean IQ was significantly greater than the mean 12th grade IQ ($\underline{t} = 1.97, p < .05$) and, in view of obtained IQ-SIQ correlations, could account on a non-developmental basis for the adult increase.

Table 7
Descriptive Statistics on Relevant Test Variables
for Grades 6, 9, and 12

	Grade 6		Grade 9		Grade 12	
	Mean	SD	Mean	SD	Mean	SD
Total IQ	108.06	9.60	112.37	11.62	112.09	9.72
CP	16.88	4.53	20.62	3.37	22.52	3.09
EG	15.16	3.43	18.69	3.55	19.25	3.22
MC	13.62	4.14	16.92	4.92	18.74	4.37
ST	9.97	2.72	11.83	2.72	13.29	2.41
MP	8.51	3.95	9.38	2.45	9.59	2.22
PE	11.14	5.36	15.07	5.71	17.22	3.65
MC+MP	23.59	5.77	28.54	6.59	32.31	5.51
PE+ST	19.35	6.23	24.43	6.46	26.81	4.65
Comp.1	56.80	11.22	71.03	12.32	77.73	9.98
Comp.2	75.01	13.56	92.04	14.92	100.61	12.21

Table 8

Descriptive Statistics on Relevant Test Variables
for Adults

	Adults	
	Mean	SD
Total IQ	116.79	9.37
VIQ	117.16	9.01
PIQ	114.10	11.80
CP	22.97	3.86
EG	19.31	4.27
MC	20.44	4.25
ST	18.66	2.44
Comp. 1	81.81	10.95

Discussion

Data in this study yield a number of interpretations potentially damaging to the psychometric adequacy of Guilford's tests as well as a number of findings supportive of previously reported, encouraging results. Thus the present study obtained many IQ-SIQ correlations in the 6th and 12th grade groups no higher than those reported by O'Sullivan, et al. (1965) and by Hoepfner and O'Sullivan (1968). Intercorrelations of SIQ subtests were reasonably small in these groups, and there were no indications of curvilinearity in the IQ-SIQ correlations; high IQ individuals received as wide a range of SIQ scores as did any other group. The Expression Grouping subtest, said to measure the most basic behavioral cognition, correlated to a low degree with intelligence in all groups.

On the other hand, IQ-SIQ correlations in 9th grade and adult samples surpassed structure-of-intellect predictions and reached .50-.60 in some instances. The investigator had proposed that correlations reflect the fact that nearly all high IQ individuals score high on SIQ tests, while SIQ bears no relation to intelligence in moderate and low IQ ranges. If this hypothesis were true, elimination of these high IQ individuals from the sample would facilitate a drop in correlation coefficients; Guilford's tests might be independent of general intelligence and practically useful in all but very high IQ individuals. As discussed, this hypothesis was not conclusively established in the present study, though a tendency in the predicted

direction was noted in the adult sample. If the sample had contained a better range of individuals falling in lower IQ ranges, this tendency might have been seen more clearly.

An alternative explanation of the data suggests that IQ-SIQ correlations may simply reflect the residue of an underlying intellectual reasoning factor in the SIQ tests, though this hypothesis was not tested directly. Thus intercorrelations between SIQ subtests, reaching .50 and higher in some cases, surpassed structure-of-intellect predictions and were greatest in those groups of 9th graders and adults in which IQ and SIQ correlated most highly. The two subtests most highly correlated with verbal IQ also correlated most highly with each other and may suggest that the common reasoning factor accounts for subtest intercorrelations. ST and MC correlated somewhat, though not significantly higher with verbal ability than any of the subtests correlated with the performance score, suggesting that verbal confounds might present somewhat more difficulty than non-verbal. If IQ-SIQ correlations did reflect the presence of an intellectual reasoning factor, true IQ-SIQ correspondence might be even higher than that noted in the intellectually rather homogeneous adult group; elimination of large numbers of highly intelligent adults and achievement of greater heterogeneity and broader range of IQ could be expected to raise coefficients. This alternative is much more damaging both to the psychometric adequacy and to the theoretical base of Guilford's tests; the theoretical existence of an independent dimension of social intelligence is brought into question.

Data revealed a number of differences between student and adult groups, differences possibly reflecting important developmental phenomena.

While adult-adolescent SIQ composite scores differed significantly in all groups, data did not clearly establish a great superiority of adult over 12th grade SIQ scores and may indicate that social intelligence is fairly completely developed by age 18. The experimenter noted that SIQ intercorrelations and the SIQ-IQ correlations were higher in adult subjects than in the 6th and 12th grade groups. Such a view may offer contraindication to the view, represented by Garrett (1946), that abilities become more highly differentiated as an individual reaches maturity; possibly growth following the age of 18 consists primarily of a filling out and catching up of previously distinct social abilities. Possibly the adult learns to label and more effectively use those basic perceptive skills acquired some time earlier; adult performance did not differ significantly from 12th grade performance on the EG subtest, said to measure the simplest and most basic form of social intelligence. Support for this view would have important implications for selection procedures in socially demanding job positions and in graduate schools of social work, psychology, nursing, etc.

Data likewise offered some hint that social intelligence may represent a somewhat different process in adolescence than in adulthood, though such a proposal is somewhat speculative at present. Thus intelligence and social intelligence seemed genuinely related in the 9th grade group; there was no indication that IQ-SIQ correlations related only to uniformly high SIQ scores in high IQ subjects. Adult correlations, just as high, gave some suggestion of reflecting primarily this restriction of SIQ in high IQ ranges. If this is so, there is some hope that adults are in reality ordered along an independent dimension of social intelligence. Supporting this view is the fact

that special sampling characteristics of this particular adult group may have artificially magnified IQ-SIQ correlations. Thus, most high IQ adults in the present sample engaged in the socially demanding professions of teaching, medicine, or sales and not in such technical and non-social fields as engineering and architecture. High IQ adults may generally have sought out intellectually oriented material and may thereby have retained a higher level of test-taking ability than lower IQ individuals. Differential intellectual exposure would not be apt to distinguish high from low IQ students, who tend to receive a more homogeneous degree of intellectual stimulation; differences in test-taking ability among high and low IQ students cannot, of course, be ruled out. Working from a psychodynamic viewpoint, Deutsch (1967) states that the particular developmental crises of the adolescent renders him capable of a different and in some ways a greater empathy than he will possess in adulthood; a straight line view of SIQ development may be too simple.

Whatever the origin of experimental effects and whatever the theoretical implications, it is clear that future studies must exercise caution in the use of Guilford's SIQ tests. More specifically, studies cannot rule out the possibility of substantial SIQ variance attributable to differences in abstract IQ. Results suggest special caution in groups of highly intelligent adults, as well as some hope for the eventual utility of social intelligence tests and concepts with mature individuals. SIQ tests may ultimately be practically useful in certain selection procedures, may help to explore the process of emerging social sensitivity, and may serve as a valuable research tool in the study of both normal and abnormal behavior.

Summary

This study examined abstract intelligence and Guilford's measures of social intelligence in three groups of 100 6th, 9th, and 12th graders and in a group of 67 adults. The investigator postulated that IQ correlates to a moderate degree with social intelligence and that such a correlation reflects a curvilinearity in the IQ-SIQ relationship; such a curvilinearity implies restriction in social intelligence score at upper IQ levels. This hypothesis was partially supported. Data revealed low to moderate SIQ intercorrelations and SIQ-IQ correlations in the student groups, somewhat higher correlations in the adult groups. While no significant curvilinearity was noted in any group, a tendency toward leveling off appeared in the adult sample. The examiner also postulated that, in accordance with developmental theory, adults would score higher on SIQ tests than would students. This hypothesis was not supported. The investigator discussed implications for future theoretical and practical work.

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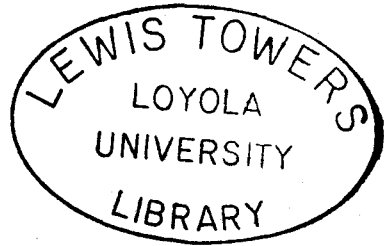
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APPROVAL SHEET

The Thesis submitted by Marcia Pavlou has been read and approved by members of the Department of Psychology.

The final copies have been examined by the director of the Thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the Thesis is now given final approval with reference to content and form.

The Thesis is therefore accepted in partial fulfillment of the requirements for the degree of Master of Arts.

5-21-73

Date

Ronald E. Walker

Signature of Advisor