HEALTH LOCUS OF CONTROL AND AVAILABLE COPING RESOURCES: DO ELDERLY "INTERNALS" HAVE AN ADVANTAGE?

THESIS

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF ARTS

By

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August, 1989
Houtz, Andrew W., Health Locus of Control and Available Coping Resources: Do Elderly "Internals" Have an Advantage? Master of Arts (Counseling Psychology), August, 1989, 35 pp., references, 37 titles.

The purpose of this study was to investigate the relationship between health attribution and the availability of organized internal resources and response style as measured by the Four Square of the Rorschach Inkblot Test. Forty-two subjects participated in this study.

Six major hypotheses were explored in the study. None of the hypotheses was statistically significant. Several factors may have contributed to these results. The small sample size and the homogeneity of the sample limited the investigator's ability to interpret the results of the study. Statistically, health attribution may not be conceptually related to organized internal resources and response style since physical and emotional distress may require different coping mechanisms.
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Statement of the Problem

It has become increasingly apparent that an individual's beliefs about health can drastically affect his or her ability to recover from disease or trauma, to respond beneficially to treatment, and to maintain a healthy body (Achterberg, Lawlis, Simonton, & Simonton, 1977; Achterberg, Mathews, & Simonton, 1976; Cromwell, Butterfield, Brayfield, & Curry, 1977; Seeman & Evans, 1962). The Health Attribution Test, developed by J. Achterberg-Lawlis and G. F. Lawlis (1980), was constructed to identify locus of control related to perceived health. This instrument measures three distinct factors pertaining to locus of control, one internal factor and two external factors. The internal factor is associated with an individual's belief that he or she is in control of his or her health. The two external factors include an individual's belief that "Powerful Others" are in charge of health and that "Chance or Fate" is responsible for health.

There is growing literature identifying the association between specific health behaviors and locus of control. Several studies suggest that individuals suffering from
physical disabilities are more external in regard to locus of control than are nonhandicapped individuals (Eggland, 1973; Land & Vineberg, 1965; Wendland, 1973). Internal locus of control has been associated with increased compliance with treatment (Goldstein, 1976; Weaver, 1972) and a clearer understanding of physical ailments (Seeman & Evans, 1962). Although it appears that individuals suffering from physical disabilities would be more likely to attribute health to external factors and that, within disability groups, a better response to treatment might be expected from individuals scoring high on the internal locus of control factor, such is not the case. Several studies have found that specific disabled groups were more internally focused than controls (Bruhn, Hampton, & Chandler, 1971) and that an external locus of control was related to exceptional recovery for some individuals suffering from cancer (Achterberg et al., 1976). Although these findings lack consistency, locus of control continues to be related to responses to disease and treatment. A possible factor contributing to these mixed findings, and not accounted for by attribution theory, is the extent to which an individual is capable of accessing and utilizing internal resources. Therefore, it was the purpose of this study to investigate the relationship between health attribution and the availability of organized internal
resources and response style as measured by the Four Square of the Rorschach Inkblot Test.

In order to investigate this relationship, the Health Attribution Test and the Rorschach Inkblot Test were administered to a sample of elderly individuals. An elderly population was chosen for this study because of the assumed increase in health-related concerns which accompanies senescence. Several studies have indicated that age-related changes in visual and auditory abilities affect performance on the Rorschach; thus, subjects were screened using appropriate tests in order to assess the extent of these changes. Subjects failing to meet the predetermined criteria on the screening tests were excluded from the study. The literature also suggests that intelligence affects performance on the Rorschach. Thus, subjects were administered a brief intelligence assessment test, and subjects scoring within the average or above average categories were included in this study.

Review of the Related Literature

Two distinct theories were utilized in the conceptualization of the Health Attribution Test. The first was the locus of control theory developed from social learning psychology (Lefcourt, 1967; Rotter, 1954). This theory proposed that control of reinforcement may be perceived to originate from either internal or external
sources. The second theory is the causal attribution theory developed from a motivational framework (Kelley, 1971). This theory is related to the internal and external forces which are believed to cause behavior. From these two theories it was postulated that beliefs occur as a result of who the individual believes is in control of events and that these beliefs persist because they are reinforced.

Strickland (1978) has demonstrated that the degree to which individuals believe that contingencies are controlled by themselves and/or by chance, fate, or powerful others is related to numerous behaviors, including health. Feinsinger and Abrams (1953) and Chodoff, Friedman, and Hamburg (1964) have also reported an association between belief systems and health-related activities. More specifically, children with cerebral palsy (Eggland, 1973), blind children (Land & Vineberg, 1965), and adult males suffering from muscular/skeletal impairments (Wendland, 1973) were found to score higher on the external factor than did nonhandicapped controls. Cromwell, Butterfield, Brayfield, and Curry (1977) reported that virtually every undesirable physical characteristic (temperature, sedimentation rate, etc.) in a sample of coronary patients was related to external locus of control. Furthermore, it was observed that patients with kidney disorders who were
more internal regarding locus of control were more compliant with treatment than were externals (Goldstein, 1976; Weaver, 1972). Contrary to these findings, Bruhn et al. (1971) reported a hemophiliac group which was more "internal" than were controls. Achterberg, Mathews, and Simonton (1976) reported that cancer patients as a group scored above normative mean scores on the internal locus of control factor. This study also found that exceptional cancer patients who outlived their predicted life expectancy of a year had significantly higher Powerful Other scores. These findings suggest that a complex relationship exists between locus of control and health.

Independent of the locus of control factor measured by the Health Attribution Test is the Four Square—a complex of four variables derived from the Rorschach Inkblot Test. Of particular interest to this study were the EB (Erlebristypus), the EA (Experience Actual), and the es (Experience Stimulation).

The EB reflects an underlying preferential response style of the individual. This measure indicates whether the individual tends toward an ideational or emotional mode of dealing with coping situations. Rorschach (1921/1942) described "ideational" individuals as introversive. These individuals have an EB ratio which is distinctly weighted in the M direction. They are prone to use their inner
lives for basic gratification of important needs, and they prefer to delay and "think over" alternatives. The introversive has the capacity for internal experience and, as a result of reliance on his or her inner life, prefers the delays associated with internal experience.

"Emotional" individuals were described as extratensive and have an EB ratio which is distinctly weighted in the chromatic color direction. These individuals are likely to use the interactions between themselves and their world for the gratification of basic needs. The extratensive is prone toward affective discharges toward his or her world which are reflected in activity or mobility. Rorschach also acknowledged the ambivalent, an individual whose EB ratio was essentially unweighted in either direction. Rorschach postulated that the ambivalent does not display a preferential response style, but is capable of using both internal and external resources for need gratification.

A review of the literature on the Four Square suggests that EB has a critical directing effect on almost all personality nuances and their association with behavior (Molish, 1967). Singer (1960) and Molish (1967) cite studies which demonstrate that introverts respond differently from extroverts in a variety of behavioral situations, including problem-solving, stress situations, and environmental responsiveness. Research regarding EA
and es suggest that these measures represent the manner in which an individual is able to use his or her resources in a deliberate manner (Exner, Wylie, & Kline, 1977). This study suggests that, if es is greater than EA, the individual will be less able to exert direction and/or control in coping situations. When EA exceeds es, the individual is more able to exert direction because more resources are available for use. Following a review of the data regarding the EA:es relationship, Exner (1978) concluded that when EA exceeds es, functions utilizing accessible resources have surpassed less controlled functions. When es exceeds EA, an individual is more likely to exhibit behaviors which are less well thought out, or behaviors which arise from need states and are subject to cognitive mediation. From these conclusions Exner stated that when EA is greater than es, an individual will possess the ability to exert direction and/or control in coping situations due to the resources available for use; conversely the high es individual will be unable to exhibit this direction of his or her behavior and/or control due to the lack of accessible resources.

Several studies have found that performance on the Rorschach is affected by sensory deficits. Eisdorfer (1960a) found impaired hearing to be associated with a significantly lower developmental level on the Rorschach
when compared to the performance of persons with normal hearing. In a later study by Eisdorfer (1960b), it was found that subjects with hearing impairments evidenced higher rigidity scores than subjects with normal auditory functioning. Corsino (1985) compared the protocols of color-blind subjects and found significantly fewer pure C responses in the color-blind group. Since the elderly population has been found to be susceptible to decrements in color vision and audition with increasing age (Dalderup & Fredericks, 1969; Eisdorfer, 1960b; Gilbert, 1957; Tiffin & Kuhn, 1942), such deficiencies must be controlled for in order to avoid statistical artifacts. Eisdorfer (1963) has also found intelligence to be more significant than age per se in relation to performance on the Rorschach. This study suggested that intellectual functioning should be taken into account in order to avoid interpreting spurious relationships.

**Hypotheses**

Although the literature regarding locus of control is not unequivocal, the majority of the research suggests that internal locus of control is related to better compliance and response to treatment and a more favorable prognosis than is external locus of control. It would appear that an individual perceiving himself or herself to be in control of his or her health would also possess a greater abundance
of organized internal resources that he or she could utilize in coping situations than an individual without such internal perceptions of control. Individuals with an internal locus of control may also be more prone than individuals with an external locus of control to use their inner lives for the satisfaction of important needs. Individuals scoring high on external factors perceive health as controlled by outside forces. These individuals may also perceive needs and affects as impinging on them, rather than themselves as possessing control over these actions. Therefore, in this study it was hypothesized that

1. Subjects scoring above a sten score of five on the Internal factor of the Health Attribution Test would have an EB ratio weighted on the introversive side (Sum $M > \sum$ weighted chromatic color responses + 1.5);

2. Subjects scoring above a sten score of five on the Powerful Other factor of the Health Attribution Test would have an EB ratio weighted on the extratensive side (Sum $M + 1.5 < \sum$ weighted chromatic color responses);

3. Subjects scoring above a sten score of five on the Chance factor of the Health Attribution Test would have an EB ratio weighted on the extratensive side (Sum $M + 1.5 < \sum$ weighted chromatic color responses);

4. Subjects scoring above a sten score of five on the Internal factor of the Health Attribution Test would
have a greater abundance of available, organized resources (EA > es);

5. Subjects scoring above a sten score of five on the Powerful Other factor of the Health Attribution Test would have a greater abundance of unorganized, inaccessible resources (EA < es); and.

6. Subjects scoring above a sten score of five on the Chance factor of the Health Attribution Test would have a greater abundance of unorganized, inaccessible resources (EA < es).

Method

Subjects

Forty-two subjects were recruited from a group of elderly volunteers who participated in a previous research project conducted by Bert Hayslip, Associate Professor of Psychology at the University of North Texas and also from local resources including the Denton Senior Center, the Retired Senior Volunteer Program (RSVP), the Denton chapter of the American Association of Retired Persons (AARP), and several local retirement communities.

The age of the participants ranged from 58 to 81 years with a mean age of 69 years. Females comprised 73.8% of the sample. Sixty-seven percent of the sample was currently married and 21.4% were widowed. The majority of the subjects reported owning their own homes (92.9%), with
31% of the sample living alone. With regard to the educational level of the participants, 2.4% had not completed high school and 31% reported having earned some college credit. Approximately a quarter had obtained bachelor's degrees, with the remainder of the sample having earned some graduate school credit or completed advanced degrees (26.1%). The majority of subjects were retired (76.2%) and had been retired for an average of six years. Perceived health status was rated as good or excellent by 88% of the sample. Approximately half (54.8%) of the subjects reported an annual income of $25,000 or more. Eighty-eight percent of the total sample scored within the normal range on the Beck Depression Inventory, and only three subjects obtained scores which could be suggestive of a significant degree of depression. All subjects included in the present study evidenced normal audition and normal visual acuity. The participants were informed that the present study investigated attitudes regarding health.

Instrumentation

An audiometric test was administered by the primary investigator and a research assistant in order to screen for possible hearing loss. Prior to this study, the primary investigator was instructed in the use of a portable audiometer by George Larson, Professor of Communication Disorders at the University of North Texas.
The visual instruments used in this study were obtained from West Coast Optical (WCO), Inc., located in Richardson, Texas. Richard Siebro and his technician/assistant, Bill Bice, of the University of Texas Health Science Center School of Ophthalmology at Dallas and two Denton ophthalmologists, Roger Nunn and George Holladay, were consulted regarding the most frequently used and efficient measures of visual acuity and color vision. The primary investigator was instructed by Nancy Dennis, Roger Nunn's assistant, in the standard procedures observed when administering the tests of visual acuity and color vision. The aforementioned consultants agreed that the visual tests could be administered and accurately interpreted by a trained nonexpert.

The subjects' hearing ability was assessed with the use of a pure-tone audiometric screening test. A Maico 20 portable audiometer was obtained for use in this study from the Speech and Hearing Clinic at the University of North Texas. The audiometer was calibrated according to appropriate standards. The research room obtained for use in this study was located in an isolated and quiet section of Oak Street Hall on the University of North Texas campus. Thus, ambient noise levels were not measured and subjects were able to pass the screening tests without undue difficulty.
Normal hearing was defined as the ability to detect a tone at the decibel (dB) level of 40 within the range of 1,000 and 2,000 hertz (Hz). George Larson assisted the primary investigator in predetermining this range, which was based on the results of a recent investigation (Weinstein, 1986) that validated the sensitivity and corresponding low false negative rates this screening yields for elderly persons. A dB loss greater than 40 at any one frequency in either ear constituted a failure for this particular screening test and was the basis for the exclusion of the subject's data from the final data analysis.

A Snellen Chart (visual) examination was administered in order to determine the adequacy of visual functioning in the subject's better eye. Subjects functioning at the 20/15 to 20/40 level were regarded as having normal visual acuity. Subjects using corrective visual aids (glasses, contact lenses) were not differentiated as a separate group, as long as their visual functioning was within the defined normal range. Subjects functioning outside the predetermined range (20/40 to 20/200 level) were not included in this study. Nancy Dennis recommended that subjects be screened for hyperopia (far-sightedness), a condition in which vision is better for distant than for near objects. The screening for this condition would ensure
that the subjects were able to adequately see the Rorschach cards while holding the cards in close personal proximity during the test administration. An individual with this condition could score within the normal range on the visual acuity test, which is given at a distance of 20 feet, yet have reduced acuity at closer distances. In order to control for this possibility, subjects were asked to read aloud a brief paragraph about weather conditions taken from the Denton newspaper. According to Dennis, the ability to read this small newspaper print is a good indicator that the subject is not suffering from near-distant visual problems. A subject's inability to read the paragraph resulted in his or her exclusion from the study.

Color vision was assessed by administration of Ishihara's Tests for Colour-Blindness by Shinobu Ishihara, Emeritus Professor of Ophthalmology at Tokyo University. This test consists of a series of 14 plates made up of embedded colored numerals. The test is designed to provide a quick and accurate assessment of color vision deficiency. Plates 12, 13, and 14 are designed to identify specific types of deficiencies and were not administered to the subjects since the intent of this test was merely to separate color defectives from those subjects with normal color vision. Straightforward directions for the administration and evaluation of the test results are
provided in the test manual. If 10 of the first 11 plates are read correctly, color vision is regarded as normal. If nine plates or fewer are read correctly, color vision is regarded as deficient. Test results of subjects with color vision deficits were not included in the final data analysis.

In order to estimate current level of intellectual functioning, the subjects completed the Information and Block Design subtests of the Wechsler Adult Intelligence Scale-Revised (WAIS-R). According to correlations by age groups between Full-Scale IQ and individual verbal and performance subtests in the WAIS-R manual, these two subtests are highly correlated with overall intellectual capacity in the age range used in this study. Although the Vocabulary subtest correlates slightly higher than Information with Full-Scale IQ, the difference is quite small (.83 compared to .80 for the 55-64 age group). When ease of administration, recording, and scoring the Information subtest as opposed to the Vocabulary subtest was taken into account, it was decided that the former subtest would be the better choice for use in this study. In addition, definitions of the vocabulary words used in the Vocabulary subtest have a higher probability of being inaccurately scored due to the point system, which assigns a higher score to sophisticated answers. In many cases,
the examiner must make a judgment call in order to score a response. Answers for the Information subtest are straightforward and unambiguous to score, thus reducing the chance of error in scoring by the examiner. The Information subtest is also shorter with regard to the amount of time required for its administration. It was believed that these advantages justified the Information subtest's inclusion, as opposed to the Vocabulary subtest's, as a screening instrument for intelligence.

Raw scores on each subtest were converted to scaled scores using the normative data by age included in the WAIS-R manual. A scaled score of 10 represents the mean. An average scaled score was computed for each subject. Information and Block Design subtests have standard deviations for scaled scores of 2.6 and 3.3, respectively. An average standard deviation of 2.95 was computed; therefore, subjects who received an average scaled score of seven or above were included for participation in this study. It was not the intent of the study to complete a thorough intellectual assessment of each subject but, rather, to provide a rough screening measure to ensure that intellectual factors were taken into account when evaluating the results of the Rorschach test.

In order to obtain a measure of affective responsiveness, the Rorschach test was administered to all
participants in this study. The responses were scored and ratios and scores computed in order to determine the Four Square (EB, EA, and es). Each subject's ratios and scores were compared to Exner's norms for adults in order to evaluate their interpretive significance.

Exner's Comprehensive System for the administration and scoring of the Rorschach test was used in this study. An estimate of the percentage of agreement between each scorer and the Exner scoring system was computed. The primary investigator and the ancillary examiners independently scored a sample of 75 Rorschach responses. These responses contained a high proportion of color and movement determinants, which must be accurately scored in order to reliably compute EB, EA, and es). A graduate student in the University of North Texas Department of Psychology volunteered to compile the responses, score, and compute the percentage agreement between each examiner's scoring of the responses and Exner's scoring. Examiners used in this study demonstrated at least an 80% agreement with the Exner scoring system.

Finally, each subject completed the Health Attribution Test, a 22-item instrument which measures internal versus external factors in perceived health. This instrument has an average test/retest reliability of .81 and an average intratest reliability of .87. The Health Attribution Test
was significantly correlated with the Levinson Locus of Control Scales and the Motivation Analysis Test, indicating acceptable concurrent validity.

Procedure

Each subject was asked to complete a brief questionnaire designed to gather basic demographic data which was used to describe the research sample. To protect against experimenter bias, all subjects were administered the Rorschach Inkblot Test before the sensory tests were administered. The order of administration for the examinations was as follows: (1) the Rorschach Inkblot Test; (2) WAIS-R subtests (first, Information and, second, Block Design); (3) Snellen visual examination; (4) newspaper paragraph; (5) Ishihara's Tests for Colour-Blindness; (6) audiometric test; and (7) Health Attribution Test.

In order to further guard against experimenter bias, examiners scored only the Rorschach protocols collected by other examiners and did not have access to the results of the sensory tests corresponding to the protocols they scored.

Statistical Analysis

The independent variables for this study were the scores on the three factors of the Health Attribution Test (Internal, Powerful Others, and Chance). The dependent
variables for this study were the EB, EA, and es scores on the Rorschach Inkblot Test. Six Chi-Square analyses were computed in order to investigate the relationships between these variables. The first three hypotheses were analyzed by computing three $3 \times 3$ Chi-Square analyses. The second three hypotheses were analyzed by computing three $2 \times 2$ Chi-Square analyses.

**Results**

The first hypothesis predicted that individuals scoring high on the Internal factor of the Health Attribution Test (HAT) would have an EB ratio weighted on the introversive side ($\text{Sum M} > \text{sum weighted chromatic color responses} + 1.5$). To investigate this hypothesis, a Chi-Square ($X^2$) analysis was performed. The independent variable for this analysis was the score on the Internal factor of the HAT, and the dependent variable was the EB ratio of the Rorschach Inkblot Test. The result of this analysis was nonsignificant ($X^2 = 4.297$, $p < .05$, $df = 2$).

The second hypothesis predicted that subjects scoring high on the Powerful Other factor of the HAT would obtain an EB ratio weighted in the extratensive direction ($\text{Sum M} + 1.5 < \text{sum weighted chromatic color responses}$). This hypothesis was investigated by performing a Chi-Square ($X^2$) analysis. The independent variable for this analysis was the score on the Powerful Other factor of the HAT and the
dependent variable was the EB ratio of the Rorschach Inkblot Test. The result of this analysis was nonsignificant ($X^2 = 1.629, \ p < .05, \ df = 2$).

The third hypothesis predicted that individuals scoring high on the Chance factor of the HAT would have an EB ratio weighted on the extratensive side ($\text{Sum } M + 1.5 < \text{sum weighted chromatic color responses}$). To investigate this hypothesis, a Chi-Square ($X^2$) analysis was performed. The independent variable for this analysis was the Chance factor of the HAT, and the dependent variable was the EB ratio of the Rorschach Inkblot Test. The result of this analysis was nonsignificant ($X^2 = 0.187, \ p < .05, \ df = 2$).

The fourth hypothesis predicted that individuals scoring high on the Internal factor of the HAT would have a higher EA than es score. This hypothesis was investigated by performing a Chi-Square ($X^2$) analysis. The independent variable for this analysis was the score on the Internal factor of the HAT and the dependent variables were the EA and es score of the Rorschach Inkblot Test. The result of this analysis was nonsignificant ($X^2 = 0.000, \ p < .05, \ df = 1$).

The fifth hypothesis predicted that individuals scoring high on the Powerful Other factor of the HAT would have a higher es than EA score. To explore this hypothesis, a Chi-Square ($X^2$) analysis was performed. The
independent variable for this comparison was the score on the Powerful Other factor of the HAT, and the dependent variables were the EA and es scores on the Rorschach Inkblot Test. The result of this analysis was nonsignificant ($X^2 = 0.460, p < .05, \text{df} = 1$).

The sixth hypothesis predicted that individuals scoring high on the Chance factor of the HAT would have a higher es than EA score. To investigate this hypothesis, a Chi-Square ($X^2$) analysis was performed. The independent variable for this analysis was the score on the Chance factor of the HAT, and the dependent variables were the EA and es scores on the Rorschach Inkblot Test. The result of this analysis was nonsignificant ($X^2 = 0.000, p < .05, \text{df} = 1$).

Discussion

The present study investigated the relationship between perceived health locus of control as measured by the Health Attribution Test and the response style and availability of internal coping resources as measured by the Four Square on the Rorschach Inkblot Test. Participants for this study were community residing and all exhibited normal audition, visual acuity, and color vision. Six major hypotheses were investigated in this study.

The first hypothesis predicted that individuals scoring high on the Internal factor of the HAT would obtain
an EB ratio weighted in the introversive direction. This hypothesis was not supported. Examination of the data reveals that 57% of the sample scored above a scaled score of five on the Internal factor of the HAT. Twenty-five percent of these subjects exhibited a response style in the predicted direction (\( \text{Sum} \ M > \text{sum weighted chromatic color responses} + 1.5 \)), 46% failed to evidence a preferential response style (\( \text{Sum} \ M + \text{sum weighted chromatic color responses} = 1.5 \) to \(-1.5\)), and 29% displayed a response style in the extratensive direction (\( \text{Sum} \ M + 1.5 < \text{sum weighted chromatic color responses} \)).

The second hypothesis predicted that subjects scoring high on the Powerful Other factor of the HAT would obtain an EB ratio weighted in the extratensive direction. This hypothesis was not supported. Analysis of the data reveals that 19% of the sample scored above a scaled score of five on the Powerful Other factor of the HAT. Of these subjects, 25% exhibited a response style in the predicted direction (\( \text{Sum} \ M + 1.5 < \text{sum weighted chromatic color responses} \)), 37.5% displayed no preferred response style (\( \text{Sum} \ M + \text{sum weighted chromatic color responses} = 1.5 \) to \(-1.5\)), and 37.5% evidenced an introversive response style (\( \text{Sum} \ M > \text{sum weighted chromatic color responses} + 1.5 \)).

The third hypothesis predicted that individuals scoring high on the Chance factor of the HAT would obtain
an EB ratio weighted in the extratensive direction. This hypothesis was not supported. Examination of the data reveals that 55% of the sample scored above a scaled score of five on the Chance factor of the HAT. Seventeen percent of these subjects exhibited a response style in the predicted direction (Sum M + 1.5 < sum weighted chromatic color responses), 57% displayed no preferential response style (Sum M + sum weighted chromatic color responses = 1.5 to -1.5), and 26% evidenced an introversive response style (Sum M > sum weighted chromatic color responses + 1.5).

The fourth hypothesis predicted that subjects scoring high on the Internal factor of the HAT would obtain an EA score which exceeded their es score. This hypothesis was not supported. Of the individuals scoring above a scaled score of five on the Internal factor of the HAT, 14% scored in the predicted direction (EA > es).

The fifth hypothesis predicted that individuals scoring high on the Powerful Other factor of the HAT would obtain an es score higher than their EA score. This hypothesis was unable to be supported or rejected due to the lack of subjects in one of the Chi-Square cells. Of the subjects scoring high on the Powerful Other factor of the HAT, 100% scored in the predicted direction (es > EA).

The sixth hypothesis predicted that individuals scoring high on the Chance factor of the HAT would obtain
an es score which exceeded their EA score. Although not statistically significant, the data obtained were in the predicted direction. Of the subjects scoring above a scaled score of five on the Chance factor of the HAT, 86% scored in the predicted direction (es > EA).

The failure to obtain significant statistical results in this study may be due to a variety of factors. The sample used in this study was not of sufficient size to permit statistical analysis of the dependent and independent variables among all subgroups. As a result of the small sample size (n = 42), the cells of the Chi-Square analyses did not contain an adequate number of observations for comparison, and in some instances the cells were completely empty of observed frequencies. Thus, the lack of adequate representation for each level of the dependent and independent variables had a deleterious effect on the investigator's ability to make statistical comparisons between groups.

Examination of the scores on the Health Attribution Test reveals the following data: the average scaled score for the Internal factor was 6.17 (standard deviation = 2.09), the average scaled score for the Powerful Other factor was 3.95 (standard deviation = 2.25), and the average scaled score for the Chance factor was 5.80 (standard deviation = 2.85). Comparison of these results
with the general categories of deviation from normal in the Health Attribution Test manual reveals that the average scaled scores for both the Internal factor and the Chance factor lie in the average range (5-6), and the average scaled score for the Powerful Other factor lies in the moderately lower than average range (3-4). The absence of extreme scores on the three factors of the HAT in the present study suggests a lack of representation toward a specific attribution of health. The absence of significant elevations on any factor of the HAT results in poor delineation between levels of the independent variable and would cause difficulty in identifying the relationship between these poorly defined groups and the dependent variables.

The assumption that a geriatric population experiences an increase in health-related concerns may be faulty, especially in a community-residing population. Eighty-eight percent of the sample reported their perceived health to be excellent. Since the vast majority of subjects in the present investigation were not experiencing a health-related crisis, significant elevations on the factors of the HAT may not be expected. Examination of the average scaled score profile (Internal = 6.325, Powerful Others = 3.950, Chance = 5.800) reveals a profile very similar to the "Joe Average" profile discussed in the HAT manual.
Interpretation of this profile suggests that these individuals help themselves to better health and often provide encouragement to others. Obtaining subjects for this study based on a sample of individuals who had volunteered for previous studies may have inadvertently tapped into a high percentage of these "Joe Average" individuals and could explain the homogeneity of this sample in regard to moderate scores on the HAT.

Examination of the results of the Rorschach Inkblot Test reveals that 21% of the sample was introversive, 55% of the sample was ambitent, and 24% of the sample was extratensive. The lack of adequate subject representation with regard to a weighted EB ratio (signifying introversiveness and extratensiveness) resulted in an inability to provide sufficient numbers of subjects for each Chi-Square cell. Thus, comparison of these levels of the dependent variable with levels of the independent variable were nonsignificant. With regard to EA and es, 76% of the sample obtained a score of es > EA, 12% scored in the opposite direction (EA > es), and 12% had equal EA and es scores. Again, the lack of adequate representation in regard to EA and es resulted in an inability to fill the cells of the Chi-Square table. Statistical results were, therefore, difficult to interpret meaningfully.
The use of the Four Square of the Rorschach Inkblot Test to assess availability of coping resources may have been particularly problematic with regard to this study. Longitudinal studies indicate that variability, rather than clear, central tendencies, is characteristic of the types of coping engaged in among the elderly (Birren, Butler, Greenhouse, Sokoloff, & Yarrow, 1971; Granick & Patterson, 1971). Thus, the validity of using the Four Square to identify coping style within a geriatric population is suspect, since the aforementioned research indicates that a specific, identifiable coping style is not present among the elderly.

An additional problem with the Rorschach is the fact that the Four Square is derived from the sum of human movement compared to the sum of weighted chromatic color responses. Research has associated loss of color and movement with the aging process and with a concomitant transition in the geriatric population to a more introversive coping style (Reichlin, 1984). McCrae (1982), however, reported that few differences in coping were found as a function of age, and Folkman and Lazarus (1981) failed to find age effects in coping pattern. These studies suggest that the changes identified by the Rorschach may be confounded by variables other than coping style.
Lazarus and DeLongis (1983) state that "one-shot" measures, such as the Rorschach, fail to predict how people will react over time or across a variety of situations. These authors recommend an approach to coping which can assess how an individual manages a variety of specific stressful transactions, and explore variability in the coping process across time. In order to assess coping processes accurately, Lazarus and DeLongis recommend measures which inquire about what an individual thought, felt, and did in several specific encounters, such as the Ways of Coping Checklist (Folkman & Lazarus, 1980). This type of assessment tool would not only be specifically constructed to measure coping style, but would also provide the examiner with interval data that could be analyzed with the use of parametric statistical techniques.

Finally, the variables of interest (locus of control and response style and available resources) may not be related on a conceptual basis. It is possible that the Health Attribution Test primarily taps the ability to cope with physical dysfunctions, whereas the Rorschach, on the other hand, may primarily assess the ability to cope with psychological distress. Although the ability to deal effectively with physical and psychological disturbances may utilize some of the same resources, it is possible that different mechanisms are used for somatic versus psychic
problems. If different resources are in fact used for physical and psychological problems, it is possible that the shared variance among the sources of these resources is not great enough to be statistically significant.

The external validity of this study was drastically reduced due to the small sample size and restricted number of subjects obtaining score elevations on the variables of interest. Furthermore, selection factors may have been in operation because participation was voluntary and, for the most part, involved individuals who had a history of volunteering for such investigations. As a result, the sample is probably not representative of the elderly population as a whole. External validity would be increased by comparing the results of the present study to similar results obtained from a clinical population of elderly individuals suffering from chronic medical conditions.

The internal validity of the present study was limited due to the use of categorical data which did not permit random selection of subjects. Although beyond the scope of the present study, a randomly selected sample that included a higher proportion of elderly subjects obtaining significantly higher, or lower, than average scores on the HAT would have increased the generalizability of the present results.
Suggestions for future research would include the use of a larger sample in which subjects are initially categorized by extreme scores on the HAT, and an effort is made to obtain equal numbers of subjects representing HAT categories. In addition, comparisons between community residing and institutionalized subjects would increase our understanding of the possible relationship between HAT scores and response style and availability of coping resources.
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