Credibility and Performance Changes in Older Persons

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The later years have typically been neglected with regard to social work, clinical psychology, and psychiatry, with little attention being paid to developmental processes past childhood and adolescence. (Zarit, 1980). Childhood has traditionally been considered the critical period for the acquisition and development of the social and intellectual skills necessary for effective functioning in society, while adulthood is viewed primarily as a process of diminished learning capacity. (Schaie & Willis, 1978). The belief that later adulthood is associated with declining abilities, activities and social ties reflects myths about aging held by lay persons and professionals. Stereotyping of the elderly, or 'ageism', results from basic ignorance about aging, and allows younger individuals to view the elderly as 'different' or less than human (Butler & Lewis, 1982).

The belief that adult development proceedes in the direction of irreversible decline in the second half of the life span is referred to as the 'irreversible decrement' model,and has often been linked with age-related decrement in sensory and neurophysiological functioning. This belief has been frequently assumed by those studying the course of intellectual function in adulthood (Schaie, 1977). Thus, intellectual development has historically been described in normative terms, assuming a peak in functioning in young adulthood, relative stability through middle age, and widespread decline in old age (Blieszer, Willis, & Baltes, 1981).

Research on adult intelligence during the last 20 years has contributed to a revision of the deficit model of aging. Recently developed longitudinal research involving cohort-sequential methodologies suggest continued, and quite variable intellectual development throughout adulthood . These findings indicated that a peak in intellectual functioning for current cohorts of healthy, well educated adults may not occur until early middle age, and that decrements in old age occurred later and were less pervasive than suggested in prior cross-sectional studies (Schaie, 1979). According to Baltes and Willis (1979), these findings suggest that adult intelligence be viewed from the perspective of a continuous developmental change process that is affected by environmental factors.

The Cattell-Horn theory of fluid and crystalized intelligence (Horn & Cattell, 1967) provides a conceptual framework for assessing patterns of intellectual development and decline throughout adulthood. The theory provides a hierarchical, structural model of psychometric intelligence that postulates two broad, second-order dimensions of fluid and crystalized intelligence (Cattell, 1971). These two types of general intelligence have different developmental profiles,with fluid intelligence exhibiting a gradual decline that begins in early adulthood, while crystallized intelligence increases or remains stable across much of adulthood (Horn & Cattell, 1967).

Horn (1978) describes fluid intelligence (Gf) as most dependent upon the integrity of brain tissue. Gf develops earliest, and is seen as the develpmental basis for all intelligence. Rather than being influenced by formal education

or cultural experiences, Gf is believed to develop through incidental learning and through other experiences that affect neural processes associated with intellectual development (Horn & Donaldson, 1980) Gf involves the ability to reason abstractly, problem-solving ability, and reasoning with novel material. The first order factors for fluid intelligence are induction, memory span, and figural relations (Horn,1970). Psychometric research reviewed by Horn and Donaldson (1980) suggests that fluid intelligence increases up until the age of 14, plateaus, then begins to decline after the ages of 25.

Crystallized intelligence (Gc) reflects abilities acquired through education, aculturation, and adult socialization (Cattell, 1971). Processes of abstraction and reasoning capacities are involved, but reflect concrete real-life applications such as decoding written or oral messages, identifying main ideas, balancing a checkbook, or filling out tax forms. Gc develops as a function of Gf, and demonstrates an increasing pattern of growth until a slight decline occurs prior to death (Horn & Cattell, 1967).

Psychometric research suggests that intellectual decline with advancing age may not follow an "irreversible decrement " model. Gf and Gc exhibit different patterns of growth and decline across the life-span, and differential responses to environmental factors (Baltes & Willis, 1979). Schaie & Baltes (1977) emphasize that intellectual functioning over the life-span demonstrates "plasticity". This variability across age profiles of fluid and crystallized intelligence reflects the capacity for

marked improvement in mental abilities, as well as for deterioration in these abilities up until death.

The current interest in intellectual plasticity, and on the impact of environmental influences on the development and decline of intellectual abilities has prompted interest in assessing the modifiability of adult intellectual functioning through various training strategies. Various training studies have demonstrated that intellectual performance on a variety of abilities can be modified, even in late adulthood (Denny, 1979; Labouvie-Vief, 1976). Using the Cattell-Horn theory of fluid and crystallized intelligence as a framework for assessing intellectual modifiability allows cognitive training effects to be evaluated. According to traditional view of cognitive change with aging, fluid intelligence declines with age and is not affected by educational or cultural experiences. Improved performance by older adults on fluid types of tasks suggests that fluid abilities may also be modified (Roberts & Labouvie, 1980). Using this framework for training research, Baltes and Willis (1982) predict a hierarchical pattern of transfer as a function of training, and long term maintainence of training gains.

Plemons, Willis, & Baltes (1978) utilized a specific cognitive training program designed to assess the effect of cognitive training on fluid intelligence measures. This group trained elderly individuals relational rules for solving figural relation problems. A hierarchy of transfer patterns was predicted, but the training group was significantly better only on near-transfer tasks and for the first post-test.

Willis and colleagues (1981) developed a more detailed

training program, utilizing a figural relations task. This group found a specific training effect for the near transfer task, less transfer for the induction task (far transfer), no transfer to crystallized measures, and significant practice effects. These effects were maintained for a 6 month period. The specificity of the transfer of abilities was supported by the hierarchical pattern of transfer, as well as by the general transfer of practice effects equally across fluid and crystallized tasks.

Despite the mounting evidence that intellectual performance can be enhanced through the use of cognitive training strategies, some researchers have failed to replicate the training effects found using induction and figural relations as target measures (Roberts & Labouvie, 1980; Labouvie-Vief & Gonda, 1976). As a result, other factors have been examined as alternative explanations for cognitive training effects on fluid ability performance in the elderly. Recent research on subjective appraisals of performance in the elderly suggests that expectations and attributions play an important mediating role in intellectual performance (Lachman, 1983; Zarit, et al, 1981). Self-assessments of performance described in the literature include both personality and cognitive dimensions among elderly adults (Lachman, et al, 1982).

Previous research has supported the relationship between self-evaluation of anxiety and poor performance on cognitive tasks for the elderly (Costa, et al, 1976; Baltes & Labouvie, 1973). Some studies suggest that elderly individuals tend to become overinvolved in tasks, which results in physiological

overarousal or anxiety, and subsequent performance decrements (Powell, et al, 1964; Furchgott & Busemeyer, 1976; Eisdorfer et al, 1970). Meichenbaum (1972) emphasized that anxiety consists of both an emotional and a cognitive component. Thus, inappropriate task involvement or effort may contribute to anxiety and negative self-evaluations about performance ability. Rodin (1980) examined the relationship between expectations about ability to perform, levels of anxiety, and performance. Low self-estimates of ability resulted in less effort expended, and high levels of anxiety in individuals showing poor performance. Thus, negative expectations about performance may engender anxiety in demanding situations.

In the context of attempts by investigators to modify the performance of the elderly on fluid types of tasks, it is important to consider how anxiety may play a mediating role in cognitive training effects. Kooken and Hayslip (1984) utilized a stress innoculation procedure (Meichenbaum, 1974) with anxious subjects (test anxiety,state/trait anxiety) and observed the effect on fluid ability performance. Results suggested that stress inoculation might be effective in reducing anxiety that may hinder intellectual performance in the elderly. Labouvie-Vief and Gonda (1976) found that anxiety training (self statements and coping strategies with regard to anxiety) enhanced immediate posttest performance on a fluid training task. These studies emphasize the importance of mediating variables such as anxiety in influencing the limits of modifiability of fluid abilities.

Self-efficacy theory (Bandura,1977; 1986) provides a useful

framework for evaluating the relationship between expectations and intellectual performance in the elderly. Self-efficacy refers to self-judgements of ones's capabilities to accomplish a certain level of performance. Many studies have demonstrated a relationship between percieved self-efficacy and performance that is independent of underlying skills (Schunk, 1984). This separation of abilities and beliefs about performance was demonstrated by Bandura (1981). He sugested that elderly adults may be likely to underestimate their intellectual abilities, with the resulting 'negative self-evaluation' producing a performance decrement. Lachman & Jelalian (1984) however, found that self-efficacy evaluations in the elderly are dependent on the task, rather than global in nature. Using subjective assessments of intellectual performance, elderly adults were found to overestimate their performance on fluid tasks (associated with poorer performance), while assessing performance accurately on crystalized tasks. Thus, the elderly individuals in this particular study did not conform to the generalized negative expectancy model, but responded to task characteristics.

Self-efficacy has been found to be associated with a variety of performance variables. Bandura (1981) reported that low self-efficacy is associated with high levels of anxiety, reduced effort, and poor performance. Apparently, this process is mediated by negative self-evaluations that creates stress or anxiety, which undermines the use of acquired skills or competancies. Percieved self-efficacy is also related to the amount of effort expended in the learning and performance of skills (Bandura,

1986). On approaching learning tasks, those rating themselves high in self-efficacy for the task undertaken may not feel the need to invest much preparatory effort. Once these skills are to be applied, however, a highly self-efficacious individual would be likely to intensify the effort needed to perform the task. Thus, learning and performance distinctions must be addressed when evaluating the effect of self-efficacy on performance. An individual with a high self-rating of self-efficacy may also invest less effort in learning a task if the material is judged to be too easy.

Bandura's theory of self-efficacy (1977, 1986) may be viewed as a reciprocal model, postulating that self-evaluations and performance mutually influence each other. Thus, negative self-evaluations may result in individuals engaging in fewer enriching activities, or failing to benefit from those activities that in fact are responsible for the development of positive self-evaluations and skills. These consequences are particularily sailent for elderly individuals because of the general expectation that decline is inevitable during later years (Lachman, 1983).

Attributions for performance outcomes are also important determinants of behavioral consequences. Historically, the literature suggests that elderly individuals are more likely to attribute their failures to internal (stable) causes, and their successes to external causes (Banziger & Drevenstedt, 1982; Rodin & Langer, 1980). This particular attributional style has been associated with learned helplessness, performance deterioration, and depression (Abramson, et al, 1978; Peterson & Seligman, 1985). Lachman & Jelalian (1984) utilyzed a subjective measure

for self-attributions (as opposed to traditional observer paradigms), and found that both young and old subjects made ability attributions for their most successful performance (Gf for young, and Gc for elderly), while making task difficulty attributions for their least successful performance (Gc for young, and Gf for elderly). While these results replicate previous findings for young subjects, the attributions made by the elderly are different from earlier studies, where attributions made by others about the elderly attribute success to external factors, and failure to internal factors. These results seem to support the reciprocal relationship between positive self-evaluations and performance, where experiences of success influence self-attributions. Although it has been established that there are age differences with regard to performance attributions, patterns of differences may vary with the method of assessment (Watson, 1982).

Locus of Control (Rotter, 1966) has been found to affect intellectual performance. Several authors have reported that locus of control beliefs (internal vs external) mediate between performance outcomes and changes in expectations (Bandura, 1977). Thus, if outcomes are attributed to internal sources (ability), then performance expectations are likely to be changed accordingly (increased for success, decreased for failure). But if outcomes are attributed to external sources, expectations are less likely to be modified as a result of performance feedback.

Numerous studies report mixed findings with regard to age differences and locus of control. Some studies show a decrease

(Brim, 1974; Lachman, 1983), an increase (Lachman, 1985; Statts, 1974), or stability (Andrisani, 1978) in internal locus of control in later life. Lachman (1986) attributes these inconsistent results to differences in sample selection, measurement instruments and statistical designs. This author used domain specific measures of locus of control for detecting patterns of age-related changes. Results suggested that older adults are more external than college students on intelligence-specific scales in the areas of 'chance' and 'powerful others', and more external on the health-specific control in the area of 'powerful others'. These results are consistent with realistic experiences of older persons. As they face increasing probabilities of becoming ill and dying during the later years, their sense of 'chance' and 'powerful others' control would increase. When examining domain specific measures, elderly persons were found to be more external on chance and powerful others, but were no different from the young on the internal dimension. The best predictors of behavioral outcomes were the domain-specific, powerful others scale, where high scorers tended to believe that they needed to depend on others for assistence. Thus, older adults who perceived their intellectual and health outcomes as dependent on powerful others demonstrated poorer performance on intelligence tests and visited the doctor more frequently. Another study (Lachman, et al, 1982) supports the previous findings, suggesting that high performance on tests of intellectual ability is related to internal locus of control, while poor performance is related to external-powerful others.

Locus of control beliefs for older persons not only have

consequences for ranges of behaviors, but have important effects on self-efficacy or self-attributions (Ryckman, 1979; Bandura, 1977). Internal locus of control tends to be related to positive self-efficacy because these individuals are more likely to use past experience as a basis for generalizing to future expectations. In contrast, individuals with an external locus of control are not likely to show self-efficacy changes because they tend to view the relationship between performance and ability as noncontingent.

In the social-cognitive realm of investigation, research in the area of self-concept has identified dimensions relating to self and social perception (Snyder,1979). Dimensions such as stability, self-knowledge, and consistency play an important role in the development of the the self-concept. According to Sampson (1978) individuals are motivated to develop a stable identity, which involves a provess of interacting with, and integrating aspects of self and environment. Ickes et al (1978) describe social cognition as a process by which individuals attend, perceive, categorize, and assess events that involve interactions between themselves, others and the environment. This is similiar to Bandura's (1977) Cybernetic model of behavior, where psychological functioning is construed as a continuous reciprocal interaction between personal (cognitive), behavioral, and environmental events. Research has focused on identifying the processes involved in perceiving and understanding social interactions. Some investigators suggest that individuals differ in their orientation or characteristic perspectives used to

understand interactions between the self and the social world (Sampson, 1978). Thus, individuals may express regularities and consistencies in social behavior that can be understood in terms of stable and enduring dispositions, or reactions to situations. These dispositional or situational differences in individuals are reflected in their beliefs and expectations about social behavior (Snyder, 1986).

Research in self-monitoring (Snyder, 1986) has identified individual differences in the extent to which people monitor (observe, regulate, and control) the public presentation of the 'self'. These preferences reflect different use of internal vs. external cues to determine appropriate social behavior. High self-monitors define their identity in terms of specific social situations and corresponding roles. The sense of self is more flexible and can be adapted to specific situations. According to Elliot (1979), they invest considerable effort into reading and understanding others in search of information to aid them in choosing their self presentations that will match the situation.

Low self-monitors value congruence between who they are and what they do. They are less concerned with constantly assessing the social climate around them. Their behavior is consistent in that they typically express what they really think and feel, even if that means not fitting in with their social environment. Low self-monitors tend to define their identity in terms of internal factors, and rely upon knowledge about their own traits, attitudes and dispositions in describing themselves (Sampson, 1978).

A wealth of research has been generated during the past two decades supporting the relationship between attributions or expectancy and performance outcomes (Bandura, 1981). In a similiar vein, the psychotherapy outcome literature has addressed expectancy with regard to treatment outcomes. Frank and his colleagues were among the first to call attention to client expectancies and their relation to symptom change (Frank, 1959). These investigators suggested that beliefs or expectations about therapy may influence the results of therapy, and that the greater the distress or need for relief, the greater the expectancy of such relief. These findings have subsequently been replicated by various authors (Goldstein, 1960; Freidman, 1963; Perotti & Hopewell, 1980).

The assessment of treatment credibility is one way of evaluating expectancies for change. According to Kazdin (1980), credibility of treatment refers to the extent to which the treatment seems believable, logical, reasonable and convincing. Treatment generated expectancies refer to the extent to which clients believe that they will improve in light of a particular treatment. Thus, credibility refers to the reasonableness of the treatment procedure, while expectancies for improvement refer to the probable effects that the procedure will have (Jacobson & Baucom, 1977). A treatment that generates high expectations for improvement is likely to be highly credible, although a treatment could be credible without engendering strong expectancies for change. Thus, these are highly related, but distinguishable factors related to treatment. Expectancy for improvement can be

assessed in several ways, in terms of method and timing. Each method has limitations and advantages that need to be evaluated before such measures are applied (Kazdin, 1980).

Credibility as a mediator of treatment effects has been investigated in the psychotherapy outcome literature (Kazdin & Wilcoxin, 1976). However, the importance of credibility in mediating performance improvements in the elderly has not been evaluated, despite numerous reports of cognitive interventions in this population. The gerontological literature contains references to studies that indirectly address the credibility issue in this population. For older adults issues such as personal relavance, task meaningfulness, interest and ecological validity are important mediating influences in intellectual performance (Botwinick, 1984).

Several studies have examined task relevance or meaningfulness as it affects the performance of older individuals. Ausubel (1977) suggests that task meaningfulness allows older persons to relate more easily to existing knowledge, which leads to increased learning and retention. Craik (1977) suggested that meaningful material is more easily remembered by older adults. Several investigators have looked at the relationship between meaningfulness and motivation to perform tasks for older persons. As noted earlier, older individuals may become overinvolved in tasks, and display autonomic overarousal that is concommitant with both physical and cognitive symptoms of anxiety, and with performance decrements. According to Shmavonian and Busse (1963), the meaningfulness of material is related to the amount of arousal for older adults. These authors used physiological

indicators of arousal (GSR) to demonstrate that elderly adults became disproportionately less involved in laboratory tasks when the material was less meaningful. Arenberg (1968) examined the effect of meaningfulness on a learning task for elderly adults. Abstract information to be learned was translated into concrete, meaningful terms, which resulted in enhanced performance for elderly subjects. Together, these two studies (Shmavonian & Busse, 1963; Arenberg, 1968) suggest that more meaningful tasks tend to motivate elderly individuals to become more involved, and that this 'involvement' for some may be excessive and interfere with performance. When arousal states have been reduced, performances seem to improve (Botwinick, 1978).

Several studies have evaluated the importance of task familiarity with regard to performance of the elderly on cognitive tasks. While there is some support for improved performance using familiar material (Kausler & Lair, 1966), other studies demonstrated decreased performance (Wittels, 1972; Craik & Masani, 1967). The poorer performance of elderly adults with familiar material was attributed to their reduced ability to spontaneously organize the material. Because meaningful material is more easily organized, any deficits in organizing capacity would be apparent. Thus, in the sense that 'familiar' or 'meaningful' relates to task demands of memory and organization, the elderly may show decreased performance.

Personal relevance appears to be a determining factor in motivation to perform tasks for elderly subjects. Hulicka (1967) found that attrition rate was high when task material was irrela-

vant to elderly adults. When the material was made more relavent, the tasks were readily performed. However, as Wittels (1972) noted, the more meaningful stimulus material was also less difficult, making it more difficult to interpret performance improvements.

Although cognitive and intellectual performance in the elderly has been examined in numerous studies, the effect of credibility on cognitive performance has typically been neglected. The examination of variables noted earlier (meaningfulness, relevance) suggests that the elderly evaluate tasks, and that their beliefs about the reasonableness of these tasks may be related to expectations about performance, which will have an effect on actual performance.

This study examined the following questions. First, at pretest, is there a significant relationship between measures of credibility and measures of expectancy or self-evaluation, and will these measures emerge as unique factors that are separate from personality variables. Second, can these unique factors reflecting pretest credibility and expectancy be used to predict levels of performance on Gf and Gc ability tasks. These questions were addressed in the following hypotheses.

Hypothesis I: There will be a significant relationship between levels of credibility and measures that indicate self-efficacy, self-appraisal and expectancy for change. These measures will emerge as factors that are separate from personality variables.

Hypothesis II. In order to investigate the relationship between credibility and performance, the following hypothesis was

investigated.

A. High levels of credibility at pretest (derived as unique factors in the preceeding Principal Component factor analysis) will result in low levels of performance in both stress innoculation and induction training groups.

METHOD

Subjects

The present study utilized 300 community residents from the Dallas/Ft. Worth metroplex area. Volunteers were recruited from local community resources, such as church organizations, newspaper articles, senior centers, and various service organizations. Participants were at least 60 years old and in good health, and initially were screened for any visual or auditory defects that would interfere with performance.

Instruments

Measures of Intellectual Ability

Assessment of fluid and crystallized abilities (Cattell, 1971; Horn, 1970, 1978) was accomplished by utilyzing portions of the Gf/Gc Sampler (Hayslip & Sterns, 1979).Fluid intelligence was assessed by induction types of tasks (letter series & letter sets), while crystallized abilities was measured using a vocabulary test. Each of these tests consisted of 10-15 items each, and required 45 minutes of administration time. Reliability statistics for these tests were obtained in several studies. Utilyzing a sample of 54 older adults over a three month period, Hayslip & Sterns (1979) reported test-retest reliabilities that ranged between .75 and .87, while an independent sample of 102 elderly individuals yielded test-retest reliabilities greater than .80 (Hayslip & Kovacs, 1986). Hayslip (1986) used a larger sample of older subjects over a nine week interval and found that test-retest reliabilities ranged

between .57 and .79. The Alpha coefficient for these tests were as follows: vocabulary subtest ranged from .80 to .85; Letter series ranged from .87 to .88, and Letter Sets ranged between .66 and .82 (Hayslip, 1986). Dr. John Horn provided an alternate form of the Gf/Gc Sampler for use in the study, and a third alternate form (Hayslip, 1986).

Measures of Self Evaluation

Credibility was assessed by a self-report measure of treatment credibility/expectancy for improvement (Kazdin & Wilcoxson, 1976). Subjects rated, on a seven-point bipolar Likert scale, the extent to which treatment appeared logical or authentic, was likely to be successful, or would be recommended to a friend. Subjects also rated how often training strategies were utilized.

Attributions made by subjects for their performance on fluid and crystallized measures were assessed by the Attributions of Success/Failure Questionaire (Okun & Siegler, 1977). Both "state" (the individual's performance on the Gf/Gc measures) and "trait" (how stressful situations are handled generally) dimensions are measured by this instrument. Eight ratings were obtained from each subject, with ratings made on a five-point bipolar Likert scale in the areas of ability, luck, effort, and task difficulty across both the "trait" and "state" dimensions.

Apprehension and distress over negative events was assessed by using the Fear of Negative Evaluation (FNE) scale (Watson & Friend, 1969). Levels of anxiety was measured by the State-Trait Anxiety Inventory (STAI) (Speilberger , Gorsuch & Lusheno, 1970). Measures of Self-Esteem and Self-Concept were also administered

to each subject (Rosenberg, 1965). Self-monitoring was determined by the Self-Monitoring Scale (SMS) (Snyder, 1974).

Procedure

Older adults participated in this study on a voluntary basis, and were paid at the rate of $4.00 per hour. Each participant recieved an honorary research certificate after the study was completed. Possible risks accrued from participating in this study were believed to be minimal, while the benefits included increased social or intellectual development and monetary gain.

Subjects were tested on three separate ocassions (pretest, 1 week posttest, 1 month posttest) which required a single 2 - 4 hour meeting. Before subjects were tested initially, each older person was assigned to one of three training groups: (1) induction training, (2) stress innoculation training, and (3) no contact controls. Testing was conducted at mutually agreed upon times and locations, such as the subject's home or at North Texas State University. The individuals administering the tests were blind to the assignment of subjects to training groups.

Each interviewer administered the pre-test, and both posttest batteries. Each was trained extensively , and piloted at least 10 subjects prior to actual testing. These interviewers were selected from a pool of interested, and experienced gerontology or psychology graduate students. Trainers were selected from this same pool, and practiced training at least two groups before actual data collection occurred.

During the first testing session, subjects were informed that the purpose of the study would be to explore and enhance their reasoning skills and problem solving ability. An informed consent form was reviewed with each subject, which outlined the potential benefits that would result from modifying negative societal attitudes towards older person's intellectual functioning. Subjects were also acquainted with their right to withdraw from the study at any time, and the confidentiality of their test results.

Each individual was administered the pre-test battery during the initial session that followed the following fixed order: Demographic data sheet, Gf/Gc Sampler, Self-Monitoring Questionaire, Attributions for Success/Failure Questionaire, State/Trait Anxiety Inventory, Self Esteem, Self Concept, Fear of Negative Evaluation, indications of interest and percieved ecological validity. The test battery was presented in a fixed order since previous research indicated that order effects are minimal (Hayslip & Sterns). None of the tests administered were timed, and no specific feedback was given at the time.

One week after the completion of the pre-test session, subjects previously assigned to one of two training group were contacted in order to arrange time and location for (5) one hour training sessions. Subjects not assigned to a training group were assigned to a no contact control group that controlled for maturational effects. A measure of treatment credibility/expectancy for improvement was administered after the presentation of the treatment rationale during the first training session. Each training group consisted of 4 - 8 elderly adults. The first

4 sessions were structured for learning specific strategies applicable to either the induction, or anxiety reduction training groups. The last session involved reviewing specific treatment principles, and then 10 - 15 minutes of practice with representative induction problems. Subjects were once again administered the credibility measure at the conclusion of the fifth training session.

Individuals assigned to the induction training group were trained with material and procedures developed by Baltes and Willis (1979). During the first session, the rationale of induction training was presented. Subjects in each group were told that they would be learning new skills to help them figure out patterns and sequences, and that this would help them in everyday situations. During the first four sessions, the trainer taught a variety of relational rules (skipped/ repeated letters/numbers, mathematical operations) that were specific to several types of induction problems. Various strategies were modeled by the trainers in order to enhance learning and retention, such as visual aids, rehearsing out-loud, and encouragement for members to create their own strategies. Subjects were allowed to practice new strategies during each session, and were given feedback on their performance. The last session was used exclusively for review of all the strategies learned.

Subjects assigned to the stress inoculation training group were taught an anxiety reduction procedure that utilized cognitive-behavioral principles (Kooken & Hayslip, 1984; Meichenbaum, 1977). During the first 4 sessions, subjects were

taught how cognitions and emotions are related, in the context of Schacter's Theory of Emotion (1973) and Ellis' A-B-C Theory of Emotion (1973). During these sessions, subjects also learned and practiced specific techniques for anxiety reduction. These techniques, which addressed both the physiological and cognitive components of anxiety, will included substitution of positive for negative self statements, and deep muscle relaxation. During the last session, the acquired skills were practiced while subjects were given a Gf task to perform. No specific strategies for solving the fluid (Gf) tasks were given to these subjects.

Approximately one week after the subjects completed one of the training groups (or passed an equivalent period of time in the no contact control group), the first posttest battery was administered. This consisted of an alternate form of the Gf/Gc Sampler.

One month later, the second posttest battery was administered, which consisted of an alternate form of the Gf/Gc Sampler, and the 'strategy use' credibility measure.

After the conclusion of the last posttest session, the subjects in the no contact control group contacted and offered an opportunity to participate in the training. Subjects also were debriefed when the study was concluded, and were given written feedback about their individual performance, and general findings from the study.

Statistical Design

Concerning Hypothesis I, the variables were indications of interest, perceived ecological validity, credibility/expectancy measures, self-monitoring, Trait/State Anxiety Inventory, Fear of Negative Evaluation, Self Concept, and Attributions of Success/Failure Questionnaire. The statistical analysis used to test this hypothesis was a Principle Components factor analysis.

Concerning Hypothesis II, stress inoculation and induction training groups were run in two separate analyses. The statistical analysis used was Multiple Regression Analysis. Independent variables included the above factor scores, Gf/Gc pretest composite variables, and Gf/Gc tasks. Dependent variables included posttest Gf/Gc composite variables, and Gf/Gc pretest and posttest tasks.

A. Factor scores were regressed on pretest and posttest Gf and Gc measures, for both the cognitive and anxiety groups.

B. The above factor scores were regressed on posttest Gf and Gc composite variables for the cognitive and anxiety groups, both controlling, and not controlling for pretest composite Gf and Gc variables.

C. A cross-lagged panel correlation was performed for both the anxiety and cognitive groups, in order to examine the cross-lagged nature of the relationships among the pretest and posttest measures of Gf, Gc, interest, expectancy, trait anxiety and state anxiety.

Results

Factor analysis of credibility/expectancy measures for Anxiety and Cognitive Groups

In order to determine the factorial composition of the self evaluative/expectancy measures for both cognitive and anxiety groups, Principal Component factor analyses were employed. Only factors with associated eigenvalues exceeding one (prior to rotation) were retained. Tables 1 and 2 include the varimax rotated solution and associated factor loadings for both groups on the self evaluative/expectancy variables in the sample of older persons.

Cognitive Group

Seven factors were extracted in the cognitive group, accounting for 73.8% of the common variance among the intercorrelations of self evaluation/expectancy measures.

Factor one for the cognitive group was defined positively by measures of trait and state anxiety, and fear of negative evaluation, while measures of self concept and ability trait attribution loaded negatively on this factor. This suggests factor one reflects a measure of low self-efficacy.

Factor two reflects a measure of perceived effort that older individuals may use to explain performance on difficult tasks. It was defined positively by effort and task difficulty trait and state attributions.

Factor three reflects an attributional style that older adults may utilyze to explain their performance. Luck trait

and state attributions defined this factor positively and most strongly, while ability state attributions loaded negatively on this factor. This factor was less strongly defined by fear of negative evaluation. Factor three thus reflects an external/unstable attributional style, where ability attributions are negatively related to attributions for luck and fear of negative evaluation.

Factor four was strongly defined by measures of expectancy for improvement and perceived ecological validity and reflects a general component of task relavence/credibility.

Factor five was defined positively and strongly by a measure of self monitoring, and less strongly by task difficulty trait attributions. This represents a tendency of older persons to modify behavior on the basis of cues indicating the appropriateness and demand of certain attitudes and emotions.

Factor six reflects an internal attributional style, which is defined positively and strongly by ability trait attributions and much less strongly by effort trait attributions.

Factor seven was defined positively and strongly by a measure of interest and reflects a specific component of task interest.

Anxiety Group

In the anxiety group, five factors were extracted, accounting for 65.3% of the common variance. Factor loadings exceeding + .40 were considered as principally defining each factor.

Factor one for the anxiety group represents a measure of low self efficacy. It was defined positively by measures of

trait and state anxiety and fear of negative evaluation. A measure of self concept loaded negatively and strongly on this factor.

Factor two reflects a measure of perceived effort in problem solving ability in relation to difficult tasks that older adults may use to explain certain events. It was defined positively by measures of effort state and trait attributions and task difficulty state and trait attributions. Ability trait attributions defined this factor less strongly.

Factor three also reflects an attributional style for explaining performance and represents an external/unstable component of attributions. Luck state and trait attributions defined this factor strongly and positively, while ability state and trait attributions loaded negatively on factor three. Thus, high levels of luck attributions for performance were associated with low attributions for ability.

Factor four reflects a component of task investment/expectancy and was defined positively by measures of interest, perceived ecological validity and expectancy for improvement.

Factor five was defined positively by measures of self monitoring and effort and ability state attributions. This self monitoring component represents a tendency to look for cues from the social environment to indicate the appropriateness of certain behaviors and is associated with self perceived effort and ability on the part of these older adults.

In examining the similarites and differences in factor

structure between the two groups, it was found that there are differences between the two groups. Although factor 1 for both groups reflects a measure of low self-efficacy, there are slight differences. Both factors are defined positively by fear of negative evaluation and trait and state anxiety, and negatively by self- concept. However, effort trait attributions negatively define factor 1 for the cognitive group. Factor 3 for both groups reflect similiar factor structures. The external/unstable attributional style is represented by high levels of luck and low amounts of ability. However, factor 3 for the cognitive group is also defined by fear of negative evaluation. Thus for the cognitive group, low levels of ability attributions are related to high levels of luck and fear of negative evaluation.

Factor 2 for both groups involves perceived effort in difficult tasks. However, in the anxiety group both ability trait attributions and effort state and trait attributions are associated with the effort attributions, while state and trait effort alone are present in the cognitive group.

Factor 4 for the anxiety group represents a general measure of expectancy and credibility, which is associated with interest and perceived ecological validity. However, in the cognitive group this factor is defined more narrowly by expectancy for improvement and perceived ecological validity.

Although a measure of self-monitoring was extracted for both groups, there are differences between the two groups. Factor 5 for the cognitive group is strongly defined by a self-monitoring component, and much less strongly by perceived task difficulty. However, in the anxiety group for factor 5, self-monitoring is

associated with self-perceived effort and ability.

Multiple Regression analyses of pretest and posttest measures

A series of multiple stepwise regression analyses (foreward inclusion) were performed separately for both the cognitive and anxiety groups to determine which of the factors extracted in the previous analyses best predict Gf and Gc performance at pretest and posttest. Dependent variables included Gf and Gc measures. Gf variables included common analogies, letter sets, letter series, Horn matrices and Cattell matrices. Gc variables included vocabulary, abstruse analogies and inventive remote associations. Independent variables included the factors extracted from prior Principal Component analyses of both cognitive and anxiety groups.

Cognitive and Anxiety Groups at Pretest

In the multiple regression analyses performed on the pretest scores for the anxiety group, three of the above extracted factors best predicted performance. Higher levels of Factor 2 (perceived effort with difficult tasks) and factor 1 (low self-efficacy) best predicted a higher performance on Gc measures of vocabulary, abstruse analogies, and remote inventive associations. Higher levels of factor 3 (external/unstable attributions) predicted a lower performance on Gc measures of vocabulary and abstruse analogies. Higher performances on the Gf measures of common analogies, letter series, Horn matrices and Cattell matrices were predicted by lower levels of factor 3 (external/unstable attributions). Higher performances on the Gf

measures of letter series and Cattell matrices were predicted by higher levels of factor 2 (perceived effort with difficult tasks). These results are summarized in table 3.

For the cognitive group, higher performances on letter series and common analogies were best predicted by higher levels of factor seven (task interest). These results are summarized in table 4.

Multiple Regression Analyses of Pretest Composite Variables

A series of multiple regression analyses (forced entry) were performed separately for both the cognitive and anxiety groups to determine which of the factors extracted in the previous analyses best predicted composite Gf and Gc pretest variables. Dependent variables included Gf and Gc composite variables at pretest. The pretest Gf composite variable was composed of Letter Series, Horn Matrices, and Common Analogies. The pretest Gc composite variable consisted of Vocabulary and Abstruse Analogies. Independent variables included the factors extracted form prior Principle component analyses of both cognitive and anxiety groups.

Pretest Gf and Gc Composite Variables for Anxiety Group

In the multiple regression analyses performed for the anxiety group, three factors were significant predictors of performance on the pretest Gc composite variable. Higher scores on both factor 1 (low self-efficacy), and factor 2 (perceived effort with difficult tasks) predicted higher scores on the pretest Gc composite variable. Lower scores on factor 3 (unstable/external attributions) predicted increased performance

on the pretest Gc composite variable. Factor 2 (perveived effort with difficult tasks) neared significance ($p < .06$) in positively predicting performance on the pretest Gf composite variable, while high levels of factor 3 (external/unstable attributions) predicted lower pretest Gf composite score performance. (see table 5 for summary).

Pretest Gf and Gc Composite Variables for Cognitive Group

In the multiple regression analyses performed for the cognitive group, only one factor significantly predicted performance on the pretest composite variable. Higher scores on factor 7 (task interest) predicted a higher performance on the pretest Gf composite variable. See table 6 for summary.

Multiple Regression Analyses of Cognitive and Anxiety Groups at Posttest

In a separate set of regression analyses, Gf and Gc measures were utilyzed as criterion variables in anxiety and cognitive groups at posttest. For the anxiety group, higher levels of factor 2 (perceived effort with difficult tasks) best predicted a higher performance on the Gc measure of vocabulary, and the Gf measures of common analogies, letter sets and letter series. Higher levels of factor 3 (external/unstable attributions) best predicted lower posttest scores on the Gc measures of abstruse analogies and vocabulary, and the Gf measures of letter series, Horn matrices, common analogies and Cattell matrices. Results are summarized in table 7.

For the cognitive group, Higher scores on factor 6 (internal

attributions), and factor 5 (self-monitoring) best predicted higher posttest performance on the Gc measure of Abstruse analogies, while higher factor 7 (task interest) scores best predicted higher levels of performance on the Gf measure of letter sets. These results are summarized in table 8.

Multiple Regression Analysis of Posttest Composite Variables Controlling for Gf and Gc Pretest Scores

A series of Hierarchical multiple regression analyses were performed separately for both the cognitive and anxiety groups to determine which of the factors extracted in the previous analyses best predicted composite Gf and Gc posttest variables while controlling for the effects of Gf and Gc pretest performance. Pretest Gf and Gc measures were entered first, and the factor scores were added subsequently. Dependent variables included Gf and Gc composite variables at posttest. The posttest Gf composite variable was composed of letter series, Horn matrices and common analogies. The posttest Gc composite variable consisted of vocabulary and abstruse analogies. Independent variables included the variables extracted from prior Principle Component analyses of both cognitive and anxiety groups, as well as pretest composite Gf and Gc variables. The pretest Gf composite variable was composed of letter series, Horn matrices, and common analogies. Measures of vocabulary and abstruse analogies comprised the pretest Gc component variable.

Posttest Gf and Gc Composite Variables for the Cognitive Group

In the multiple regression analyses performed for the cognitive group, only one of the previously obtained factor scores significantly predicted Gc posttest composite variables. Lower scores on factor 2 (perceived effort with difficult tasks) predicted higher scores on the posttest Gc composite variable. See table 9 for summary.

Posttest Gf and Gc Composite Variables for the Anxiety Group

In the Hierarchical regression analyses performed for the anxiety group, two factors significantly predicted performance on the posttest Gc composite variable. Higher scores on factor 2 (perceived effort with difficult tasks), and lower scores on factor 3 (external/unstable attributions) predicted higher scores on the posttest Gc composite variable. Higher scores on the posttest Gf composite variable were predicted by higher scores on factor 2 (perceived effort with difficult tasks). See table 10 for a summary.

Cross-Lagged Panel Correlation of Pretest and Posttest Measures

In a final set of analyses, a series of cross-lagged correlations were performed separately for both the cognitive and anxiety groups, in order to examine the time-lagged nature of the relationships among pretest and posttest measures of Gf, Gc, interest, expectancy, trait anxiety and state anxiety. Gf variables included letter sets and letter series. Gc variables included vocubalary only. Analyses of cross-lagged panel correlations were carried out only in cases where at least one of

the correlations computed across occasions was significant. The differences between pairs of cross-lagged correlations were tested by using the Pearson - Filon Z test for non-independent correlations (Kenny, 1979).

Cognitive and Anxiety Groups

In the cross-lagged analysis performed on correlations between pretest and posttest variables in the cognitive group, only one of the four comparisons was significant. The significant time-lagged analysis in table 11 suggests that higher levels of interest at pretest predicted lower levels of state anxiety at posttest.

For the anxiety group, five out of eight of the cross-lagged analyses performed were significant. Higher levels of vocabulary (Gc) performance at pretest predicted increased levels of interest at posttest, while higher pretest levels of state anxiety predicted decreased levels of interest at posttest. At pretest, a higher performance on letter series (Gf) predicted lower levels of expectancy for improvement at posttest. Higher levels of expectancy for improvement at pretest predicted decreased performance on the posttest vocabulary measure (Gc). At pretest, higher levels of trait anxiety predicted decreased preformance on letter sets (Gf) measures at posttest. Results are summarized in table 12.

Discussion

Factor Structure of Personality and Expectancy Variables Cognitive and Anxiety Groups

Hypothesis I which examined the relationship between measures of personality and credibility and expectancy at pretest was supported. The Principal Component factor analyses that were performed separately for the cognitive and anxiety groups produced five independent factors for the anxiety group, and seven independent factors for the cognitive group. The factorial composition of the self-evaluative and expectancy measures suggests that unique factors for expectancy for improvement and credibility emerge separately from measures of personality, self-efficacy and attributions for performance. Several of the factors that emerged for the anxiety and cognitive groups were slightly different, as addressed in the results section. However, two factors emerged as unique for the cognitive group. Factor 7 for the cognitive group was defined strongly by task interest alone. For the anxiety group, a broader measure of interest also included measures for credibility and expectancy for improvement (factor 4). Factor 6 for the cognitive group was narrowly defined by the trait ability attribution measure. Although differences between the factor structures for both groups are minimal, the unique factors emerging for the cognitive group appear to be more narrowly defining components of interest/expectancy for change and attributions for performance. Differences between the two groups at pretest are not expected becuase of random group assignment of

subjects. Differences seen regarding factor structure between the two groups could be attributed to sampling error.

Intercorrelations of Factors for Cognitive and Anxiety Group

A separate Principal Axis factor analysis was performed on the measures used in the above Principal Component analysis in order to examine the relationship between the various factors. For both groups, significant correlations between factors are above .19. These significant correlations were used to clarify the nature of the relationship between various factors. For the anxiety group, one significant correlation was examined. The correlation between factor 3 (external/unstable attributions) and factor 5 (self-monitoring) was -.24. Although this correlation is low, it suggests that high self- monitoring individuals may make fewer external attributions for performance. High self-monitoring refers to an individuals sensitivity to the expression and self-presentation of others in social situations as cues for monitoring his/her own self-presentation. This contrasts with low self-monitors, who express behaviors that are a true reflection of internal states (Snyder, 1979). High self-monitors may make performance attributions that are based on the use of specific external cues that are perceived as controllable (not attributed to luck). However, this relationship is weak.

For the Cognitive group, three significant correlations were examined. The correlation between factor 5 (self-monitoring) and factor 7 (task interest) was -.20. This suggests high levels of self-monitoring are related to low levels of task interest. Task interest may reflect an expression of internal states rather

than an evaluation of external cues for monitoring social behavior. Thus, High self-monitors may focus less on internal evaluations such as interest relative to external cues. Although the correlations are low for both the anxiety and cognitive groups, the high self-monitors appear to preferentially focus on and evaluate external social cues. Prior research suggests that high self-monitors do not view their (internal) beliefs and behaviors as necessarily equivalent (Snyder & Tanke, 1976). Thus, these internal evaluative processes reflect internal states such as interest in a task, and attributions for performance, and appear to be somewhat independent of social demands and cues for performance. The .20 correlation between factor 4 (task relavence/expectancy) and factor 5 (self-monitoring) was also significant. This positive correlation suggests that high levels of self-monitoring are related to high levels of task relavence/expectancy. It appears that a similiar process of attention to external cues in order to judge the appropriateness of behavior may be identified in both of these factors. While high levels of self-monitoring suggests a more developed sensitivity to external social cues as demands for ones own behavior, task relevance/expectancy also reflects an external focus on appropriate cues or demands for behavior. The last, and most significant correlation described the relationship between factor 1 (low self-efficacy) and factor 6 (internal attributions). This correlation of .31 suggests that low levels of self-efficacy predict higher amounts of internal attributions for performance. Self-efficacy reflects judgements about one's capabilities for accomplishing certain levels of

performance. Thus, negative self appraisals for performance are related to internal attributions for performance. This is consistent with research suggesting that individuals' with low self-esteem tend to make internal attributions for in situations with past poor performance, or ambiguous feedback. Furthermore, individuals with low self-esteem often view their performance as inadequate, especially when feedback is ambiguous (Shrauger, 1975). Bandura's (1981) theory of self-efficacy would predict such a relationship, where self-judgements about performance are based on beliefs about one's ability to accomplish a task.

Multiple Regresssion Analyses of Pretest Factor Scores

The second hypothesis, which predicted that credibility/expectancy/interest measures at pretest (factors extracted at pretest) would predict levels of performance on pretest and posttest ability measures for the anxiety and cognitive groups was not supported. Although the series of regression analyses explicated some interesting relationships between personality/attributional factors described earlier and pretest and posttest ability measures, the unique expectancy/credibility factors were not predictive of performance.

Multiple Regression Analysis of Pretest Gf and Gc Measures

Anxiety Group

When the relationship between pretest Gf and Gc ability measures and pretest factors scores was examined for the anxiety group, performance on both Gf and Gc measures was predicted by several of the pretest factors. Although fluid measures were

targeted by the training interventions, experiences with the pretest battery would be expected to influence attributions for performance on both fluid and crystallized types of tasks. The pattern of factors predicting performance on the Gf and Gc tasks was somewhat different. Higher performance on Gc tasks was predicted by low self-efficacy (factor 1), high perceived effort with difficult tasks (factor 2), and fewer external attributions (factor 3). Such attributions for performance would be expected after experience with crystallized types of tasks. Crystallized types of tasks are easier than fluid types of tasks, and success with such tasks are likely to enhance perceived self-efficacy for general problem solving skills (Hayslip, 1988). Furthermore, individuals with low self-esteem have been shown to have a better performance on tasks that are easier. These individuals perceive that success is possible on less demanding tasks, and may fail to generate anxious/negative self-evaluations that interfere with performance (Brockner, 1983). More internal attributions seen with the crystallized types of tasks may also stem from the relatively easier nature of such tasks. Internal attributions are made on the basis of the degree of past success at a specific task, as well as similiar tasks (Lachman & Jelalian, 1981). Experiences with crystallized types of tasks are likely to be similiar to prior, less novel types of activities experienced independently of the present study. Thus, to the degree that such crystallized tasks are similiar to past types of activities, more internal attributions are likely to be seen. Attributions for perceived effort with difficult tasks are somewhat

unexpected for tasks that are relatively easy (Gc tasks). Self-perceived effort may have been greater for this older population than predicted by the relatively easier nature of the crystallized tasks. As noted earlier (Furchgott & Busemeyer, 1976), elderly individuals may indeed overinvest effort in tasks, especially when material is meaningful. Gc tasks reflecting real-life applications may be more meaningful for such older persons. Older persons may also invest more effort in easier tasks in situations (such as the pretest battery) that threaten self-perceptions of intellectual competance (Hayslip, 1988).

Higher performance on the Gf tasks was positively predicted by perceived effort with difficult tasks (factor 2), and negatively predicted by external attributions (factor 3). The fluid tasks are typically more difficult and novel. Attributions for self-perceived effort with difficult tasks would be expected to predict a better performance on tasks that are more difficult and that fail to capitalize on prior learning. As noted earlier, the nature of the task may effect performance evaluations (Lachman & Jelalian, 1984). Thus, an experience with novel types of tasks that emphasize skill building may encourage increased internal attributions for performance.

Cognitive Group

For the cognitive group, only task interest (factor 7) predicted performance on fluid measures. This pattern of relationships between factor 7 and Gf measures is unusual, in that factor 7 accounts for the least amount of variance (6.3%), and random assignment to groups predicts that there should be no

differences between the cognitive and anxiety groups at pretest. It is likely that this pattern of results for the cognitive group reflects sampling error.

Multiple Regression of Composite Pretest Gf and Gc Variables

For both the cognitive and anxiety groups, a composite fluid and crystallized variable were used in regression analyses. The composite variables were composed of individual Gf or Gc measures that demonstrate the strongest training effects at posttest (Hayslip, 1986). The results for the composite variables reflect the same pattern of relationships seen with the individual Gf and Gc measures described in the section above. Thus, using only selected Gf and Gc measures in a composite variable, the same pattern of relationships between factors and composite variables emerged that was identified for factors and individual Gf and Gc measures.

Multiple Regression of Posttest Gf and Gc Measures

Examination of the relationship between pretest factor scores and posttest Gf and Gc measures allowed explication of the effects of the two training interventions on post-training performance. Although the unique credibility/expectancy factors derived at pretest did not predict posttest performance, as hypothesized, interesting relationships between posttest performance and personality/attribution measures emerged.

Anxiety Group

Post-training effects were seen for both measures of fluid (Gf) and crystallized (Gc) tasks. Although training

interventions targeted improvement on fluid measures, training alone, independent of practice effects, will result in attributional shifts for performance (Segal, 1987). A consequence of a training experiences is a shift towards internal/stable (ability) attributions for performance. This results from the training emphasis on skill building, and the self-observation of improved performance and development of coping skills with which to meet future situations (Bandura,1977). Thus, training experience and practice effects can account for perceived effort with difficult tasks, and increased attributions that are internal, for Gc task performance.

Fluid (Gf) task performance, which was targeted on the training interventions, was also related to predictable post-training shifts in performance attributions. While practice effects can account partly for enhanced internal attributions (since internal attributions reflect prior experience with a task or similiar task), more ability specific attributions would be predictable (Segal, 1987). At posttest, internal attributions and perceived effort in difficult tasks more strongly predicts increased fluid (Gf) performance, compared to only two Gc measures of vocabulary and abstruse analogies. An unusual relationship was found between the Gf measure of Cattell Matrices and factor 4 (task relevance/expectancy). Lower pretest interest and performance expectations predicted higher performance for only the Gf measure of Cattell Matrices. Compared to the Cattell matrices, other fluid tasks (Gf) may be somewhat easier to solve, and more relevant to real-life experiences. Thus, the Cattell

matrices may have been less interesting and less credible. Hayslip (1987) suggested that more competent individuals may be less interested in tasks that are not challenging and rate such tasks as less credible. In addition, low ratings for credibility predicted higher performances in the Hayslip study.

Higher performances on post-training fluid tasks (common analogies, letter sets, Horn matrices) were also predicted by lower self-efficacy (factor 1) at pretest. Brockner's (1983) discussion about the relationship between low self-esteem and performance may explain these results. Much research has documented the relationship between low self-esteem and self-defeating patterns of affect, cognition, and behavior (Meichenbaum, 1977). These anxious individuals tend to be more dependent on others for performance evaluations. This openness to influence from external cues can produce performance decrements in evaluative situations for low self-esteem individuals via anxious self-focus and negative self-appraisals. Brockner and Hulton (1978) suggested that low self-esteem individual's sensitivity to external cues reflects behavioral plasticity, which refers to the susceptibility to external social influence. This plasticity may be beneficial for low self-esteem individuals in some situations. If external cues could be manipulated to decrease anxiety and negative self-evaluations, perhaps performance would be enhanced. A series of experiemnts (Brockner, 1979;Brockner & Hulton, 1978) actually manipulated external cues and found that task focused attention may indeed enhance performance for low self-esteem individuals. The test

anxiety literature also suggests that techniques aimed at redirecting the attention of test anxious subjects from self to task will enhance performance (Wine, 1980). Individuals with low self-esteem and low self- efficacy are similiar in that both have higher amounts of anxiety, lower performance expectations, and negative self-appraisals regarding performance (Bandura, 1977). In the present study,the anxiety reduction training may have benefitted subjects with low self-efficacy via the teaching of cognitive modification strategies and relaxation techniques that counter anxiety ridden task irrelevant thoughts leading to anxiety and poorer performance. Researchers have demonstrated such links between anxiety reduction techniques and enhanced performance (Meichenbaum, 1977). This anxiety reduction intervention may be mediated via behavioral plasticity and openness to influence that is characteristic of individuals with low self-esteem or low self-efficacy.

Cognitive Group

For the cognitive group only performance on abstruse analogies (Gc) amd letter sets (Gf) were related to pretest factor scores. High self- monitoring (factor 5) and ability attributions (factor 6) predicted a higher performance on the Gc measure of abstruse analogies, while task interest (factor 7) predicted higher performance on the Gf measure of letter sets. While ability specific attributions are expected as a function of training on fluid (Gf) tasks, for both Gf and Gc types of tasks (Hayslip, 1986), self-monitoring and task interest are less expected. As a consequence of induction training, much of the

focus for performance relates to how well cognitive strategies are learned. It is possible that the difficulty of some parts of the training, and the subsequent posttest battery, may have caused older persons to look for external cues in order to judge their performance. In a similiar vein, Brockner's (1983) research characterizes the 'low self esteem' individual as a high self-monitor, who may be more sensitive to social cues and evaluative situations (especially when the task is difficult), and thus more susceptible to both negative and positive cues from the environment. As a consequence of training, these individuals with more 'behavioral plasticity' may show enhanced training effects. Higher amounts of task interest (factor 7) also predicted higher Gf pretest performance for the cognitive group. Again, this finding is difficult to explain outside of sampling error. One difference at posttest, relative to pretest, is that group specific rationales are presented after administration of the pretest batteries, and prior to measurement of credibility. Group specific differences at posttest could be attributed to differential interest in perception of experiences and expectations for the different training groups. The narrower post-training effects for the cognitive group relative to the anxiety group may reflect the differential training effects on posttest performance. While cognitive/ induction training focuses on learning cognitive strategies that enhance problem solving skills, anxiety reduction training focuses on skills that are likely to affect cognitive and non-cognitive abilities. Thus general self-efficacy resulting from enhanced coping skills is a likely consequence of anxiety reduction training. At posttest,

cognitive training may more narrowly enhance ability specific attributions, while the effect that anxiety reduction training has on general self-efficacy may result in greater and more generalized improvements on performance.

Multiple Regression of Composite Posttest Variables

These analyses, for both the cognitive and anxiety groups, controlled for the pretest effects of Gf and Gc performance. Thus, relationships between pretest factor scores and Gf and Gc posttest measures reflect unique effects of training, independent of initial pretest levels of Gf and Gc measures.

Cognitive Group

For the cognitive group, increased effort with difficult tasks (factor 2) at pretest predicted lower Gc posttest performance on vocabulary and abstruse analogies (composite variable). This is in contrast to the positive relationship between higher pretest effort attributions for difficult tasks (factor 2) and scores on the composite variable that was reported earlier in this discussion. A possible explanation for the negative relationship between pretraining effort attributions and posttraining vocubulary performance for the cognitive group may relate to the task overinvestment observed in some older individuals when material is more meaningful (Furchgott & Busemeyer, 1976). For some older persons the meaningfulness of material is related to the amount of arousal (Busse & Shmavonian, 1963), and to subsequent task overinvestment. Task overinvestment resulting from over-arousal has been shown to

reduce performance in some older individuals (Botwinick, 1978).

Anxiety Group

For the anxiety group, effects unique to training, independent of pretest levels, were seen for both the composite Gf (letter series, horn matrices, cattell matrices) and Gc (vocabulary, abstruse analogies) measures. The positive relationship between the fluid composite measure and perceived effort with difficult tasks (factor 2) is expected. Training was targeted to the more difficult and novel fluid types of tasks. Thus ability specific attributions for difficult tasks requiring effort are seen as a result of training. Increased attributions for perceived effort with difficult tasks (factor 2), and fewer external attributions (factor 3) also predict a higher performance on the Gc composite measure. Although Gc tasks were not targeted by the training intervention, the training experience alone encourages increased internal attributions because of the emphasis on skill building. Thus, for the anxiety group, training effects appear to be ability specific, and related to effort in the fact of difficult tasks. This suggests that anxiety reduction training benefits performance via certain attributions about performance (Hayslip,1986). To the extent that the use of strategies aimed at reducing inappropriate arousal can facilitate the formation of effective problem solving strategies, attributions may be made regarding enhanced self-efficacy and ability to solve problems. Increases in self-efficacy have been shown to result from self-observations of improved performance via the perception of better

coping and problem solving skills (Bandura, 1977). Thus attributions about performance are important in facilitating better performance.

Cross-Lagged Panel Correlations of Pretest and Posttest Variables

Anxiety Group

Significant time-lagged analyses for both the anxiety and cognitive groups suggests a causal effect between some of the pre-training and post-training measures. For the anxiety group, pre and post training measures of credibility and interest are related to Gf and Gc performance, as initially hypothesized. Interest at post-training is positively predicted by pre-training vocabulary, and negatively predicted by pre-training state anxiety. Pre-training anxiety for an older adult would suggest excessive preoccupation with not only negative self evaluations, but concern about negative evaluations from others. This concern with performance outcomes, or lower self-efficacy, would likely result in less investment and perhaps less interest in a task (Bandura, 1981). The positive relationship between initial levels of vocabulary performance and post-training interest may result from the nature of the vocabulary task. Fund of word knowledge reflects a Crystallized ability that is acquired through education and aculturation (Cattell, 1971). The concrete, real-life nature of the vocabulary task would likely be familiar and thus more meaningful for an older adult, resulting in increased investment and more task interest (Arenberg, 1968).

The negative relationship between anxiety and performance has been well documented. Many authors conceptualize anxiety as

resulting from negative expectations, or low self-efficacy (Bandura, 1981; Rodin, 1980). These negative self-appraisals about performance or ability generate stress and anxiety that may result in the undermining of competancies. Thus, initial levels of trait anxiety may be associated with negative self-efficacy, and subsequently with lower performance on a fluid task at post-training. An alternative explanation is offered by Meichenbaum (1972) who suggests that initial levels of anxiety may result from overinvestment in the task, which may increase arousal levels and subsequently lower performance.

The final two causal sequences for the anxiety group suggest almost a reciprocal relationship between expectancy for improvement and performance. Self-efficacy is related to expectancy for success or for positive outcomes, and both predicts, and is predicted by, experiences of success (Bandura, 1986). The causal relationships between expectancy for success and performance reported here duplicate earlier findings by Hayslip (1987), where high ratings for credibility at pre-training predicted lower performance at post-training. The relationship between expectancy or credibility and performance may be mediated by self-appraisals or attributions about ones performance. Locus of control has been reported to be an important mediator between performance and expectancy (Bandura, 1977). Internal attributions (ability) for performance outcomes are associated with expectancy for success, while external attributions (luck) lead to expectations for failure. Thus an individual with low self-efficacy is likely to have expectations for failure and an external locus of control, where he/she sees

their own performance as dependent on others. This relationship between self-efficacy and locus of control may provide a possible explanation for the expectancy-performance relationship reported in this analysis. Individuals with low self-efficacy and external locus of control may approach a task with attributions about "powerful others" controlling their performance outcomes. Thus, one may actually rate a task as more credible on the basis of such performance attributions. Despite the rating of high credibility/expectancy for change, the mediating belief held by the individual (negative self-appraisals/low self-efficacy) undermines actual performance. Hayslip (1987) demonstrated that persons with initial high credibility ratings not only demonstrated lower performance, but also benefitted less from training. Perhaps low self-efficacy initially (pre-training) sets up expectations of failure, resulting in less benefit from training, and subsequently lower performance at post-training.

In this analysis initial high performance on a fluid task at pre-training predicted lower expectancy for improvement ratings at post-training. In the same vein, mediating attributions regarding success or failure can explain the performance/expectancy relationship. Bandura (1986) suggests that those approaching a learning task with self-perceptions of high self-efficacy may feel little need to invest or prepare much for the task. Those individuals with initial success with a fluid task at pre-training are more likely to have positive self-appraisals. These individuals may also be more likely to make internal attributions about performance, and rate a task as less

credible.

Cognitive Group

For the cognitive group, initial high levels of interest lead to decreased state anxiety at post-training. This is similiar to the anxiety/interest relationship seen with the anxiety group. For the cognitive group, however, initial levels of interest may suggest less preoccupation with self-evaluations, or negative evaluations from others that interfere with performance and create stress and anxiety.

In summary, the major findings of this study are as follows:

(a) Unique factors for expectancy for improvement and credibility emerged separately from measures of personality, self-efficacy and attributions for performance.

(b) Factor inter-correlations were described, with more significant correlations for the cognitive than the anxiey group.

(c) There were more significant relationships between pretest factors (self-efficacy and ability attributions) and Gf/Gc pretest measures for the anxiety group than for the cognitive group.

(d) Gf/Gc composite variables at pretest demonstrated the same relationship with pretest factors as seen with individual Gf/Gc pretest measures.

(e) There were more significant relationships between pretest factors for self-efficacy and ability attributions and Gf/Gc posttest measures for the anxiety group than for the cognitive group.

(f) Gf/Gc composite variables at posttest demonstrated a differential pattern of relationships to pretest factors between

the cognitive and anxiety group, with more significant relationships for the anxiety group.

(g) Using cross-lagged panel correlations of individual Gf/Gc measures at pre and post training, significant causal sequences were identified for both the cognitive and anxiety groups. with measures of letter series, letter sets, vocabulary, state and trait anxiety, interest and expectancy for improvement.

This study has provided additional information regarding the relationship between performance and cognitive appraisals about performance in older adults. Although much research has been generated regarding this relationship in general, applications with older populations have been neglected. Further, how attributions about success and failure affect perceptions of credibility and expectancy for improvement in an older population has yet to be formally addressed in the literature. Unique factors for expectancy and credibility were explicated, although these factors were not found to predict performance in the types of analyses used in this study. However, cross-lagged analyses did suggest that credibility/expectancy ratings for performance may be mediated by a " cognitive set " of attributions about one's own perofrmance. A limitation of this study was the difference in factor structure between the cognitive and anxiety group measures at pretest. The problem may be resolved by initially combining data for the anxiety and cognitive groups before factor analyzing the data.

The relationship between credibility and expectancy ratings and attributions needs to be further delineated. Specifically,

the items used to measure expectancy for improvement and credibility at pretest can be factor analyzed in order to look at the relationship between these two measures. only important for older populations, but for research focused on outcomes in many areas, including psychotherapy research. While credibility and expectancy have been viewed as interchangeable in much of the literature, there is evidence that separate processes may be involved. Because such ratings are used frequently in research, it is important to understand how personality factors and experience effect such ratings.

Table 1

Factor Structure of Credibility/Expectancy Measures

Anxiety Group

	Factor One	Factor Two	Factor Three	Factor Four	Factor Five
Interest	-.17	-.06	-.30	.71	-.04
Perceived Ecological Validity	.13	-.13	.14	.73	.23
Expectancy	-.25	.13	.23	.54	-.02
Self Monitoring	.17	.01	.08	.36	.55
Trait Anxiety	.89	-.01	.03	-.12	-.11
State Anxiety	.86	-.06	-.05	-.02	-.11
Fear Negative Evaluation	.75	-.03	.15	.04	.19
Self Concept	-.74	-.02	-.14	.04	-.10
Trait Attributions					
Luck	.01	-.11	.84	-.07	.09
Ability	-.30	.44	-.45	-.00	-.04
Effort	-.11	.78	.01	-.00	.17
Task Difficulty	-.04	.77	-.03	-.08	-.00
State Attributions					
Luck	.07	-.03	.88	.11	-.11
Ability	-.23	.01	-.54	-.24	.59
Effort	-.00	.64	-.07	.09	.59
Task Difficulty	.15	.77	-.15	.11	-.15

FACTOR NAME	EIGENVALUE	% COMMON VARIANCE
1 Low Self-Efficacy	3.52	22.0
2 Perceived effort with Difficult Tasks	2.48	15.5
3 External/Unstable Attributions	1.95	12.2
4 Investment/Expectancy	1.48	9.3
5 Self-Monitoring	1.00	6.3

Table 2

Factor Structure of Credibility/Expectancy Measures

Cognitive Group

	Factor one	Factor two	Factor three	Factor four	Factor five	Factor six	Factor seven
Interest	_.00	.01	.12	.09	-.06	.06	.84
Perceived Ecological Validity	.03	-.03	-.00	.79	-.18	-.03	.27
Expectancy	_ 20	-.06	-.04	.75	.11	-.01	-.14
Self Monitoring	.06	-.11	.06	-.05	.91	-.03	-.03
Trait anxiety	.84	.22	.02	-.13	.01	-.10	-.15
State Anxiety	.80	-.10	-.11	.07	.11	.07	.12
Fear Negative Evaluation	.51	.02	.49	.02	-.12	.24	-.39
Self Concept	-.75	.16	-.25	.33	.03	.05	-.01
Trait Attributions							
Luck	.08	.13	.68	.01	.38	-.24	.02
Ability	_.01	.11	-.11	-.01	-.01	.93	.06
Effort	-.47	.49	-.04	-.28	-.08	.40	-.14
Task Diff.	.02	.64	.06	.11	.45	.20	-.26
State Attributions							
Luck	.04	-.10	.78	-.13	.02	.09	.24
Ability	.05	.38	-.61	-.10	.14	.26	.13
Effort	-.13	.82	-.09	-.15	-.09	.05	.16
Task Diff.	.09	.82	-.08	.03	-.09	-.01	-.04

FACTOR NAME	EIGENVALUE	% COMMON VARIANCE
1 Low Self-Efficacy	3.09	19.4
2 Perceived effort with Difficult Tasks	2.46	15.4
3 External/Unstable Attributions	1.60	10.0
4 Task Relevance/Expectancy	1.35	8.5
5 Self- Monitoring	1.26	7.9
6 Internal/Attributions	1.01	6.4
7 Task Interest	1.00	6.3

Table 3

Multiple Regression Analysis of Pretest Gf and Gc Measures Anxiety Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
Vocabulary (Gc)	Factor 2	.38	.002
	Factor 3	-.30	.01
	Factor 1	.26	.03
Abstruse Analogies (Gc)	Factor 2	.37	.002
	Factor 1	.33	.006
	Factor 3	-.25	.04
Inventive Remote (Gc) Associations	Factor 2	.26	.04
Common Analogies (Gf)	Factor 3	-.27	.03
Letter Series (Gf)	Factor 3	-.38	.002
	Factor 2	.28	.02
Horn Matrices (Gf)	Factor 3	-.39	.002
Cattell Matrices (Gf)	Factor 2	.30	.01
	Factor 3	-.26	.04

Table 4

Multiple Regression Analysis of Pretest Gf and Gc Measures
Cognitive Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
Common Analogies (Gf)	Factor 7	.27	.03
Letter Series (Gf)	Factor 7	.31	.001

Table 5

Multiple Regression Analysis of Composite Pretest Gf and Gc Variables Anxiety Group

DEPENDENT VARIABLE		INDEPENDENT VARIABLE	BETA	SIG
GF1	Letter Series 1	Factor 2	.23	.06
	Horn Matrices 1	Factor 3	-.46	.00
	Cattell Matrices 1			
GC1	Vocabulary 1	Factor 1	.31	.01
	Abstruse Analogies 1	Factor 2	.40	.001
		Factor 3	-.30	.01

Table 8

Multiple Regression Analysis of Composite Pretest Gf and Gc Variables Cognitive Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
GF1 Letter Series 1 Horn Matrices 1 Cattell Matrices 1	Factor 7	.31	.02
GC1 Vocabulary 1 Abstruse Analogies 1	Factor 2	.23	.08

Table 7

Multiple Regression Analysis of Posttest Gf and Gc Measures
Anxiety Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
Vocabulary (Gc)	Factor 2	.47	.00
	Factor 3	-.28	.02
Abstruse Analogies (Gc)	Factor 3	-.27	.03
Common Analogies (Gf)	Factor 2	.39	.00
	Factor 3	-.36	.00
	Factor 1	.27	.02
Letter Sets (Gf)	Factor 2	.28	.02
	Factor 1	.26	.03
Letter Series (Gf)	Factor 3	-.32	.01
	Factor 2	.28	.02
Horn Matrices (Gf)	Factor 3	-.43	.00
	Factor 1	.24	.04
Cattell Matrices (Gf)	Factor 4	-.33	.01
	Factor 3	-.25	.04

Table 8

Multiple Regression Analysis of Posttest Gf and Gc Measures
Cognitive Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
Abstruse Analogies (Gc)	Factor 6	.29	.01
	Factor 5	.25	.03
Letter Sets (Gf)	Factor 7	.35	.00

Table 9

Multiple Regression of Composite Posttest Gf and Gc Variables* Cognitive Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
GC2 Vocabulary 2 Abstruse Analogies 2	Factor 2	-.20	.05

*Controls for pretest Gf and Gc

Table 10

Multiple Regression of Composite Posttest Gf and Gc Variables* Anxiety Group

DEPENDENT VARIABLE	INDEPENDENT VARIABLE	BETA	SIG
GF2 Letter Series 2 Horn Matrices 2 Cattell Matrices 2	Factor 2	.17	.04
GC2 Vocabulary 2	Factor 2	.23	.02
Abstruse Analogies 2	Factor 3	-.22	.02

*Controls for pretest Gf and Gc

Table 11

Cross-Lagged Panel Correlations
Gf and Gc Measures at Pretest and Posttest
Anxiety Group

PRE-TRAINING	POST-TRAINING	CORRELATION	Z VALUE
Vocabulary 1	State Anxiety 2	-.19 *	-.81
State Anxiety 1	Vocabulary 2	-.10	
Vocabulary 1	Interest 2	.17 *	3.29 *
Interest 1	Vocabulary 2	.09	
Letter Series 1	Trait Anxiety 2	-.27 *	-.36
Trait Anxiety 1	Letter Series 2	-.18 *	
Letter Series 1	State Anxiety 2	-.19 *	-.56
State Anxiety 1	Letter Series 2	-.13	
Letter Series 1	Expectancy 2	-.23 *	3.89 *
Expectancy 1	Letter Series 2	.01	
Letter Sets 1	Trait Anxiety 2	-.22 *	-4.27 *
Trait Anxiety 1	Letter Sets 2	-.26 *	
Expectancy 1	Vocabulary 2	-.26 *	3.40 *
Vocabulary 1	Expectancy 2	-.10	
State Anxiety 1	Interest 2	-.23 *	3.80 *
Interest 1	State Anxiety 2	-.17 *	

* P<.05

Table 12

Cross-Lagged Panel Correlation
Gf and Gc Measures at Pretest and Posttest
Cognitive Group

PRE-TRAINING	POST-TRAINING	CORRELATION	Z VALUE
Expectancy 1	Vocabulary 2	.18 *	1.58
Vocabulary 1	Expectancy 2	.12	
Expectancy 1	Letter Sets 2	-.18 *	-.28
Letter Sets 1	Expectancy 2	-.11	
State Anxiety 1	Expectancy 2	-.22 *	1.12
Expectancy 1	State Anxiety 2	-.04	
Interest 1	State Anxiety 2	-.17 *	2.48 *
State Anxiety 1	Interest 2	-.15	

* P<.05

Summary Table

Anxiety Group

FACTOR	PRETEST		POSTTEST		COMPOSITE POST ADJ. PRETEST	
	GF	GC	GF	GC	GF	GC
1		*	*			
2	*	*	*	*	*	*
3	*	*	*	*		*
4			*			
5						

Cognitive Group

FACTOR	PRETEST		POSTTEST		COMPOS. POST ADJ. PRETEST	
	GF	GC	GF	GC	GF	GC
1						
2						*
3						
4						
5				*		
6				*		
7	*		*			

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