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INDIVIDUAL DIFFERENCES IN SELF-KNOWLEDGE AND THE PSYCHOMETRIC PROPERTIES OF SELF-REPORT MEASURES OF PERSONALITY TRAITS AND ATTITUDES

Raymond A. Kilduff
University of Rhode Island

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INDIVIDUAL DIFFERENCES IN SELF-KNOWLEDGE
AND THE PSYCHOMETRIC PROPERTIES OF SELF-REPORT
MEASURES OF PERSONALITY TRAITS AND ATTITUDES

BY

RAYMOND A. KILDUFF

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
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Abstract

I evaluated the relationship between self-knowledge and the psychometric properties of self-report measures of personality traits and attitudes. To accomplish this, three sequential investigations were conducted and each investigation was based on data collected in two relatively large community college samples ($N_1 = 351$; $N_2 = 260$). In the first investigation, competing measurement models of the Self-Consciousness Scale (SCS) were systematically examined within a structural modeling framework. A 3-factor correlated measurement model eliminating eight of the original SCS items provided the best fit to the data. A shortened version of the private self-consciousness subscale (PriSC), an indicator of self-knowledge differences, was recommended as a potential alternative to the original 10-item subscale. Results were confirmed over time and sample, and implications for self-consciousness theory were discussed. In the second investigation, three studies were conducted in an attempt to clarify the structure, reliability and predictive validity of the Survey of Study Habits and Attitudes (SSHA). A brief 32-item version of this questionnaire, simply labeled the Brief Survey of Study Habits and Attitudes (BSSHA) was developed and found to be psychometrically superior to the original 100-item questionnaire. The four BSSHA scales were labeled: Learning Difficulties, Academic Diligence, Delay-Avoidance, and Teacher Approval. Finally, in the last investigation two studies examined the relationship between PriSC and the internal and external validity of the BSSHA scales. Both the original and short versions of the PriSC scale were used to define high and low self-knowledge groups. Moderator effects related to the internal validity of the BSSHA were minimal, and effects on stability depended on the scale involved. Further, PriSC moderated the predictive validity of the Academic Diligence scale and the Teacher Approval scale, but not the predictive validity of the remaining two BSSHA scales or an objective measure

of aptitude. Finally, results were consistent across versions of the PriSC scale, but the shorter 5-item scale tended to be slightly more sensitive in producing effects. Overall results are considered in terms of their implications for future research, self-consciousness theory, and studies of self-directed learning.

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Chapter 1

Introduction

Self-report measures of values, attitudes, interests, and personality traits are extremely common assessment devices used in college counseling centers. Information collected from instruments employing a self-report format aid the counselor or psychologist in decision making related to educational, career, and personal counseling issues. In order to use self-report measures effectively, however, the practitioner must assume that the person being assessed is both willing and able to report accurately (Nunnally, 1978). Since most clients seeking counseling are highly motivated to obtain services, the first assumption seems reasonable. We know very little, however, concerning how sensitive our most popular self-report measures of behavioral dispositions are to individual differences in self-knowledge. Thus, the second assumption is problematic.

With respect to behavioral dispositions, self-knowledge refers to the knowledge individuals have about their own traits, attitudes, motives, goals, behaviors and other aspects of the self. The construct assumes that individuals differ in their degree of self-knowledge and that as a result they are more or less capable of giving accurate self-reports. When asked for a self-report, persons lacking in self-knowledge might have to resort to something akin to guessing. Persons with extensive self-knowledge, on the other hand, would be expected to give better estimates of their typical behavior and feelings and thus more reliable and valid self-reports. Although several researchers have noted the importance of self-knowledge and its probable relationship to the psychometric properties of self-report measures (e.g. Buss, 1980; Jackson & Paunonen, 1980; Markus, 1983; Nunnally, 1978; Penner & Wymer, 1983; Scheier, 1980;) surprising few empirical studies have been reported. The studies that do exist,

interestingly, have been generated by researchers testing predictions from two closely related theories: Self Awareness Theory (Buss, 1980) and Self-Consciousness Theory (Fenigstein, Scheier & Buss, 1975).

Self Consciousness Theory was originally proposed by Fenigstein, Scheier, and Buss (1975) and later integrated into a more general theory of self awareness by Buss (1980). According to Buss, at any given point in time, people may direct their attention on some aspect of the self or some aspect of the environment. If we turn our attention inward, toward the private aspects of the self (i.e., our feelings, motives, attitudes, thoughts, and fantasies) we enter the state of "private self-awareness". According to the theory this results in two important processes: (1) intensification of affect, and (2) clearer self-knowledge. Because of these two processes, it is suggested that the state of "private self-awareness" promotes the development of self-knowledge. Considerable research has supported both the intensification and clearer self-knowledge hypotheses (for reviews see Buss, 1980; Scheier & Carver, 1983).

If we focus our attention inward, however, we could also attend to the public aspects of the self; i.e. those aspects of the self that are observable by others. The most obvious public aspects of the self are appearance, voice, and style. This state is identified as "public self-awareness". This type of awareness is important because it furnishes us with information about our public self. This information can be used to make a good impression and to influence others, but can also lead to apprehension, lowered self-esteem, and attempts to escape or avoid certain situations. Although the general state of self-awareness includes both private and public self-awareness, in many situations each state produces different outcomes (e.g. for reviews see Buss, 1980; Carver & Scheier, 1987). For example, private self-awareness has been shown to improve the predictive validity of self-report measures of traits and attitudes while

public self-awareness either has no effect or works against consistency (e.g. Pryor, Gibbons, Fazio, & Hood, 1977).

Fenigstein, Scheier, & Buss (1975) proposed that some individuals habitually direct their attention inward or outward. Some persons, for example, frequently think about themselves, scrutinize their behavior and mull over their thoughts. Others hardly ever turn their attention inward and have little understanding of either their own personal attitudes, goals, characteristics, or how they appear to others. Most of us, however, fall somewhere in-between. To distinguish this trait from the state of self-awareness they labeled it "self-consciousness". In order to measure this trait Fenigstein, Scheier, & Buss (1975) developed the Self-Consciousness Scale (SCS; Appendix A) The authors defined a set of seven aspects of self-directed attention, developed a relatively large item pool, and conducted a series of principal component studies involving 9 samples and over 2,000 college students resulting in a final set of 23 items. The items empirically grouped into three components labeled private self-consciousness, public self-consciousness, and social anxiety. Private self-consciousness refers to the habitual tendency to self-reflect or attend to the private aspects of the self (habitual private self-awareness). Public self-consciousness, on the other hand, refers to the habitual tendency to attend to the public or observable aspects of the self (habitual public self-awareness). For example, attending to one's style of behaving and appearance. Finally, the social anxiety scale refers to the tendency to experience anxiety in a variety of situations involving the presence of others. This last form of self-consciousness closely resembles definitions of self-consciousness found in dictionaries. Finally, the scales were found to be minimally correlated and were treated as relatively orthogonal.

Although the SCS is presently a research instrument without a published

manual, considerable reliability and validity data are available. Fenigstein, Scheier, and Buss (1975) report test-retest coefficients based on 84 college students and a two week interval between testings ranging from .73 to .80. Several researchers have reported satisfactory internal consistency coefficients (alphas) in the high 70's to low .80's for the public and social anxiety scales. Alphas tend to be appreciably lower (.63 to low .70's) for the private scale (Daly, Vangelisti, & Lawrence, 1989; Leary, Shepperd, McNeil, Jenkins, Barnes, 1986; Penner & Wymer, 1983; Santee & Maslach, 1982), and at least one author has questioned its internal consistency (Penner & Wymer, 1983). In addition, a variety of data generally support the construct, discriminant, and convergent validity of the questionnaire (for a review see Buss 1980; Scheier & Carver, 1983; Carver and Scheier, 1987). With respect to the private self-consciousness scale, there have been at least nine studies reviewed by Buss (1980) in which individual differences in private self-consciousness have led to effects duplicating those produced by state private self-awareness. These studies support the theoretical predictions relating private self-consciousness to intensification of affect and increased self-knowledge. (Scheier, 1980).

Self-consciousness theory predicts that private self-consciousness should improve the validity of self report measures of attitudes and personality traits. Persons who habitually attend to their emotional states and behaviors should be more knowledgeable about themselves, and should be able to describe their typical behaviors more accurately. Persons low in private self-consciousness, however, seldom attend to these events and thus would be lacking in self-knowledge. In fact, persons high in private self-consciousness have been found to describe themselves in greater detail (Turner, 1978), and to demonstrate greater memory for ascribed characteristics (Nasby, 1985; Turner 1978; 1980). Perhaps more importantly, persons high in private self-consciousness have been found to give more accurate self-reports.

Several studies have examined the relationship between private self-consciousness and the validity or accuracy of self-report measures of behavioral dispositions. Four studies have considered the relationship between self-reported dispositions and actual behaviors. Scheier, Buss, and Buss (1979), for example, found that the correlation between self-reports of aggressiveness and subsequent aggression in a laboratory situation was .66 for those high in private self-consciousness and .09 for those low in private self-consciousness. Turner (1978), studying dominance, found the relationship between self-reports and subsequent behavior in a discussion group to also be moderated by level of private self-consciousness. The correlation was .67 for those high in private self-consciousness and .33 for those low in this trait. Another study by Underwood and Moore (1981) found a correlation of .44 between self-reports of sociability and ratings of sociable behavior for high private self-conscious students compared to .03 for low private self-conscious students.

In a somewhat related study, Scheier (1980) demonstrated that the moderating effects of private self-consciousness may, on occasion, interact with public self-consciousness. In his study self reports of "attitudes toward the use of punishment as a learning technique" were used to predict expressed attitude four weeks later. When students thought they were going to read their expressed attitude (essay) publicly in a small discussion group, only those high in private self-consciousness and low in public self-consciousness produced a significant correlation between the self-report attitude measure and their essay ($r = .68$). Apparently those students high in public self-consciousness were significantly affected by the anticipated social interaction and as a result their attitudinal consistency depended not only on their level of private self-consciousness but also their level of public self-consciousness. Taken collectively, the above four studies demonstrate that persons high in private self-consciousness have consistently produced greater correspondence between their behavioral dispositions and

their actual behavior, at least in laboratory situations.

Another common form of validity assessment involves evaluating the correspondence between self and peer reports. Klesges and McGinley (1982) reported significantly higher agreement scores between self and peer reports of "typical" and "maximal" expressed aggression for students high in private self-consciousness. The effect was somewhat attenuated when the maximal rather than the typical assessment format was used. Franzoi (1983), found that consistent with theory, students high in private self-consciousness produced little discrepancy between their own self and peer ratings of creativity, and thus greater correspondence between their self and peer ratings than did students low in private self-consciousness. In another study, Cheek (1982) investigated the relationship between self and peer ratings across four personality dimensions. In general, persons high in private self-consciousness produced an average correlation of .49 while persons low in this trait produced a correlation of .38. Interestingly, the moderating effect of private self-consciousness depended on the personality dimension assessed. High private self-conscious persons produced significantly higher correlations between self and peer ratings of conscientiousness (.60 vs. .34) and agreeableness (.48 vs .27) but no moderating effects for extraversion (.58 vs .58) or emotional stability (.26 vs .29). Wymer & Penner (1985) replicated Cheek's (1982) results and have provided an explanation for the mixed results found when private self-knowledge differences are used to moderate self-peer ratings. They reported that correspondence between self and peer ratings of personality dispositions depended on both self-knowledge, as measured by private self-consciousness, and social communication skill. When self-peer rating correspondence is studied, both variables need to be assessed.

Taken collectively, the above studies suggest that private self-consciousness

tends to moderate the predictive validity of self-report measures of personality traits and attitudes, and this effect appears to be stronger for typical rather than maximal assessment instruments. Further, when the predicted behavior is to be public and involves a sensitive or controversial issue private self-consciousness may interact with public self-consciousness. Buss (1980) concluded that private self-consciousness moderates the relationship between self-reports and behavior because high scorers have greater self knowledge and this permits them to give more accurate self-reports about their attitudes and typical behavior.

Although private self-consciousness has been related to the predictive validity of self-reports, theoretically it should impact on other psychometric characteristics as well. Scheier (1980) has noted that, presumably, the temporal stability of self-reported attitudes and traits should be high for persons high in private self-consciousness, and low for persons low in private self-consciousness. We might also expect greater self-knowledge or high private self-consciousness to be related to consistency over items as well (cf. Jackson and Paunonen, 1980), raising questions concerning the relationship between this trait and the factorial validity of self-reports.

Only two studies have considered the question of whether or not private self-consciousness and presumably self-knowledge differences relate to self-report reliability. Recently, Nasby (1989) reported that private self-consciousness moderated the stability of 12 of 15 Personality Research Form (PRF) scales. Significant correlations between private self-consciousness and test-retest standardized difference scores on the PRF scales ranged from $-.26$ to $-.41$, indicating that as private self-consciousness increases then test-retest difference scores decreased or demonstrated greater correspondence. Traditional stability coefficients for persons high vs. low on the private scale were not reported. Also, McFarland and Sparks (1985) reported that

the self-reports of subjects high in private self-consciousness were more internally consistent than those low in this trait, but their measure of item internal consistency was mathematically unrelated to alpha, the traditional measure of reliability (p. 1695). Thus the relationship between private self-consciousness and self-report reliability of behavioral dispositions remains uncertain, at least in terms of traditional measures of reliability.

To date, however, there have been no reported studies investigating the relationship between private self-consciousness and the factorial validity of self-report measures of either attitudes or personality traits. If self-knowledge differences do effect the structure of a scale then these differences may be one factor explaining the influence of private self-consciousness on self-reported reliability and validity. Internal consistency comparisons, for example, would be inappropriate if the scale could not be assumed unidimensional (Hattie, 1984).

To complicate matters, recently the factorial validity of the Self-Consciousness Scale has been questioned. Burnkrant & Page (1984) found the private scale to be two-dimensional resulting in a four, rather than a three factor structure of the Self-Consciousness Scale (SCS). Further, they were able to replicate their results in a second sample. More recently, Mittal & Balasubramanian (1987) and Piliavin & Charng (1988), have provided additional support for a two-dimensional interpretation of the private scale. If the scale is two-dimensional, then using total scores seriously undermines the interpretation of reported effects (cf. Carver, 1989), and may explain the apparent low internal consistency of the scale (Penner & Wymer, 1983).

In summary, although the private self-consciousness scale has been consistency related to individual differences in self-knowledge, the dimensionality of the scale remains an issue. Also, validity studies have been limited to studying the relationship

between self and peers reports (e.g. Cheek, 1982), and the relationship between self-reports and behavioral measures of the same trait in laboratory settings (e.g. Scheier, Buss & Buss, 1978). Another common and important measure of validity, real life outcomes, such as grades, promotions, or heart attacks have not been used. Moreover, the relationship between self-knowledge (private self-consciousness) and internal validity also remains to be investigated. Finally, the predictive validity studies never have included a measure of a characteristic not employing a self-report format. Self-knowledge differences, for example, should not moderate the predictive validity of objectively measured constructs (e.g. aptitude), but this has yet to be tested.

The primary propose of my research was to provide an additional test of Self-Consciousness Theory by determining if individual differences in private self-consciousness significantly influences the reliability, internal validity, and predictive validity of self-report measures of personality traits and attitudes. A second purpose was to evaluate the internal and external validity of the Survey of Study Habits and Attitudes (SSHA: Brown & Holtzman, 1967, 1984), a popular measure used in counseling centers and studies of self-directed learning. The SSHA was selected for this study for several reasons. First, this self-report instrument consists of four scales measuring two traits and two attitudes (Appendix B). Second, Brown and Holtzman (1967, 1984) have developed a clearly defined theoretical model describing the hierarchical factor structure of the instrument. Third, the SSHA is the most frequently used measure of this type. It has been employed in over 200 studies of academic competence (cf. Kirschenbaum and Perri, 1982) and independent learning (cf. Rohwer, 1984). Fourth, the instrument has received positive reviews regarding its development and psychometric status (Mehrens & Lehmann 1987). And finally, the SSHA is being considered for use as a screening devise and outcome measure at the Community College of Rhode Island. Thus the results of this study would have practical as well as

theoretical significance.

Three sequential investigations follow. The first is specifically concerned with examining competing measurement models for the Self-Consciousness Scale (SCS), and in particular, resolving the issue of the dimensionality of the private subscale. The second study, reports on the psychometric properties of the Survey of Study Habits and Attitudes (SSHA) and describes the development of a brief form of this questionnaire with superior psychometric characteristics. Finally, the last investigation is concerned with determining the relationship between private self-consciousness and the internal and external validity of the Brief Survey of Study Habits and Attitudes (BSSHA). Overall results are considered in terms of their implications for self-consciousness theory and the usefulness of the BSSHA, particularly in community college settings where self-directed learning skill deficits are a common problem.

Chapter 2

Competing Measurement Models for the Self-Consciousness Scale

Fenigstein, Scheier, and Buss (1975) defined self-consciousness as the consistent tendency to direct attention inward toward the self or outward toward the environment. They carefully developed a scale to measure this trait and conducted a series of factor analytic studies demonstrating that self-consciousness was multidimensional. Their Self-Consciousness Scale (SCS) presently yields scores corresponding to three forms of self-consciousness: private self-consciousness, public self-consciousness and social anxiety. Private self-consciousness refers to the tendency to focus attention on the unobservable aspects of the self. Persons high on this dimension habitually examine their thoughts, moods, and motives, and in general are self-reflective. Public self-consciousness refers to the tendency to focus attention on the more public aspects of the self. Persons scoring high on this dimension typically attend to their appearance, style of behavior, and in general, the impression they make on others. Finally, social anxiety refers to the tendency to experience discomfort in the presence of others. Persons who score high on social anxiety also tend to be high in public self-consciousness, but in addition, are likely to become upset and nervous in the presence of others.

The self-consciousness scale has stimulated considerable research interest which has tended to support its usefulness (for reviews, Buss, 1980; Carver & Scheier, 1987; Fenigstein, 1987; Scheier & Carver, 1983). Most of the research effort has focused on the private subscale, and this construct has been related to a wide variety of behavioral phenomena. For example, high private self-consciousness has been related to greater and more accurate self-knowledge (Bernstein & Davis, 1982; Franzoi, 1983; Turner,

1978a), greater attitude consistency over time and over different situations (Scheier, 1980), greater consistency between self-reports and behavior (Carver & Scheier, 1981; Scheier, Buss & Buss, 1978; Turner, 1978b; Underwood & Moore, 1981), and greater consistency between peer and self-reports (Cheek, 1982; Klesges & McGinley, 1982; Franzoi, 1983). Individuals high in private self-consciousness have demonstrated increased awareness of internal sensations (Scheier, Carver, & Gibbons, 1979), greater responsiveness to experimental manipulation of mood (Scheier, 1976; Scheier & Carver, 1977), and reduced responsiveness to insight oriented counseling (Damsteegt & Christoffersen, 1982). Furthermore, private self-consciousness has been identified as an important construct in theories of loneliness and self-disclosure (Franzoi & Davis, 1985; Franzoi, Davis, & Young, 1985), stress and illness (Mullen & Suls, 1982; Suls & Fletcher, 1985), alcohol consumption (Hull & Young, 1983; Hull, Young, & Jouriles, 1986), and depression (Ingram & Smith, 1984; Smith & Greenberg, 1981).

Neither the public self-consciousness or social anxiety subscales have stimulated as much research interest as the private subscale. Nevertheless, both subscales have been found to be extremely useful. High public self-consciousness, for example, has been related to conformity, need for affiliation, low self-esteem, and low risk taking (Tunnell, 1984). The relationship between privately and publicly expressed attitudes appears to be higher if individuals are low in public self-consciousness (Scheier, 1980). In addition, high public self-conscious persons appear to be more sensitive to peer rejection (Fenigstein, 1979), more sensitive to the impression they make (Tobey & Tunnell, 1981), and more compliant in experimental situations (Froming & Carver, 1981). Public self-consciousness has been repeatedly shown to possess considerable discriminant validity with respect to private self-consciousness (for a review, Scheier & Carver, 1983), and both public self-consciousness and social anxiety have been proposed as important constructs in Schlenker and Leary's (1982) self-presentation

model, Buss's (1980) theory of social anxiety, and in the study of self-concept processes (Franzoi, 1983). In addition, the social anxiety subscale has been found to be a useful measure in the study of social phobia (Hope & Heimberg, 1988).

Despite the popularity of the SCS and the extensive support for its external validity, there appears to be considerable controversy specifically related to the scale's structure, and the reliability of some of its items. Recently, Burnkrant & Page (1984) have provided evidence for a two factor interpretation of the private self-consciousness subscale. Mittal & Balasubramanian (1987) provide supporting evidence for this view, but in addition, forward a two factor model of public self-consciousness. Both studies present serious challenges to the construct validity of the private and public self-consciousness subscales and render previous interpretations of self-consciousness effects questionable. In addition, several studies (for example, Burnkrant & Page, 1984; Edelman, 1985; Gould, 1986; Mittal & Balasubramanian, 1987) have questioned the use of many of the SCS items because they appear to be complex or contain excessive measurement error and thus contribute minimally to the measurement of the constructs.

Presently, there is surprisingly little evidence to support the original Fenigstein, Scheier, & Buss (1975) 23 item 3-factor structure of the SCS. The primary purpose of this study was to briefly examine the available research addressing this issue and to use a confirmatory factor analytic approach (CFA) to compare competing measurement models for this scale.

In their original study, Fenigstein, Scheier, and Buss (1975) used principal components analysis (PCA) to derive their 3-factor structure of the SCS. In addition, they used a varimax rotation to impose orthogonality on the factors. An oblique rotation was also obtained but the results were judged to be highly similar and thus they chose to retain the orthogonal rotation as their final solution. They conducted a series of

PCA studies involving approximately 2,000 university students, and in each case, the 3-factor structure was replicated although a few of the items were re-written or deleted. The final set of items and their factor loadings are presented in Table 2.1.

Four independent methodological replications of the SCS have been conducted. In general, these studies have produced mixed results. Using a German translation of the SCS and sampling university students, Heinemann (1979) was able to reproduce the 3-factor structure of the instrument. He also employed a PCA approach and rotated the first 3 components using both varimax and oblique rotation methods. Although he found the two patterns to be similar he chose the oblique rotation as his final solution. Significant correlations between private and public self-consciousness and between public self-consciousness and social anxiety were noted. Private self-consciousness and social anxiety, however, were uncorrelated. In addition, Item 2 appeared to be complex and item 3 failed to load on any factor.

Vleeming and Engelse (1981) also successfully replicated the 3-factor structure of the SCS using a Dutch translation of the instrument and a sample of university students. They noted similar results when using both varimax and oblique rotations but selected the varimax solution to be consistent with the original Fenigstein et. al (1975) study. They did note, however, in their oblique rotation, the same pattern of factor correlations identified by Heinemann (1979). The authors also reported item 2 as complex and items 3 and 9 as unreliable.

Edelmann (1985) attempted to verify the 3-factor structure of the SCS using British university students. He used PCA and rotated the first three factors using a varimax solution. Although all items loaded on their respective factors, he recommended dropping five items from the private scale because their loadings were

below .40 suggesting that they contained considerable measurement error. These items were from the private subscale (items 3, 9, 13, 20 and 22).

The final PCA study was reported by Hollenbeck and Williams (1987). Analyzing only the private and public self-consciousness items, they found that they could not separate the two scales and accepted a unidimensional self-consciousness factor as their final model. In their defense, they pointed out that many studies have reported relatively high correlations between the two scales (cf. Fenigstein, 1987; Wicklund & Gollwitzer, 1987). It is noteworthy that this is the only PCA study involving adults (retail salespersons) who were not university students.

Recently, Scheier and Carver (1985) noted that previous research employing the SCS has relied almost exclusively on using college students to generate data. Although both Scheier and Carver have together and independently contributed significantly to the published research in this area, they have concluded that the SCS, as originally constructed, is unsuitable for use with populations other than undergraduates. They reported, for example, that coronary artery bypass patients found some of the items difficult to understand and the response format confusing. The authors felt that there was a need for a revised SCS to be used with non-college populations. As part of a broader study designed primarily to develop a revised SCS for this purpose, they also asked college students to complete the original SCS. A 'principal factors' factor analysis was then performed on the original scale and three factors were retained for varimax and oblique rotation. Since the rotations produced similar results, the authors accepted the orthogonal rotation as their final solution. They concluded that their results supported the 3-factor structure reported by Fenigstein et. al. (1975). It should be noted, however, that although all items but one loaded highest on their proper scale, some items produced undesirably small factor loadings. Factor loadings for items 7, 8, 9, and 22 were under .30, while loadings for items 2, 3, and 20 were under .40. In addition,

item 2 also appeared to be complex, yielding a loading on the private scale nearly as high as its loading on its own scale (public).

Burnkrant and Page (1984) used confirmatory factor analysis (LISREL) in an attempt to confirm the theoretical structure of the SCS. Analyzing data generated from a sample of adult women, they reported that a correlated 3-factor solution provided a significantly better fit than the often accepted orthogonal 3-factor solution. A correlated 4-factor solution, however, in which five items were dropped from the SCS, provided the best fitting measurement model. The items they recommended dropping were items 3, 9, 12, 17, and 21. They suggested dropping these items because they were unreliable and did not meet LISREL criteria for fit. Burnkrant and Page (1984) were able to replicate their results in a second sample of college students. Interestingly, their 4-factor measurement model (Table 2.2) identifies both the public and social anxiety factors but suggests that the original private scale should be viewed as measuring two correlated but distinct constructs: self-reflection and internal state awareness.

Gould (1986) sampled adult university students and also conducted a confirmatory factor analysis (LISREL) of the SCS. He compared the Fenigstein et. al. (1975) 3-factor model to the Burnkrant and Page (1984) 4-factor model in terms of goodness of fit. The Burnkrant and Page (1984) model was superior to the original Fenigstein et. al. (1975) model, but Gould concluded that a modified correlated 3-factor model fit the data best. The modified model confirmed the original private, public, and social anxiety factors, but utilized only the 13 best items of the scale. Thus, Gould recommends dropping 10 items (items 3, 9, 12, 13, 16, 17, 18, 20, 21, and 22) to improve fit. It should be noted, however, that the recommended best fitting model was not defined 'a priori', and the results were not replicated in a new sample.

Gudykunst et. al. (1987) collected data from Japan, Korea and the United States. All participants were university students. The authors compared a one factor model, an uncorrelated 3-factor model, and a correlated 3-factor model simultaneously across the three samples using multiple group confirmatory factor analysis (LISREL). They concluded that the correlated 3-factor model provided the best fit to the data, although items 3 and 9 appeared to have excessive measurement error, and the goodness of fit indices (GFI) were relatively low (approximately .80).

Bernstein et. al. (1986) conducted an interesting confirmatory factor analysis of the SCS using oblique multiple group procedures. They concluded that the original 3-factor structure with correlated factors provided a reasonable fit to the data in general, and a clearly superior fit to three 3-factor models defined in terms of purely statistical criteria (items sorted by 1. means; 2. variances; 3. skewness) and a random 3-factor model defined by arbitrary assignment of items to factors. Bernstein et. al. (1986) also provide evidence against breaking down the private subscale into two separate traits as Burnkrant and Page (1984) propose. Although this model does improve the fit slightly, the self-reflection and internal state miniscales demonstrate lower reliabilities than the complete private scale; appear to be determined by incidental properties of the item statistics, and are not based on any discriminant validity criterion. Furthermore, they argue against deleting any scale items and suggest instead that items be added to improve the reliability of the scale. However, inspection of Bernstein et. al. (1986) correlation matrix indicates that several items have near zero correlations with most of the items in their respective scales. Items 3, 9, and 22 appear to be significantly correlated with only one or two items in their respective private self-consciousness scale. Justifying their use because of adequate factor loadings (in the low .30's) in the factor pattern matrix is questionable.

Finally, Mittal and Balasubramanian (1987) add to the confusion by providing data which supports a 5-factor SCS measurement model. Like Burnkrant and Page (1984), they suggest splitting the private scale into two distinct but correlated traits: self-reflection and internal state awareness. The public subscale, however, is also hypothesized to measure two separate traits they label style self-consciousness and appearance self-consciousness (Table 2.2). Using internal and external consistency tests based on classical test theory they argue that the resulting 5-factors are unidimensional whereas the original 3-factors are not. The authors also propose dropping four items from the original 23 item set (Items 7,9,12,and 23).

In summary, it appears that several issues remain unresolved regarding the structural properties of the SCS. First, there appears to be some confusion regarding the number of factors needed to explain the responses to this instrument. Two, three, four, and five factor models have been proposed. Second, there appears to be some confusion regarding whether or not the factors are best represented as independent, completely correlated, or mixed. Third, some of the original SCS items appear to be unreliable or complex and may need to be dropped from the scale.

In this study, I evaluated eight competing measurement models implied by the above research in terms of their relative fit and parsimony. The eight models are presented in terms of their item composition in Table 2.2. Model 1 and Model 3D have been added to those already proposed in the literature. Model 1 is suggested as a baseline model representing the simplest or least complex measurement model. This model suggests that one construct can completely explain the relationships existing among the items. Model 3D which is labeled SCS Short Form is also added to those implied by the above review. This model was developed a priori by eliminating from each of the original subscales those items that have been repeatedly troublesome in the above reviewed research. Specifically, items 3, 9, 13, 20, and 22 were eliminated from

the private scale, items 2 and 17 were eliminated from the public scale, and finally, item 12 was eliminated from the social anxiety scale. Thus, this model represents a shortened version of the original 3-factor measurement model proposed by Fenigstein et. al. (1975). Finally, for Models 2 through 5 both independent and fully correlated versions will be tested and compared in terms of their relative fit and parsimony.

Given the substantive nature of the constructs suggests that the three forms of self-consciousness would be correlated (cf. Buss, 1980) it was expected that the correlated models would provide a significant improvement in fit over the independent models, for all models tested. It was also expected that the 4 and 5 factor models would provide the best fit to the data but would be less parsimonious than the 3 factor solutions, (i.e., they would achieve their fit at the expense of wasting information on estimating parameters). Further, among the 3-factor models, it was predicted that Model 3D would provide the best and most parsimonious fit to the data. Since this model was formed by eliminating items found to be complex or unreliable over previous factor studies, it was expected that the elimination of these items would significantly improve fit. Finally, Buss (1980) has theorized that private self-consciousness and social anxiety are uncorrelated. The above research allowing for correlated factors has tended to support this view. Thus, it was predicted that the correlation between these two latent variables would not be statistically significant.

Method

Subjects

Two samples were drawn from a moderately sized northeastern community college. Participants in both samples completed the Self-Consciousness Scale (SCS) and several other measures as part of a much broader study in groups of 10 to 35 students. Responses were anonymous and were obtained with informed consent. All

students received extra course credit for their participation in this study. Sample 1 was randomly drawn from the general student population and originally included 375 students who completed the SCS twice with a six week interval between test administrations. Students who dropped out of school during data collection or who failed to submit complete and scorable questionnaires were deleted from the study. The final sample size consisted of 351 students (250 female and 101 male) ranging in age from 18 to 58 (median age = 21).

Sample 2 originally consisted of 275 business students who were enrolled in Elementary Accounting and who were asked to complete the SCS only once. Fifteen students either dropped out of school during data collection or failed to submit complete and scorable questionnaires and were deleted from the study. Thus, the final sample size consisted of 260 business students (139 female and 121 male) ranging in age from 18 to 48 (median age = 22).

Instruments

The original version of the Self-Consciousness Scale (SCS) measures three forms of self-consciousness- Private SC, Public SC, and Social Anxiety, and was specifically designed to test theoretical hypotheses related to self-attention processes and their behavioral consequences (Fenigstein, Scheier, & Buss, 1975). The scale consists of 21 items employing a 5-point Likert-type response format ranging from "0-Extremely Uncharacteristic" to "4-Extremely Characteristic".

Reliability estimates for the original version of the SCS appear to be adequate for a research instrument. Fenigstein et. al. (1975) reported test-retest reliabilities equal to .79, .84, and .73 for the private, public and social anxiety subscales respectively. Internal consistency coefficients (alphas) of .63, .76, and .68 (Bernstein et. al., 1986) and .53, .77, and .75 (Penner & Wymer, 1983) have also been reported for the private,

public, and social anxiety subscales, although the internal consistency of the private scale has been questioned (Penner & Wymer, 1983).

Considerable evidence for the convergent and discriminant validity of the subscales also exists (Carver & Glass, 1976; Carver & Scheier, 1981; Cheek & Briggs, 1982; Turner, Scheier, Carver, & Ickes, 1978; see Carver & Scheier, 1987; Fenigstein, 1987; Scheier and Carver, 1983; Buss, 1980 for a review). Among this research is the reported near zero correlation between each SCS subscale and social desirability (Turner, Scheier, Carver, & Ickes, 1978).

Data Analysis

The eight models presented in Table 2.2 were systematically evaluated by using a structural modeling approach. Specifically, the confirmatory factor analysis (CFA) submodel as operationalized by LISREL VI (Joreskog & Sorbom, 1986) was used in all analyses. The many advantages of CFA over exploratory factor analysis (EFA) are well known (Long, 1983; Marsh & Hocevar, 1985), but include: the ability to yield unique factorial solutions; the ability to define and test exact simple structure ; the ability to rigorously define and test unidimensional models (cf. Gerbing & Anderson, 1988); the ability to compare the relative goodness of fit of several specifically defined competing models; and finally, the ability to rigorously define and test construct stability over time (Tanaka & Huba, 1987), and construct invariance over sample (Marsh & Hocevar, 1985).

In the present analysis, all models were specified as unidimensional or congeneric models. Maximum likelihood estimation of parameters was chosen because of its large sample precision (Joreskog & Sorbom, 1986) and because the SCS item distributions were approximately normal justifying its use (Huba & Harlow, 1987). For the sake of interpretability and to be consistent with previous investigations the

correlation matrix was analyzed rather than the covariance matrix in the first phase of this study. Once the best measurement model(s) were chosen, stability and invariance hypotheses were tested using the covariance matrix in order to obtain a more accurate solution (Marsh & Hocevar, 1985).

To assess the goodness of fit of the competing measurement models several indices were used: (a) the Chi-Square Goodness-of-Fit Test; (b) the ratio of Chi-Square to the degrees of freedom; (c) the Root Mean Square Residual; (d) the Goodness of Fit Index (GFI); (e) the Normed Fit Index (NFI) or Delta; (f) the Tucker-Lewis Index (TLI); and (g) the Chi-Square Incremental Type 2 index (X^2I_2).

The Chi-Square Goodness-of-Fit statistic is the most common measure of fit. Good fit is determined by a nonsignificant result. It is well known, however, that this statistic is sensitive to sample size, model complexity, and deviations from normality. Thus, Joreskog & Sorbom (1986) and Marsh & Hocevar (1985) recommend using additional criteria to assess fit. GFI, another commonly used measure of fit, is a measure of the relative variances and covariances jointly accounted for by the model (Joreskog & Sorbom, 1986 p. 41). NFI, TLI, and X^2I_2 are incremental fit indices which assess the degree of improvement the common factor model makes relative to a null model where the measured variables are hypothesized to be completely independent, generally called the "null model". Values equal to or greater than .90 are considered to indicate reasonably good fit. Although the TLI and the X^2I_2 indices are used less frequently than GFI or NFI, they have the distinct advantage of being relatively independent of sample size (Marsh, Balla, & McDonald, 1988), and for this reason are included in the analysis.

Besides assessing goodness of fit, parsimony of fit was also examined. Since fit can be easily improved by freeing additional parameters, models with many free

parameters compared to fixed parameters tend to demonstrate better fit, particularly when compared to similar models with fewer free parameters. This improved fit is accomplished at the expense of parsimony. The goal of the factor analysis, however, is to determine the most parsimonious model that is consistent with the data. The various parsimony indices assist us in realizing this goal by quantifying parsimony and by identifying models that appear to waste parameters without sufficient gain in fit (cf Hayduk, 1987 p. 162; James, Mulaik, and Brett, 1982; Mulaik et al., 1989).

Therefore, to assess parsimony, corrections were made to the GFI, NFI, TLI, and the X^2/I_2 indices to control for excessive parameterization. James, Mulaik, & Brett (1982). have discussed the justification of this correction in terms of the NFI, but Mulaik et al. (1989) have recently generalized the parsimony correction to GFI, NFI, TLI and X^2/I_2 . Briefly, each fit index was multiplied by its appropriate parsimony correction index resulting in the following parsimonious fit indices: PGFI, PNFI, PTLI, and PX^2/I_2 . The decision regarding which model was optimal was based on all the indices discussed above but less weight was placed on the chi-square statistic particularly when comparing non-nested models.

Results

Responses to negatively worded items were reflected so that the highest response code on all items was indicative of a more positive rating. Scale means and standard deviations for the original 3-factor Fenigstein et al. (1975) measurement model were consistent over time and sample. Further, these statistics were virtually identical to those reported by the original authors, suggesting that community college students are similar to university students with respect to level and variability of self-consciousness. Finally, mean item skew and kurtosis values (Appendix C) were within

+1.00 and -1.00 over all three data sets and were not expected to distort parameter estimates derived from the structural analysis (Huba & Harlow, 1987).

With respect to the structural analyses, proper solutions were obtained for all measurement models in all analyses reported below. It should be noted that the chi-square probability values were statistically significant for all models across the three data sets (sample 1: test, sample 1: retest, and sample 2). However, as discussed above, the chi-square test is almost certain to be significant when sample sizes and models are large (many degrees of freedom).

Independent Vs. Correlated Factors

Both orthogonal and oblique versions of Models 2-5 were defined and estimated. Since the orthogonal models are nested within their oblique counterparts, a chi-square difference test was used to evaluate their differences. As shown in Table 2.3, when Models 2-5 were allowed to have correlated factors, a statistically significant improvement in fit resulted for all models ($p < .001$). However, one possible problem with using the chi-square difference test with relatively large samples is that these differences may be statistically significant but actually trivial. This interpretation can be rejected for at least two reasons. First, when the chi-square difference statistic is estimated for a smaller sample size of 200, generally considered to be the minimum sample size for testing causal models of this type (Marsh & Hocevar, 1985), the chi-square difference statistic for all models remains highly significant ($p < .01$) across all three data sets. Second, inspection of the Root Mean Square Residual values (RMS) within each model suggest large differences in each model's ability to reproduce the relationships among the items depending on whether or not the factors were constrained to be uncorrelated. Consistently, the RMS values were considerably higher for the

orthogonal versions of Models 2-5. These models appear to be unsupported by the data and may be rejected.

Full Item Set Models

Models 1, 2, and 3A are nested models based on the entire SCS 23 item set. Specifically, Models 1 and 2 are more restricted versions of Model 3A. Thus, chi-square difference tests can be used to help select the best fitting model. Models 3B, 3C, 3D, 4, and 5, however, are based on different subsets of the SCS items and the chi-square difference test does not apply. These models will be evaluated separately and compared to the best fitting measurement model derived from the full 23 item set.

Fit and parsimony indices for the full item set models are presented in Table 2.4, while chi-square difference test results are presented in Table 2.5. Statistically, Model 2 provides a substantial improvement in fit over Model 1 even when values are estimated for a smaller sample size. Furthermore, there is a substantial and consistent improvement in fit over all other fit indices and this improvement is maintained when parsimony is taken into account. These differences are evident across both administrations of the SCS in sample 1 and also in the data generated from sample 2. Model 3A, however, provides a substantial improvement in fit and parsimony relative to Model 2, and these differences are statistically significant across all three data sets (Tables 2.4 and 2.5). Thus, it appears that both the single factor model, and the two factor model suggested by Hollenbeck & Williams (1987) can be rejected in favor of the original Fenigstein, Scheier, & Buss (1975) 3-factor model providing the factors are allowed to be correlated.

The standardized solution for Model 3A is presented in Table 2.6. Although all factor loadings are statistically significant, consistent with previous research cited above, items 3 and 9 in the private scale are excessively determined by measurement

error and items 13, 20, 22, also in the private scale appear to be marginal at best. Inspection of the normalized residual matrix revealed that the relationships existing among items 13, 20, and 22 were not adequately accounted for by this model. This result is consistent with Burnkrant and Page's (1984) contention that items 13, 20, and 22 reflect a separate but correlated factor they labeled "Internal State Awareness".

The hypothesis that the private and social anxiety constructs were uncorrelated received mixed results. The correlation between these two constructs was statistically significant ($p < .05$) in the sample 1 test condition and also in sample 2, but these correlations were modest. The correlation between the private and social anxiety derived from the sample 1 retest data was not significant ($p > .05$).

Reduced Item Set Models

Model 3A is compared to the remaining measurement models and fit and parsimony indices are presented in Table 2.7. Models 3B - 5 are based on a reduced item set defining each model. These models were based on the hypothesis that the quality of the measurement model could be improved if unreliable items were dropped from the scale. The specific items dropped varies from model to model, although most of the eliminated items are the same across models (Table 2.2). Since the results involve models derived from different sets of items, the RMS index can not be used to compare models.

In terms of fit and parsimony, Model 3A appears to be the worst fitting model, suggesting that dropping marginal items may substantially improve model fit. Averaging the fit indices (GFI, NFI, TLI, and X^2/I_2) over the three data sets provides an overall or average fit index of .81, well below the target value of .90. Averaging the parsimonious fit indices (PGFI, PNFI, PTLI, and PX^2/I_2) over the three data sets also reveals that Model 3A is one of the least parsimonious models (mean parsimony = .71).

Model 5 can also be rejected with average fit equal to .87 and the lowest average parsimony value at .70. In addition, Mittal & Balasubramanian's (1987) contention that the public scale is multidimensional is unsupported. The correlations between the style and appearance factors were not statistically different from 1.00 ($p > .05$) and thus do not possess discriminant validity. Of the remaining models, Model 3C and 3D appear to provide the best fit. Both models yield average fit equal to .92 which is above the target value of .90. But Model 3D produced X^2/df ratios below 2.0 and more importantly provided the most parsimonious fit to the data with an average parsimony index of .74 vs .71 for Model 3C.

It should be noted that Model 4 produced an average fit of .90, which equals the target value, but its average parsimony was lower than Model 3D with a value of .73. Model 3C and Model 4 are almost identical models except in Model 4, Burnkrant & Page (1984) have included a 4th factor indicated by items 13, 20, and 22. These items originally were defined as part of the private scale. Both Model 3C and 3D, however, drop these items because they are hypothesized to be poor indicators of private self-consciousness. Although the Burnkrant & Page's (1984) Model 4 adds these items to measure an additional factor, these results suggest that this factor may be trivial. Inspection of the standardized factor loadings supports this view. All of the loadings are below .60 and alphas over the three data sets are also relatively low (.52, .50, .60). The estimated test-retest coefficient is also relatively low at .60 (Table 2.8).

Table 2.9 presents the standardized solution for Model 3D, which is a 15 item shortened version of the original 3-factor SCS. All parameters were found to be statistically significant ($p < .001$), and all factors were significantly correlated ($p < .05$), although the correlations between private self-consciousness and social anxiety were modest. The pattern of correlations was consistent with previous research (Buss, 1980; Scheier & Carver, 1983).

Stability and Invariance

In a subsequent analysis both the original Fenigstein, Scheier, & Buss (1975) SCS allowing for correlated factors (Model 3A) and the SCS Short Form (Model 3D) were examined with respect to stability of the constructs over time and invariance over sample. The covariance matrices in the appropriate data sets were used to evaluate both stability and invariance.

Stability results are presented in Table 2.10. Corresponding factor loadings were constrained across time (6 week interval) and compared to a model in which the loadings were set free. These models failed to be statistically different ($p > .05$). Thus, these results suggest that for both the original version of the SCS and the revised model, the three SCS constructs appear to be relatively stable in meaning over time (cf. Tanaka & Huba, 1987).

Several invariance restrictions were assessed for both Model 3A and Model 3D. Results are presented in Table 2.11. Statistically, both Models 3A and 3D were found to be invariant with respect to factor pattern, factor loadings, and factor covariances. However, since the chi-square difference test is sensitive to sample size, other indices were also evaluated. GFI and Marsh and Hocevar's (1985) Target Coefficient indicated that differences between models also postulating invariant error appeared to be trivial. Thus, the evidence suggests that both the original and short versions of the SCS were invariant over sample with respect to factor pattern, loadings, factor covariances, and error. Consistent with previous results, the fit indices overall were much better for Model 3D, the SCS Short Version than they were for the original 23 item model.

Discussion

Fenigstein, Scheier, and Buss (1975) presented an orthogonal 3-factor model of the Self-Consciousness Scale (SCS) which has stimulated considerable research. However, many studies have consistently found the constructs, at least as operationalized, to be correlated (Buss, 1980; Scheier & Carver, 1983), and recent confirmatory factor analytic studies have supported this view (Burnkrant & Page, 1984; Gould, 1986; Gudykunst et. al., 1987). In the present study, eight competing measurement models were brought together in one study and compared in terms of relative goodness-of-fit and parsimony. With the exception of the single factor model, orthogonal and oblique versions of the remaining seven models were defined and tested. Consistently, the oblique models were more consistent with the data. Of note was the failure of the orthogonal models to adequately predict and thus reproduce the item correlation matrix. Thus, I found strong support for the theoretical position that the latent constructs, and not just the operational measures of these constructs, are themselves significantly related.

In addition, two factor, four factor, and five factor models were also evaluated and eliminated as potential measurement models for the SCS. In particular, the private and public subscales were found to be related, but their correlation was consistently and substantially less than 1.00, thus eliminating the two factor model proposed by Hollenbeck and Williams (1987). It should be noted, however, that these researchers asked adult retail salespersons to respond to the SCS. It may be that adults or adult business persons do not discriminate significantly between private and public aspects of the self or more probably, that there may not be sufficient variance in private self-attention in an occupation that promotes public self-consciousness and an external focus of attention to produce a distinct private self-consciousness factor. In fact, Scheier and

Carver (1985) have recommended that the original SCS not be used with noncollege populations. Hollenbeck & Williams' (1987) data supports this view, at least as a method of operationalizing the private and public self-consciousness constructs.

Mittal & Balasubramanian's (1987) five factor model was also not supported. It appears that the public scale is unidimensional and the style and appearance constructs that they propose can not be separated. These results further support the construct validity of the public self-consciousness subscale.

The construct validity of the private subscale, however, remains problematic. Although the four factor model of Burnkrant and Page (1984) was eliminated, the dimensionality of any private scale that includes the "Internal State Awareness" items remains suspect. The four factor model was a better fitting model when compared to the original SCS, and also more parsimonious. The models that provided a significant improvement in fit over the Burnkrant and Page (1984) model, however, eliminated these items. Although the Internal State Awareness factor appeared to be highly specific, its correlation with the remaining private items was considerably less than one. More troublesome is the considerable amount of research relating private self-consciousness to affect phenomena. Are these events related to Internal State Awareness or to the ruminative process of Self-Reflection? Future research should address this issue.

Of considerable importance is the finding that measurement models which drop many of the original SCS items provide a better fit to the data, and compared to the original scales have adequate reliability. Notably, at least half the items from the private scale have been dropped without affecting significantly the reliability of the scale or the correlation pattern existing among the SCS constructs. In fact, the reliability of the 5-item scale was consistently higher than its 10-item counterpart. This

is not surprising considering that the internal consistency of the private scale is moderate at best and has been questioned previously (Penner & Wymer, 1983).

The present study also replicates the findings of Gould (1986), who found that a 3-factor exploratory model (Model 3B) provided a better fitting alternative to the Burnkrant and Page (1984) 4-factor model (Model 4). However, when parsimony was considered I found that Model 4 provided a more parsimonious fit relative to Gould's (1986) 3-factor model.

The best fitting and most parsimonious model, however, was the SCS Short version (Model 3D) that was constructed 'a priori' by eliminating items found to be repeatedly troublesome in the literature. This version of the SCS, which theoretically measures the three self-consciousness constructs using fewer items, has been shown to possess relatively stable constructs over a six week interval, and to be relatively invariant over somewhat diverse samples. The 5-item private scale was clearly superior to 10-item original private scale. As previously noted, the 5-item private scale was found to be consistently more reliable than the 10-item original private scale.

Conclusions with respect to both the public and social anxiety scales are more complex. On the one hand, both the 5-item public scale (eliminating items 2 and 17) and the 5-item social anxiety scale (eliminating item 12) were less reliable than the original scales. One does not usually drop items that improve reliability. On the other hand, close inspection of the modification indices testing models employing the complete public and social anxiety scales revealed that items 2, 12, and 17 were complex. Although their highest loading was on their appropriate target construct, each item also loaded significantly on a second nontarget construct. Eliminating these items improved model fit by removing complexity from the unidimensionally defined model. Item 2, for example, did load highest on its appropriate construct, public self-

consciousness, but consistent with previous research (Heinemann, 1979; Scheier & Carver, 1985; Vleeming & Engelse, 1981) it also loaded significantly on the private construct, adding to the correlation between the scales. Perhaps the high correlation observed between private and public self-consciousness, and the inability to separate these factors in some studies (e.g. Edelman, 1984) is partly due to the inclusion of item 2. Thus we have a choice between higher reliability but with some complexity, or lower reliability but with no complexity. Since the reliabilities of these two scales are still more than adequate (see Table 2.8), I lean toward the five item scales. When the verdict is close, however, the benefit of any doubt should be given to the original scales, particularly given their proven usefulness (cf. Scheier & Carver, 1983). In future research, it would be useful to further test the model proposed by Edelman (1985) against the SCS Short Model. Edelman's (1985) model employs the same five item private scale, but uses the complete or original public and social anxiety scales. Any differences between the two models in fit and parsimony would be attributable differences in the public and social anxiety scales only. Thus, a comparison between these two models in new samples may resolve this issue.

In any case, it appears that the two facets of private self-consciousness, self-reflection and internal state awareness, are relatively independent processes. Future research should explore the discriminant validity of these two constructs and determine if it would be useful to measure both. Presently, however, the evidence suggests that the major process underlying responses to the private scale is self-reflection. Therefore, scores derived from the original ten item scale should be interpreted with considerable caution, particularly when applied to affect phenomena.

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Table 2.1
Self-Consciousness Scale Items and Factor Loadings

<u>Private Self-Consciousness</u>		<u>Loadings</u>
(Self Reflection)		
1.	I'm always trying to figure myself out.	65
5.	I reflect about myself alot.	73
7.	I'm often the subject of my own fantasies.	45
15.	I'm constantly examining my motives.	62
18.	I sometimes have the feeling that I'm off somewhere watching myself	43
3.	Generally, I'm not very aware of myself.*	48
9.	I never scrutinize myself.*	51
(Internal State Awareness)		
13.	I'm generally attentive to my inner feelings.	66
20.	I'm alert to changes in my mood.	55
22.	I'm aware of the way my mind works when I work through a problem.	46
<u>Public Self-Consciousness</u>		
(Attention to Style)		
2.	I'm concerned about my style of doing things.	47
6.	I'm concerned about the way I present myself.	65
14.	I usually worry about making a good impression.	72
19.	I'm concerned about what other people think of me.	73
(Attention to Appearance)		
11.	I'm self-conscious about the way I look.	61
17.	One of the last things I do before I leave my house is look in the mirror.	51
21.	I'm usually aware of my appearance.	60
<u>Social Anxiety</u>		
(Discomfort in the Presence of Others)		
4.	It takes me time to overcome my shyness in new situations.	76
8.	I have trouble working when someone is watching me.	45
10.	I get embarrassed very easily.	70
12.	I don't find it hard to talk to strangers.*	66
16.	I feel anxious when I speak in front of a group.	46
23.	Large groups make me nervous.	69

Notes: Adapted from Fenigstein et. al. (1975). Private and public items have been clustered into subgroups for the convenience of the present review. The numbers indicate the sequence of items on the scale. Items were answered on a 0 to 4 point scale with 0 indicating "extremely uncharacteristic" and 4 indicating "extremely characteristic". Decimals omitted from factor loadings.

* Item is reversed for scoring.

Table 2.2
Item Composition of Self-Consciousness Scale Measurement Models

Model	Factor Name	Items
1: Single Factor (23 Items)	I Self-Consciousness	All 23 items
2: Hollenbeck & Williams (23 Items)	I Self-Consciousness	1,3,5,7,9,13,15,18,20,22
	II Social Anxiety	2,6,11,14,17,19,21
		4,8,10,12,16,23
3A: Fenigstein et al (1975) (23Items)	I Private Self-Consciousness	1,3,5,7,9,13,15,18,20,22
	II Public Self-Consciousness	2,6,11,14,17,19,21
	III Social Anxiety	4,8,10,12,16,23
3B: Edelman (1985) (18 Items)	I Private Self-Consciousness	1,5,7,15,18
	II Public Self-Consciousness	2,6,11,14,17,19,21
	III Social Anxiety	4,8,10,12,16,23
3C: Gould (1986) (13 Items)	I Self-Reflection	1,5,7,15
	II Public Self-Consciousness	2,6,11,14,19
	III Social Anxiety	4,8,10,23
3D: SCS Short Form (15 Items)	I Private Self-Consciousness	1,5,7,15,18
	II Public Self-Consciousness	6,11,14,19,21
	III Social Anxiety	4,8,10,16,23
4: Burnkrant & Page (1984) (17 Items)	I Self-Reflection	1,5,7,15
	II Internal State Awareness	13,20,22
	III Public Self-Consciousness	2,6,11,14,19
	IV Social Anxiety	4,8,10,16,23
5: Mittal & Balasubramanian (1987) (19 items)	I Self-Reflection	1,5,15,18
	II Internal State Awareness	3,13,20,22
	III Style Self-Consciousness	2,6,14,19
	IV Appearance Self-Conscious.	11,17,21
	V Social Anxiety	4,8,10,16

Notes: Model numbers (1-5) refer to the number of theoretical factors.

Table 2.3
Comparison of Correlated vs. Independent Factors Models

Model	$\Delta X^2(\Delta df)$	If N=200*	RMS	
			Independent	Correlated
2: Hollenbeck & Williams (23 Items)				
Sample 1				
Test	23.09(1)	13.13(1)	.094	.082
Retest	32.28(1)	18.35(1)	.095	.079
Sample 2	20.87(1)	16.04(1)	.103	.086
3A: Fenigstein, Scheier, & Buss (23 Items)				
Sample 1				
Test	81.29(3)	46.22(3)	.104	.072
Retest	107.97(3)	61.39(3)	.112	.065
Sample 2	95.39(3)	73.29(3)	.134	.073
3B: Edelman (18 Items)				
Sample 1				
Test	78.40(3)	44.58(3)	.114	.066
Retest	110.01(3)	62.55(3)	.129	.062
Sample 2	86.12(3)	66.17(3)	.142	.060
3C: Gould (13 Items)				
Sample 1				
Test	92.34(3)	52.50(3)	.136	.060
Retest	113.89(3)	64.76(3)	.149	.057
Sample 2	85.75(3)	65.89(3)	.152	.047
3D: Short SCS (15 Items)				
Sample 1				
Test	85.31(3)	48.51(3)	.122	.059
Retest	100.93(3)	57.39(3)	.127	.048
Sample 2	80.67(3)	61.98(3)	.142	.051
4: Burnkrant & Page (17 Items)				
Sample 1				
Test	127.99(6)	72.77(6)	.124	.060
Retest	160.17(6)	91.07(6)	.131	.053
Sample 2	132.43(6)	101.75(6)	.148	.052
5: Mittal & Balasubramanian (19 Items)				
Sample 1				
Test	245.61(10)	139.65(10)	.133	.062
Retest	332.14(10)	188.85(10)	.154	.056
Sample 2	278.58(10)	214.04(10)	.172	.057

* Estimated ΔX^2 if N = 200. Derived from the following formula: $X^2 = (N-1)F$. Model numbers (2 - 5) refer to the number of theoretical factors. Sample 1: N = 351. Sample 2: N = 260.

Table 2.4
Fit Indices for Full Item Set Models (23 Items)

Model	$\chi^2(df)$	χ^2/df	RMS	GFI	NFI	TLI	$\chi^2_{I_2}$	PGFI	PNFI	PTLI	$PX^2_{I_2}$
1: Single Factor											
Sample 1											
Test	942.50(230)	4.10	.097	.72	.43	.44	.50	.60	.39	.40	.46
Retest	942.12(230)	4.10	.097	.76	.49	.51	.56	.63	.45	.46	.51
Sample 2	821.40(230)	3.57	.103	.73	.52	.55	.60	.61	.47	.50	.55
2: Hollenbeck & Williams (Independent factors)											
Sample 1											
Test	688.49(230)	2.99	.094	.80	.59	.64	.68	.67	.54	.58	.62
Retest	707.98(230)	3.08	.095	.82	.62	.67	.71	.68	.56	.61	.65
Sample 2	637.37(230)	2.77	.103	.80	.62	.69	.72	.67	.56	.63	.66
2: Hollenbeck & Williams (Correlated factors)											
Sample 1											
Test	665.40(229)	2.91	.082	.84	.60	.66	.70	.70	.54	.60	.63
Retest	675.71(229)	2.95	.079	.83	.64	.69	.73	.69	.58	.63	.66
Sample 2	616.50(229)	2.69	.086	.80	.64	.70	.74	.66	.58	.63	.67
3A: Fenigstein et. al. (Independent factors)											
Sample 1											
Test	584.99(230)	2.54	.104	.87	.65	.72	.75	.73	.59	.66	.68
Retest	596.03(230)	2.59	.112	.87	.68	.75	.78	.73	.62	.68	.71
Sample 2	556.61(230)	2.42	.134	.84	.67	.75	.78	.70	.61	.68	.71
3A: Fenigstein et. al. (Correlated factors)											
Sample 1											
Test	503.70(227)	2.22	.072	.89	.70	.78	.81	.73	.63	.70	.73
Retest	488.06(227)	2.15	.065	.89	.74	.82	.84	.73	.66	.74	.75
Sample 2	461.22(227)	2.03	.073	.86	.73	.82	.84	.71	.66	.74	.75

Notes: Model numbers (1 - 3) refer to the number of theoretical factors. Sample 1: N = 351. Sample 2: N = 260. Null Models: $df = 253$; $\chi^2 = 1661.51, 1861.03, 1692.46$ for sample 1 (test), sample 1 (retest), and sample 2 data respectively.

Table 2.5
Chi-Square Difference Tests for Nested Models 1, 2, and 3A

Model	$\Delta X^2(\Delta df)$	If N=200*
Model 1 Vs 2:		
Sample 1		
Test	277.13(1)	157.57(1)
Retest	266.41(1)	151.47(1)
Sample 2	224.90(1)	172.80(1)
Model 2 Vs 3A:		
Sample 1		
Test	161.70(2)	91.94(2)
Retest	187.65(2)	106.69(2)
Sample 2	155.28(2)	119.31(2)

Notes: Model numbers (1-3) refer to the number of theoretical factors. All ΔX^2 values are statistically significant ($p < .001$). Sample 1: N = 351. Sample 2: N = 260.

* Estimated ΔX^2 if N = 200. Derived from the following formula: $X^2 = (N-1)F$

Table 2.6
Standardized Solution for the Original 23 Item SCS

<u>Lambda Y</u>									<u>Theta Eps</u>			
Item/Measures	Private			Public			SocAnx			1a	1b	2
	1a	1b	2	1a	1b	2	1a	1b	2			
1	65	61	64							58	64	60
5	61	62	66							63	62	57
7	40	31	50							84	90	75
15	63	69	74							60	53	46
18	38	40	54							85	84	71
3	20	19	18							96	96	97
9	15	23	17							98	95	97
13	33	36	37							89	87	86
20	35	33	42							88	89	82
22	29	34	33							92	89	89
2				33	51	62				89	74	62
6				59	61	70				65	63	52
11				60	66	65				64	57	57
14				69	72	70				52	48	51
17				34	41	55				88	84	70
19				62	72	70				61	48	52
21				38	54	54				86	71	71
4							79	66	71	38	56	49
8							35	46	53	88	79	72
10							71	73	68	50	47	54
12							52	50	44	73	75	81
16							32	34	51	90	89	74
23							64	64	49	59	59	76
<u>Psi</u>												
	Private			Public			SocAnx					
	1a	1b	2	1a	1b	2	1a	1b	2			
Private	66	67	73									
Public	48	52	60	71	80	83						
SocAnx	18	12†	19	45	41	39	74	73	74			

Note: Decimals omitted. Factor reliabilities are presented in Psi matrix in bold.

* 1a = Sample 1 (test); 1b = Sample 1 (retest); 2 = Sample 2.

† $p > .05$. All other parameters significant: $p < .05$.

Table 2.7
Fit Indices for Original Theoretical Model and Reduced Item Set Models

Model	$\chi^2(df)$	χ^2/df	RMS	GFI	NFI	TLI	χ^2I_2	PGFI	PNFI	PTLI	PX^2I_2
3A: Fenigstein et. al. (23 Items)											
Sample 1											
Test	503.70(227)	2.22	.072	.89	.70	.78	.81	.73	.63	.70	.73
Retest	488.06(227)	2.15	.065	.89	.74	.82	.84	.73	.66	.74	.75
Sample 2	461.22(227)	2.03	.073	.86	.73	.82	.84	.71	.66	.74	.75
3B: Edelman Model (18 Items)											
Sample 1											
Test	257.35(132)	1.95	.066	.92	.81	.88	.90	.71	.70	.76	.78
Retest	300.95(132)	2.28	.062	.91	.81	.86	.88	.70	.70	.74	.76
Sample 2	218.45(132)	1.66	.060	.91	.84	.92	.93	.70	.73	.79	.80
3C: Gould Model (13 Items)											
Sample 1											
Test	128.28(62)	2.07	.060	.95	.87	.91	.93	.65	.69	.72	.74
Retest	152.42(62)	2.46	.057	.94	.87	.89	.92	.64	.69	.71	.73
Sample 2	87.60(62)	1.41	.047	.95	.91	.96	.97	.65	.72	.76	.77
3D: SCS Short Form (15 Items)											
Sample 1											
Test	171.72(87)	1.97	.059	.94	.84	.90	.92	.68	.70	.75	.76
Retest	149.67(87)	1.72	.048	.95	.88	.93	.95	.69	.73	.77	.79
Sample 2	139.28(87)	1.60	.051	.93	.87	.94	.95	.67	.72	.78	.79
4: Burnkrant & Page (17 Items)											
Sample 1											
Test	218.73(113)	1.94	.060	.93	.82	.90	.90	.69	.68	.75	.75
Retest	212.54(113)	1.88	.053	.93	.84	.90	.92	.69	.70	.75	.76
Sample 2	156.82(113)	1.39	.052	.93	.87	.95	.96	.69	.72	.79	.80
5: Mittal & Balasubramanian (19 Items)											
Sample 1											
Test	289.66(142)	2.04	.062	.92	.77	.83	.87	.69	.64	.69	.72
Retest	293.20(142)	2.07	.056	.92	.80	.86	.89	.69	.66	.71	.74
Sample 2	233.89(142)	1.65	.057	.91	.83	.91	.93	.68	.69	.76	.77

Notes: All models allow for correlated factors. Model numbers (1 - 5) refer to the number of theoretical factors. Sample 1: N = 351. Sample 2: N = 260. Null Models: 3A (df = 253; χ^2 = 1661.51, 1861.03, 1758.87); 3B (df = 153; χ^2 = 1332.29, 1576.38, 1364.47); 3C (df = 78; χ^2 = 978.57, 1140.79, 922.57); 3D (df = 105; χ^2 = 1103.89, 1218.90, 1069.62); 4 (df = 136; χ^2 = 1206.44, 1342.58, 1163.21); 5 (df = 171; χ^2 = 1243.24, 1489.35, 1381.53).

Table 2.8
Reliability Coefficients for Self-Consciousness Scale Measurement Models

Model		Factor Name	Items	Alpha			R ₁₂
				1a	1b	2	
1:	Single Factor (23 items)	I Self-Consciousness	23	76	78	82	73
2:	Hollenbeck & & Williams (1987) (23 items)	I Self-Consciousness II Social Anxiety	17 6	75 72	78 72	83 73	70 79
3A:	Fenigstein et al (1975) (23 items)	I Private Self-Consciousness II Public Self-Consciousness III Social Anxiety	10 7 6	66 70 72	67 78 72	74 82 73	71 73 79
3B:	Edelmann (1985) (18 items)	I Private Self-Consciousness II Public Self-Consciousness III Social Anxiety	5 7 6	68 70 72	66 78 72	76 82 73	67 73 79
3C:	Gould (1986) (13 items)	I Self-Reflection II Public Self-Consciousness III Social Anxiety	4 5 4	66 69 70	64 78 71	73 81 70	65 70 74
3D:	SCS Short Form (15 items)	I Private Self-Consciousness II Public Self-Consciousness III Social Anxiety	5 5 5	68 72 69	66 79 70	76 79 71	67 69 76
4:	Burnkrant & Page (1984) (17 items)	I Self-Reflection II Internal State Awareness III Public Self-Consciousness IV Social Anxiety	4 3 5 5	66 52 69 69	64 50 78 70	73 60 81 71	65 60 70 76
5:	Mittal & Balasubramanian (1987) (19 items)	I Self-Reflection II Internal State Awareness III Style Self-Consciousness IV Appearance Self-Conscious. V Social Anxiety	4 4 4 3 4	66 48 63 45 60	67 47 73 59 61	76 61 77 62 69	67 62 67 67 75

Model numbers (1-5) refer to the number of theoretical factors. Items equals the number of items in the theoretical scale. 1a = sample 1 (test); 1b = sample 1 (retest); and 2 = sample 2. R₁₂ refers to stability (test-retest) coefficients derived from Sample 1 data.

Table 2.9
Standardized Solution for SCS Short Form

<u>Lambda Y</u>						<u>Theta Eps</u>						
Item/Measures	Private			Public			SocAnx					
	1a	1b	2	1a	1b	2	1a	1b	2	1a	1b	2
1	65	65	67							57	57	55
5	63	59	68							61	65	54
7	41	31	49							83	90	76
15	62	70	73							62	52	46
18	43	42	59							82	83	65
6				58	59	69				66	66	53
11				62	67	65				62	55	58
14				69	72	72				53	48	48
19				64	74	70				59	45	51
21				35	52	52				88	73	73
4							74	62	68	46	61	54
8							38	48	55	85	77	70
10							74	74	68	45	45	54
16							32	36	50	90	87	75
23							63	63	51	60	60	74
<u>Psi</u>												
	Private			Public			SocAnx					
	1a	1b	2	1a	1b	2	1a	1b	2			
Private	69	67	77									
Public	44	48	53	72	79	79						
SocAnx	24	18	24	48	49	44	71	71	72			

Note: Decimals omitted. All parameters significant: $p < .05$. 1a = Sample 1 (test); 1b = Sample 1 (retest); 2 = Sample 2. Factor reliabilities are given in bold.

Table 2.10
Stability of SCS Constructs

Model	$\chi^2(df)$	GFI	$\chi^2_d(df_d)^*$	Stability
<u>Original Scales</u>				
1: Private (10 items)				
A. No equality constraints	330.94(159)	.91		
B. Equality constraints	334.97(169)	.91	4.03(10)	.84
2: Public (7 items)				
A. No equality constraints	125.02(68)	.95		
B. Equality constraints	137.62(75)	.95	12.06(7)	.83
3: Social Anxiety (6 items)				
A. No equality constraints	63.20(47)	.97		
B. Equality constraints	68.32(52)	.97	5.12(6)	.89
<u>Short Version</u>				
1: Private (5 items)				
A. No equality constraints	31.37(29)	.98		
B. Equality constraints	35.21(34)	.98	3.84(5)	.81
2: Public (5 items)				
A. No equality constraints	46.74(29)	.97		
B. Equality constraints	58.41(34)	.97	11.67(5)	.82
3: Social Anxiety (5 items)				
A. No equality constraints	23.30(29)	.99		
B. Equality constraints	29.04(34)	.98	5.74(5)	.87

Notes: N = 351. Six week interval between administrations. Each construct was analyzed separately.

* $p > .01$

Table 2.11
Invariance of Original SCS Model and SCS Short Version

Model	$\chi^2(df)$	χ^2/df	RMS	GFI	$\Delta\chi^2(\Delta df)$	TC
3A: Fenigstein, Scheier, & Buss (Correlated Factors)						
<u>Invariant</u>						
1. Pattern	949.27(454)	2.09	.081	.86		
2. Plus Loadings	981.25(477)	2.06	.096	.85	31.98(23)	.987
3. Plus Factor Cov	982.62(480)	2.05	.096	.85	33.35(23)	.987
4. Plus Error	1032.09(503)	2.05	.099	.84	82.82(23)*	.968
3D: SCS Short Version (Correlated Factors)						
<u>Invariant</u>						
1. Pattern	288.95(174)	1.66	.061	.93		
2. Plus Loadings	316.52(189)	1.68	.086	.93	27.57(15)	.986
3. Plus Factor Cov	317.55(192)	1.65	.086	.93	28.60(18)	.986
4. Plus Error	346.94(207)	1.68	.091	.92	57.99(33)*	.971

Notes: Sample 1: Retest and Sample 2 covariance matrices were analyzed. TC = target coefficient

* $p < .05$

Chapter 3

The Structure, Reliability, and Validity of the Brief Survey of Study Habits and Attitudes (BSSHA)

The view that the student is responsible for a considerable amount of his or her own learning is a distinguishing characteristic of higher education. Instructors generally expect students to devote at least twice as much time to independent study of course related material as to class attendance (Rohwer, 1984). When, how, and how much studying actually takes place is determined primarily, if not completely, by the student. It is not surprising then to find that students when surveyed regarding the factors they believe responsible for their poor performance in college, point to lack of motivation, inattention to school work, and poor study habits as the principal factors influencing their demise (Hart & Keller, 1980). Empirical studies also demonstrate that students who are unable to develop adequate self-directed learning skills are more likely to be unsuccessful in college (e.g. Bean & Metzner, 1985; Brown, 1977; Kirschenbaum & Perri, 1982; Kulik, Kulik & Schwalb, 1983; McCombs, 1988; Rohwer, 1984; Weinstein et. al., 1988). More important, it appears that when high risk students are taught effective self-directed learning skills they do improve academically and are more persistent toward academic goals (for reviews see Kirschenbaum & Perri, 1982; Kulik, Kulik & Schwalb, 1983).

Presently, the most frequently used measure of individual differences in study motivation and study behavior is the college edition of the Survey of Study Habits and Attitudes (SSHA; Brown & Holtzman, 1967; 1984). The SSHA was designed to provide: (1) a basis for the early identification of students whose study behavior and attitudes are different from students who earn high grades and thus who might profit from early counseling intervention, (2) a means of diagnosing self-directed learning

deficits which may be contributing to academic difficulties, (3) a useful basis for designing study skills training programs and evaluating their effectiveness, and (4) a useful instrument for educational and counseling research.

The SSHA is a self-report questionnaire consisting of four 25 item scales assessing important aspects of study behavior and study motivation. The Delay-Avoidance scale(DA) is concerned with identifying the extent to which a student delays or avoids studying. High scorers on this scale generally display freedom from procrastination, wasteful delay, and distractions that interfere with studying effort. The Work Methods(WM) scale also focuses on study behavior, but attempts to determine the extent to which the student uses productive study strategies. High scorers on this scale tend to use efficient and effective study methods and display reasonable efficiency in completing academic assignments. The Teacher Approval(TA) scale is a measure of the student's general attitude toward teachers. High scorers on the TA scale tend to have a more favorable attitude toward teachers and the methods they use. Finally, the Education Acceptance(EA) scale attempts to assess the student's general attitude toward education. High scorers on this scale tend to have a more favorable opinion of educational requirements, practices, and objectives.

The four SSHA scales are correlated and their structure assumed to be hierarchical in nature. Scores on the DA and WM scales can be summed to provide a more general measure of study behavior labeled Study Habits(SH). Likewise, the TA and EA scores can be summed to provide a general measure of Study Attitudes(SA). An overall measure of study habits and attitudes or Study Orientation(SO) is obtained by adding the SH and SA scores. Thus, a given student's responses to the 100 SSHA items produces a seven score profile consisting of four primary scale scores, two second order construct scores, and one third order global score. Brown and Holtzman (1967, p. 24) developed their primary scales using extensive item analytic procedures on a large

number of items expressing motivational differences between good and poor students. The hierarchical nature of their model, however, appears to have been derived through a simple logical analysis of the interscale correlations consistently found across several college samples.

Reliability and criterion related validity estimates are reported in the manual (Brown & Holtzman, 1967) and, in general, support the authors contention that the SSHA scales are psychometrically sound. Internal consistency coefficients range from .87 to .89 for the primary scales, but unfortunately are not reported for the second order Study Habits(SH) or Study Attitudes(SA) dimensions or the third order Study Orientation(SO) dimension. Stability coefficients based on a four week interval range from .88 to .93 for the four primary scales and .94 for Study Orientation(SO). Stability coefficients based on a fourteen week interval are also reported in the manual and range from .83 to .88 for the primary scales, and .88 for Study Orientation(SO). Stability coefficients for the second order Study Habits(SH) and Study Attitudes(SA) scales are not given. The authors conclude that the SSHA scales are sufficiently stable to justify their use in predicting future behavior and in assessing the degree of change in study behavior and attitudes after intervention.

Evidence of criterion validity is also reported in the manual and is based on the SSHA's ability to predict college GPA alone and beyond that accounted for by scholastic aptitude. The correlations between SSHA total score or SO and GPA across six relatively large college samples ranged from .25 to .45 with a weighted average of .36. Correlations between SO and scholastic aptitude, however, were consistently found to be lower ranging from .05 to .27 with a weighted average of .21, and multiple R's using both aptitude and SO to predict GPA ranged from .36 to .66 with a weighted average of .53. In the multiple regression studies SSHA total scores added significantly to the prediction of GPA in every case (Brown & Holtzman, 1967, p. 18). A similar

pattern of correlations was reported for the primary scales when they were separately correlated with GPA and scholastic aptitude, with the exception of the WM scale which appears to be equally correlated with GPA and aptitude (weighted average = .32 and .30 respectively).

Unfortunately, multiple R's were not reported for the primary scales and therefore, the question of whether or not the WM scale adds to our ability to predict GPA, or how many primary scales are actually needed to efficiently predict GPA is not answered. The absence of multiple regression data is particularly troublesome since the intercorrelations among the primary scales (Brown & Holtzman, 1984, p. 4) are relatively large (weighted average = .50 to .72 across eight college samples) compared to the individual scale/GPA correlations, suggesting the scales may be considerably redundant.

Independent research has generally provided strong support for the utility of the SSHA. The SSHA has been used extensively as an outcome measure to evaluate, in part, the effectiveness of interventions and courses designed to improve academic effectiveness (e.g. Annis, 1986; Decker, 1987; Francis, McDaniel, & Doyle, 1987; Gadzella, 1982; Kirschenbaum, Tomarken & Ordman, 1982; Seni et. al., 1978). The SSHA has also been used to select students for treatment assignment (e.g. Decker & Russell, 1981; Knapp & Mierzwa, 1983), and as an important measure used in test anxiety treatment research (e.g. Cavallaro & Meyers, 1986; Decker and Russell, 1981) and not surprisingly as a significant correlate of academic effectiveness (Goldfried and D'Zurilla, 1973) and academic achievement (Blustein et. al., 1986; Cappella, Wagner, & Kusmierz, 1982; Webb, 1987; Wikoff & Kafka, 1981). In addition, the SSHA scales have also been shown to be minimally correlated with reading comprehension (Blustein et. al., 1986) and aptitude (De Vito, Tryon, & Carlson, 1983) while significantly predicting GPA. These studies provide support for similar research cited in the SSHA

manual (Brown & Holtzman, 1967). Furthermore, Cappella, Wagner, & Kusmierz (1982) reported a significantly higher correlation between SSHA total score (SO) and GPA than for self-reported study time and GPA, suggesting that study time productivity may be a function of the student's study habits and study attitudes. In recent reviews, Kirschenbaum and Perri (1982) and Mehrens and Lehmann (1987) have recommended the continued use of the SSHA over other available instruments and Rohwer (1984) has noted the popularity of the SSHA questionnaire in the developmental study of self-directed learning.

The SSHA, however, is not without its problems. Convergent and discriminant validity information with respect to the four primary scales as well as the two second order factors, Study Habits (SH) and Study Attitudes (SA) is virtually nonexistent. In fact, interscale correlations reported in the manual supplement (Brown & Holtzman, 1984, p. 4) do not appear to support the existence of distinct second order behavior and attitude factors. Across eight college samples the weighted average correlation (.69) between the study behavior scale- Delay-Avoidance (DA), and the attitude scale- Educational Acceptance (EA), is virtually identical to the weighted average correlation (.68) between the two study behavior scales- Delay-Avoidance (DA) and Work Methods (WM). The scale correlations reported in the manual supplement, however, do seem to suggest the existence of a single general factor underlying the primary scales. This would support a two stage rather than three stage conception of the hierarchical nature of the constructs.

Formally, only two studies have investigated the factorial validity of the SSHA, and both have failed to confirm the original three stage hierarchical structure proposed by the instrument's authors. In the first study, Khan & Roberts (1975) factored the SSHA items and rotated the first four factors. Using .35 to define a salient loading, they were able to identify DA, WM, and TA factors, but an EA factor failed to emerge. A

4th factor, which they labeled Academic Diligence (AD), appeared instead and was defined by items originally assigned to the DA and WM scales. They also noted that twelve items, all originally assigned to the EA scale, failed to significantly load on any factor, and many items produced marginal loadings (between .35 and .40). Separate second order Study Habits (SH) and Study Attitudes (SA) factors could not be identified, but their results did support the definition of a general factor underlying the primary scale correlations. Khan and Roberts (1975) concluded that their results support the use and interpretation of the SSHA total score (SO) as a general measure of study habits and attitudes, and the use and interpretation of four relatively distinct primary scale scores. As noted above, however, these four scales are not completely identical to those proposed by Brown and Holtzman (1967).

In a second study, Bray, Maxwell, and Schmeck (1980) used confirmatory factor analysis (CFA) in an attempt to confirm the Brown and Holtzman (1967) theoretical structure of the SSHA. They concluded that the assignment of items to scales as proposed by the original authors was not justified; the primary scales appeared to be complex, and many of the SSHA items exhibited large unique variance. Unfortunately, Bray et. al. (1980) did not test the fit of the alternative measurement model proposed by Khan and Roberts (1975).

Although there appears to be ample support for the external validity of the SSHA, the internal validity of the instrument is questionable. Most researchers, however, are using and interpreting some or all seven SSHA scores as defined according to the author's original measurement model. This practice coupled with the lack of internal validity studies clarifying the nature of the underlying SSHA dimensions and their structure has lead to considerable confusion in the literature. Several studies, for example, have reported results emphasizing the second order SH and SA factors (e.g. Blustein et. al., 1986; Goldfried & D'Zurilla, 1973; Mathiasen,

1985) although their existence is empirically unsupported and thus their interpretation problematic. In addition, some researchers have interpreted the SSHA global score, Study Orientation (SO), as an overall measure of study habits and attitudes (e.g. Annis, 1986; Gadzella, 1982), while others have interpreted this score as an overall measure of study habits (e.g. Cavallaro & Meyers, 1986; Decker, 1981; Decker & Russell, 1981; Knapp & Mierzwa, 1983), or as a general measure of study attitudes (e.g. Francis, McDaniel, & Doyle, 1987; Kirschenbaum & Perri, 1982). Not surprisingly, Rohwer (1984), in his review of the development of independent learning skills, noted the extreme popularity of the SSHA in this research area, but continually emphasized his difficulty in explaining results due to the precarious meaning of SSHA scores.

Another problem encountered in SSHA research relates to the common practice of using and interpreting only the 100 item SSHA global score (e.g. Annis, 1986; Cappella, 1982; Cavallaro & Meyers, 1986; Decker, 1987; Decker & Russell 1981; Francis, McDaniel & Doyle, 1987; Kirschenbaum & Perri, 1982; Knapp & Mierzwa, 1983). As already noted, in practice its interpretation is ambiguous primarily because of the lack of a clear meaning for the scales upon which it is based. Regardless how individual items are eventually assigned to the primary scales, however, it is clear that Study Orientation (SO) is a composite measure, and its solitary use is a questionable practice for at least two reasons. First, if the primary utility of the 100 item SSHA is in its ability to assess a general composite (study orientation) then one must question the efficiency of the questionnaire. Surely, study orientation can be measured more economically. Second, although the use of a single global multifaceted construct has the advantage of conceptional simplicity, ignoring the underlying components defining the global concept can lead to misleading conclusions (Carver, 1989). For example, if the primary scales do possess discriminant validity as theoretically proposed, then it is conceivable that only one component (e.g. Delay-Avoidance) may be significantly

related to a given external criterion (e.g. procrastination). Using the global score only (e.g. Study Orientation), completely obscures this result. What is found, however, is misleading and ambiguous in interpretation. Although we might blame the researchers for this questionable practice, it is my opinion that the precarious internal validity of the SSHA has precluded a defensible position regarding SSHA score interpretations, especially concerning their correlations with external criteria.

The failure of the factor studies discussed above to confirm the theoretical structure of the SSHA, however, may be due, at least in part, to a methodological artifact. Responses to SSHA items are made using a popular 5-point answering format (Rarely to Almost Always). Both Khan and Roberts (1975) and Bray, Maxwell, and Schmeck (1980) based their item correlations on this 5-point answering format, scoring items from 1 to 5. The theoretical model proposed by Brown and Holtzman (1967), and in particular, their data analysis has involved the use of an unusual but acceptable scoring format. An extreme response in a positive direction (5) is given a weight of 2; the next most extreme response (4) is given a weight of 1; and the remaining responses (3,2,1) are given a weight of 0. In effect, the 5-point response format is converted to a 3-point format for scoring and statistical analysis purposes. In a series of studies, Velicer and his colleagues (Oswald & Velicer, 1980; Velicer, DiClemente, & Corriveau, 1984; Velicer, Govia, Cherico, & Corriveau, 1985; Velicer & Stevenson, 1978) demonstrated that adding points or categories to response format can change the structure of self-report personality scales. For example, Velicer et. al. (1985) found the same number of factors underlying the Buss-Durkee Hostility Inventory using 2-point and 7-point response scoring formats, but the nature of the factors were very different. In another study, Velicer & Stevenson (1978), found differences in the number of factors retained as well as their nature when 2-point and 7-point versions of the Eysenck Personality Inventory were compared. Presently, 5 and 7-point scoring formats are

preferred because items tend to be more reliable with increasing response categories (c.f. Comrey, 1988; Comrey & Montag, 1982)

Thus, the Khan and Roberts (1975) and Bray, Maxwell, and Schmeck (1980) factor studies may not be a fair or even appropriate evaluation of the SSHA theoretical structure. It would have been advisable to have factored the SSHA items using both the original 3-point scoring system and the alternative 5-point scoring system so that their relative advantages and disadvantages could have been compared and their effect on the structure of the SSHA determined.

In summary, the popularity of the SSHA suggests that there is a need for an instrument that assesses individual differences in study motivation and study behavior. Presently there is considerable support for the external validity of the SSHA, but the internal validity of this instrument appears tenuous. The inability to provide empirical support for the interpretation of SSHA scores is a significant problem which limits the potential usefulness of this instrument in theoretical and applied research. This problem appears due, in part, to the relative absence of interval validity studies substantiating and/or clarifying the factors underlying this instrument. The only two studies examining this issue have failed to support the author's measurement model and have concluded that many of the items are of limited value (Khan & Roberts, 1975; Bray Maxwell, & Schmeck, 1980).

The primary purpose of this study was to develop an efficient brief version of the SSHA (BSSHA) comparable to the original SSHA in reliability and validity but improving upon its internal structure. The definition of the new measurement model for the BSSHA was based on a recent updated paradigm for scale development proposed by Gerbing and Anderson (1988). After reviewing several popular methods for the development of unidimensional² scales these authors proposed a sequential procedure

for scale development based on the principle that composite measures must be unidimensional in order to be meaningful. Briefly, they proposed that preliminary scales be defined based on item analytic results and exploratory factor procedures (or principal components analysis). Unidimensionality is then stringently tested within a structural modeling approach to confirmatory factor analysis. Finally, once unidimensionality is adequately established, reliability and external validity data can then be ascertained to provide further support for the construct validity of the new scales. In applying this model, three studies were designed. In Study 1 a preliminary measurement model for a brief SSHA was developed to assess the fundamental dimensions underlying responses to SSHA items. In developing the model, both the original 3-point scoring format and an alternative 5-point scoring format were compared. Given the research cited above, it was expected that the original SSHA measurement model would be supported only when the 3-point scoring procedure was used. I expected the 5-point scoring procedure to support Khan and Robert's (1975) alternative measurement model and I also expected this model to provide a better fit to the data. After a brief version of the SSHA was developed a second study was designed to confirm the empirically derived model in a new sample. Independent and correlated measurement models were tested along with several invariance hypotheses. Given the nature of the constructs I expected the correlated measurement model to provide a significantly better fit across samples. In addition, I expected the factor pattern, factor loadings, factor variances and covariances, and error to be invariant over samples. Reliability coefficients were generated and compared across samples and to those derived from the original SSHA, and latent construct stability coefficients for the new scales were also determined and evaluated. Finally, in Study 3 the ability of the BSSHA scales to predict course grades was examined and compared to the ability of the original SSHA scales to predict the same criterion. It was predicted that the reliability

and external validity of the brief version of the SSHA would be comparable to that found for the original SSHA.

Study 1: Development of the Basic Measurement Model

Method

Subjects. Participants were randomly drawn from the general student population of a moderately sized northeastern community college. Students completed the Survey of Study Habits and Attitudes (SSHA) and several other measures as part of a much broader study in groups of 10 to 35 students. Responses were anonymous and were obtained with informed consent. All students received extra course credit for their participation in this study. I asked 375 students to complete the SSHA twice with a six week interval between test administrations. Students who dropped out of school during data collection or who failed to submit complete and scorable questionnaires were deleted from the study. The final sample size consisted of 351 community college students (250 female and 101 male) ranging in age from 18 to 58 (median age = 21).

Instrument. The Survey of Study Habits and Attitudes (SSHA) is a 100 item structured questionnaire employing a 5-point response format ranging from "1-rarely" to "5-almost always". The Delay-Avoidance (DA), Work Methods (WM), Teacher Approval (TA), and Educational Acceptance (EA) scales each contain 25 items. The DA and WM items can be added to form a Study Habits (SH) measure, while the TA and EA items can be added to form a Study Attitudes (SA) measure. Adding all items yields a Study Orientation score (SO). Reliability and criterion validity support the usefulness of this instrument and recent reviews have been favorable and recommend its continued use (Kirschenbaum & Perri, 1982; Mehrens & Lehmann, 1987).

Data Analysis. Summary statistics, item analysis, and reliability coefficients were computed using the SPSSx (v.2.2) program. A principal component analysis of the 100 X 100 SSHA item matrix was performed and Velicer's (1976) MAP procedure was used to determine the minimum number of components to retain. Zwick and Velicer (1982, 1986) demonstrated that the MAP rule was one of the most accurate methods for determining the number of nontrivial factors, and is successful under a wide variety of circumstances and compares favorably to the most widely used methods for such purposes.

Results

Responses to negatively worded items were reflected so that the highest response code on all items was indicative of a more positive rating. Two 100 X 100 interitem correlation matrices were then derived. The first was based on using the Brown and Holtzman (1967) 3-point scoring format while the second was based on using the more direct alternative 5-point scoring system. A separate principal-components analysis was performed on each matrix and the minimum average partial (MAP) procedure (Velicer, 1976) was used to determine the number of components to retain.

The MAP rule selected 7 components for both data sets. Items with loadings $\geq .40$ were defined as salient,¹ and both orthogonal (varimax) and oblique (promax) rotations were studied for solutions ranging from 4 to 8 components. Regardless of data set, components 5 through 8 were consistently poorly defined with four or fewer items marginally meeting the .40 criterion. The 4-component solution, however, was judged to be the best solution across both scoring systems. Since the varimax and promax rotations were found to be very similar, the varimax solution was chosen for interpretation.

Although the 4-components were easily cross-identified across scoring format, the 5-point scoring format consistently produced greater item variance, a greater number of salient loadings, accounted for slightly more variance than the 3-point scoring format, and produced slightly higher mean salient loadings. Thus, it was decided to further analyze only the 4-component varimax solution based on the 5-point scoring system.

The theoretical and empirical factors are cross-classified in Table 3.1. 24% of the SSHA items failed to produce a salient loading on any of the 4 components and two items from the original DA scale appeared to be complex. Component I was tentatively labeled Learning Difficulties. Although this component was defined almost entirely by WM items, the items retained appear to suggest a failure to profit from studying, rather than what specific work methods or techniques the student used, as is implied by the entire WM theoretical item set and the authors' description of the scale. 54% of the original WM items defined this component. The second component was tentatively labeled Academic Diligence and was a mixed component defined primarily by DA, WM, and EA items. Components III and IV were identified as consistent in meaning with the original theoretical factors. Component III was labeled Teacher Approval and was defined almost entirely by items from the theoretical TA scale. 84% of the theoretical TA items loaded on this component. Component IV was defined by a core of the DA items (64%) and therefore was labeled Delay-Avoidance. The EA scale failed to materialize as a significant component although several of its items appeared on other factors.

The best items from each scale were chosen based on principal components analysis, Cronbach's coefficient alpha, item analysis results, and breadth of construct coverage, resulting in four eight item scales (Table 3.2). The varimax rotated component pattern for the new 32 item instrument over two administrations of the questionnaire is presented in Table 3.3. Examination of the two patterns reveals their

close correspondence and relative stability across administrations. The first administration 4-component solution accounted for approximately 45% of the total variance of the 32 item reduced set, with an average salient loading of approximately .61. The second administration solution accounted for approximately 50% of the total variance, and the average salient loading was approximately .65. Based on the MAP analysis, the average distance between a salient loading and its population value was estimated to be .051 and .047 for the 1st and 2nd administrations respectively. These results suggest that the 4-component solution was well defined, clearly interpretable, and an excellent estimate of its population pattern (cf Guadagnoli & Velicer, 1988).

For comparison purposes, means, standard deviations, reliability coefficients and interscale correlations for the new and original scales are presented in Table 3.4. Means and standard deviations for both the new and original scales were virtually identical across administrations. Reliability coefficients for the new scales compared favorably with those obtained from the original scoring scheme, especially considering the small number of items defining the new scales. Reliability coefficients and interscale correlations for the original scales are consistent with those reported in the manual. New and original scale intercorrelations were significant ($p < .01$), and were also consistent across administrations. Finally, the new scale intercorrelations were significant ($p < .01$) but much lower than those obtained using the original scoring scheme, suggesting the new scales were less redundant.

Study 2: Confirmatory Analysis of the Basic Measurement Model

Method

Subjects. Students who had participated in the first study represented sample 1 in the confirmatory study of the BSSHA. These students have been previously described. A new sample of 275 business students who were enrolled in Elementary

Accounting and who were asked to complete the SSHA, the Otis Lennon School Ability Test, and several personality scales as part of a broader study examining the determinants of student success defined sample 2. Sample 2 students completed the questionnaires in groups of 25 to 35 and all students received extra course credit for their participation in this research project. Responses were anonymous and were obtained with informed consent. Fifteen students either dropped out of school during data collection or failed to submit complete and scorable questionnaires and were deleted from the study. Thus, the final sample size for sample 2 consisted of 260 business students (139 female and 121 male) ranging in age from 18 to 48 (median age = 22).

Data Analysis. The SPSSx (v 2.2) program was used to compute summary statistics, internal consistency coefficients (alphas), and stability coefficients for the SSHA and BSSHA scales. In order to test the structural hypotheses of this study, however, the LISREL VI program (Joreskog & Sorbom, 1986) was used.

Confirmatory factor analyses in this study were conducted using item parcels rather than individual items as the basic unit of analysis. Each BSSHA factor was represented by four variables, and each variable was defined as the summed score of two items designed to measure that factor. Given the assumption that each factor was homogeneous, the item pairs were formed simply by random assignment. Thus, the LISREL analyses reported below were conducted on 16 X 16 (item-pairs) covariance matrices derived from data generated by sample 1 and sample 2. These item-pairs are presented in Appendix D.

The analysis of individual items can pose several problems when using a structural modeling approach to CFA. Trait and attitude items in particular, tend to have large error variances and nonnormal distributional properties. Both characteristics

can affect the fit of the model although maximum likelihood parameter estimates appear to be robust (c.f. Hayduk, 1987; Huba & Harlow 1987). Several researchers have recommended the use of item parcels rather than individual items in EFA and CFA studies for the following reasons. First, item parcels are likely to be more reliable, more normally distributed, less affected by the idiosyncratic wording of individual items, and yield results having greater generalizability (Comrey, 1988; Marsh, Barnes, Cairns, & Tidman, 1984). Second, item parcels reduce the number of measured variables used in the analysis. Item-pairs, for example, divide the number of measured variables in half, assisting in convergence of the ML solution and considerably reducing the cost of the analysis. Finally, item parcels protect against the emergence of trivial factors based on differential item statistics (c.f. Bernstein & Teng, 1989; Bernstein, Teng & Garbin, 1986). Item parcels are not recommended for use, however, when information about the individual items is needed to further refine the instrument. Since this was not my purpose, I decided to use item-pairs for the advantages cited above.

The LISREL CFA submodel was used to test three a-priori defined hypotheses: (1) Responses to the BSSHA could be explained by a correlated four factor congeneric measurement model;² (2) The measurement model was invariant over the two samples, and (3) the latent constructs were stable over time. The stability of the latent constructs was assessed following a procedure given by Tanaka and Huba (1987). Essentially, this procedure allows for the determination of the test-retest correlation for each latent construct as well as a test of the stability of the loadings over time. The authors point out that if the factor loadings are not stable, then the meaning of the construct can be assumed to change over time. Because of its precision, maximum likelihood estimation was used to estimate parameters in all LISREL analyses. (Joreskog & Sorbom, 1984). As recommended elsewhere (Everitt, 1984; Hayduk, 1987; Long, 1983; Marsh & Hocevar, 1985), multiple criteria were used to assess model fit and quality. First,

estimated parameters were examined to determine if all values were within a permissible range. Second, statistical and subjective goodness of fit criteria were examined and compared for all models tested. The subjective goodness of fit criteria also included indices of model parsimony. Mulaik et. al. (1989) have recently reviewed these procedures and their justification. Briefly, model fit can easily be improved by freeing additional parameters. Parsimony indices take into account the number of freed parameters in the model and correct for minimal improvements in fit resulting from the freeing of additional parameters (parameterization bias). These fit criteria are described in Table 3.5. Third, the quality of each model was evaluated in terms of parameter significance as indicated by LISREL's T-values, and in terms of the percent of aberrant normalized residual values (cf. Gerbing and Anderson, 1988).

Results

Table 3.6 gives BSSHA scale means, standard deviations, intercorrelations, and reliability estimates derived from sample 2 data. Note that these values are very similar to those reported for sample 1 (Table 3.4). Examination of the alpha coefficients across samples suggest that the reliability of the scales in the general community college population (sample 1) is very similar to those found for business students (sample 2).

Covariance matrices were used to test all confirmatory hypotheses. Proper solutions were obtained for all models tested in this study. Although all item-pairs exhibited a moderately positive skew and moderately non-normal kurtosis, all values were between 0 and 2.00 and thus were not expected to significantly distort the parameter estimates (cf. Huba & Harlow, 1987).

Correlated vs. Independent Factors. Two congeneric measurement models were fitted to the data produced by sample 1 and sample 2. The first model constrained factors to be independent while the second allowed the factors to be correlated. Fit

indices comparing these models are presented in Table 3.7. For both the independent and correlated models fitted in each sample, the hypothesized 4-factor models represented a statistically unacceptable fit to the data. Given the sensitivity of X^2 to sample size and the relatively large samples used in this study this result was expected. The question is whether these differences can be considered trivial. Recomputing X^2 as if the sample size was smaller but sufficiently large ($N=200$) resulted in an statistically acceptable fit ($p > .05$) for the correlated 4-factor models (sample 1, $X^2_{(98)} = 105.42$; sample 2, $X^2_{(98)} = 122.74$) but a statistically unacceptable fit ($p < .001$) for the independent 4-factor models (sample 1, $X^2_{(104)} = 287.46$; sample 2, $X^2_{(104)} = 342.76$). As noted in Table 3.7, the X^2 difference test (X^2_d) comparing the independent vs. correlated 4-factor models within each sample consistently demonstrated a statistically significant improvement in fit ($p < .001$) resulting when factors were allowed to be correlated. Although the X^2_d test is also sensitive to sample size bias, this improvement in fit remains highly significant ($p < .001$) even when the X^2_d is estimated for a smaller but acceptably large sample size ($N = 200$; sample 1, $X^2_d(6) = 182.06$; sample 2, $X^2_d(6) = 221.03$).

The subjective fit indices also confirm the superiority of the correlated 4-factor model over its independent factors counterpart. X^2/df for the correlated 4-factor model was less than the targeted value of 2.0 and GFI, TLI, and X^2I_2 values were well above the minimum targeted value of .90. These results were consistent across samples. Comparing parsimony values reveals that even when parameterization bias is corrected for, the correlated 4-factor model is still superior to the independent 4-factor model. Again, this effect was consistent across samples. The most striking difference between the two basic models, however, was noted in their relative ability to reproduce the sample covariance matrix. A study of the normalized residual values for both models revealed that the independent factors models could not adequately reproduce the sample

covariance matrix. For sample 1 and 2 respectively 74% and 75% of the normalized residuals were above 2.0, and 69% and 65% were above 3.0, when factor correlations were constrained to be zero. When correlated factors were allowed, less than 2% of the normalized residuals were greater than 2.0 and none were greater than three. Taken collectively, these results suggest that the hypothesized 4-factor congeneric model fits the data well but only when factors are allowed to be correlated.

Invariance of the Basic Model. The previous analysis provides strong support for the contention that the same pattern of parameter estimates is able to fit each sample separately. Tests of invariance were also conducted to determine to extent to which the a-priori defined model was equivalent across student samples. These tests revealed equivalency across samples with respect to correlation matrices, factor loadings, factor variances and covariances, and uniquenesses. The goodness of fit indicators for these invariance models are presented in Table 3.8. Inspection of the subjective indicators also provides strong support for the equivalencies of the parameter estimates across samples.

The final standardized solution³ for invariance model 4 is presented in Table 3.9. All parameter estimates were statistically significant ($p < .001$). Factor loadings were large with T-values 15 to 20 times the size of their standard errors. Factor variances were also large with T-values 10 to 11 times the size of their standard errors. Factor covariances were variable but all statistically significant with T-values 5 to 11 times the size of their corresponding standard errors. Finally, all uniquenesses were also significant with T-values 10 to 16 times the size of their corresponding standard errors. Inspection of the normalized residuals revealed that fewer than 7 % of the values were greater than 2.0.

Stability of the Constructs. Stability coefficients for the latent constructs are presented in Table 3.10. All constructs were relatively stable over time, however, Teacher Approval was the least stable construct. Factor loadings were judged to be equivalent over time suggesting that the meaning of the constructs were stable as well.

Study 3: External Validity of the SSHA and BSSHA

As noted earlier, much of the criterion validity of the SSHA scales, and in particular SSHA total score, rests on its ability to significantly predict academic achievement. The results of studies 1 and 2 support the conclusion that the BSSHA, compared to the original SSHA has superior internal validity. Another, perhaps more important, comparison concerns their relative external validity. That is, their relative ability to predict meaningful external criteria. Eliminating items in order to produce a more efficient, internally valid version of the SSHA, however, could diminish the scale's validity. This would result, of course, only if some or all of the discarded items carried distinct validity information. On the other hand, most of the validity may be carried by the items making up the common factors so criterion related validity may not differ between the 100 item SSHA and the 32 item BSSHA. In this third and last study the original and brief versions of the SSHA are used to predict academic achievement. It is predicted that the new 32 item BSSHA scales will produce validity and efficiency coefficients equal to those found for the original 100 item SSHA.

Method

Subjects. Participants in this study (N = 260) were described as sample 2 in the previous investigation. All students were enrolled in Elementary Accounting, a required course in the college's business program.

Instruments. Besides SSHA scores, aptitude scores were available for each student enrolled in Elementary Accounting. Aptitude was measured using the Otis-Lennon School Ability Test which has reported reliabilities exceeding .90 and has been found to be a useful local predictor of academic achievement in a previous study (Schertz, 1988).

Criterion Measure. Although the prediction of grade point average (GPA) has practical significance, its use as a criterion is problematic (see Goldman & Slaughter, 1976) and following the recommendation of Kirschenbaum, and Perri (1982), specific course grades were used as the criterion in this study. Elementary Accounting was chosen as the criterion course primarily for three reasons. First, the demand for persistent, motivated, study behavior in this course was among the highest in the college's curriculum. Classes meet daily, 5 days per week in 50 minute periods, and homework is assigned for every class. Since the nature of the course content is cumulative, unless the student studies consistently and productively it is very difficult to succeed in the course. Second, although the demand for self-directed learning is high, the content of the course is not considered particularly difficult. Schertz (1988), reported a relatively modest correlation between academic achievement in accounting and aptitude ($r = .25$; $p < .01$), success depending more on motivational variables. Third, final grade distributions for elementary accounting classes examined between 1984 to 1986 revealed considerable spread in semester grades but only a modest dropout rate after the first five weeks of school (averaging less than 6%). Students completed three non-cumulative exams during the semester and their average exam grade was used as the criterion in this study.

Data Analysis. The SPSSx (v 2.2) program was used to compute summary statistics, correlations, and multiple regression statistics to examine the internal consistency, and both the criterion validity and criterion efficiency of the SSHA and

BSSHA scales. Zero order correlations between each SSHA and BSSHA scale correlated with accounting grades provided a measure of each scale's criterion validity. Correlations were also computed between grades and each SSHA and BSSHA scale with the effect of aptitude partialled out. Finally, the efficiency of the SSHA vs. the BSSHA in predicting grades in addition to aptitude was examined within a stepwise multiple regression framework. In all multiple regression runs, academic aptitude was entered first in the equation. As noted by Burisch (1984), zero order correlations provide evidence of the external validity of each individual scale. The focus of the multiple regression analysis, however, is in determining the most parsimonious equation for predicting a criterion. The multiple R, then, is an index of the each battery's efficiency, and the regression equation describes this efficiency in terms of the minimum number of predictors maximally accounting for the variance of the criterion. In addition, the multiple regression results provide a method for determining, at least within this context, the discriminant validity of the individual scales. To the extent that a given scale contributes uniquely to the prediction of grades then there is evidence for its discriminant validity. Since SSHA total score is often used to predict academic achievement (e.g. Blustein et. al., 1986; Cappella, 1982; Wikoff & Kafka, 1981), an additional regression analysis was performed using the 100 item SSHA total score as the major predictor.

Results

Summary statistics and validity coefficients for SSHA and BSSHA scales are presented in Table 3.11. Means, standard deviations, scale intercorrelations, and internal consistencies are comparable to those previously reported for sample 1 and presented in Table 3.4. In general, correlations between individual study scales and aptitude were modest (-.04 to .32) regardless of which version of the SSHA was used. More important, correlations between study scales and final grade average were notably

higher (.43 to .55) and these validity coefficients changed little when aptitude was partialled out of the correlations (.46 to .54). Only the correlation between SSHA Delay-Avoidance and aptitude (.09), and the correlation between BSSHA Academic Diligence and aptitude were not statistically significant ($p < .05$). It is noteworthy that the correlation between the BSSHA Learning Difficulties scale and aptitude ($r = .32$) is the highest correlation reported between the individual study scales and aptitude. This finding is consistent with the tentative interpretation given this new scale as a measure of the degree to which students are free from performance difficulties inconsistent with the amount of time they spend studying. We would expect this scale to be significantly related to aptitude because differences in aptitude provide one explanation for this discrepancy. Thus, the external validity of both the original SSHA scales and the new BSSHA scales are supported in this study. In addition, these validities are relatively equivalent across both versions of the SSHA.

The zero order validities, although significant in their own right, do not shed light on the unique contribution each construct contributes to the prediction of accounting grades. It is possible that the SSHA and BSSHA scales differ in terms of their degree of prediction efficiency, their degree of redundancy, and their degree of uniqueness in predicting this criterion. In order to examine this issue, three multiple regression analyses were performed using the individual SSHA scales, the SSHA total score, and the individual BSSHA scales as three independent sets of predictors. Within each analysis, academic aptitude was entered as the first predictor in each equation, and average exam grade served as the criterion.

The results from these three separate analyses are presented in Table 3.12. A comparison of the three equations reveals several important differences. First, the study scales, regardless of version, significantly added to the prediction of student grades beyond that accounted for by the cognitive predictor academic aptitude. The added

variance explained (between 29% and 35%), in fact, was substantial compared to the variance accounted for by individual differences in academic aptitude (9%). Second, overall, the BSSHA/academic aptitude predictor set accounted for more variance in the prediction of grades (44%) than either the SSHA scales/aptitude (38%) or the SSHA total score/aptitude (38%) predictor sets. These results translate to efficiency coefficients (adjusted R's) equal to .66 for the BSSHA/Aptitude combination and approximately .62 for the SSHA scales/aptitude combination and the SSHA total score/aptitude combination. Third, there appears to be nothing gained by employing the SSHA total score rather than the individual scales in the prediction equation. Adjusted R's for both equations were approximately equal. Using the two individual scales, Educational Acceptance and Work Methods, along with aptitude to predict grades, however, involves only half the items used in determining the SSHA total score and thus, appears to be the more parsimonious approach. Finally, all four BSSHA scales contributed uniquely and significantly ($p < .05$) to the prediction of grades, providing support for the discriminant validity of the individual scales. Less support was found for the discriminant validity of the original SSHA scales since only two scales, Educational Acceptance and Work Methods, contributed uniquely to the prediction of grades. Given the high intercorrelations of these scales, however, these results were not surprising.

Discussion

The Survey of Study Habits and Attitudes (SSHA) is a popular and useful measure of study motivation and behavior theoretically related to successful self-directed learning and academic success (Brown, 1972). Although the SSHA appears to possess satisfactory external validity, its poor factorial validity has made it especially difficult to interpret the constructs presumably measured, and to defend the scoring key employed by this instrument (c.f. Kirschenbaum & Perri, 1982; Rohwer, 1984).

Consistent with previous factor analytic research (Bray, Maxwell, & Schmeck, 1980; Khan & Roberts, 1975), the theoretical structure of the SSHA was not supported in the present study.

Contrary to expectations, employing the original 3-point scoring system did not produce a solution consistent with the theoretical structure of the SSHA. Both the 3-point and more direct 5-point scoring system produced nearly the same results in terms of number of factors, pattern, and interpretation of the item level component structure, and this structure was virtually identical to an alternative measurement model reported by Khan and Roberts (1975). Although the quality of the solution actually favored the alternative 5-point scoring system, the differences noted between formats were essentially trivial. These results then, are not consistent with previous research demonstrating significant effects on factorial structure when response categories are increased (e.g. Oswald & Velicer, 1980; Velicer, DiClemente, & Corriveau, 1984; Velicer, Govia, Cherico, & Corriveau, 1985; Velicer & Stevenson, 1978).

At least two differences between this particular study and previous response format research, however, may have attenuated results. First, in previous research 2-point and 7-point response formats have been compared. In this study, a less distinct comparison was made involving 3-point vs. 5-point scoring systems which may have diminished effects. Second, in previous research, both the response format and scoring format matched. Participants responding to the 2-point response format were forced to categorize their responses as either true or false or were allowed to respond along a 7-point continuum. Differences in the response process itself may be what influences multiscale structure evaluated at the item level. In this study all students were given the opportunity to respond to each individual item using a 5-point response format (Rarely to Almost Always) but statistics were derived using either a matched 5-point scoring system or converting scores first to a 3-point format.

Although the superiority of the 5-point scoring format in terms of its psychometric benefits could not be established in this study, never the less, the 5-point scoring system still had the distinct advantages of producing more variance, corresponding exactly to the actual response format used, and saving the additional and unnecessary step of converting the scores to the 3-point system. Thus, the author's use of the 3-point scoring system for the 100 item SSHA appears unnecessary and should be reconsidered.

Although the empirical factors delineated in this study appear to support the alternative measurement model proposed by Khan and Roberts (1975), I disagree with some of their conclusions regarding the meaning of their results. They reported four meaningful factors. One factor was based on a core set of DA items, a second factor was based on a core set of WM items, a third factor was based on set of DA and WM items not loading on the previous two factors, and their last factor was essentially equivalent to the original TA factor. They also noted that the four factor correlated solution could be explained by a single general factor. From these data they concluded that the a-priori assignment of items to scales given by Brown and Holtzman (1967) was supported for the DA, WM, and TA scales, but not for the EA scale. They chose to ignore, however, the AD factor they reported in place of the EA construct. But since their 4th factor consisted of a mixture of DA and WM items loading on this factor rather than their a-priori defined scales, then their data (and mine) do not actually support the a-priori assignment of all original items to the DA and WM scales. Taken together, their results and my results suggest that the 4th factor, Academic Diligence, is a conceptually distinct, meaningful, reliable and valid factor which presumably measures a more or less systematic commitment to study responsibilities. The original DA and WM scales appear to be complex, and thus, the new unidimensional factors are not identical to their

original counterparts. The only original scale that appears to have replicated by Khan and Roberts (1975) and myself is the TA scale.

Perhaps the most important finding of this study was that a brief version of the SSHA could be successfully developed, and this brief version was found to be comparable to the original SSHA in terms of its reliability and external validity. The BSSHA, however, was also found to have several distinct advantages over the original SSHA. First, the BSSHA was found to have superior factorial validity. The underlying BSSHA dimensions were found to satisfy unidimensional criteria and the basic measurement model was found to be invariant over samples. The ability to defend a distinct interpretation given to each construct is a major advantage over the original instrument. Second, since the 32 item BSSHA is essentially a subset within the original 100 item SSHA, previous research can be easily reanalyzed to evaluate results in terms of the new content oriented factors. Finally, although comparable in terms of reliability and criterion validity, with only 32 items the BSSHA is much more economical to administer and score than the original 100 item SSHA. Taken together, the results of my three studies appears to support Burisch's (1984) general thesis that short scales can be psychometrically equal to or better than their longer counterparts

My results also support previous findings related to the reliability and external validity of the original SSHA. Scale internal consistency estimates were relatively high across both samples (.82 to .90) and consistent with those reported in the manual (Brown & Holtzman, 1967). Further, when a course was selected with a high demand for self-directed study, the ability of the SSHA scales to predict grades was also relatively high (.46 to .55) and these validities were maintained even when controlling for the influence of academic aptitude (.44 to .54). Finally, scale intercorrelations were also found to be high (.46 to .79) and consistent to those found in the latest update to the SSHA manual (Brown & Holtzman, 1984).

Although the BSSHA appears to be a promising alternative to the presently popular SSHA, limitations still exist. First, the brief scales do not balance keying and acquiescence bias may be a problem. If new items are added to the scales and some modifications made, they should include balancing the items to minimize acquiescence. The influence of social desirability bias also needs to be determined for these scales and is recommended for future study. It should be noted, however, that the influence of both acquiescence and social desirability is probably minimal, given the rather large criterion validities for these scales.

The convergent and discriminant validity of the scales should also be extended in future research. The relationship between the BSSHA scales and two currently popular constructs, academic self-concept (Marsh, 1987) and academic self-efficiency (Schertz, 1988) should be assessed. Also, it may be interesting to determine the relationship between the Learning Difficulties scale and reading comprehension, especially since reading comprehension would be expected to be correlated to LD, and previous research has found the original SSHA scales to be uncorrelated to reading comprehension. Finally, the relationship between Delay-Avoidance and procrastination should be carefully examined. Delay-Avoidance may be one of the determinants of the tendency to procrastinate. In any case the BSSHA needs to be integrated into a broader theory concerned with student motivational factors and self-directed learning.

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Notes

¹Another popular cutoff point for salience is .30, however, applying this rule resulted in a very large number of complex items and so the more conservative .40 cutoff was adopted.

²If we find evidence for a single construct underlying a set of measures then we can conclude that the measures are unidimensional or congeneric (Hattie, 1985). This definition of acceptable unidimensionality is less restrictive than the requirement that the measures be tau equivalent or parallel.

³For the sake of interpretation, the data were reanalyzed using correlation matrices and the standardized solution from this analysis was reported. Results based on the correlation matrices when compared to those found for the covariance matrices were essentially identical.

Table 3.1
Item Cross Classification between SSFA Theoretical Scales and the Four Components

Theoretical Scale	Component					No Salient	Loading
	I	II	III	IV	Complex		
Delay-Avoidance	0	7	0	16	2	4	
Work Methods	13	6	0	1	0	5	
Teaching Approval	1	1	21	0	0	2	
Education Acceptance	0	3	6	3	0	13	

Complex items were counted as salient on both scales.

Table 3.2
New 32 Item SSHA Scales

Component I: Learning Difficulties		
1	WM*	I get nervous and confused when taking an exam and fail to answer questions to the best of my ability.
2	WM	After reading several pages of an assignment I am unable to recall what I have just read.
3	WM	I have difficulty picking out the important points of a reading assignment--points that later appear on examinations.
4	WM	I seem to accomplish very little in relation to the amount of time I spend studying.
5	WM	In taking notes, I tend to take down material which later turns out to be unimportant.
6	WM	I do poorly on tests because I find it hard to think clearly and plan my work within a short period of time.
7	WM	I can concentrate on a reading assignment for only a short period of time before the words become a meaningless jumble.
8	WM	During examinations I forget names, dates, formulas, and other details that I really do know.
Component II: Academic Diligence		
1	WM	In preparing reports, themes, term papers, etc. I make certain that I clearly understand what is wanted before I begin work.
2	WM	I give special attention to neatness on themes, reports, and other work to be turned in.
3	EA	Even though I don't like a subject, I still work hard to make a good grade.
4	EA	I strive to develop a sincere interest in every course I take.
5	DA	I complete my homework assignments on time.
6	WM	When preparing for an examination, I arrange facts to be learned in some logical order--order of importance, order of presentation in class or textbook, order of time in history, etc.
7	DA	When I get behind in my school work for some unavoidable reason, I make up back assignments without prompting from the teacher.
8	DA	At the beginning of a study period I organize my work so that I will utilize the time most effectively.

Table 3.2 Continued

Component III: Teachers Approval		
1	TA	I think that teachers like to exercise their authority too much.
2	TA	I feel that teachers tend to be sarcastic towards their poorer students and tend to ridicule their mistakes excessively.
3	TA	I feel that the ridiculous assignments made by teachers are the main reason for students cheating.
4	TA	I feel that teachers lack an understanding of the needs and interests of students.
5	TA	I feel that teachers allow their personal like or dislike for a student to influence their grading unduly.
6	TA	I feel that teachers think too much about grades and lose sight of the real objectives of education
7	TA	I think that teachers expect students to do too much studying outside of class.
8	TA	I feel that teachers make their courses too difficult for the average student.
Component IV: Delay-Avoidance		
1	DA	Daydreaming about dates, future plans, etc. distracts my attention from my lessons while I am studying.
2	DA	"Extracurricular activities"--dating, clubs, athletics, fraternity and sorority activities, etc. cause me to get behind in my school work.
3	DA	I am unable to concentrate well because of periods of restlessness, moodiness, or "having the blues".
4	DA	When I sit down to study I find myself to tired, bored, or sleepy to study efficiently.
5	DA	Problems outside of school--financial difficulties, being in love, conflict with parents etc.--cause me to neglect my school work.
6	DA	It takes a long time for me to get warmed up to the task of studying.
7	DA	I waste too much time talking, reading magazines, listening to the radio, watching TV, going to the movies, etc. for the good of my studies.
8	DA	With me, studying is a hit-or-miss proposition depending on the mood I'm in.

*Refers to original theoretical scale: DA = Delay-Avoidance, WM = Work Methods, TA = Teacher Approval, EA = Educational Acceptance.

Table 3.3

Varimax-Rotated Component Patterns for the Two Administrations of the 32 Item SSHA

Items*	1st Administration Components				2nd Administration Components				Theoretical Scale**
	1	2	3	4	1	2	3	4	
26	56				71				WM
46	66				73				WM
50	69				65				WM
62	62				65				WM
34	51				68				WM
38	58				66				WM
66	57				59				WM
98	70				60				WM
2		66				72			WM
14		71				69			WM
12		66				71			EA
72		59				65			EA
73		65				59			DA
78		59				64			WM
5		60				62			DA
97		53				71			DA

Table 3.3 Continued

Varimax-Rotated Component Patterns for the Two Administrations of the 32 Item SSHA

Items*	1st Administration Components				2nd Administration Components				Theoretical Scale**
	1	2	3	4	1	2	3	4	
19			62				70		TA
59			64				71		TA
91			58				70		TA
3			53				60		TA
11			64				64		TA
71			66				60		TA
27			49				63		TA
63			50				62		TA
9				65				54	DA
61				62				61	DA
41				65				58	DA
49				53				65	DA
69				69				69	DA
37				56				59	DA
53				74				61	DA
81				60				73	DA

Decimals omitted.

* As item appears on original SSHA questionnaire.

**DA= Delay-Avoidance; WM= Work Methods; TA= Teacher Approval; EA= Education Acceptance

Table 3.4

Means, Standard Deviations, Reliability Coefficients, and Scale Intercorrelations for the Brief SSHA and Original SSHA Scales Across Two Administrations of the Questionnaire

Scale	1st Administration			2nd Administration			Stability Coefficient and Intercorrelations			
	M	SD	α	M	SD	α	I	II	III	IV
New Scales										
(8 item scales; 5-point scoring system)										
I Learning Difficulties	30.3	5.6	.82	30.8	5.7	.85	.77	.27	.38	.55
II Academic Diligence	29.2	6.1	.80	29.6	6.3	.83	.32	.79	.23	.50
III Teacher Approval	33.2	4.1	.76	33.4	4.6	.83	.43	.22	.63	.43
IV Delay-Avoidance	29.6	6.3	.85	29.7	6.3	.86	.54	.41	.45	.79
Original Scales										
(25 item scales; 3-point scoring system)										
I Delay Avoidance	21.0	9.4	.87	21.3	10.2	.90	.84	.65	.45	.71
II Work Methods	25.0	9.0	.86	25.6	9.2	.87	.65	.80	.51	.61
III Teaching Approval	32.3	7.9	.87	32.4	9.1	.90	.46	.51	.63	.73
IV Education Acceptance	29.3	7.8	.82	29.2	8.4	.85	.71	.58	.70	.70

Note: The test-retest interval was 6 weeks. Stability Coefficients are in the diagonal (bold). All 1st administration (lower diagonal) and 2nd administration (upper diagonal) scale intercorrelations are significant ($p<.01$). N=351.

Table 3.5
Goodness-of-Fit and Parsimony Indicators

Indicator	Description
χ^2	The chi-square likelihood ratio test. Good fit is determined by nonsignificant result
χ^2/df	The ratio of the chi-square to the degrees of freedom of a given model. Values equal to or less than 2 are considered to indicate good fit.
χ^2_d	The chi-square difference test between nested models. Good fit is determined by a nonsignificant result.
GFI	Measure of the relative variances and covariances jointly accounted for by the model (Joreskog & Sorbom, 1986 p. 41).
TLI	Tucker-Lewis Index. A type 2 incremental-fit index. Values equal to or greater than .90 indicate good fit. Relatively independent of the influence of sample size.
$\chi^2 I_2$	Chi-square type 2 incremental fit index. Values equal to or greater than .90 indicate good fit. Relatively independent of the influence of sample size.
PGFI, PTLI, $PX^2 I_2$	Parsimony measures based on corrections to GFI, TLI, and $\chi^2 I_2$. The higher the value the more parsimonious the model (Muliak et. al., 1989).
TC	Target Coefficient. A measure of the ability of a model with invariance constraints to explain the covariation compared to a corresponding model with no invariance constraints. When TC equals 1.0, the covariance accounted for by the more restrictive invariant model equals that accounted for by the model without invariance constraints (Marsh, 1987).

Note: For the interested reader formulas for TLI and $\chi^2 I_2$ may be found in Marsh, Balla & McDonald (1988). Formulas for PTLI, and $PX^2 I_2$ may be found in Mulaik, James, Van Alstine, Bennett, Lind, & Stilwell (1989). The formula for the TC index is given in Marsh (1987).

Table 3.6

Comparison of SSHA and BSSHA Summary Statistics and Scale Intercorrelations

Scale		M	SD	Alpha	Intercorrelations*			
					I	II	III	IV
Original SSHA Scales (25 item scales; 3-point scoring system)								
I	Delay Avoidance	20.5	10.1	.89	1.00			
II	Work Methods	24.9	9.6	.88	.72	1.00		
III	Teaching Approval	31.5	9.6	.90	.57	.61	1.00	
IV	Education Acceptance	28.2	9.6	.88	.75	.71	.79	1.00
New BSSHA Scales (8 item scales; 5-point scoring system)								
I	Learning Difficulties	29.7	6.2	.85	1.00			
II	Academic Diligence	29.7	6.4	.82	.33	1.00		
III	Teacher Approval	32.5	5.2	.83	.48	.24	1.00	
IV	Delay-Avoidance	28.4	6.7	.85	.59	.50	.50	1.00

* All intercorrelations are significant ($p < .01$). SSHA Scales: 25 item scales; 3-point scoring system; BSSHA Scales: 8 item scales; 5-point scoring system.
N=260.

Table 3.7
Fit Indices for CFA Models

Model	X ² (df)	X ² /df	GFI	TLI	X ² I ₂	PGFI	PTLI	PX ² I ₂	X ² _d (df _d)
0: Null Model									
Sample 1	2638.44(120)	21.99	.34						
Sample 2	2028.77(120)	16.91	.32						
1: Independent Factors									
Sample 1	505.59(104)*	4.86	.84	.82	.84	.64	.71	.73	
Sample 2	447.41(104)*	4.30	.82	.79	.82	.63	.69	.71	
2: Correlated factors									
Sample 1	185.41(98)*	1.89	.94	.96	.97	.68	.78	.79	320.18(6)*
Sample 2	159.74(98)*	1.63	.93	.96	.97	.67	.78	.79	287.67(6)*

Notes: Sample 1: N = 351. Sample 2: N = 260. Chi Square Difference test compared the independent model with correlated model within each sample.
* p < .001

Table 3.8
Invariance Tests for Correlated Four-Factor Model

Model	$\chi^2(\text{df})$	χ^2/df	TLI	$\chi^2 I_2$	PTLI	$PX^2 I_2$	TC	$\chi^2_d(\text{df}_d)$
0: Null Model								
Sample1/Sample2	4667.21(240)	19.45						
1: No invariance								
Sample1/Sample2	344.11(196)	1.76	.96	.97	.78	.79	1.0	
2: Factor loadings invariant								
Sample1/Sample2	349.95(208)	1.68	.96	.97	.83	.84	.999	5.84(12)**
3: Model 2 with factor variances and covariances invariant								
Sample1/Sample2	357.27(218)	1.64	.97	.97	.88	.88	.997	13.16(22)**
4: Model 3 with uniquenesses invariant								
Sample1/Sample2	395.92(234)	1.69	.96	.96	.94	.94	.988	51.81(38)*

Notes: Sample 1: N = 351. Sample 2: N = 260.
* p > .05. ** p > .10

Table 3.9

Standardized Invariant Solution for the BSSHA Correlated Four Factor Model

<u>Factors Loadings*</u>					<u>Uniqueness</u>
Item-Pair	LD	AC	TA	DA	
1	76				43
2	66				57
3	78				39
4	86				27
5		77			41
6		70			51
7		78			39
8		69			52
9			79		38
10			75		44
11			70		50
12			69		52
13				79	38
14				72	48
15				77	41
16				79	38

Factor Correlations

	<u>LD</u>	<u>AD</u>	<u>TA</u>	<u>DA</u>
LD	85			
AD	37	83		
TA	50	28	82	
DA	68	60	54	85

Note: Decimals omitted. Factor reliabilities are given in bold. All factor loadings, factor correlations, and uniquenesses are invariant across student samples. All parameters are statistically significant: $p < .01$.

* LD = Learning Difficulties; AD = Academic Diligence; TA = Teacher Approval; DA = Delay-Avoidance.

Table 3.10
Stability of BSSHA Constructs

Model	$\chi^2(df)$	GFI	$\chi^2_d(df_d)^*$	Stability
1: Learning Difficulties				
A. No equality constraints	15.56(15)	.99		
B. Equality constraints	18.33(18)	.99	2.77(3)	.87
2: Academic Diligence				
A. No equality constraints	36.15(15)	.98		
B. Equality constraints	37.93(18)	.97	1.78(3)	.91
3: Teacher Approval				
A. No equality constraints	48.93(15)	.97		
B. Equality constraints	51.01(18)	.97	2.08(3)	.73
4: Delay-Avoidance				
A. No equality constraints	44.54(15)	.97		
B. Equality constraints	49.11(18)	.97	4.57(3)	.86

Notes: N = 351. Six week interval between administrations. Each construct was analyzed separately.

* $p > .10$

Table 3.11
SSHA and BSSHA Validity Coefficients

Scale	Validity Coefficients*		
	OL	FGA	FGA2
Original SSHA Scales (25 item scales; 3-point scoring system)			
I Delay Avoidance	.09 ^{ns}	.52	.51
II Work Methods	.16	.53	.51
III Teaching Approval	.16	.46	.44
IV Education Acceptance	.15	.55	.54
New BSSHA Scales (8 item scales; 5-point scoring system)			
I Learning Difficulties	.32	.52	.47
II Academic Diligence	-.04 ^{ns}	.43	.47
III Teacher Approval	.17	.48	.46
IV Delay-Avoidance	.19	.55	.52

* OL = Otis-Lennon School Ability Test. FGA = Final Grade Average. FGA2 = Final Grade Average controlling for aptitude (OL). ns = not significant ($p > .05$), remaining validity coefficients are significant ($p < .05$).

N=260.

Table 3.12
SSHA and BSSHA Efficiency Coefficients

Equation	Predictor Set	b	b _{SE}	B	B _{SE}	R	R ²	R ² _{Adj}	F*	R ² _{Ch}	F _{Ch} *
I	SSHA Scales/Academic Aptitude										
1.	Academic Aptitude (OL)	.232	.055	.209	.050	.300	.090	.087	25.52	.090	25.52
2.	Education Acceptance	.442	.092	.336	.070	.594	.353	.347	69.94	.262	104.16
3.	Work Methods	.338	.092	.259	.070	.621	.385	.378	53.48	.033	13.66
	(Constant)	29.320	5.750								
II	SSHA Total Score/Academic Aptitude										
1.	Academic Aptitude (OL)	.235	.055	.212	.049	.300	.090	.087	25.52	.090	25.52
2.	Study Orientation	.205	.018	.553	.049	.623	.389	.384	81.64	.299	125.45
	(Constant)	28.331	5.730								
III	BSSHA Scales/Academic Aptitude										
1.	Academic Aptitude (OL)	.207	.055	.187	.050	.300	.090	.087	25.52	.090	25.52
2.	Delay-Avoidance	.345	.124	.183	.066	.582	.338	.333	65.73	.248	96.48
3.	Teacher Approval	.533	.135	.220	.056	.623	.389	.381	54.23	.050	21.00
4.	Academic Diligence	.476	.107	.242	.055	.661	.437	.428	49.42	.048	21.79
5.	Learning Difficulties	.327	.122	.167	.062	.672	.452	.441	41.93	.016	7.17
	(Constant)	1.780	6.609								

Original SSHA Scales: 25 item scales; 3-point scoring system. New BSSHA Scales: 8 item scales; 5-point scoring system. N = 260.

OL = Otis-Lennon. Efficiency coefficients are given in bold.

* p < .01

Chapter 4

Private Self-Consciousness and the Internal and External

Validity of Self-Report Measures of Personality Traits and Attitudes

Private self-consciousness, a cognitive style, refers to the habitual tendency to engage in self-observation. Persons high in private self-consciousness (PriSC) are more attentive to their private thoughts and feelings. Recent research supports the view that private self-consciousness represents a process that promotes the development of self-knowledge (Buss, 1980; Carver & Scheier, 1983; 1987; Hull, 1988). Several studies, for example, have found that persons high in PriSC are more sensitive to changes in their emotions and bodily states (Scheier & Carver, 1977; Scheier, Carver, & Gibbons, 1979, 1981), know themselves in greater detail (Franzoi 1983; Turner, 1978a), and are more accurate in their self-reports (Scheier, Buss, & Buss, 1978). Further, PriSC tends to facilitate recall of self-relevant information (Hull & Levy, 1979; Hull, Treuren, Ashford, Propsom, & Andrus, 1988), and persons high in private self-consciousness tend to be biased in considering internal factors like emotions, attitudes, dispositions, and standards as guides for behavior (Carver & Scheier, 1983).

The construct of private self-consciousness (PriSC) has stimulated a considerable amount of research since Fenigstein, Scheier, & Buss (1975) formulated the construct and developed a scale to measure it. Currently, PriSC is considered an important construct in theories of self-regulation (Carver & Scheier, 1983), alcohol consumption (Hull & Young, 1983a, 1983b; Hull, Young, & Jouriles, 1986), loneliness (Franzoi & Davis, 1985; Franzoi, Davis, & Young, 1985), and stress, coping, and illness (Mullen & Suls, 1982; Suls & Fletcher, 1985) to name a few.

Although there are several theories of the mechanism underlying private self-consciousness (Buss, 1980; Carver & Scheier, 1983; Hull et al. 1988) all agree that

private self-consciousness generates differences in self-knowledge. Compared to persons low in private self-consciousness (PriSC), persons high in private self-consciousness possess greater knowledge of their behaviors, attitudes and traits. Since greater self-knowledge is expected to lead to greater reliability (Nasby, 1989; Jackson & Paunonen, 1980) and validity of self-report measures of behavioral dispositions (Buss, 1980; Nunnally, 1978), one would expect that PriSC would moderate self-report reliability and validity. In fact, several studies have demonstrated greater correspondence between self-reports of behavioral dispositions and actual behavior for persons high in PriSC (Scheier, Buss, & Buss, 1978; Turner, 1978; Underwood & Moore, 1981). Self-peer ratings of dispositions can also demonstrate greater correspondence for high PriSC persons (Cheek, 1982; Klesges & McGinley, 1982) although social communication skills also tend to be important and can undermine moderating effects (Wymer & Penner, 1985).

Another form of validity tests the ability of dispositions to predict important 'real life' outcomes like grades, promotions, success of marriage, etc. (cf. Cheek, 1982). To date, no validity study of this type testing the moderating influence of PriSC has been attempted. Studies evaluating the influence of PriSC as a moderator of internal validity are also rare. Nasby (1989) has provided one study demonstrating that high PriSC persons tend to be more stable in their self-reports, and McFarland & Sparks (1985) have provided some data suggesting that high PriSC persons can be more internally consistent in their responses to personality items. Both studies, however, used nontraditional measures of consistency and it is unclear whether or not these measures actually estimate effects on more traditional estimates of reliability (test-retest coefficients or alphas).

Perhaps the most serious problem involves the failure of any of these validity or reliability studies to examine if PriSC promotes changes in the factor structure of the

instruments studied. Validity effects may be related to changes in the internal validity of dispositional measures based on self-report. The primary purpose of the present investigation was to examine the moderating effects of PriSC on the internal and external validity of self-reported behavioral dispositions. Structural modeling procedures were used to provide a strong test of the invariance of the internal validity of the dispositions studied over level of PriSC. Further, the external validity study used a 'real life' criterion, classroom accounting grades, and also incorporated an objective measure of aptitude to determine if PriSC effects were indeed confined to self-report measures.

Overview of Studies

I conducted two studies investigating the relationship between individual differences in self-knowledge and the psychometric properties of self-report measures of attitudes and behavioral characteristics. Private self-consciousness (PriSC) was used to assess individual differences in level of self-knowledge, with higher scores on this scale indicating greater self-knowledge. The first study examined the specific relationship between private self-consciousness and the internal validity and reliability of the Brief Survey of Study Habits and Attitudes (BSSHA) scales. The principle hypothesis investigated was that persons high in private self-consciousness would report more reliably about their behaviors and attitudes. In addition, they would produce a measurement structure or model with higher internal validity than persons low in private self-consciousness. In addition, study 1 sought to support the hypothesis that the short 5-item version of the private scale (Chapter 2) would perform as well as the original 10-item scale in identifying these differences. The second study attempted to partially replicate the results of the first study and to examine the relationship between private self-consciousness and the predictive validity of the BSSHA scales. Consistent with previous research examining the relationship between private self-consciousness and

self-report validity, it was predicted that persons high in private self-consciousness would produce higher validity coefficients than those produced by persons low in private self-consciousness. Again, it was predicted that both the short and original versions of the private self-consciousness scale would produce identical results.

Study 1: Internal Validity

Method

Subjects. Participants were randomly drawn from the general student population of a moderately sized northeastern community college. Students completed the Survey of Study Habits and Attitudes (SSHA), the Self-Consciousness Scale (SCS), and several other measures as part of a much broader study in groups of 10 to 35 students. Responses were anonymous and were obtained with informed consent. All students received extra course credit for their participation in this study. I asked 375 students to complete the SSHA and the SCS twice with a six week interval between test administrations. Students who dropped out of school during data collection or who failed to submit complete and scorable questionnaires were deleted from the study. The final sample size consisted of 351 students (250 female and 101 male) ranging in age from 18 to 58 (median age = 21).

Survey of Study Habits and Attitudes. The college edition of the Survey of Study Habits and Attitudes (SSHA; Brown & Holtzman, 1968, 1984) is a 100 item structured questionnaire employing a 5-point response format ranging from "1-rarely" to "5-almost always." Reliability and criterion validity support the usefulness of this instrument, and recent reviews have been favorable and recommend its continued use (Kirschenbaum & Perri, 1982; Mehrens & Lehmann, 1987). For the present study, however, only the 32 items representing the shortened version of this instrument, the Brief Survey of Study Habits and Attitudes (BSSHA; see Chapter 3), were used. The

BSSHA yields scores on four relatively independent scales theoretically related to academic motivation and student success. The Teacher Approval scale assesses the student's attitude toward teachers and the methods they use. High scores indicate a more positive attitude. Persons scoring high on the Academic Diligence scale report giving considerable and deliberate attention to their course work. The Delay-Avoidance scale is a measure of the degree to which a student reports being free from personal and social distractions that interfere with schoolwork. Finally, the Learning Difficulties scale is a measure of the degree to which a student appears to be having difficulties profiting from self-directed study of course related material. High scores on both the Delay-Avoidance and the Learning Difficulties scale suggest freedom from the problems they attempt to assess. Reliability and validity data for the BSSHA are presented in Chapter 3 and support the utility of these scales. Items defining each BSSHA construct are presented in Table 4.1.

Private Self-Consciousness. One of the Self-Consciousness Scale measures, private self-consciousness (PriSC), was used in this study as a moderator variable. Persons were asked to respond to each PriSC item according to a 5-point response format ranging from "0- completely uncharacteristic" to "4- completely characteristic." Both the original 10-item scale and a short version comprised of the best 5-items of this scale were used in this study to split persons into high or low private self consciousness groups. Since the PriSC scale was administered to students twice, the average of the two scores for each individual was used to define low and high PriSC groups via a median split of scores on each version of the instrument. Both versions of the PriSC scale are presented in Appendix A. Considerable research support exists for the reliability and validity of the original private self-consciousness scale (e.g. Carver & Glass, 1976; Fenigstein, Scheier, & Buss, 1975; Turner, Scheier, Carver, & Ickes, 1978). A previous study (Chapter 2) has reported comparable reliabilities and factorial

validity for both versions of the private scale, and the present investigation attempts to compare both versions in terms of their predictive validity.

Data Analysis. The SPSSx (v 2.2) program was used to compute summary statistics, internal consistency coefficients (alphas), and stability coefficients for the BSSHA scales. The analysis proceeded in two stages. First, the relationship between PriSC and self-report reliability was evaluated using traditional procedures to assess differences between correlations at the scale level. One problem with evaluating the influence of PriSC on these manifest reliability estimates, however, concerns the possibility that PriSC differences affect the structure of the model underlying responses to the BSSHA items. If the factor structure changes over level of PriSC, then the above analysis would be inappropriate. In order to examine this issue, the second stage of the analysis employed structural modeling procedures (LISREL VI; Joreskog & Sorbom, 1986) to analyze the influence PriSC may have had on the factor structure of the BSSHA scales. Focusing on the latent constructs, the reliability and stability analysis was then reexamined using structural modeling techniques. Where appropriate, these new results were then compared to those previously obtained from the traditional analysis.

A multi-group confirmatory factor model was employed in this study to examine the degree of invariance of the BSSHA's measurement model over levels of private self-consciousness. Covariance matrices were produced using item parcels rather than individual items as the basic unit of analysis. Each BSSHA factor was represented by four variables, and each variable was defined as the summed score of two items designed to measure that factor. In order to compare measurement models derived in this study to those from a previous analysis, items were assigned to pairs exactly as given in Chapter 3 (p. 63). Thus, the LISREL analyses reported below were conducted on 16 X 16 (item-pairs) covariance matrices derived from data generated by persons

classified as high PriSC or low PriSC on the original 10 item private self-consciousness scale. The analysis was then repeated but this time the covariance matrices were generated using the short 5 item private self-consciousness scale to define low private and high private groups. These item-pairs are presented in Table 4.1.

The analysis of individual items can pose several problems when using a structural modeling approach to CFA. Trait and attitude items in particular, tend to have large error variances and non normal distributional properties. Both characteristics can affect the fit of the model although maximum likelihood parameter estimates appear to be robust (cf. Hayduk, 1987; Huba & Harlow 1987, Sharma, Durvasula, & Dillon 1989). Several researchers have recommended the use of item parcels rather than individual items in EFA and CFA studies for the following reasons. First, item parcels are likely to be more reliable, more normally distributed, less affected by the idiosyncratic wording of individual items, and yield results having greater generalizability (Comrey, 1988; Marsh, Barnes, Cairns, & Tidman, 1984). Second, item parcels reduce the number of measured variables used in the analysis. Item-pairs, for example, divide the number of measured variables in half, assisting in convergence of the ML solution and considerably reducing the cost of the analysis. Finally, item parcels protect against the emergence of trivial factors based on differential item statistics (cf. Bernstein & Teng, 1989; Bernstein, Teng & Garbin, 1986). Item parcels are not recommended for use, however, when information about the individual items are needed to further refine the instrument. Since this was not my purpose, I decided to use item-pairs for the advantages cited above.

The LISREL CFA submodel was used to examine the relationship between private self-consciousness and the internal structure and reliability of the four BSSHA scales. Three major hypotheses were tested. The first predicted that responses to the BSSHA items could be explained by a correlated four factor congeneric measurement

model which was invariant over levels of private self-consciousness. Although the number of factors and factor pattern was expected to be invariant over levels of private self-consciousness (PriSC), it was also predicted that the quality of the measurement model underlying responses from individuals high in PriSC would be significantly better than that produced by individuals classified as low in PriSC. Second, it was predicted that factor reliabilities would not be invariant over levels of private self-consciousness. The high PriSC group was expected to produce factors with significantly higher reliabilities than those found for the low PriSC group. Finally, the stability of the latent constructs was predicted to be a function of level of private self-consciousness. Specifically it was predicted that the latent constructs would be significantly more stable for persons high in private self-consciousness than for persons low in this cognitive trait. Again, all three hypotheses were analyzed within a structural modeling framework. Bagozzi (1981) has discussed the advantages of using structural modeling procedures to examine the psychometric properties of self-report scales, and has given a demonstration of its use. His general procedure has been adapted to this study. The stability of the latent constructs, however, was assessed following a procedure demonstrated by Tanaka and Huba (1987). Essentially, this procedure allows for the determination of the test-retest correlation for each latent construct as well as a test of the stability of the loadings over time. Tanaka and Huba (1987) point out that if the factor loadings are not stable, then the meaning of the construct can be assumed to change over time.

Because of its precision, maximum likelihood estimation was used to estimate parameters in all LISREL analyses (Joreskog & Sorbom, 1984). As recommended elsewhere (Everitt, 1984; Hayduk, 1987; Long, 1983; Marsh & Hocevar, 1985), multiple criteria were used to assess model fit and quality. First, estimated parameters were examined to determine if all values were within a permissible range. Second,

statistical and subjective goodness of fit criteria were examined and compared for all models tested. The subjective goodness of fit criteria also included indices of model parsimony. Mulaik et al. (1989) have recently reviewed these procedures and their justification. They note that model fit can easily be improved by freeing additional parameters. Parsimony indices take into account the number of freed parameters in the model and correct for minimal improvements in fit resulting from the freeing of additional parameters (parameterization bias). The major fit criteria used in the present study are described briefly in Table 4.2. Third, the quality of each model was evaluated in terms of parameter significance as indicated by LISREL's T-values, and in terms of the percent of aberrant normalized residual values (cf. Gerbing and Anderson, 1988).

Results

Preliminary Analyses. All responses to negatively worded items were reflected so that the highest response code indicated a positive rating on the attitude or trait being measured. Table 4.3 gives BSSHA scale means, standard deviations, and reliability estimates for persons high and low in private self-consciousness across both administrations of the BSSHA scales. These statistics were based on the individual items of each scale rather than the item pairs used in the analyses reported below. Means and standard deviations were relatively stable over administrations, levels of private self-consciousness (PriSC), and versions of the PriSC scale. Thus differential content did not appear to play a significant role in determining PriSC effects, and these results were consistent even when the 5 item version of the PriSC scale was employed to split individuals into low vs. high PriSC groups.

In general, there was a tendency for internal consistency reliabilities (alphas) to be slightly higher for the high PriSC group, and these differences were consistent over both administrations of the scales (means: 1st admin. .83 vs. .79; 2nd admin. .86 vs

.83). Comparable differences were also found when the short PriSC scale was used to split groups (means: 1st admin. .82 vs. .79; 2nd admin. .85 vs .83). None of these differences, however, were statistically significant.¹ Table 4.3 also reveals that the reliabilities (alphas) of the BSSHA scales also appeared to increase over administrations.

Stability coefficients demonstrated greater differences. In every comparison, persons high in PriSC were more stable over time on the characteristics measured by the BSSHA scales. The average BSSHA stability coefficient was .67 for the low PriSC group and .82 for the high PriSC group. These differences were slightly greater when the short version of the PriSC scale was used to define PriSC groups (.66 vs .83). Although these differences were in the predicted direction, it should be noted that when the original PriSC scale was used to define groups only the specific differences observed for the Teacher Approval and Academic Diligence scales were statistically significant ($p < .05$). When the short PriSC scale was used to define groups, however, the increase in stability noted for the high PriSC group on the Learning Difficulties scale was also statistically significant ($p < .05$). Finally, level of private self-consciousness appeared to have its greatest effect on the stability of the Teacher Approval attitude scores. With almost 60% of their observed score variance attributable to error, persons low on PriSC appeared to change dramatically in their rankings on this scale over the six week interval between testings. Persons high in PriSC, however, were reasonably stable in maintaining their rankings over time with less than 18% of their observed score variance attributable to error.

Confirmatory Factor Analyses. Covariance matrices were used to test all confirmatory hypotheses. Proper solutions were obtained for all models tested in this study. Although all item-pairs exhibited a moderately negative skew and moderately non-normal kurtosis (Appendix F), mean values for skew were less than -1.00, and mean

values for kurtosis were less than +1.00 and thus were not expected to significantly distort the parameter estimates (c.f. Huba & Harlow, 1987; Sharma, Durvasula, & Dillon, 1989).

When the original 10 item PriSC scale was used to define low and high self-knowledge groups, the hypothesized 4-correlated factor model represented a statistically unacceptable fit to the data for both groups (Table 4.4). All other indices, however, suggest that the differences between the theoretical model and the data appear to be trivial. For both groups, the $X^2/d.f.$ ratio was less than 2.00 indicating a good fit to the data when the size of the model was taken into account. Further, for the low PriSC group, the TLI and X^2I_2 indices indicated that between 93% and 95% of the data covariation was accounted for by the theoretical model. The same indices indicated that the hypothesized model provided an even better fit for the high PriSC group. TLI and X^2I_2 indices indicated that between 96% and 98% of the data covariation was explained by the model. The hypothesized model was able to easily reproduce the correlation matrix generated by the data in each group. An inspection of the normalized residuals in each group revealed that fewer than 5% (the expected value) of these residuals were greater than 2.00, and none were greater than or equal to 3.00. These data suggest that the 4 correlated factor model provides a good fit to the data for both the low and high PriSC groups, but this factor model provides an even better fit for the high PriSC group.

A careful inspection of Table 4.4 reveals that when the short PriSC scale was used to define groups, results were virtually identical to those discussed above. It should be noted, however, that the differences found between the low and high PriSC groups were slightly greater when the short version of the PriSC scale was used.

Invariance of the BSSHA Measurement Model. The above analyses suggest that the number of factors and pattern of parameter estimates fit the data well over both

PriSC groups and versions of the moderator. The high PriSC group, however, did yield indices suggesting a better fit for this group. On average the multiple correlations between each item pair and its corresponding factor was approximately 6% higher when estimated for persons in the high PriSC group. To further explore the significance of these differences the degree of factorial invariance across PriSC groups was carefully examined.

Four models varying in invariance constraints were tested. The first model simply provided an overall chi-square for the hypothesis of equal number of factors and consistent parameter pattern over the two levels of PriSC. Although this model was already tested above, each group was fitted separately, and thus, an overall chi-square was not obtained. The overall chi-square obtained in this analysis, provided a baseline or target against which more restricted models could be evaluated, and was used to calculate the target coefficient (TC) and chi-square difference test (X^2_d). The second model tested the hypothesis that the 16 factor loadings were equal across groups. The third model tested the hypothesis that the factor loadings and the 16 uniquenesses were equal over groups, and finally the last model tested the hypothesis that the factor loadings, uniquenesses, the 4 factor variances and 6 covariances were equal over groups. For comparison, the four models were retested using the short PriSC scale to define low and high private self-consciousness groups.

Goodness of fit and parsimony indices for models with invariance constraints are presented in Tables 4.5 and 4.6. Statistically, Models 2, 3, and 4 provide a poorer fit to the data than the baseline model ($p < .05$). Other fit indices, however, suggest that these differences may be trivial. For example, Model 4, the most restrictive model, differed little in TLI and X^2/I_2 indices of fit when compared to Model 1. Parsimony indices indicated that Model 4 was the most parsimonious model tested and the target coefficient indicated that this model accounted for approximately 97% of the variance

explained by Model 1. Considering the sensitivity of X^2 (and X^2_d) to sample size and the relatively large sample size used in this study ($N = 351$), the X^2_d for the model 1 vs. model 4 comparison was recomputed with $N = 200$. Recalculating X^2_d as if the sample size was smaller, but still sufficiently large resulted in a nonsignificant X^2_d ($p > .05$). This result supports the conclusion that the statistically significant X^2_d was due in part to the size of the sample. Finally, perhaps the most important indicator of model fit concerns the model's ability to reproduce the covariance matrix it is trying to explain. For Model 4, approximately 5% of the normalized residuals were greater than 2.00, and none were greater than 3.00, suggesting that this model was able to reproduce the covariance matrix within expected sampling error. Given the above, it was concluded that factor loadings, uniquenesses, factor variances and covariances were reasonably invariant over levels of PriSC.

When the short version of the PriSC scale was used to define groups, invariance results were virtually identical to those discussed above. Thus, it was also concluded that factor loadings, uniquenesses, factor variances and covariances were invariant over levels of PriSC regardless of which version of the scale was used to define groups. For comparison purposes, the standardized solution² generated from Model 4 results for each version of the PriSC scale is presented in Table 4.7. All parameter estimates are statistically significant ($p < .01$). These results are extremely similar to each other, and also extremely similar to a solution generated from a previous study (Chapter 3) in which the factor loadings, uniquenesses, factor variances and covariances were found to be invariant over independent samples. Factor reliabilities are also presented in this table and support the conclusion that they as well as the underlying factor structure of the BSSHA appear to be relatively unaffected by individual differences in PriSC. Together these results reveal a well defined structure invariant over sample, invariant over level of PriSC, and invariant over version of PriSC.

Stability of the BSSHA Constructs. Assessment of the stability of the BSSHA constructs involved the specification of two invariance models for each individual construct. The first model constrained factor loadings to be equivalent over time and group, and across time uniquenesses were allowed to be correlated. The second model constrained factor loadings to be equivalent over time and group, and in addition, required the covariance between the time 1 and time two constructs to be equal. Of particular concern was the difference between the X^2 for Model 1 vs. 2, which of course tests the stability of the construct over the six week time interval between testings.

Invariance results for the stability models are presented in Table 4.8. Only the Teacher Approval construct failed to be invariant over low and high levels of PriSC when the original private self-consciousness scale was used to define groups. The difference between chi-squares comparing the model constraining factor covariances to be equal with that allowing factor covariances to be free was statistically significant ($X^2_d = 45.18$, d.f. = 1, $p < .01$), suggesting that the stability of the constructs over time varied over levels of PriSC. To determine if sample size played a significant role in determining this effect, the X^2_d was recalculated with $N = 200$ instead of the actual size of $N = 351$. Still the X^2_d was large and statistically significant ($X^2_d = 25.69$, d.f. = 1, $p < .01$). These results support the hypothesis that individuals high in PriSC tend to give very stable self-reports regarding their attitudes toward their college instructors, while individuals low in PriSC appear to be quite unstable in their self-reports, which tend to change dramatically over time. The stability of the remaining three constructs, however, appear to be relatively high and unaffected by PriSC differences, at least as defined by the original PriSC scale.

Interestingly, when the short PriSC scale was used to define low and high levels of PriSC, the invariance results pertaining to the stability of the BSSHA constructs was not entirely consistent with those reported above (Table 4.9). Although the stability of

the Teacher Approval construct was again found to be a function of level of PriSC, the differences between groups appeared to be slightly greater (compare Tables 4.8 and 4.9). In addition, the stability of the Academic Diligence construct was also influenced by level of PriSC ($X^2_d = 7.45$, d.f. = 1, $p < .01$), and this effect remained statistically significant even when sample size bias was corrected ($N = 200$; $X^2_d = 4.24$, d.f. = 1, $p < .01$). Thus, with respect to the trait of Academic Diligence, individuals high in PriSC were significantly more stable in their self-reports, although the stability of self-reports for those low in PriSC was still relatively high.

Study 2: Replication and Predictive Validity

Results from the first study suggest that private self-consciousness (PriSC) does moderate the internal validity of the Brief Survey of Study Habits and Attitudes (BSSHA) scales. Measurement model fit was better for the high PriSC group, and high/low PriSC differences increased when groups were defined using the short PriSC scale. But both fits (high vs low PriSC) were good and further analysis revealed that for practical purposes these differences were trivial. Overall, my results supported the conclusion that the factor structure and factor reliability estimates of the BSSHA scales were invariant over level and version of PriSC. Study 2 attempts to replicate these findings. It was hypothesized that the internal validity of the BSSHA would be invariant over level of PriSC. Further it was expected that results would be comparable across version of PriSC.

In addition, the relationship between private self-consciousness and the predictive validity of the BSSHA scales and an aptitude measure were also examined. Consistent with previous research examining the relationship between private self-consciousness (PriSC) and self-report validity, it was predicted that persons high in PriSC would produce higher validity coefficients than those produced by persons low in

PriSC. Since aptitude was objectively measured, rather than measured by self-report, no PriSC moderating effects were predicted. Finally it was predicted that results would not differ across the original 10-item and shorten 5-item PriSC scales.

Method

Subjects. I asked 275 community college business students enrolled in Elementary Accounting to participate in this study. All students were asked to complete the Self-Consciousness Scale (SCS), the Survey of Study Habits and Attitudes (SSHA), the Otis Lennon School Ability Test (OL), and several personality scales as part of a broader study examining potential determinants of student success. They completed the questionnaires in groups of 25 to 35 and all students received extra course credit for their participation in this research project. Responses were anonymous and were obtained with informed consent. Fifteen students either dropped out of school during data collection or failed to submit complete and scorable questionnaires and were deleted from the study. Thus, the final sample size consisted of 260 business students (139 female and 121 male) ranging in age from 18 to 48 (median age = 22).

Instruments. The SCS and BSSHA have been described previously. Aptitude was measured using the Otis-Lennon School Ability Test (OL) which has reported reliabilities exceeding .90 and has been found to be a useful local predictor of academic achievement in a previous study (Schertz, 1988).

Criterion Measure. Although the prediction of grade point average (GPA) has practical significance, its use as a criterion is problematic (see Goldman & Slaughter, 1976) and following the recommendation of Kirschenbaum, and Perri (1982), specific course grades were used as the criterion in this study. Elementary Accounting was chosen as the criterion course primarily for three reasons. First, the demand for persistent, motivated, study behavior in this course was among the highest in the

college's curriculum. Classes meet daily, 5 days per week in 50 minute periods, and homework is assigned for every class meeting. Since the nature of the course content is cumulative, unless the student studies consistently and productively it is very difficult to succeed in the course. Second, although the demand for self-directed learning is high, the content of the course is not considered particularly difficult. In a local study, Schertz (1988), reported a relatively modest correlation between academic achievement in accounting and aptitude ($r = .25$; $p < .01$), success depending more on motivational variables. Third, final grade distributions for elementary accounting classes examined between 1984 to 1986 revealed considerable spread in semester grades but only a modest dropout rate after the first five weeks of school (averaging less than 6%). Students completed three non-cumulative exams during the semester and their average exam grade was used as the criterion in this study.

Data Analysis. The data were analyzed in three stages. First, the SPSSx (v2.2) program was used to generate BSSHA scale means, standard deviations, and internal consistency coefficients (alpha) which were compared across levels and versions of PriSC. Second, using structural modeling procedures (LISREL; Joreskog & Sorbom, 1986), the degree of factorial invariance of the BSSHA measurement model described above was also examined over levels of PriSC. Thus, the first two stages of the analyses mirrors the data analytic approach taken in study 1, and represents an attempt to replicate results reported in the previous study.

Whereas the first two stages of my analysis focus on the moderating influence of PriSC on the internal validity of the BSSHA scales, the third stage examines the relationship between PriSC and the external validity of the BSSHA. Specifically, hierarchical regression analysis was used to evaluate the extent to which PriSC moderated the predictive or external validity of the BSSHA scales and the aptitude measure. This procedure allows me to avoid the use of the median split to examine

PriSC moderator effects. Using the continuous PriSC scores instead of a 2-point high-low median split increases power and allows all the information available from the actual PriSC score continuum to be examined in the analysis (cf. Saunders, 1956; Cohen & Cohen, 1983). As noted above, I expected the correlations between each BSSHA scale and classroom achievement to be moderated by PriSC. The correlation between aptitude and classroom achievement, however, was expected to be unaffected by PriSC.

Results

Preliminary Analyses. Negatively worded items were reflected so that the highest response code on every item indicated a positive rating on each measured BSSHA disposition. BSSHA scale means, standard deviations, and reliability estimates based on the individual items of each scale rather than item pairs, are presented in Table 4.10. These summary statistics are given separately for persons high and low in PriSC and also by version of PriSC scale. Consistent with study 1 results, means and standard deviations were relatively stable over level of PriSC and version of PriSC scale suggesting that differential content did not appear to play a deciding role in producing PriSC effects. Reliabilities (alphas), on average, were slightly higher for the high PriSC group over both versions of the scale but these differences were not statistically significant ($p < .05^1$). Overall, these results are consistent with those reported in the previous study (cf. Table 4.3).

Confirmatory Factor Analysis (CFA). Covariance matrices were used to test all confirmatory hypotheses, and proper solutions were obtained in all analyses reported below. Moderately negative skew and moderately non-normal kurtosis (Appendix G) were exhibited by all item-pairs. Consistent with study 1, however, mean values for skew were less than -1.00 and mean values for kurtosis were less than +1.00. Thus item-

pair skew and kurtosis values were not expected to distort the parameter estimates (cf. Huba & Harlow, 1987; Sharma, Durvasula, & Dillon, 1989)

Using the original PriSC scale to define high and low PriSC groups, the correlated 4-factor measurement model was fitted separately to the data generated by each group. Not surprisingly, for both groups, the hypothesized 4-factor correlated measurement model represented a statistically unacceptable fit to the data. (Table 4.11). All other indices, however, indicated a good, if not excellent fit, suggesting that the differences between the theoretical model and the data could be considered trivial. For both groups the $X^2/d.f.$ ratio was less 2.00, and the TLI and the X^2I_2 goodness of fit indices were above .90. The fit indices tended to be somewhat better for the high PriSC group. Group differences, however, were not great and the fit in both groups was good. These results replicate those found in study 1.

The correlated 4-factor measurement model was then refitted to the data using the short PriSC scale to define groups. These results, also presented in Table 4.11, were virtually identical to those found when the original scale was used to define groups. Statistically, the measurement model did not achieve an adequate fit to the data, regardless of group. However, the subjective measures indicated a very good fit in both groups. The $X^2/d.f.$ ratios were less than 2.00, and the TLI and X^2I_2 goodness of fit indices were above .90. Although the fit indices were consistently better for the high PriSC group, these differences were not as great as those found when the original PriSC scale was used. Thus, the CFA results appeared to be consistent over versions of PriSC scale.

The confirmatory factor analysis results from this study replicate those found in the previous study with one exception. In study 1, group differences were greater when the short PriSC scale was used to define groups, but in this study the exact opposite was

found. Group differences were greater when the original PriSC scale defined groups. It is important to point out, however, that PriSC scale differences in both studies were minor. These conflicting results suggest that PriSC scale differences were probably due to sampling and can be treated as unimportant.

Invariance of the BSSHA Measurement Model. To further explore the significance of the high vs. low PriSC differences, a series of invariance studies were conducted. As in study 1, four models varying in invariance constraints were systematically tested. Goodness of fit and parsimony indices are presented in Tables 4.12 and 4.13 for models testing invariance over factor pattern through invariance over factor pattern, factor loadings, factor variances and covariances, and uniquenesses. Consistent with study 1, regardless of version of PriSC scale, Model 4 constraining factor pattern, factor loadings, factor variances and covariances, and uniquenesses over level of PriSC was accepted as the best fitting, most parsimonious model. The $X^2/d.f.$ ratios were less than 2.00, and TLI and X^2I_2 indices of fit and parsimony were above .90. Further, Model 4 was able to easily reproduce the covariance matrix with fewer than 5% of the normalized residuals greater than 2.00, and all values less than 3.00. Finally, the standardized invariant solutions² for both versions of the PriSC scale are presented in Table 4.14. All parameters are significant ($p < .05$), consistent across solutions, and within each solution define a well developed measurement model.

Statistically, Models 3 and 4 were significantly poorer fitting models than Model 2, but only when the original PriSC scale was used to define groups. When the short PriSC scale was used instead, Model 4, the most restrictive model was also statistically supported. That is, Model 4 was not found to be statistically different in fit from model 1 (with only pattern constraints). Since both chi-square and the chi-square difference test are problematic, these differences are noted for the reader. The other indices considered above provide relatively strong support for invariance Model 4 across both

versions of the PriSC scale. Thus, these results also replicate those found in the previous study, providing strong support for the invariance of the BSSHA factor pattern, loadings, factor variances and covariances, and error, over level and version of PriSC scale.

Predictive Validity of the BSSHA Scales. Raw score means, standard deviations, reliabilities, and intercorrelations for the four BSSHA scales, the aptitude measure, the two versions of the PriSC, and the classroom performance measure are presented in Table 4.15. Notably, neither PriSC scale was significantly correlated with classroom performance or aptitude. On average, the 5-item PriSC scale was less correlated with the BSSHA scales, but regardless of PriSC scale these correlations were trivial.

Stepwise regression analysis was used to determine if the predictive validity of the BSSHA scales and the aptitude measure were moderated by PriSC. Each scale was analyzed separately. Ten prediction equations were determined and with each prediction equation containing four variables: a predictor (BSSHA scale or aptitude), a moderator (version of PriSC scale), a predictor X moderator interaction term, and the dependent variable (classroom performance). Following Cronbach's (1987) recommendation, the predictors and moderators were standardized to minimize multicollinearity. Once the predictors and moderators were standardized, then the product or interaction terms were calculated. The dependent variable, classroom performance; i.e. final grade average over three noncumulative exams, was not standardized.

Results presented in Tables 4.16, 4.17, and 4.18 indicate, as expected, that the Otis-Lennon aptitude measure and the four BSSHA scales significantly predicted final accounting grade averages (see Chapter 3). Further, Table 4.16 presents the results of

the regression analyses involving measured aptitude. The prediction that the predictive validity of the aptitude measure, being objective rather than self-report, would not be moderated by PriSC was supported over both versions of PriSC scale.

Table 4.16 presents the results of the four stepwise regression analyses evaluating the validity of the BSSHA scales when the original PriSC scale was used as the moderator. Two of the four BSSHA scales demonstrated significant moderator effects. The interaction between Academic Diligence and PriSC was found to account for a significant amount of the variance in predicting classroom performance. Collectively, Academic Diligence and the interaction between Academic Diligence and PriSC accounted for approximately 21% of the variance in classroom performance, specifically $R^2 = .212$, $F(3, 256) = 22.96$, $p < .01$. The variance explained by Academic Diligence alone was increased by approximately 2.5% by including the moderator. Similarly, Teacher Approval and the interaction between Teacher Approval and PriSC accounted for approximately 23% of the variance in classroom grades with $R^2 = .23$, $F(3, 256) = 27.39$, $p < .01$. The moderator appeared to have less of an effect, accounting for approximately 1% of the explained variance. These results support the conclusion that PriSC moderates the predictive validity of two of the BSSHA scales. Specifically, as PriSC, and presumably self-knowledge, increases then the predictive validity of both the Academic Diligence and Teacher Approval scales also increases. Failure to find significant interaction effects for either the Learning Problems scale or the Delay-Avoidance Scale suggests that PriSC moderating effects are scale dependent.

The regression analyses reported above were repeated using the 5-item version of the PriSC scale as the moderator variable instead of the original scale. The analyses were specifically conducted to determine if the shorter version of the PriSC scale was sensitive enough to produce conceptually identical results. Table 4.17 presents these results which mirror those reported above. PriSC appeared to moderate the predictive

validity of both the Academic Diligence scale and the Teacher Approval scale. That is, significant interaction effects were found for both the Academic Diligence and the Teacher Approval scales, and these interaction effects were virtually identical to those found when the original 10-item PriSC scale was employed as the moderator.

Academic Diligence and the interaction between Academic Diligence and PriSC accounted for approximately 20% of the variance in grades, that is $R^2 = .20$, $F(3, 256)$, $p < .01$. The interaction effect, however, was smaller than that observed above, accounting for approximately 1.5% of the explained variance. Teacher Approval and the interaction between Teacher Approval and PriSC accounted for approximately 24% of the variance in classroom grades with $R^2 = .24$, $F(3, 256)$, $p < .01$. With respect to Teacher Approval, a similar interaction effect was observed over version of PriSC, accounting for approximately 1% of the variance.

Discussion

A basic contention in Buss's (1980) Self-Consciousness Theory is that one consequence of habitual self-directed attention is greater self-knowledge. Buss (1980) has maintained that persons who are high in private self-consciousness, other things being equal, will produce more accurate self-reports. Some researchers have proposed that being more accurate means being more reliable as well (Jackson & Paunonen, 1980; McFarland & Sparks, 1985; Nasby, 1989). In the present study, PriSC differences did appear to moderate the factorial validity of the BSSHA scales in the predicted direction, thus supporting Self-Consciousness Theory, but these effects appeared to be trivial. In practical terms, the factor structure and factor reliabilities of the scales could be treated as invariant over level of PriSC. If these results apply to other behavioral dispositions as well, then it is safe to assume that changes in factor structure do not explain previous studies noting higher validity coefficients for people high in PriSC (e.g. Scheier, Buss, & Buss, 1978).

One caution should be noted. The BSSHA scales were found to have a strong structure (Chapter 3) and thus the minimal effects observed could have been due to a ceiling effect. Although there were clear differences in the predicted direction, both group measurement model fits were very good ($>.90$ on TLI and X^2/I_2 indices), and fit indices for the high PriSC group could not be expected to be much higher, being already close to 1.00). The use of item pairs rather than individual items may have contributed to these results. One recommendation would be to reanalyze the data using the individual items. If the items demonstrate a significant effect, however, this would provide support for the contention that item-parcels may be more resistant to PriSC effects. Some researchers have recently argued for the use of homogeneous item-sets as a basic data unit in factor studies (Comrey, 1988; Marsh, Smith, Barnes, & Butler (1983).

The stability results were mixed in providing support for Nasby's (1989) view that persons high in PriSC demonstrate greater stability on self-report measures of behavioral dispositions. Presumably, persons high in PriSC have more articulated self-schemata and tend to process incoming information in terms of its self-relevance. Nasby (1989) notes that greater schematic articulation promotes the processing of self-relevant information more consistently. Raw scores test-retest coefficients were all in the predicted direction but only two of the four scales produced significant results. The Teacher Approval (TA), an attitude scale, demonstrated large PriSC effects. Persons low in PriSC were extremely unstable in their self-reports over time. Use of the TA scale in studies assuming stability over periods of six weeks or greater should proceed with caution, and should estimate or control for self-knowledge effects. The Academic Diligence (AD) scale also demonstrated significant PriSC effects but these effects were not as great as those noted for the TA scale. The consistency of both the test-retest correlations and the latent stabilities in both scales suggests that changes were not

random but due to actual changes in true scores. The stability of both dispositions, however, appears to be related to a person factor which has important implications for the use of both scales. For example, with respect to persons high in PriSC, counselors using the TA or AD scale would be able to predict that positive or negative attitudes toward teachers are not likely to change without intervention, at least over a six week period (1/3 of the semester!). An interesting question concerns whether high PriSC persons with negative attitudes or little Academic Diligence would be more resistant to intervention, while low PriSC persons may change more readily (cf. Damsteegt & Christoffersen, 1982). Thus, self-consciousness effects may have counseling implications as well. Finally it appears that both the Learning Difficulties (LD) and the Delay-Avoidance (DA) scales are resistant to PriSC effects.

The predictive validity results were also mixed. The failure to find PriSC effects for the objective measure supports the notion that PriSC moderating influences are related to self-report measures. Further, the finding in an independent sample that both the TA and AD scale's predictive validity was moderated by PriSC suggests that these effects may in due, at least in part, to changes in true scores over time. As noted above, Both scales demonstrated PriSC moderating influences affecting stability over time. However, the effects on predictive validity were not great, only accounting for 1% to 3% of the variance in accounting grades. A stronger test of the relationship between attitude/trait stability and predictive validity would require that both be studied within the same sample. A study of this nature is recommended. Presently, one wonders if the stability of both characteristics would have been more resistant to PriSC effects in this sample. Recall that the stability sample was representative of the general population, while the replication and validity sample was drawn from the population of business students only. However, since the factorial validity and scale internal consistencies appeared to be invariant over sample, its quite possible that others effects, if tested

would have been similar as well. Regardless, even given the size of these effects, large differences in predictive validity coefficients would be found when people are extremely low or high in PriSC and caution must be exercised in these cases. Finally, with respect to their predictive validities, both the Learning Difficulties (LD) and Delay-Avoidance (DA) scales were unaffected by PriSC differences, supporting their use with persons varying in the degree of their self-knowledge.

Perhaps the most important finding in this study concerned the comparison made between the 5-item PriSC scale and the original 10-item scale. Eliminating half of the items of the original PriSC scale resulted in a more efficient scale with higher reliability. In this study, results were consistent across version of PriSC. When the original scale detected differences so did the shorter version, sometimes even with greater sensitivity. For example, the test-retest correlations of the Delay-Avoidance (DA) scale was found to be significantly different when the 5-item version was used but not when the original scale was used to define high and low PriSC groups. However, overall differences were minimal. These results suggests that self-reflection or specifically the ruminative aspects of self-directed attention may account for the effects related to this construct, rather than the broader view of PriSC as involving self-reflection, tendency to fantasize, and internal state awareness (Buss, 1980). This notion of PriSC is also consistent with Franzoi & Brewer's (1984) finding that persons high on this trait tend to engage in more ruminative thinking focusing on past behavior, while persons low in PriSC tended to avoid ruminative thinking preferring to direct attention inwards to consider novel events or experiences. It is recommended that researchers who have data based on the PriSC scale, reexamine their results using the 5 recommended items of the short version (Chapter 2). Researchers planning new studies might consider evaluating their results using both versions. This information may help further clarify the meaning of the PriSC construct.

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Notes

¹Feldt, Woodruff, & Salih (1987) have provided the formulas and justification for testing statistical hypotheses involving alpha reliability coefficients. Because of the number of comparisons, however, the chosen significance level (.05) was corrected to control for the overall error rate using the simple Bonferroni procedure (i.e. dividing the chosen significance level .05 by 16, the number of comparisons, and using this new value as the corrected significance level. Caution must be taken when using this procedure with samples employing unequal n, but in this case, the differences were minimal and the effect presumably inconsequential.

²For ease of interpretation, the three relevant data sets were reanalyzed using correlation matrices and the standardized solution from each analysis was reported in the table. Results based on the correlation matrices, when compared to those found for the covariance matrices were essentially identical.

Table 4.1
BSSHA Scales (Arranged as Item Pairs)

Scale 1: Learning Difficulties

1. WM9 In taking notes, I tend to take down material which later turns out to be unimportant.
 WM13 I have difficulty picking out the important points of a reading assignment- points that later appear on examinations.
2. WM7 I get nervous and confused when taking an exam and fail to answer questions to the best of my ability.
 WM25 During examinations I forget names, dates, formulas, and other details that I really do know.
3. WM12 After reading several pages of an assignment I am unable to recall what I have just read.
 WM16 I seem to accomplish very little in relation to the amount of time I spend studying.
4. WM17 I can concentrate on a reading assignment for only a short period of time before the words become a meaningless jumble.
 WM10 I do poorly on tests because I find it hard to think clearly and plan my work within a short period of time.

Scale 2: Academic Diligence

5. WM4 I give special attention to neatness on themes, reports, and other work to be turned in.
 DA25 At the beginning of a study period I organize my work so that I will utilize the time most effectively.
 6. WM1 In preparing reports, themes, term papers, etc. I make certain that I clearly understand what is wanted before I begin work.
 WM20 When preparing for an examination, I arrange facts to be learned in some logical order-- order of importance, order of presentation in class or textbook, order of time in history, etc.
 7. EA3 Even though I don't like a subject, I still work hard to make a good grade.
 EA18 I strive to develop a sincere interest in every course I take.
 8. DA2 When I get behind in my school work for some unavoidable reason, I make up back assignments without prompting from the teacher.
 DA19 I complete my homework assignments on time.
-

Table 4.1 (Continued)

Scale 3: Attitude toward Teachers

9. TA5 I think that teachers like to exercise their authority too much.
 TA18 I feel that teachers think too much about grades and lose sight of the real objectives of education.
10. TA7 I think that teachers expect students to do too much studying outside of class.
 TA16 I feel that teachers make their courses too difficult for the average student.
11. TA15 I feel that teachers tend to be sarcastic towards their poorer students and tend to ridicule their mistakes excessively.
 TA23 I feel that the ridiculous assignments made by teachers are the main reason for students cheating.
12. TA1 I feel that teachers lack an understanding of the needs and interests of students.
 TA3 I feel that teachers allow their personal like or dislike for a student to influence their grading unduly.

Scale 4: Distractions

13. DA3 Daydreaming about dates, future plans, etc. distracts my attention from my lessons while I am studying.
 DA13 When I sit down to study I find myself to tired, bored, or sleepily to study efficiently.
14. DA11 I am unable to concentrate well because of periods of restlessness, moodiness, or "having the blues".
 DA18 Problems outside of school--financial difficulties, being in love, conflict with parents etc.--cause me to neglect my school work.
15. DA10 It takes a long time for me to get warmed up to the task of studying.
 DA16 "Extracurricular activities"--dating, clubs, athletics, fraternity and sorority activities, etc. cause me to get behind in my school work.
16. DA14 I waste too much time talking, reading magazines, listening to the radio, watching TV, going to the movies, etc. for the good of my studies.
 DA21 With me, studying is a hit-or-miss proposition depending on the mood I'm in.
-

Table 4.2
Goodness-of-Fit and Parsimony Indicators

Indicator	Description
χ^2	The chi-square likelihood ratio test. Good fit is determined by nonsignificant result
χ^2/df	The ratio of the chi-square to the degrees of freedom of a given model. Values equal to or less than 2 are considered to indicate good fit.
χ^2_d	The chi-square difference test between nested models. Good fit is determined by a nonsignificant result.
TLI	Tucker-Lewis Index. A type 2 incremental-fit index. Values equal to or greater than .90 indicate good fit. Relatively independent of the influence of sample size.
χ^2I_2	Chi-square type 2 incremental fit index. Values equal to or greater than .90 indicate good fit. Relatively independent of the influence of sample size.
PTLI, PX^2I_2	Parsimony measures based on corrections to TLI, and χ^2I_2 . The higher the value the more parsimonious the model (Muliak et. al., 1989).
TC	Target Coefficient. A measure of the ability of a model with invariance constraints to explain the covariation compared to a corresponding model with no invariance constraints. When TC equals 1.0, the covariance accounted for by the more restrictive invariant model equals that accounted for by the model without invariance constraints (Marsh, 1987).

Note: For the interested reader formulas for TLI and χ^2I_2 may be found in Marsh, Balla & McDonald (1988). Formulas for PTLI, and PX^2I_2 may be found in Mulaik, James, Van Alstine, Bennett, Lind, & Stilwell (1989). The formula for the TC index is given in Marsh (1987).

Table 4.3
BSSHA Means, Standard Deviations, and Reliability Coefficients as a Function of Level of Private Self-Consciousness

	1st Administration						2nd Administration					
	Private			Low			Private			High		
	M	SD	α	M	SD	α	M	SD	α	M	SD	α
Scales Split By PriSC												
I Learning Difficulties	29.8	5.4	.79	30.8	5.7	.84	30.4	5.3	.82	31.2	6.1	.88
II Academic Diligence	28.7	6.0	.79	29.7	6.2	.80	28.8	6.2	.82	30.5	6.2	.83
III Teacher Approval	32.9	4.0	.74	33.5	4.2	.79	33.0	4.6	.82	33.9	4.6	.84
IV Delay-Avoidance	29.8	6.0	.82	29.4	6.6	.87	29.9	6.0	.84	29.6	6.7	.87
Scales Split By Short PriSC												
I Learning Difficulties	30.9	5.1	.79	29.6	6.0	.83	31.5	4.9	.81	30.1	6.4	.88
II Academic Diligence	29.5	6.0	.80	28.8	6.2	.80	29.8	6.2	.82	29.3	6.3	.83
III Teacher Approval	33.3	3.9	.74	33.0	4.4	.78	33.7	4.5	.84	33.2	4.8	.83
IV Delay-Avoidance	30.8	5.7	.83	28.3	6.7	.85	30.8	5.9	.85	28.6	6.7	.86

Six week interval between test administrations. Since the Private scale was also given twice, median splits were based on each individual's average private score over the two testings. A median split based on the private scale resulted in a different number of people classified as low or high depending on the version of the private scale used. Thus for low private: original scale n = 185; short scale n = 188. High private: original scale n = 166; short scale n = 163.

* p < .05.

Table 4.4

Goodness of Fit Indices for the Correlated Four-Factor BSSHA Measurement Model as a Function of Two Versions of the Private Self-Consciousness Scale

Model	$\chi^2(df)$	χ^2/df	TLI	χ^2I_2	PTLI	$P\chi^2I_2$
<u>PriSC (Original Version)</u>						
0: Null Model						
Low PriSC	1342.98(120)**	11.19				
High PriSC	1470.91(120)**	12.26				
1: Four BSSHA factors:						
Low PriSC	163.63(98)**	1.67	.93	.95	.76	.78
High PriSC	148.97(98)**	1.59	.98	.96	.80	.78
<u>PriSC (Short Version)</u>						
0: Null Model						
Low PriSC	1457.06(120)**	12.14				
High PriSC	1327.15(120)**	11.06				
1: Four BSSHA factors:						
Low PriSC	179.32(98)**	1.83	.93	.94	.76	.77
High PriSC	128.17(98)*	1.31	.97	.98	.79	.80

* $p < .05$. ** $p < .01$.

Notes: PriSC (Original Version): Group 1 (Low Private), $N = 185$; Group 2 (High Private), $N = 166$.

PriSC (Short Version): Group 1 (Low Private), $N = 188$; Group 2 (High Private), $N = 163$.

Table 4.5

Invariance Tests for Correlated Four-Factor BSSHA Model as a Function of Private Self-Consciousness (Original Scale)

Model	χ^2 (df)	χ^2 /df	TLI	$\chi^2 I_2$	PTLI	$PX^2 I_2$	TC	χ^2_d (df _d)
0: Null Model Low vs. High Private	2813.89(240)	11.73						
1: Four BSSHA factors invariant Low vs. High Private	312.60(196)	1.59	.95	.96	.78	.78	1.0	
2: Model 1 with factor loadings invariant Low vs. High Private	353.83(208)	1.70	.94	.94	.82	.82	.98	41.23(12)*
3: Model 2 with uniquenesses invariant Low vs. High Private	387.17(228)	1.70	.94	.94	.89	.89	.97	74.57(32)*
4: Model 3 with factor variances & covariances invariant Low vs. High Private	391.32(234)	1.67	.94	.94	.92	.92	.97	78.72(38)*

Notes: Sample 1 (Low Private): N = 185. Sample 2 (High Private): N = 166.

* $p < .05$.

Table 4.6

Invariance Tests for Correlated Four-Factor BSSHA Model as a Function of Private Self-Consciousness (Short Version)

Model	χ^2 (df)	χ^2 /df	TLI	$\chi^2 I_2$	PTLI	$P\chi^2 I_2$	TC	χ^2_d (df _d)
0: Null Model Low vs. High Private	2784.21(240)	11.60						
1: Four BSSHA factors invariant Low vs. High Private	307.49(196)	1.57	.95	.96	.78	.78	1.0	
2: Model 1 with factor loadings invariant Low vs. High Private	343.17(212)	1.62	.94	.95	.83	.84	.99	35.68(16)*
3: Model 2 with uniquenesses invariant Low vs. High Private	377.01(228)	1.65	.94	.94	.89	.89	.97	69.52(32)*
4: Model 3 with factor variances and covariances invariant Low vs. High Private	397.33(234)	1.70	.93	.94	.91	.92	.96	89.84(38)*

Notes: Sample 1 (Low Private): N = 188. Sample 2 (High Private): N = 163.

* p < .05.

Table 4.7

Standardized Invariant Solutions for the BSSHA Correlated Four Factor Model

Factor Loadings*												Uniqueness			
Item-Pair	LD			AD			TA			DA			1	2	3
	1	2	3	1	2	3	1	2	3	1	2	3			
1	76	75	75										43	43	44
2	66	65	63										57	58	60
3	78	79	78										39	38	40
4	86	82	83										27	32	32
5				77	77	77							41	41	40
6				70	69	70							51	52	51
7				78	78	78							39	39	39
8				69	70	71							52	51	50
9							79	78	78				38	39	39
10							75	74	74				44	46	46
11							70	69	71				50	52	50
12							69	72	72				52	49	49
13										79	83	82	38	31	32
14										72	71	70	48	49	51
15										77	76	75	41	43	43
16										79	78	79	38	40	38

Factor Correlations

	LD			AD			TA			DA		
	1	2	3	1	2	3	1	2	3	1	2	3
LD	85	84	84									
AD	37	34	35	83	83	83						
TA	50	45	46	28	26	26	82	82	83			
DA	68	67	66	60	61	60	54	51	51	85	85	85

* LD = Learning Difficulties; AD = Academic Diligence; TA = Teacher Approval; DA = Delay-Avoidance. 1 = Invariance across samples, N = 611 (Kilduff & Velicer, 1989); 2 = Invariance across levels of Private Self-Consciousness, N = 351 (original scale); 3 = Invariance across levels of Private Self-Consciousness, N = 351 (short version).

Decimals omitted. Factor reliabilities are underlined in correlation matrix. All parameters are statistically significant: $p < .01$.

Table 4.8

Invariance of BSSHA Stability Coefficients across Low vs. High Self-Consciousness (original scale)

Model	$X^2(df)$	$X^2_d(df_d)$	Stability	
			Low	High*
1: Learning Difficulties				
A. Loadings invariant	55.15(42)			
B. A plus factor covariances invariant	55.17(43)	.02(1)	.86	Inv
2: Academic Diligence				
A. Loadings invariant	68.48(42)			
B. A plus factor covariances invariant	70.85(43)	2.37(1)	.91	Inv
3: Teacher Approval				
A. Loadings invariant	90.27(42)			
B. A plus factor covariances invariant	135.45(43)	45.18(1)**	.51	.94
4: Delay-Avoidance				
A. Loadings invariant	90.05(42)			
B. A plus factor covariances invariant	90.58(43)	.53(1)	.86	Inv

Notes: N = 351. Six week interval between administrations. Each construct was analyzed separately.

* Private Self-Consciousness (original scale)

** $p < .01$

Table 4.9

Invariance of BSSHA Stability Coefficients across Low vs. High Self-Consciousness (short version)

Model	$\chi^2(df)$	$\chi^2_d(df_d)$	Stability	
			Low	High*
1: Learning Difficulties				
A. Loadings invariant	64.90(42)			
B. A plus factor covariances invariant	65.26(43)	.36(1)	.86	Inv
2: Academic Diligence				
A. Loadings invariant	61.61(42)			
B. A plus factor covariances invariant	69.06(43)	7.45(1)**	.85	.96
3: Teacher Approval				
A. Loadings invariant	81.78(42)			
B. A plus factor covariances invariant	132.32(43)	50.54(1)**	.49	.96
4: Delay-Avoidance				
A. Loadings invariant	81.60(42)			
B. A plus factor covariances invariant	81.98(43)	.38(1)	.85	Inv

Notes: N = 351. Six week interval between administrations. Each construct was analyzed separately.

* Private Self-Consciousness (short version)

** $p < .01$

Table 4.10
BSSHA Means, Standard Deviations, and Reliability Coefficients as a Function of Level of Private Self-Consciousness
(Sample 2)

		Private Self-Consciousness			
		Low		High	
		M	SD	α	α
BSSHA Scales (10 item Private Scale)					
I	Learning Difficulties	29.3	6.4	.85	.86
II	Academic Diligence	29.4	6.7	.83	.81
III	Teacher Approval	32.2	5.1	.84	.83
IV	Delay-Avoidance	29.3	6.2	.83	.86
BSSHA Scales (5 item Private Scale)					
I	Learning Difficulties	32.2	5.1	.83	.86
II	Academic Diligence	29.8	6.3	.81	.83
III	Teacher Approval	29.3	6.3	.85	.83
IV	Delay-Avoidance	29.4	6.0	.81	.87

A median split based on the private scale resulted in a different number of people classified as low or high depending on the version of the private scale used. Thus for low private: original scale n = 137; short scale n = 143. High private: original scale n = 123; short scale n = 117.

Table 4.11

Goodness of Fit Indices for the Correlated Four-Factor BSSHA Measurement Model as a Function of Two Versions of the Private Self-Consciousness Scale (Sample 2)

Model	$\chi^2(df)$	χ^2/df	TLI	$\chi^2_{I_2}$	PTLI	$P\chi^2_{I_2}$
<u>PriSC (Original Version)</u>						
0: Null Model						
Low PriSC	1174.10(120)**	9.78				
High PriSC	1045.82(120)**	8.72				
1: Four BSSHA factors:						
Low PriSC	183.14(98)**	1.87	.90	.92	.74	.75
High PriSC	121.97(98) ^a	1.25	.97	.98	.79	.80
<u>PriSC (Short Version)</u>						
0: Null Model						
Low PriSC	1128.65(120)**	9.41				
High PriSC	1083.07(120)**	9.03				
1: Four BSSHA factors:						
Low PriSC	171.68(98)**	1.75	.91	.93	.74	.77
High PriSC	144.56(98)**	1.48	.94	.95	.77	.78

^a $p > .05$; * $p < .05$; ** $p < .01$.

Notes: PriSC (Original Version): Group 1 (Low Private), N = 185; Group 2 (High Private), N = 166.

PriSC (Short Version): Group 1 (Low Private), N = 188; Group 2 (High Private), N = 163.

Table 4.12

Invariance Tests for Correlated Four-Factor BSSHA Model as a Function of Private Self-Consciousness (Original Scale)

Model	$\chi^2(\text{df})$	χ^2/df	TLI	$\chi^2 I_2$	PTLI	$PX^2 I_2$	TC	$\chi^2_d(\text{df}_d)$
0: Null Model Low vs. High Private	2219.92(240)	9.25						
1: Four BSSHA factors invariant Low vs. High Private	305.11(196)	1.56	.93	.95	.76	.78	1.0	
2: Model 1 with factor loadings invariant Low vs. High Private	323.41(208)	1.56	.93	.94	.81	.82	.99	18.30(12)
3: Model 2 with uniquenesses invariant Low vs. High Private	352.67(224)	1.57	.93	.94	.87	.88	.98	47.56(28)*
4: Model 3 with factor variances & covariances invariant Low vs. High Private	365.19(234)	1.56	.93	.93	.91	.91	.97	60.08(38)*

Notes: Sample 1 (Low Private): $n = 137$. Sample 2 (High Private): $n = 123$.* $p < .05$.

Table 4.13
Invariance Tests for Correlated Four-Factor BSSHA Model as a Function of Private Self-Consciousness (Short Version)

Model	$\chi^2(df)$	χ^2/df	TLI	χ^2I_2	PTLI	PX^2I_2	TC	$\chi^2_d(df_d)^*$
0: Null Model Low vs. High Private	2211.72(240)	9.22						
1: Four BSSHA factors invariant Low vs. High Private	316.23(196)	1.61	.93	.94	.76	.77	1.0	
2: Model 1 with factor loadings invariant Low vs. High Private	335.45(212)	1.58	.93	.94	.82	.83	.99	19.22(16)
3: Model 2 with uniquenesses invariant Low vs. High Private	352.59(224)	1.57	.93	.94	.87	.88	.98	36.36(28)
4: Model 3 with factor variances and covariances invariant Low vs. High Private	363.21(234)	1.55	.93	.94	.91	.92	.98	46.98(38)

Notes: Sample 1 (Low Private): n = 143. Sample 2 (High Private): n = 117.
* p > .05.

Table 4.14

Standardized Invariant Solutions for the BSSHA Correlated Four Factor Model (Business Sample)

Factors Loadings*												Uniqueness			
Item-Pair	LD			AD			TA			DA			1	2	3
	1	2	3	1	2	3	1	2	3	1	2	3			
1	76	76	76										43	43	43
2	66	67	67										57	55	56
3	78	77	77										39	41	41
4	86	89	89										27	21	21
5				77	77	77							41	41	41
6				70	70	70							51	52	52
7				78	77	78							39	41	40
8				69	68	67							52	54	55
9							79	81	81				38	34	35
10							75	76	76				44	42	43
11							70	72	73				50	48	47
12							69	66	67				52	56	55
13										79	74	73	38	46	46
14										72	71	71	48	49	50
15										77	77	77	41	40	41
16										79	81	80	38	34	35

Factor Correlations

	LD			AD			TA			DA		
	1	2	3	1	2	3	1	2	3	1	2	3
LD	85	86	86									
AD	37	41	41	83	82	82						
TA	50	56	55	28	29	29	82	83	83			
DA	68	73	73	60	63	62	54	60	61	85	85	84

*LD = Learning Difficulties; AD = Academic Diligence; TA = Teacher Approval; DA = Delay-Avoidance. 1 = Invariance across samples, N = 611 (Kilduff & Velicer, 1989); 2 = Invariance across levels of Private Self-Consciousness, N = 260 (original scale); 3 = Invariance across levels of Private Self-Consciousness, N = 260 (short version).

Decimals omitted. Factor reliabilities are in bold in correlation matrix. All parameters are statistically significant: $p < .01$.

Table 4.15
BSSHA, Otis-Lennon (Aptitude), and Classroom Performance Summary Statistics

Scale	M	SD	Alpha	Intercorrelations					P5	FGA	
				I	II	III	IV	OL			
I. BSSHA Learning Difficulties	29.7	6.2	.85	1.00							
II. BSSHA Academic Diligence	29.7	6.4	.82	.33	1.00						
III. BSSHA Teacher Approval	32.5	5.2	.83	.48	.24	1.00					
IV. BSSHA Delay-Avoidance	28.4	6.7	.85	.59	.50	.50	1.00				
OL Otis-Lennon (Aptitude)	103.6	11.4	NA	.32	-.04ns	.17	.19	1.00			
P10 Private (original 10 item scale)	23.0	5.7	.74	.13	.16	.10ns	-.09ns	.03ns	1.00		
P5 Private (5-item scale)	10.1	4.0	.76	.07ns	.03ns	.04ns	-.19	-.01ns	.86	1.00	
FGA Final Grade Average	74.2	12.6	NA	.52	.43	.48	.55	.30	.07ns	-.02ns	1.00

NA = not available. ns = not significant ($p > .05$), remaining intercorrelations are significant ($p < .05$).
N=260.

Table 4.16
Otis-Lennon (Aptitude) Validity Coefficients Moderated by Private Self-Consciousness

Equation	Predictor Set	b	b _{SE}	B	B _{SE}	R	R ²	R ² _{Adj}	F	R ² _{Ch}	F _{Ch}
PriSC (Original Scale)											
I	Otis-Lennon (OL)										
	1. OL	3.78	.749	.300	.059	.300	.090	.087	25.52***	.090	25.52***
	2. PriSC	NS									
	3. OL X PriSC	NS									
	(Constant)	74.235	.747								
PriSC (Short Scale)											
I	Otis-Lennon (OL)										
	1. OL	3.78	.752	.300	.060	.300	.090	.087	25.52***	.090	25.52***
	2. PriSC	NS									
	3. OL X PriSC	NS									
	(Constant)	74.235	.747								

* p < .10; ** p < .05; *** p < .01. NS = not significant p > .10. N = 260.
Significant interaction effects are in bold.

Table 4.17
BSSHA Validity Coefficients Moderated by Private Self-Consciousness (Original Scale)

Equation	Predictor Set	b	b _{SE}	B	B _{SE}	R	R ²	R ² _{Adj}	F	R ² _{Ch}	F _{Ch}
I Learning Difficulties (LD)											
1.	LD	6.53	.679	.518	.054	.519	.269	.266	94.92***	.269	94.92***
2.	PriSC	NS									
3.	LD X PriSC	NS									
	(Constant)	74.235	.670								
II Academic Diligence (AD)											
1.	AD	5.64	.712	.448	.057	.433	.187	.184	59.35***	.187	59.35***
2.	PriSC	NS									
3.	AD X PriSC	1.81	.635	.159	.056	.461	.212	.203	22.96***	.025	8.12***
	(Constant)	73.95	.705								
III Teacher Approval (TA)											
1.	TA	5.96	.689	.472	.055	.480	.230	.227	77.08***	.230	77.08***
2.	PriSC	NS									
3.	TA X PriSC	1.52	.747	.113	.055	.493	.243	.234	27.39***	.012	4.14**
	(Constant)	74.09	.688								
IV. Delay Avoidance (DA)											
1.	DA	7.03	.654	.557	.052	.547	.299	.296	109.92***	.299	109.92***
2.	PriSC	1.53	.654	.122	.052	.560	.314	.308	58.67***	.015	5.50**
3.	DA X PriSC	NS									
	(Constant)	74.24	.656								

* p < .10; ** p < .05; *** p < .01. NS = not significant p > .05. N = 260.
Significant interaction effects are in bold.

Table 4.18

BSSHA Validity Coefficients Moderated by Private Self-Consciousness (Short Scale)

Equation	Predictor Set	b	b _{SE}	B	B _{SE}	R	R ²	R ² _{Adj}	F	R ² _{Ch}	F _{Ch}
I Learning Difficulties (LD)											
1. LD		6.59	.674	.523	.054	.519	.269	.266	94.92***	.269	94.92***
2. PriSC		NS									
3. LD X PriSC		NS									
	(Constant)	74.235	.670								
II Academic Diligence (AD)											
1. AD		5.51	.705	.438	.056	.433	.187	.184	59.35***	.187	59.35***
2. PriSC		NS									
3. AD X PriSC		1.37	.657	.116	.056	.449	.202	.192	21.54***	.014	4.32**
	(Constant)	73.95	.705								
III Teacher Approval (TA)											
1. TA		5.97	.688	.473	.055	.480	.230	.227	77.08***	.230	77.08***
2. PriSC		NS									
3. TA X PriSC		1.39	.736	.104	.055	.492	.242	.233	27.23***	.011	3.57*
	(Constant)	74.09	.688								
IV. Delay Avoidance (DA)											
1. DA		7.10	.667	.563	.053	.547	.299	.296	109.92***	.299	109.92***
2. PriSC		NS									
3. DA X PriSC		NS									
	(Constant)	74.24	.657								

* p < .10; ** p < .05; *** p < .01. NS = not significant p > .05. N = 260.
Significant interaction effects in bold.

Chapter 5

General Discussion

The primary purpose of my research was to evaluate the relationship between individual differences in self-knowledge and the psychometric properties of self-report measures of behavioral dispositions commonly used in college counseling centers. The private self-consciousness (PriSC) scale was chosen to differentiate persons high and low in self-knowledge. The Survey of Study Habits and Attitudes (SSHA) was chosen to represent the behavioral dispositions studied. Because of unresolved issues regarding the structure of both the PriSC scale and the SSHA, in order to successfully interpret results, I also evaluated the internal validity of the Self-Consciousness Scales (SCS), which includes the PriSC as a subscale; and the internal and external validity of the Survey of Study Habits and Attitudes (SSHA). In conducting this research, I attempted to answer three basic questions having both theoretical and practical relevance for my own work in a college counseling center.

First, what is the dimensionality of the PriSC scale and how does its structure contribute to our understanding of this construct? Although I compared several competing measurement models of the SCS, the most important comparisons for my own research, involved those models presenting varying views of the PriSC construct. Specifically, the question was whether the two facets of PriSC, self-reflection and internal state awareness (Table 2.1) reflect one underlying process or two related, but distinct processes. My results clearly support the view that they are two different but correlated processes. Internal state awareness, however, with only three items and marginal reliability, should be viewed as only a minor factor. This may explain why some studies (e.g. Bernstein, Teng, & Garbin, 1986) did not confirm it. As a moderator, both the original 10-item PriSC scale and the short 5-item PriSC (without the internal

state awareness items), produced near identical results. When differences were noted, it appeared that the short scale was more sensitive in producing effects. Given the PriSC short scale also produced higher reliability coefficients (alphas), I would recommend that the internal state awareness items be dropped from the original scale.

It is possible, however, that the internal state awareness factor may be responsible for some of the effects observed for this scale, particularly those involving affect. It may be more reasonable to add items to this scale and to systematically test its discriminant validity with respect to self-reflection. In a recently published study, Piliavin & Charng (1988) found that a measure of identity seeking correlated positively with self-reflection ($r = .23, p < .001$) and negatively with internal state awareness ($r = -.22, p < .001$). Adding items would increase the reliability of this 3-item scale and perhaps result in a fairer test of its discriminant validity. I would also recommend that researchers currently using the PriSC scale score both versions of the scale and compare results. Further, researchers who have data sitting in their file cabinets could assist in shedding light on the discriminant and convergent validity of internal state awareness and self-reflection by reevaluating their data.

With respect to the meaning of PriSC scores, my results support Franzoi & Brewer's (1984) conclusion that the major difference between persons high and low in PriSC is their degree of ruminative self-attention. Persons high in this trait tend to be very ruminative in their self-reflection, examining and reexamining their motives, behavior, and self-relevant experiences. Persons low on this trait, however, tend to avoid ruminative thinking. When self-conscious they tend to think about new experiences rather than mulling over old ones, and seldom engage in self-study or self-analysis. When new experiences are unavailable, then their attention quickly shifts outward toward the environment. In my study of the internal validity of the SCS, the highest PriSC factor loadings consistently involved those items suggesting ruminative

self-study (e.g. I'm constantly examining my motives; see Tables 2.1, 2.6, 2.9; items 1, 5, and 15).

One troublesome aspect of my review of the available SCS factorial validity research, was the consistent finding that two items on the PriSC scale simply did not work. Items 3 and 9 (Table 2.1), at best, are very poor indicators of PriSC and should be eliminated from the scale. Although their elimination has been repeatedly suggested, researchers have generally ignored the problem, using the original version of the scale, failing to even mention research questioning the items or structure of the scale, and noting in their method section those studies supporting the factorial, discriminant and convergent validity of the scales. Perhaps the real problem involves the difficulty in changing scales that have been achieved some popularity. Consider Bernstein, Teng, & Garbin's (1986) recent factor study. The authors set out to evaluate the structure of the SCS, and the suggestion that the PriSC subscale was really two-dimensional. They also wanted to evaluate Burnkrant and Page's (1984) suggestion that some of the PriSC items should be eliminated. After an elaborate study of the structure of the PriSC items, they concluded that the scale was unidimensional and the ten items making up this scale, including items 3 & 9 should be retained. They based their conclusions on the component loadings they derived. To their credit they also included the correlation matrix in their publication. What they apparently missed, however, was the fact that items 3 & 9 failed to have any significant correlations with the other items in the scale, that is, besides their own correlation. Since both items are the only negatively worded items on the scale, their correlation is not surprising. Now we might ask to what extent did confirmation bias influence their analysis?

I would like to make two recommendations concerning the above. First, promising constructs should have their dimensionality independently evaluated as soon as they become promising, preferably within two years of their initial publication. The

factor structure of the Self-Consciousness Scales (SCS), were not independently evaluated until nine years after the scale's development. By then almost 200 published studies had already used the private scale. Second, when a construct appears to be useful, multiple measures of it should be developed. I make both recommendations specifically to those whose interests lie in psychometrics or in this case personality assessment.

The second question I addressed was: Can a more interpretable, more efficient, but equally valid measure of the major sources of variance underlying the Survey of Study Habits and Attitudes (SSHA) be developed? Although a popular instrument clearly related to self-directed learning and classroom performance, the length of the instrument, 100 items, and the high scale intercorrelations have limited its usefulness (Rohwer, 1984). My results (chapter 3) clearly support the promise of a brief version of the SSHA. The Brief Survey of Study Habits and Attitudes (BSSHA), with its four relatively independent 8-item scales was found have superior psychometric properties compared to its longer counterpart. Compared to the original 100 item SSHA, counseling and tutorial staff members at the Community College of Rhode Island already prefer the brief version. What is needed at this point is to evaluate the BSSHA constructs with respect to current motivational models of self-directed learning and student success. We have already begun to evaluate the relationship between the BSSHA scales and the new Learning and Study Strategies Inventory (LASSI; Weinstein, Zimmerman, & Palmer, 1988), and hope our results will clarify how the BSSHA constructs relate to information processing models of student motivation and study behavior.

Finally, the last basic question I addressed in my research was: To what extent do individual differences in self-knowledge moderate the internal and external validity of behavioral dispositions measured by self-report? The available research suggests that

human self-reflection and self-observation are important determinants of self-knowledge (e.g. Nasby, 1989). Research studying the relationship between self-knowledge and the psychometric properties of self-reports have had two distinguishing characteristics. First, the PriSC scale has been the operational measure of self-knowledge differences, and second, moderator effects have been studied at the scale level. As previously noted, (chapter 4), PriSC effects presumably caused by differences in level of self-knowledge depended on the behavioral disposition studied. One explanation for this finding may be that personality and attitude type items vary in terms of their susceptibility to self-knowledge differences. It seems reasonable to assume that statements involving daily activities, or strong emotional experiences might be resistant to these effects. For example, people don't need to be self-experts to know if they experience headaches daily. Items involving less frequent activities might be more prone to the influence of level of self-knowledge. Accepting this, I would recommend that self-knowledge effects be examined at the item level.

The idea that some people are more stable in their characteristics and more resistant to change, while others are less stable and more open to change is both intriguing and troublesome. A key question involves whether habitual self-attention, itself, can be increased or decreased to benefit the individual. I could not find any study that attempted to promote PriSC. It may be beneficial to bring together the literature on PriSC and the rather large literature in operant learning concerning self-observation. Perhaps assessment of behavioral dispositions by self-report would benefit. In any case, continued research exploring the effects of individual differences in self-knowledge, human self-reflection and their influence on personality development, change, and assessment is encouraged.

Appendix A

Self-Consciousness Scale

DIRECTIONS: Read each statement carefully. Select one number which is best for you from the five possible numbers in the scale below. Work quickly and answer all questions.

Answer Key:

4 = Extremely characteristic
 3 = Characteristic
 2 = Neutral
 1 = Uncharacteristic
 0 = Extremely uncharacteristic

Answer Below

1.	I'm always trying to figure myself out.	_____
2.	I'm concerned about my style of doing things.	_____
3.	Generally, I'm not very aware of myself.*	_____
4.	It takes me time to overcome my shyness in new situations.	_____
5.	I reflect about myself alot.	_____
6.	I'm concerned about the way I present myself.	_____
7.	I'm often the subject of my own fantasies.	_____
8.	I have trouble working when someone is watching me.	_____
9.	I never scrutinize myself.*	_____
10.	I get embarrassed very easily.	_____
11.	I'm self-conscious about the way I look.	_____
12.	I don't find it hard to talk to strangers.*	_____
13.	I'm generally attentive to my inner feelings.	_____
14.	I usually worry about making a good impression.	_____
15.	I'm constantly examining my motives.	_____
16.	I feel anxious when I speak in front of a group.	_____
17.	One of the last things I do before I leave my house is look in the mirror.	_____
18.	I sometimes have the feeling that I'm off somewhere watching myself.	_____
19.	I'm concerned about what other people think of me.	_____
20.	I'm alert to changes in my mood.	_____
21.	I'm usually aware of my appearance.	_____
22.	I'm aware of the way my mind works when I work through a problem.	_____
23.	Large groups make me nervous.	_____

(* Item is reversed for scoring.)

Appendix B

SURVEY OF STUDY HABITS AND ATTITUDES

DIRECTIONS

The purpose of this survey is to furnish an inventory of study habits and attitudes to serve as a foundation for self-improvement. If taken seriously, this inventory can help you obtain a better understanding of how to study properly. Since your answers will be treated with the strictest confidence, feel free to answer all questions frankly.

Please respond to every item. For every statement please use the 5-point scale listed below to respond on the answer sheet. For example, you would mark space **R** on your answer sheet if you believe the statement is **rarely** true of you. To aid you in answering this questionnaire, the terms on the 5-point rating scale have been defined on a percentage basis as follows:

R - Rarely means from 0 to 15% of the time.

S - Sometimes means from 16 to 35% of the time.

F - Frequently means from 36 to 65% of the time.

G - Generally means from 66 to 85% of the time.

A - Almost Always means from 86 to 100% of the time.

Remember, you should rate yourself, not in accordance with what you think you should do or feel, but as you are in the habit of doing or feeling. When you cannot answer a statement on the basis of actual experience, mark the statement according to what you would be most likely to do if the situation should arise.

There are no right or wrong answers, just answers that are more or less accurate in describing your beliefs, feelings and behavior. There is not time lime limit for this questionnaire, but work as rapidly as possible without being careless and do not spend too much time on any one statement.

Survey of Study Habits and Attitudes (SSHA; Items arranged by scale)

Delay-Avoidance Items

1. When my assigned homework is extra long or unusually difficult, I either quit in disgust or study only the easier parts of the lesson. (1)
2. When I get behind in my school work for some unavoidable reason. I make up back assignments without prompting from the teacher. *(5)
3. Daydreaming about dates, future plans, etc. distracts my attention from my lessons while I am studying. (9)
4. Even though an assignment is dull and boring, I stick to it until it is completed. *(13)
5. I keep all the notes for each subject together, carefully arranging them in some logical order.* (17)
6. When I am having difficulty with my school work, I try to talk over the trouble with the teacher.* (21)
7. I lay aside returned examinations, reports, and homework assignments without bothering to correct errors noted by the instructor. (25)
8. I keep my place of study business-like and cleared of unnecessary or distracting items such as pictures, letter, mementos, etc.* (29)
- 9.. Telephone calls, people coming in and out of my room, "bull-sessions" with my friends, etc. interfere with my studying. (33)
10. It takes a long time for me to get warmed up to the task of studying. (37)
11. I am unable to concentrate well because of periods of restlessness, moodiness, or "having the blues." (41)
12. I put off writing themes, reports, term papers, etc., until the last minute.(45)
13. When I sit down to study I find myself too tired, bored, or sleepy to study efficiently. (49)
14. I waste too much time talking, reading magazines, listening to the radio, watching TV, going to the movies, etc., for the good of my studies. (53)
15. My studying is done in a random, unplanned manner--is impelled mostly by the demands of approaching classes. (57)
16. "Extracurricular activities"--dating, clubs, athletics, fraternity and sorority activities, etc., cause me to get behind in my school work. (61)
17. I utilize the vacant hours between classes for studying so as to reduce the evening's work. *(65)
18. Problems outside of school--financial difficulties, being in love, conflict with parents etc.--cause me to neglect my school work. (69)
19. I complete my homework assignments on time.* (73)
20. I like to have a radio, record player, or television set turned on while I'm studying. (77)
21. With me, studying is a hit-or-miss proposition depending on the mood I'm in.(81)
22. I study three or more hours per day outside of class. * (85)
23. I keep my assignments up to date by doing my work regularly from day to day. * (89)
24. I prefer to study my lessons alone rather than with others.(93)
25. At the beginning of a study period I organize my work so that I will utilize the time most effectively.* (97)

Work Methods Scale

1. In preparing reports, themes, term papers, etc. I make certain that I clearly understand what is wanted before I begin work.* (2)
2. Difficulty in expressing myself in writing slows me down on reports, themes, examinations, and other work to be turned in. (6)
3. My teachers criticize my written reports as being hastily written or poorly organized. (10)
4. I give special attention to neatness on themes, reports, and other work to be turned in.* (14)
5. I memorize grammatical rules, definitions of technical terms, formulas, etc., without really understanding them. (18)
6. I hesitate to ask a teacher for further explanation of an assignment that is not clear to me. (22)
7. I get nervous and confused when taking an examination and fail to answer questions to the best of my ability. (26)
8. I have trouble with the mechanics of English composition. (30)
9. In taking notes, I tend to take down material which later turns out to be unimportant. (34)
10. I do poorly on tests because I find it hard to think clearly and plan my work within a short period of time.(38)
11. I skip over the figures, graphs, and tables in a reading assignment. (42)
12. After reading several pages of an assignment, I am unable to recall what I have just read. (46)
13. I have difficulty in picking out the important points of reading assignment--points that later appear on examinations. (50)
14. When in doubt about the proper form for a written report, I refer to an approved model to provide a guide to follow.* (54)
15. When reading a long textbook assignment, I stop periodically and mentally review the main points that have been presented.* (58)
16. I seem to accomplish very little in relation to the amount of time I spend studying. (62)
17. I can concentrate on a reading assignment for only a short while before the words become a meaningless jumble. (66)
18. I copy the diagrams, tables, and other illustrations that the instructor puts on the blackboard.* (70)
19. I lose points on true-false multiple-choice examinations because I change my original answer only to discover later that I was right the first time. (74)
20. When preparing for an examination, I arrange facts to be learned in some logical order--order of importance, order of presentation in class or textbook, order of time in history, etc.* (78)
21. I am careless of spelling and the mechanics of English composition when answering examination questions. (82)
22. Although I work until the last possible minute, I am unable to finish examinations within the allotted time. (86)
23. If time is available, I take a few minutes to check over my answers before turning in my examination paper.* (90)
24. When tests are returned, I find that my grade has been lowered by careless mistakes. (91)
25. During examinations I forget names, dates, formulas, and other details that I really do know. (98)

Teacher Approval Items

1. I feel that teachers lack understanding of the needs and interest of students.(3)
2. My teachers succeed in making their subjects interesting and meaningful to me.* (7)
3. I feel that teachers allow their personal like or dislike for a student to influence their grading unduly. (11)
4. I believe that the easiest way to get good grades is to agree with everything.your teachers say (15)
5. I think that teachers like to exercise their authority too much. (19)
6. I feel that teachers are too rigid and narrow-minded. (23)
7. I think that teachers expect students to do too much studying outside of class. (27)
8. When explaining a lesson or answering questions, my teachers use words that I do not understand. (31)
9. My teachers fail to give sufficient explanation of the materials they are trying to teach. (35)
10. I feel that teachers are overbearing and conceited in their relations with students.(39)
11. I believe that teachers secretly enjoy giving their students a "hard time" (43)
12. I think that teachers tend to talk too much. (47)
13. I feel that teachers try to distribute their attention and assistance equally among all their students. * (51)
14. The illustrations, examples, and explanations given by my teachers are too dry and technical. (55)
15. I feel that teachers tend to be sarcastic towards their poorer students and to ridicule their mistakes excessively. (59)
16. I feel that teachers make their courses too difficult for the average student. (63)
17. I think that football coaches contribute more to school life than do the teachers. (67)
18. I feel that teachers think too much about grades and lose sight of the real objectives of education. (71)
19. I think that students who ask questions and offer comments in class are only trying to impress the teacher. (75)
20. I believe that teachers intentionally schedule tests on the days following important athletic or social activities. (79)
21. I believe that one way to get goods grades is by using flattery on your teachers.(83)
22. I feel that it 's almost impossible for the average student to do all of his assigned homework.(87)
23. I feel that the ridiculous assignments made by teachers are the main reasons for students cheating. (91)
24. I feel that students cannot be expected to like most teachers. (95)
25. I believe that teachers enter their profession mainly because they enjoy teaching. (99)

Education Acceptance Items.

1. My dislike for certain teachers causes me to neglect my school work. (4)
2. I feel that I would study harder if I were given more freedom to choose courses that I like. (8)
3. Even though I don't like a subject, I still work hard to make a good grade. * (12)
4. I lost interest in my studies after the first few days of a new semester. (16)
5. I believe that teachers truly want their students to like them. *(20)
6. I feel that students are not given enough freedom in selecting their own topics for themes and reports. (24)
7. Lack of interest in my school work makes it difficult for me to keep my attention focused on assigned reading. (28)
8. Unless I really like a course, I believe in doing only enough to get a passing grade. (32)
9. I feel confused and undecided as to what my educational and vocational goals should be. (36)
10. Some of my courses are so uninteresting that I have to "force" myself to do the assignments. (40)
11. I believe that having a good time and getting one's full share of fun out of life is more important than studying. (44)
12. I believe that teachers tend to avoid discussing present-day issues and events with their classes. (48)
13. I feel that my grades are a fairly accurate reflection of my ability.* (52)
14. I feel that it is not worth the time, money, and effort that one must spend to get a college education. (56)
15. Some of my classes are so boring that I spend the class period drawing pictures, writing letters, or daydreaming instead of listening to the teacher. (60)
16. I feel that I am taking courses that are of little practical value to me. (64)
17. I believe that the sole purpose of education should be to equip students to make a living. (68)
18. I strive to develop a sincere interest in every course I take. *(72)
19. The prestige of having a college education provides my main motive for going to college. (76)
20. I believe that a college's football reputation is just as important as its academic standing. (80)
21. I think that it might be best for me to drop out of school and get a job. (84)
22. I feel that the things taught in school do not prepare one to meet adult problems. (88)
23. Prolonged reading or study gives me a headache. (92)
24. I feel like cutting classes whenever there is something I'd rather do or whenever I need to cram for a test. (96)
25. I believe that grades are based upon a student's ability to memorize facts rather than upon the ability to "think" things through. (100)

* Reversed for scoring. Number in parenthesis refers to item number on questionnaire. Items are arranged by scale for convenience only.

Appendix C

Skew and Kutosis for Self-Consciousness Scale Items

Items	Sample 1				Sample 2	
	1st Administration		2nd Administration		Kurtosis	Skewness
	Kurtosis	Skewness	Kurtosis	Skewness		
1	-0.58	-0.25	-0.41	-0.33	-0.71	-0.11
2	0.27	-0.70	0.12	-0.71	-0.18	-0.65
3	0.07	-0.67	0.02	-0.68	-0.24	-0.63
4	-0.88	-0.35	-0.78	-0.31	-0.84	-0.23
5	-0.28	-0.41	-0.16	-0.24	-0.48	-0.16
6	1.12	-0.90	2.07	-1.03	1.73	-1.10
7	-0.75	0.00	-0.65	-0.07	-0.82	-0.11
8	-0.77	-0.31	-0.58	-0.30	-0.61	-0.44
9	-0.11	-0.04	0.14	0.00	0.54	-0.19
10	-0.74	-0.15	-0.75	-0.16	-0.72	-0.22
11	-0.14	-0.63	-0.12	-0.59	0.12	-0.75
12	-0.58	0.41	-0.68	0.31	-0.79	0.35
13	0.31	-0.57	1.02	-0.77	0.13	-0.54
14	-0.42	-0.40	-0.37	-0.33	-0.31	-0.49
15	-0.24	-0.12	-0.56	-0.02	-0.37	-0.03
16	-0.51	-0.71	-0.32	-0.79	-0.86	-0.49
17	-0.98	-0.16	-1.02	-0.15	-0.93	-0.26
18	0.25	0.73	-0.45	0.50	-0.83	0.34
19	0.04	-0.59	-0.20	-0.46	-0.23	-0.57
20	0.66	-0.72	1.03	-0.79	0.29	-0.63
21	2.47	-0.94	2.02	-1.03	1.60	-0.82
22	-0.11	-0.40	-0.10	-0.40	-0.05	-0.42
23	-0.81	0.01	-0.78	0.10	-1.07	0.03
Means	-0.12	-0.34	-0.06	-0.36	-0.24	-0.35

Appendix D

BSSHA Item Pairs Used in Structural Modeling Analysis

Scale 1: Learning Difficulties

1	WM9	In taking notes, I tend to take down material which later turns out to be unimportant.
	WM13	I have difficulty picking out the important points of a reading assignment- points that later appear on examinations.
2	WM7	I get nervous and confused when taking an exam and fail to answer questions to the best of my ability.
	WM25	During examinations I forget names, dates, formulas, and other details that I really do know.
3	WM12	After reading several pages of an assignment I am unable to recall what I have just read.
	WM16	I seem to accomplish very little in relation to the amount of time I spend studying.
4	WM17	I can concentrate on a reading assignment for only a short period of time before the words become a meaningless jumble.
	WM10	I do poorly on tests because I find it hard to think clearly and plan my work within a short period of time.

Scale 2: Academic Diligence

1	WM4	I give special attention to neatness on themes, reports, and other work to be turned in.
	DA25	At the beginning of a study period I organize my work so that I will utilize the time most effectively.
2	WM1	In preparing reports, themes, term papers, etc. I make certain that I clearly understand what is wanted before I begin work.
	WM20	When preparing for an examination, I arrange facts to be learned in some logical order--order of importance, order of presentation in class or textbook, order of time in history, etc.
3	EA3	Even though I don't like a subject, I still work hard to make a good grade.
	EA18	I strive to develop a sincere interest in every course I take.
4	DA2	When I get behind in my school work for some unavoidable reason, I make up back assignments without prompting from the teacher.
	DA19	I complete my homework assignments on time.

Scale 3: Teacher Approval

1	TA5*	I think that teachers like to exercise their authority too much.
	TA18	I feel that teachers think too much about grades and lose sight of the real objectives of education.
2	TA7	I think that teachers expect students to do too much studying outside of class.
	TA16	I feel that teachers make their courses too difficult for the average student.
3	TA15	I feel that teachers tend to be sarcastic towards their poorer students and tend to ridicule their mistakes excessively.
	TA23	I feel that the ridiculous assignments made by teachers are the main reason for students cheating.
4	TA1	I feel that teachers lack an understanding of the needs and interests of students.
	TA3	I feel that teachers allow their personal like or dislike for a student to influence their grading unduly.

Scale 4: Distractions

1	DA3	Daydreaming about dates, future plans, etc. distracts my attention from my lessons while I am studying.
	DA13	When I sit down to study I find myself to tired, bored, or sleepily to study efficiently.
2	DA11	I am unable to concentrate well because of periods of restlessness, moodiness, or "having the blues".
	DA18	Problems outside of school--financial difficulties, being in love, conflict with parents etc.--cause me to neglect my school work.
3	DA10	It takes a long time for me to get warmed up to the task of studying.
	DA16	"Extracurricular activities"--dating, clubs, athletics, fraternity and sorority activities, etc. cause me to get behind in my school work.
4	DA14	I waste too much time talking, reading magazines, listening to the radio, watching TV, going to the movies, etc. for the good of my studies.
	DA21	With me, studying is a hit-or-miss proposition depending on the mood I'm in.

*Refers to original theoretical scale: DA = Delay-Avoidance, WM = Work Methods, TA = Teacher Approval, EA = Educational Acceptance.

Appendix E

Private Self-Consciousness Scale Items

Original 10 item version

Items^a

1. I'm always trying to figure myself out.
5. I reflect about myself alot.
7. I'm often the subject of my own fantasies.
15. I'm constantly examining my motives.
18. I sometimes have the feeling that I'm off somewhere watching myself.
3. Generally, I'm not very aware of myself.*
9. I never scrutinize myself.*
13. I'm generally attentive to my inner feelings.
20. I'm alert to changes in my mood.
22. I'm aware of the way my mind works when I work through a problem.

Short 5 item version

Items^a

1. I'm always trying to figure myself out.
5. I reflect about myself alot.
7. I'm often the subject of my own fantasies.
15. I'm constantly examining my motives.
18. I sometimes have the feeling that I'm off somewhere watching myself

^a Item number as item appears on the 23 item Self-Consciousness Scale.

* Reversed for scoring.

Appendix F

BRIEF SURVEY OF STUDY HABITS AND ATTITUDES (BSSHA)
SKEW AND KUTOSIS FOR CCRI SAMPLE 1 DATA

ITEM PAIRS	PRIVATE				SHORT PRIVATE			
	LOWPRI		HIGHPRI		LOWPRI		HIGHPRI	
	SK	KU	SK	KU	SK	KU	SK	KU
T1	-0.86	1.06	-1.00	1.46	-0.96	1.84	-0.82	0.69
T2	-0.87	1.10	-1.16	1.68	-0.93	1.13	-1.06	1.49
T3	-1.72	3.34	-1.96	5.33	-1.95	4.89	-1.75	3.45
T4	-1.23	1.86	-1.38	2.76	-1.37	2.80	-1.20	1.71
P1	-0.79	0.70	-1.36	2.01	-0.86	1.02	-1.10	1.03
P2	-0.67	-0.18	-0.95	0.53	-0.82	0.22	-0.73	-0.07
P3	-1.02	0.86	-1.03	0.89	-1.05	1.38	-0.87	0.23
P4	-0.65	-0.03	-1.05	1.15	-0.81	0.35	-0.79	0.44
M1	-0.09	-0.53	-0.58	-0.37	-0.28	-0.57	-0.40	-0.56
M2	-0.40	-0.67	-0.77	-0.11	-0.54	-0.46	-0.59	-0.50
M3	-0.37	-0.75	-0.59	-0.59	-0.56	-0.51	-0.37	-0.88
M4	-0.52	-0.59	-0.43	-0.80	-0.54	-0.59	-0.46	-0.59
D1	-0.81	0.19	-0.60	-0.04	-0.84	0.42	-0.56	-0.18
D2	-0.72	-0.17	-0.99	0.34	-0.85	0.29	-0.81	-0.17
D3	-0.77	0.28	-1.02	0.79	-1.03	0.88	-0.81	0.51
D4	-0.75	0.02	-0.97	0.35	-0.71	-0.09	-0.95	0.27
MEAN	-0.77	0.41	-0.99	0.96	-0.88	0.81	-0.83	0.43
MIN	-1.72	-0.75	-1.96	-0.80	-1.95	-0.59	-1.75	-0.88
MAX	-0.09	3.34	-0.43	5.33	-0.28	4.89	-0.37	3.45

Appendix G

BRIEF SURVEY OF STUDY HABITS AND ATTITUDES (BSSHA)
SKEW AND KURTOSIS FOR CCRI SAMPLE 2 DATA

ITEM PAIRS	PRIVATE				SHORT PRIVATE			
	LOWPRI		HIGHPRI		LOWPRI		HIGHPRI	
	SK	KU	SK	KU	SK	KU	SK	KU
T1	-1.41	2.79	-1.08	1.27	-1.24	2.00	-1.25	1.96
T2	-0.93	1.31	-1.09	0.94	-0.93	1.07	-1.07	1.07
T3	-1.39	1.21	-1.11	0.15	-1.42	1.23	-1.05	0.13
T4	-1.06	1.21	-0.71	0.47	-1.03	1.18	-0.70	-0.22
P1	-0.75	0.12	-0.82	0.25	-0.86	0.48	-0.70	-0.22
P2	-0.77	0.16	-0.58	-0.47	-0.79	0.11	-0.57	-0.46
P3	-0.89	0.13	-1.03	0.85	-0.96	0.28	-0.95	0.63
P4	-0.58	-0.04	-1.13	1.11	-0.79	0.31	-0.90	0.59
M1	-0.35	-0.67	-0.34	-0.53	-0.54	-0.31	-0.20	-0.78
M2	-0.31	-0.80	-0.57	-0.28	-0.42	-0.74	-0.60	-0.40
M3	-0.28	-1.09	-0.57	-0.28	-0.34	-0.87	-0.48	-0.68
M4	-0.71	-0.28	-0.60	-0.53	-0.69	-0.28	-0.61	-0.55
D1	-0.52	-0.40	-0.58	-0.73	-0.69	-0.15	-0.42	-0.83
D2	-0.59	-0.29	-0.74	-0.39	-0.69	-0.13	-0.71	-0.39
D3	-0.99	0.66	-0.89	0.16	-0.96	0.98	-0.80	-0.29
D4	-0.60	-0.18	-0.77	-0.24	-0.71	0.00	-0.66	-0.41
MEAN	-0.76	0.24	-0.79	0.11	-0.82	0.32	-0.73	-0.05
MIN	-1.41	-1.09	-1.13	-0.73	-1.42	-0.87	-1.25	-0.83
MAX	-0.28	2.79	-0.34	1.27	-0.34	2.00	-0.20	1.96

Appendix H

INFORMED CONSENT

I. DESCRIPTION OF STUDY

Each semester the Advising and Counseling Center offers a series of workshops concerned with helping students improve their study skills. Presently, we are attempting to evaluate these workshops. The results of our research will help us revise our program in order to better meet student needs.

This particular study is primarily concerned with evaluating the usefulness of the Survey of Study habits and Attitudes. This self report questionnaire is used to assess a students study skills, habits, and attitudes. Once a students' scores are known, the Counselor can then recommend various workshops depending on the students needs. In this study, we are specifically concerned with how stable your SSHA scores are over time (four weeks), how your scores relate to self awareness (a personality characteristic), and finally how your scores relate to your classroom performance.

To accomplish this we are asking you to respond to the Survey of Study Habits and Attitudes and the Self Consciousness Questionnaire today and again in four weeks. Finally, at the end of the semester, you will be asked to participate in a small group discussion relating to study habits and educational attitudes.

II. RESULTS ARE CONFIDENTIAL

Your questionnaire results and classroom performance are strictly confidential. No one will have access to your individual results except myself. In fact, we are only interested in the group scores as a whole, and not individual results.

III. VOLUNTARY PARTICIPATION

Participation in this study is completely voluntary. If you do participate, however, you will receive extra credit in this course (as explained by your instructor). If you do not wish to participate, you will be excused before the questionnaires are passed out. Your instructor will provide another means for you to earn extra credit. Note that even if you decide to participate, you may quit this study and/or have your test scores withdrawn at any time.

IV. FEEDBACK

Besides earning extra credit, you will be given the opportunity to examine your own scores, and have your strengths and weaknesses highlighted and discussed with you. You can obtain this feedback by simply making an appointment to see me after the semester ends. Day and evening appointments are available. In addition, the general results of our study will be available to any interested student.

Student Signature: _____

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