Journal of Counseling Psychology
2002, Vol. 49, No. 4, 484–498

0022-0167/02/$5.00 DOI: 10.1037//0022-0167.49.4.484

Examining the Generalizability of Problem-Solving Appraisal in Black South Africans

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Two studies examined the generalizability of the Problem Solving Inventory (PSI; P. P. Heppner, 1988) through research with Black South African samples. Study 1 examined the generalizability of the factor structure of the PSI through confirmatory factor analysis. Study 2 examined the relationship between problem solving and psychological distress and tested a Problem-Solving Confidence mediational model of psychological distress through structural equation modeling. The estimates of the factor structure as well as other reliability and validity estimates provided strong support for the generalizability of the PSI to South African Black college students. The results also provided partial support for the mediational model of psychological distress.

Applied problem solving has been the focus of inquiry for many years (e.g., D'Zurilla & Goldfried, 1971; Shure, 1982; Sternberg, 1982). In this article, we use the term *applied problem solving* to denote a highly complex, often intermittent, goal-directed sequence of cognitive, affective, and behavioral operations for adapting to what are often stressful internal and external demands (Heppner & Krauskopf, 1987). It has been suggested for some time that ineffective applied problem solving is related to psychological distress (e.g., D'Zurilla & Goldfried, 1971; Spivack & Shure, 1974). It makes intuitive sense that effective problem solvers would be flexible and able to develop various methods, sometimes creatively, to solve everyday hassles as well as major stressful life problems (Durlak, 1983). In the last 20 years, there has been a wide range of data that indicates problem solving and coping do play an adaptive role in dealing with stressful life events and psychological adjustment in general (e.g., Heppner & Hillerbrand, 1991; Snyder & Ford, 1987; Summerfeldt & Endler, 1996; Zeidner & Endler, 1996).

One line of research linking problem solving and psychological distress is *problem-solving appraisal*, which has been defined as individuals' belief or appraisal of their problem-solving abilities and style. Problem-solving appraisal has been operationalized with the Problem Solving Inventory (PSI; Heppner, 1988), which has been referred to as one of the most widely used self-report inventories of applied problem solving in the United States (Nezu, Nezu, & Perri, 1989). Over 100 empirical studies provide a strong link between problem-solving appraisal and (a) a variety of psychological distress indices, particularly depression; (b) physical health and health expectancies; (c) a wide range of coping activities as well as awareness, utilization, and satisfaction with helping resources; and (d) variables related to educational and vocational issues (Heppner & Lee, 2002).

In reviewing the PSI literature, Leong (1990) noted that more attention is needed to examine psychometric issues with racial or ethnic minorities. Most of the PSI studies have used White college student samples in the United States, although in recent years more research has been conducted with racial or ethnic minority samples (e.g., Neville, Heppner, & Wang, 1997). Clearly, more research is needed with non-White samples to extend knowledge about problem-solving appraisal in diverse groups as well as extend the external validity of the PSI. Furthermore, there has been a relatively small number of studies that have examined the link between problem-solving appraisal and psychological distress in countries other than the United States (e.g., Cheng & Lam, 1997; Pretorius, 1992, 1993; Pretorius & Diedricks, 1994; Sabourin, Laporte, & Wright, 1990; Sahin, Sahin, & Heppner, 1993). More research is needed with cross-national samples to (a) search for psychological universals (i.e., *etic* approach; Lonner, 1980; Lopez et al., 1989); (b) identify culturally specific constructs, which are useful for identifying and explaining cultural differences (i.e., *emic* approach; Lonner, 1985); and (c) integrate the etic and emic approaches to clarify conceptual differences and build a more comprehensive knowledge base in psychology (Berry, Poortinga, Segall, & Dasen, 1999). Cross-national research with the PSI would not only provide useful psychometric information about the generalizability of the PSI factor structure but also, more important, help researchers to understand the nature of the relationship between problem-solving appraisal and psychological distress in

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different cultures. The latter may be especially helpful in clarifying the utility of problem-solving constructs across diverse environments and facilitate the development of more comprehensive theories about problem solving and psychological distress.

Problem solving, and particularly problem-solving appraisal, is a topic of particular relevance in South Africa. There have been many reports of the psychological distress associated with the institutional policy known as *apartheid* (segregation on racial grounds) as well as with the transitional and transformational process toward a different political system in the recent postapartheid years (e.g., Dawes, 1985). Researchers, psychologists, and mental health workers in South Africa have highlighted the need for preventive approaches to psychological health. Problem solving and problem-solving training interventions would seem to hold a great deal of potential for preventive and remedial interventions (see Heppner & Hillerbrand, 1991). Research of this nature, like most other research in South Africa, has been hampered by the lack of suitable instruments. For example, to our knowledge the PSI has been used in three published studies by Pretorius with South African samples (Pretorius, 1993, 1996; Pretorius & Diedricks, 1994). Compared with research conducted in the United States, the results suggest that the zero-order correlations between the PSI and depression are similar (*r*s = .28–.32), as are the means and alpha coefficients. However, many questions remain about the generalizability of the PSI to Black South Africans, such as the adequacy of the factor structure. Thus, the purpose of the following two cross-national studies with Black South African college samples was not only to more fully examine the generalizability of the factor structure of the PSI but also to examine the zero-order correlations as well as a more complex model of problem solving and psychological distress that might have implications for health care professionals in both South Africa and the United States.

More specifically, the primary purpose of Study 1 was to extend previous research findings by examining the generalizability of the PSI factor structure with a Black South African sample. If the factor structure differs greatly, the perception of problem-solving appraisal might differ in Black South Africans. In addition to examining the factor structure, we also examined psychometric estimates (i.e., reliability estimates, normative information, and factor intercorrelations) to test the comparability of problem-solving appraisal in Black South Africans. Based on previous research reporting alpha coefficients for the PSI on Black South African samples (Pretorius, 1993, 1996; Pretorius & Diedricks, 1994), two hypotheses guided our work in Study 1. First, we hypothesized that the PSI structure in Black South African samples would be comparable to psychometric estimates from U.S. samples and thus provide the support for the notion of problem-solving appraisal in South Africa. Second, we hypothesized that the factor structure of the PSI with Black South African college student samples would support the use of both the three specific factors of the PSI (i.e., Problem-Solving Confidence, Approach–Avoidance Style, and Personal Control) and a general problem-solving factor (the PSI total score), which is often reported in the PSI literature in the United States (Heppner & Baker, 1997).

Another test of the generalizability of the problem-solving appraisal research in the United States would be to examine associations commonly found between the PSI and indices of psychological distress. The basic issue is whether the construct of problem-solving appraisal would be significantly associated with psychological distress in Black South African samples, as has been found in the United States (e.g., Heppner & Baker, 1997; Heppner & Lee, 2002). For example, if similar zero-order correlations were found, such data would provide additional evidence that the construct of problem-solving appraisal operates in similar ways in Black South African samples. Thus, the first purpose of Study 2 was to extend the generalizability of previous findings in American samples that have linked problem-solving appraisal to psychological distress, such as depression, hopelessness, trait anxiety, and trait anger (see Heppner, 1988). Partly on the basis of previous research by Pretorius in South Africa (e.g., Pretorious, 1993, 1996), we hypothesized that higher PSI scores (indicating self-perceived ineffective problem solving) would be associated with higher levels of depression, hopelessness, anxiety, anger, and interpersonal problems.

A second and more central purpose of Study 2 was to extend previous research by going beyond zero-order correlations to examine a more complex model of problem-solving appraisal and psychological distress. Researchers have suggested that a more complete understanding of problem-solving appraisal might occur by examining the relationship between specific PSI factors and psychological distress (e.g., Dixon, Heppner, & Anderson, 1991). This suggestion is based in part on data that indicate that the PSI factors are only moderately correlated with each other (and thus measure distinct constructs) as well as theoretical conceptualization of the functions and outcomes of the PSI factors within the complex chain of applied problem solving (see Heppner & Krauskopf, 1987). Although we do not wish to downplay the role of personal control, two of the PSI factors were of particular interest in Study 2: (a) Problem-Solving Confidence (PSC), defined as an individual's self-assurance in a wide range of problem-solving activities, and a belief and trust in one's problem-solving abilities and coping effectiveness (Heppner & Lee, 2002); and (b) Approach–Avoidance Style (AAS), defined as a general tendency to approach or avoid different problem-solving activities (Heppner & Lee, 2002). A tendency to approach problems is conceptualized to be especially critical in the initiation of active problem solving, but it is PSC that is conceptualized as promoting perseverance and continuation of problem solving. While using an information-processing model, researchers have suggested that approaching problems is associated with making progress toward an adaptive solution, facilitated by persistence, positive feedback, and self-confidence (Heppner & Krauskopf, 1987). Thus, we conceptualized that approaching problems and PSC are instrumental and intertwined in problem solving, and may merit further study.

For example, a tendency to avoid problems could result in fewer opportunities to gain a sense of confidence in dealing with personal problems, which in turn could affect the level of psychological distress. Recently, two studies based on U.S. samples have found support for such an association between avoiding problems and PSC, and subsequently psychological distress as well. Witty, Heppner, Bernard, and Thoreson (2001) found that PSC mediated the relationship between AAS and three separate measures of distress (depression, hopelessness, and general psychosocial adjustment) in chronic low-back pain patients in the United States. In essence, the results suggested that although a person's tendency to approach or avoid problems was directly related to psychological distress, that tendency was associated with less PSC, which in turn

was associated with more psychological distress. A second study replicated the problem-solving mediational model of psychological distress with U.S. college students. This study not only confirmed the mediational model that explained individual psychological distress (measured by indices of depression, anxiety, hopelessness, and loneliness) but also supported the model when it was subjected to a more rigorous test of removing negative affectivity from all of the variables (Heppner, Lee, Wei, Anderson, & Wang, 2001).

Thus, to examine the generalizability of the problem-solving mediational model of psychological distress, we investigated whether PSC would also mediate the relationship between AAS and psychological distress in a Black South African sample. Furthermore, to obtain a more complete understanding of psychological distress, we included measures that assessed both intrapersonal (depression, hopelessness, anxiety, and anger) and interpersonal (intimacy and social satisfaction) dimensions of psychological distress. Previous research has found that intrapersonal and interpersonal indices of psychological distress are differentially related to psychosocial variables (Sharpe & Heppner, 1991; Sharpe, Heppner, & Dixon, 1995); for example, Sharpe, Heppner, and Dixon (1995) found that self-esteem, anxiety, and depression were more strongly associated with instrumentality, whereas intimacy and sociability were more strongly related to expressiveness. To reflect multiple aspects of psychological distress, we used structural equation modeling to test a postulated mediational model in which the construct of psychological distress consisted of two latent variables: intrapersonal and interpersonal distress. We hypothesized that a stronger tendency to avoid problems would be fully mediated by a lack of PSC, which would be associated with higher levels of psychological distress.

In sum, the purpose of this research was to extend previous research on problem-solving appraisal based on primarily White U.S. samples by using Black samples from another country, South Africa. We anticipated that such cross-national research would provide not only useful psychometric information about the generalizability of the PSI but also information about the link between problem-solving appraisal and psychological distress in South African culture. Moreover, the study would provide a strong cross-national test of the problem-solving mediational model of psychological distress. In short, this study has both theoretical implications for future research and applied implications for mental health professionals in both South Africa and the United States.

Study 1: Factor Structure of the PSI

The first investigation examined the factor structure of the PSI with Black South African college students by using confirmatory factor analysis. A confirmatory factor analysis is the most appropriate method for an etic approach to evaluate the extent to which an original factor structure can be recovered within another culture (Piedmont & Chae, 1997). The etic approach focuses on the phenomena shared by human beings while incorporating culture-specific knowledge into the understanding of the constructs under study (Carter & Qureshi, 1995). In addition, other psychometric estimates (i.e., normative information, reliability, and factor intercorrelations) were examined to assess the generalizability of the PSI to Black South African college student samples. For example, previous PSI research has reported very few sex differences across men and women participants; we examined the comparability of this finding in the South African samples of this study.

Method

Participants and Procedure

Participants were 447 undergraduate students enrolled in a research and statistical psychology course at the University of Western Cape (UWC), Bellville, South Africa. Students from all areas of the university enroll in this course. UWC historically has catered primarily to the Black populations in South Africa and has distinguished itself as a strong and activist university in opposing apartheid. The majority of participants were female (68.1%), Christian (86.7%), full-time students (74.9%), single (83.7%), and from an urban background (79.3%), and 49% were Afrikaans-speaking. The age of the participants ranged from 19 to 53 years ($M = 24.10$, $SD = 5.80$). Participation was voluntary, and participants were guaranteed anonymity, confidentiality, and the right to know the results of their responses. Sixty percent of the students returned completed questionnaires. Participants were informed that the purpose of the study involved collection of data for research purposes. Because English is the language common to all groups in South Africa, students are expected to study English through Grade 12, and it is the medium of instruction at UWC, all inventories were presented in English. The results of the study were discussed in class, and participants had an opportunity to ask questions.

Instruments

The PSI–Form B (Heppner, 1988; Heppner & Petersen, 1982) consists of 35 six-point Likert scale items (including 3 filler items; 1 = *strongly agree*, 6 = *strongly disagree*). The PSI assesses the perceived awareness of individuals' general problem-solving abilities rather than actual problem-solving skills, with higher scores indicating an individual's assessment of oneself as a relatively ineffective problem solver. The PSI contains three factors: (a) PSC (11 items), (b) AAS (16 items), and (c) Personal Control (PC; 5 items). The PSC is defined as an individual's self-assurance, a belief, and trust in a wide range of one's problem-solving activities. The AAS refers to a general tendency to approach or avoid different problem-solving activities. The PC is defined as believing one is in control of one's emotions and behaviors while solving problems (Heppner & Baker, 1997). The PSI has been found to have acceptable internal consistency estimates (alpha coefficients ranging from .72 to .90) and stability estimates over a 2-week period (test–retest correlation coefficients ranging from .83 to .89; e.g., Heppner, 1988). In addition, a wide range of validity estimates provides a wealth of data supporting the validity of the PSI (see Heppner, 1988; Heppner & Baker, 1997; Heppner & Lee, 2002).

Results

Psychometric Properties of the PSI

We first report the results of the confirmatory factor analysis of the PSI factor structure, followed by the psychometric estimates pertaining to normative information, reliability, and factor intercorrelations. Given that almost 175 analyses were conducted in Study 1 and Study 2, a correction for alpha (Type I error) inflation was necessary. However, given that this was the first comprehensive test of the generalizability of the psychometric properties of the PSI with Black South African samples, we also were concerned about Type II error. To balance the Type I and Type II errors, we set a more stringent alpha level (.01) throughout the two studies.

Normative information. The means and standard deviations for the PSI total scores and three factors were as follows: PSI total:

M = 81.20, SD = 19.30; PSC: M = 25.50, SD = 7.20; AAS: M = 39.50, SD = 11.30; PC: M = 16.50, SD = 4.80. These numbers are slightly lower than the typical PSI means of college students in the United States (Heppner, 1988) but similar to another study conducted with Black South African university students: Pretorius (1996) reported a PSI mean of 83.10 (SD = 18.00).

We next examined whether third variables might be influencing the results, in particular, whether the PSI total scores or any of the three factors were significantly related to the seven demographic variables (age, sex, language, relationship status, rural/urban, religion, and full- or part-time students); none of the analyses was significant (all ps $>$ .01), with one exception: The part-time students had higher PC scores than the full-time students ($p <$ .01). In addition, as recommended by Tabachnick and Fidell (1996), we examined skewness and kurtosis statistics and found them to be low for the PSI total scores and the factors (ranges = .04 to .38 and .19 to −.39, respectively). These numbers suggest that the distributions of the PSI total scores and factor scores are close to a normal distribution.

Reliability. Estimates of internal consistency were examined for the PSI total and each of the factors. The alpha coefficients were as follows: .89 for PSI total, .79 for PSC, .84 for AAS, and .71 for PC. These initial estimates of reliability suggest that the PSI and the three factors have acceptable levels of internal consistency in the South African sample. Similarly, Pretorius (1996) reported an alpha coefficient of .84 for the PSI total.

Factor intercorrelations. Similarly to the research in the United States (Heppner, 1988), an intercorrelation matrix of the factor scores indicated moderate intercorrelations among the three factors: PSC/AAS = .50, PSC/PC = .47, and AAS/PC = .53. Thus, these moderate intercorrelations suggest that the three factors are somewhat interrelated but still represent distinct constructs.

In sum, psychometric estimates (i.e., normative information, reliability, and factor intercorrelations) of the PSI with Black South African college samples were found to be comparable to those from U.S. samples, supporting the first hypothesis of Study 1.

Confirmatory factor analysis (CFA). To answer our research question as to whether the PSI assesses one general factor as well as three specific factors, one alternative would be to compare the second-order factor model (or hierarchical model) with the first-order factor model. However, the 3 first-order factors model and the 1 second-order factor model are empirically just-identified; thus, we cannot actually test the presence of the second-order factor. Instead, we used another alternative, a bilevel model as indicated by Tracey and his colleagues for computing the best representative model (see discussion by Tracey, Glidden, & Kokotovic, 1988; Tracey & Kokotovic, 1989). Specifically, we compared CFAs with a one-general-factor model (a PSI total score), a three-correlated-specific-factors model (AAS, PSC, and PC), and a bilevel model (general + specific factor model; see Figures 1–3 for computing the best representation of the factor structure of the PSI). The bilevel model was similar to the model used by Tracey and his colleagues (Tracey et al., 1988; Tracey & Kokotovic, 1989) and included 3 first-order factors that are 3 specific factors (e.g., AAS, PSC, and PC) and the second-order factor that is 1 general factor (e.g., PSI). In other words, each indicator loads on both a general factor and 1 of the 3 specific factors of the PSI (see Figure 3).

Before conducting the CFA, we created 9 item-bundles (or parcels), instead of using the 32 individual items of the PSI, to (a) guard against estimating an unnecessarily large number of parameters (i.e., factor loadings and error terms) as well as (b) reduce the possibility of distortion from idiosyncratic characteristics of individual items in fitting the model to the data (see discussion by Russell, Kahn, Spoth, & Altmaier, 1998). More specifically, we divided 32 items from the three PSI factors—PSC (11 items), AAS (16 items), and PC (5 items)—into 9 bundles (3 bundles for PSC, 4 bundles for AAS, and 2 bundles for PC). To develop these item-bundles, we conducted three exploratory factor analyses on each of the three factors (PSC, AAS, and PC) separately. We then rank ordered the items, on the basis of factor loadings for each factor and assigned items to bundles to equate the average loadings of each bundle on each factor. For example, for the PSC latent variable, we assigned items ranked 1, 4, 7, or 10 to Bundle 1 (PSC1); items ranked 2, 5, 8, or 11 to Bundle 2 (PSC2); and items ranked 3, 6, or 9 to Bundle 3 (PSC3; see Figure 1). Because of the unequal number of items in each bundle, we used the average scores (instead of the sum) of each item to form each bundle. In addition, the variance and covariance matrices of 9 item-bundles from the bilevel model are presented in Table 1.

As suggested by Hu and Bentler (1999) and Quintana and Maxwell (1999), five indices were used to assess goodness of fit of the models: Comparative fit index (CFI; best if close to .95 or greater), Bollen's (1989) fit index (BL89; best if close to .95 or greater), Nonnormed fit index (NNFI; best if close to .95 or greater), McDonald's (1989) centrality index (Mc; best if close to .90 or greater), and root-mean-square error of approximation (RMSEA; best if close to .05 or less). In addition, the one-general-factor model (see Figure 1) and the three-correlated-specific-factors model (see Figure 2) are empirically nested models. (When the factor correlations in the latter model are equal to one, it is actually equal to the one-general-factor model.) Thus, a chi-square difference test was used to compare these two models for deciding the best representation of the factor structure of PSI. However, the bilevel model (see Figure 3) is not a nested model with the one-general-factor model and the three-correlated-specific-factors model. Maruyama (1998) suggested that some statistics could be used to compare nonnested models, such as Akaike's information criterion (AIC; Akaike, 1987; Maruyama, 1998), consistent Akaike's information criterion (CAIC; Bozdogan, 1987), expected cross-validation index (ECVI; Browne & Cudeck, 1993), and Schwarz's Bayesian criterion (SBC; Schwarz, 1978; Sclove, 1987). In general, lower values of AIC, CAIC, ECVI, and SBC are associated with better model fit when comparing nonnested models (Maruyama, 1998).

A maximum-likelihood analysis using CALIS in SAS (SAS Institute, 1991) was used to estimate goodness of fit of the three models (see Figures 1–3). The information in Table 2 indicates that the one-general-factor model offered the poorest fit. The three-correlated-specific-factors model is a better model than the one-general-factor model, $\Delta\chi^2(3, N = 447) = 281.63$. In the three-correlated-specific-factors model, all factor loadings were significant ($p <$ .001), indicating that the three factors were well represented by the bundles. The three factors shared approximately 38−45% of the variance. One goal in creating item-bundles is to

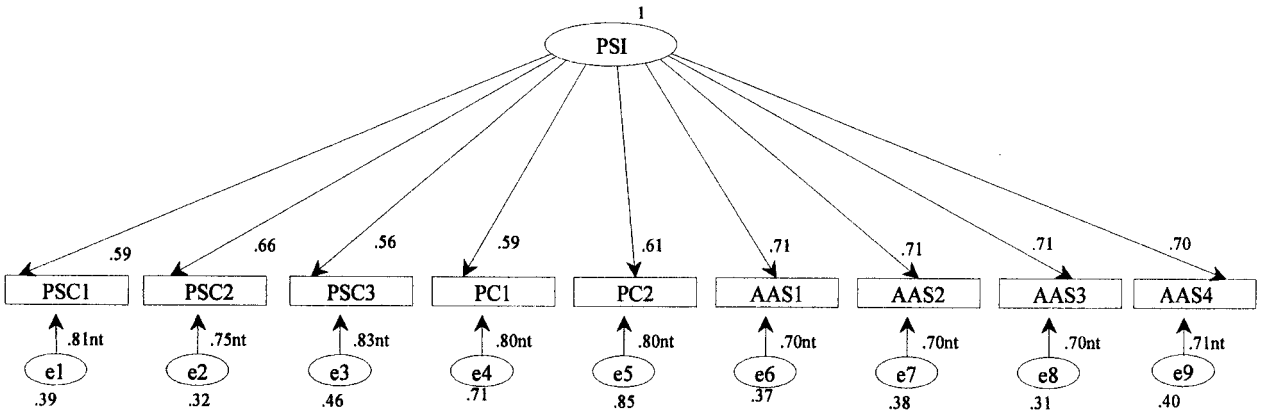

Figure 1. The one-general-factor model. The rectangles are measured variables, the large oval is the latent construct, and the small ovals are residual variances. Factor loadings are standardized and all are significant ($p < .01$), except for the paths designated "nt," which were fixed at 1. PSI = Problem Solving Inventory; PSC = Problem-Solving Confidence; PC = Personal Control; AAS = Approach–Avoidance Style.

make each parcel within each subscale similar, resulting in comparable correlations with the latent variable. Figure 2 indicates comparable correlations between the parcels and the latent variable (for PSC: path loadings ranged from .72 to .82; for PC: loadings ranged from .75 to .78; for AAS: loadings ranged from .72 to .79).

Next, we compared the three-correlated-specific-factors model and the bilevel model. Both models yielded very good fit indices (see Table 2), indicating that both models well represented the PSI factor structure with Black South African college student samples. When based on the AIC and ECVI, the bilevel model was better, whereas the three-correlated-specific-factors model was better when based on the CAIC and SBC. However, the bilevel model had overall better fit indices (e.g., CFI, BL89, and Mc) and fewer degrees of freedom (see Table 2). The bilevel model is also consistent with how the PSI is conceptualized in terms of three specific factors and a general problem-solving factor (Heppner, 1988; Heppner & Baker, 1997) as well as how the PSI is used throughout the literature (i.e., researchers have reported the factor scores and/or the total score). In sum, these results suggest that when applying the PSI in Black South African populations, there is empirical support for a bilevel model consisting of the three specific factors (PSC, AAS, and PC) as well as the one general factor (PSI), supporting the second hypothesis of Study 1.

Discussion

Previous factor analyses of the PSI (Heppner, 1988) using predominantly White U.S. samples have reported a factor structure similar to the original factor analysis of Heppner and Petersen (1982). Another factor-analytic study using a Turkish sample also provided support for the original factor structure of the PSI, although with fewer items loading on the respective PSI factors (Sahin et al., 1993); these results extended the generalizability of the PSI to a quite different culture. The results of the current study provide additional support for the generalizability of the PSI factor structure to a large Black South African college sample at an activist university and reveal that the three specific PSI factors existed in the perceptual processes of predominantly Black college students in South Africa. Along with the study by Sahin et al. (1993), these results suggest considerable consistency of the PSI

Table 1
Variance and Covariance Matrices of 9 Item-Bundles From the Bilevel Model in the Confirmatory Factor Analysis of Study 1

Item-bundle	PSC1	PSC2	PSC3	PC1	PC2	AAS1	AAS2	AAS3	AAS4
PSC1	.59084	.33354	.34503	.22663	.29633	.24414	.20332	.26200	.23388
PSC2	.33354	.56841	.36459	.31351	.38222	.23828	.34457	.27622	.27148
PSC3	.34503	.36459	.66366	.30258	.37052	.19637	.20147	.21991	.23061
PC1	.22663	.31351	.30258	1.09917	.70507	.33545	.38432	.25477	.44292
PC2	.29633	.38222	.37052	.70506	1.34669	.39291	.36022	.32412	.45162
AAS1	.24414	.23828	.19637	.33545	.39291	.74218	.45892	.39491	.43590
AAS2	.20332	.24457	.20147	.38432	.36022	.45892	.77707	.43627	.44382
AAS3	.26200	.27622	.21991	.25477	.32412	.39491	.43627	.62758	.32719
AAS4	.23388	.27148	.23061	.44292	.45162	.43590	.44382	.32719	.79588

Note. PSC1, PSC2, and PSC3 are from 11 items of the Problem-Solving Confidence factor of the Problem Solving Inventory (PSI) (Heppner, 1988); PC1 and PC2 are from 5 items of the Personal Control factor of the PSI; AAS1, AAS2, AAS3, and AAS4 are from 16 items of the Approach–Avoidance Style factor of the PSI.

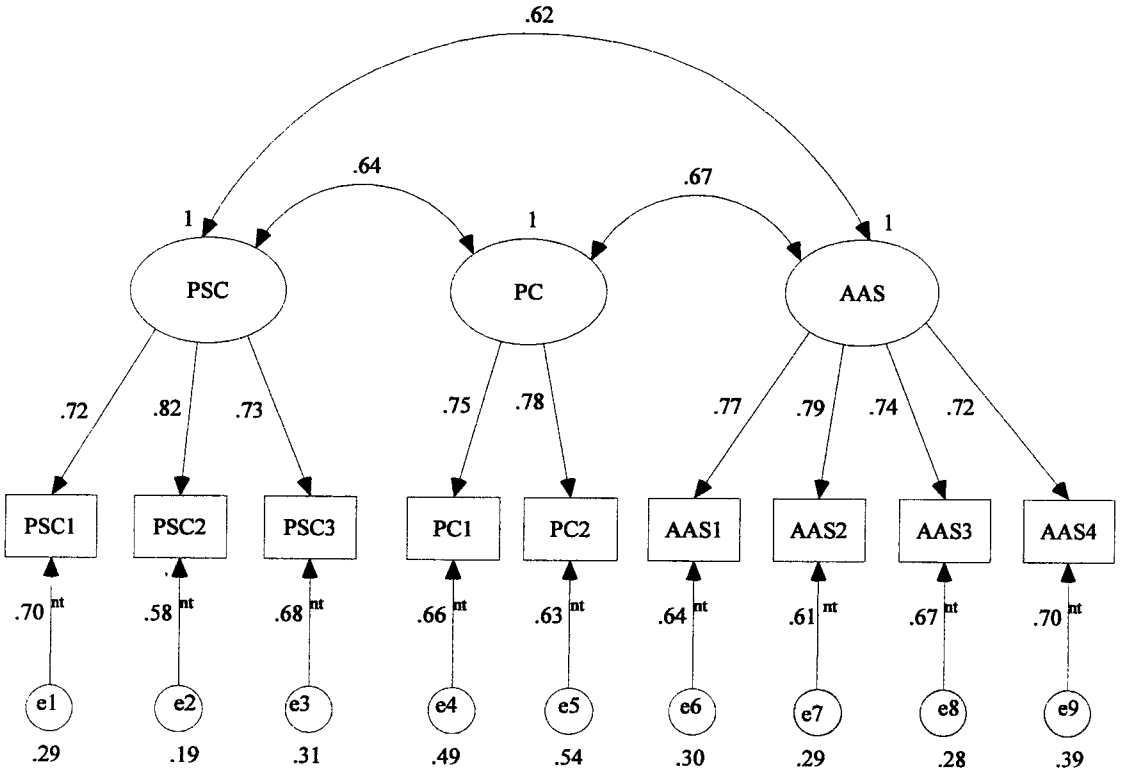

Figure 2. The three-correlated-specific-factors model. The rectangles are measured variables, the large ovals are latent constructs, and the small circles are residual variances. Factor loadings are standardized and all are significant ($p < .001$), except for the paths designated "nt," which were fixed at 1. PSC = Problem-Solving Confidence; PC = Personal Control; AAS = Approach–Avoidance Style.

factor structure across quite different cultures and imply that problem-solving appraisal as measured by the PSI may be a useful construct across different cultures. In addition, the PSI means, standard deviations, estimates of internal consistency, and factor intercorrelations from the South African college samples are comparable to previous research based on predominantly White college samples in the United States. Finally, the results suggest that there is support for using not only the three specific factors of the PSI but also a general PSI factor. In sum, the results of this cross-national study suggest that the components of problem-solving appraisal as measured by the PSI seem to generalize to Black South African college students and thus may be a useful instrument to examine problem solving with Black South African college students.

Study 2: Problem-Solving Appraisal and Psychological Distress

Study 2 examined the associations between problem-solving appraisal and psychological distress in Black South African samples. The goals of this study were twofold. First, we wanted to examine whether the construct of problem-solving appraisal would be related to psychological distress, as has been found in U.S. samples (see Heppner & Lee, 2002) and which has started to appear in South African samples. For example, previous research with Black South African samples reported statistically significant correlations between the PSI and primarily depression (Pretorius, 1992, 1993; Pretorius & Diedricks, 1994) but also anxiety, self-esteem (Pretorius, 1993), and indices of positive family environment (Pretorius, 1996). Second and more important, we wanted to examine the feasibility of a more complex model of problem solving and psychological distress that might have a range of implications for mental health professionals.

We had two sets of hypotheses for Study 2. First, we hypothesized that, similarly to research conducted with White U.S. samples, there would be statistically significant zero-order correlations between the PSI and six indices of psychological distress. Our second set of hypotheses pertained to the mediational role of PSC in the relationship between AAS and both intrapersonal and interpersonal psychological distress. The initial hypothesized model for the present study contained 4 latent variables: AAS, PSC, intrapersonal psychological distress, and interpersonal psychological distress, with a total of 13 observed variables (see Figure 4). On the basis of previous studies (e.g., Sharpe & Heppner, 1991), we hypothesized that PSC would mediate the relation between AAS and the intrapersonal and interpersonal aspects of psychological distress. Therefore, there are two hypothesized mediating paths depicted in the model in Figure 4: (a) PSC mediates the relation between AAS and intrapersonal psychological distress, and (b) PSC mediates the relation between AAS and interpersonal psychological distress.

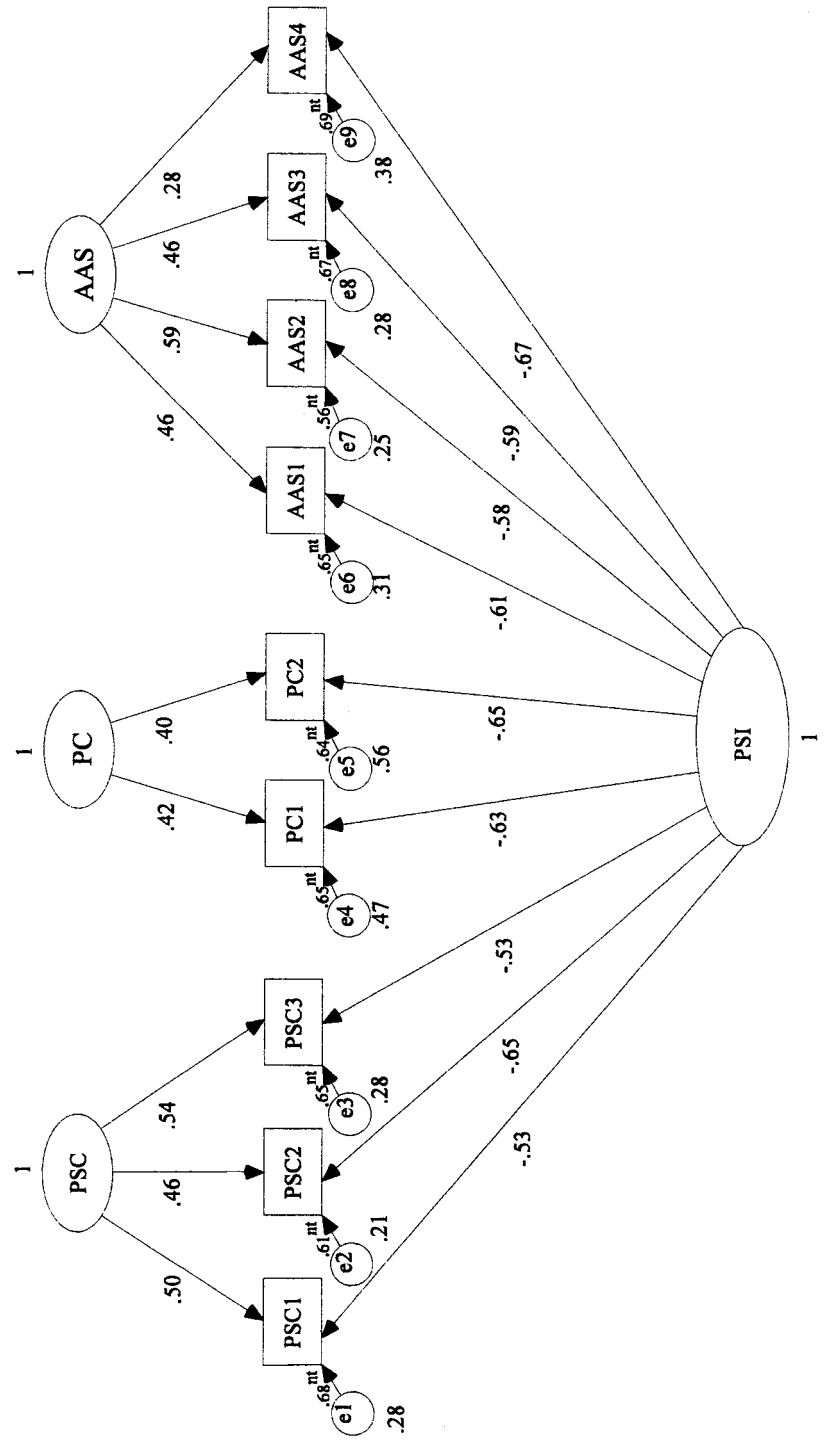

Figure 3. The bilevel model. The rectangles are measured variables, the large ovals are latent constructs, and the small circles are residual variances. Factor loadings are standardized and all are significant ($p < .01$), except for the paths designated "nt," which were fixed at 1. PSI = Problem Solving Inventory; PSC = Problem-Solving Confidence; PC = Personal Control; AAS = Approach–Avoidance Style.

Table 2
Goodness-of-Fit Indices for the One-General-Factor Model, Three-Correlated-Factors Model, and Bilevel Model

Goodness-of-fit index	One-general-factor model	Three-correlated-specific-factors model	Bilevel model
χ^2 (*df*)	368.09 (27)	86.46 (24)	66.55 (18)
p value	<.0001	<.0001	<.0001
CFI	.80	.96	.97
BL89	.80	.96	.97
NNFI	.73	.94	.94
Mc	.68	.93	.95
RMSEA[a]	.17 (.15–.18)	.08 (.06–.09)	.08 (.06–.10)
AIC	314.09	38.46	30.55
CAIC	176.32	−84.00	−61.30
ECVI[a]	.91 (.78–1.06)	.29 (.23–.36)	.27 (.23–.34)
SBC	203.32	−60.00	−43.30

Note. $N = 447$. CFI = comparative fit index; BL89 = Bollen's (1989) fit index; NNFI = non normed fit index; Mc = McDonald's centrality index; RMSEA = root-mean-square error of approximation; AIC = Akaike's information criterion; CAIC = consistent Akaike's information criterion; ECVI = expected cross-validation index; SBC = Schwarz's Bayesian criterion.
[a] Lower confidence limit = 90%; upper confidence limit = 90%.

Method

Participants and Procedure

The participants were 234 (178 women, 56 men) students enrolled at UWC. All participants volunteered to participate in the study as part of a class project conducted by T. B. Pretorius; 53% of the class returned completed, useable questionnaires. The age of the participants ranged from 18 to 45 years ($M = 23.30$, $SD = 4.40$). The educational background of the students ranged from having not completed primary school to having received a high school diploma. Their first languages were Xhosa (36%), Afrikaans (26%), 1 of 4 other traditional languages (18%; e.g., Zulu), and English (16%). However, because English is the medium of instruction at UWC, all instruments were presented in English. Fifty-six percent of the participants were from an urban setting. The participants were predominantly Christian (93%), full-time students (98%), in their second year of study (78%), and seeking a bachelor's degree (70%).

Instruments

The PSI–Form B (Heppner, 1988; Heppner & Petersen, 1982) was previously described in Study 1. Estimates of internal consistency for the PSI and factor scores on this South African sample were as follows: PSI total ($\alpha = .81$), PSC ($\alpha = .70$), AAS ($\alpha = .73$), and PC ($\alpha = .55$), all of which were lower than those in Study 1.

The Beck Depression Inventory (BDI; Beck, 1967) consists of 21 four-point Likert scale items that assess the presence and severity of depressive symptomatology during the past week. Scores can range from 0 to 63, with higher scores indicating a greater severity of depression. Specifically, the BDI measures depressive symptoms by surveying several areas, such as feeling states, relationships with others, physical indices of depression (e.g., loss of appetite, change in amount of sleep needed, change in body weight), performance on daily tasks, and outlook toward the future. Split-half reliabilities of the BDI have been reported to range from .78 to .93, indicating good internal consistency. The alpha coefficient conducted for this study was .81. Test–retest reliabilities have been reported, ranging from .48 for psychiatric patients after 3 weeks to .74 for undergraduates after 3 months. The BDI had been used in more than 1,000 research studies (see Beck, Steer, & Garbin, 1988). For example, the BDI has been shown to significantly correlate with other measures of depression and clinicians' ratings of depression, indicating evidence of concurrent validity (Corcoran & Fischer, 1987). In addition, several studies have provided reliability and validity estimates for the BDI used in Black South African samples (e.g., Cartens & Spangenberg, 1997; Naidoo & Pillay, 1994; Pillay & Sargent, 1999; Westaway & Wolmarans, 1992). In our current study, we found similar means and standard deviations for the BDI. Estimates of internal consistency in Black South African samples have been similar to those in the United States ($\alpha = .79$; Westaway & Wolmarans, 1992). In terms of concurrent validity, the BDI has been significantly correlated with the Hopelessness Scale (Beck, Weissman, Lester, & Trexler, 1974) and the Beck Anxiety Inventory (Beck & Steer, 1993) in a South African sample (Pillay & Sargent, 1999). The BDI was also found to successfully differentiate South African patients diagnosed with major depressive disorder as well as patients with chronic low-back pain from their control groups in two different studies (Cartens & Spangenberg, 1997; Naidoo & Pillay, 1994).

The Beck Hopelessness Scale (BHS; Beck et al., 1974) is a 20-item true–false inventory that assesses the degree to which individuals' cognitive schemas are associated with pessimistic expectations (e.g., "I don't expect to get what I really want," "My future seems dark to me"). Scores can range from 0 to 20, with higher scores indicating a greater degree of hopelessness. Internal consistency of .93 has been reported, along with concurrent validity of .74 with clinical ratings of hopelessness and .60 with other scales of hopelessness (Beck et al., 1974). The alpha coefficient for this study was .82. Two studies also provided validity estimates for the BHS used in South African samples (Pillay & Sargent, 1999; Pillay & Wassenaar, 1995). Pillay and Sargent found significant correlations among the BHS, BDI, and another anxiety scale. The BHS also successfully differentiated the South African participants who were parasuicides from the control group (Pillay & Wassenaar, 1995). In the same study, the parasuicidal South African adolescents who received treatment scored significantly lower on posttest with the BHS after 6 months. No alpha coefficients were reported in either study.

The Inventory of Interpersonal Problems (IIP; Horowitz, Rosenberg, Baer, Ureno, & Villasenor, 1988) is a 127-item instrument that measures distress arising from interpersonal sources. Participants rate each item on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). Factor-analytic studies yielded six subscales (Horowitz et al., 1988). In the present study, only two subscales—the Hard to Be Intimate Scale (HIS; 12 items) and the Hard to Be Sociable Scale (HSS; 18 items)—were used as measures of interpersonal distress, with higher scores on both subscales indi-

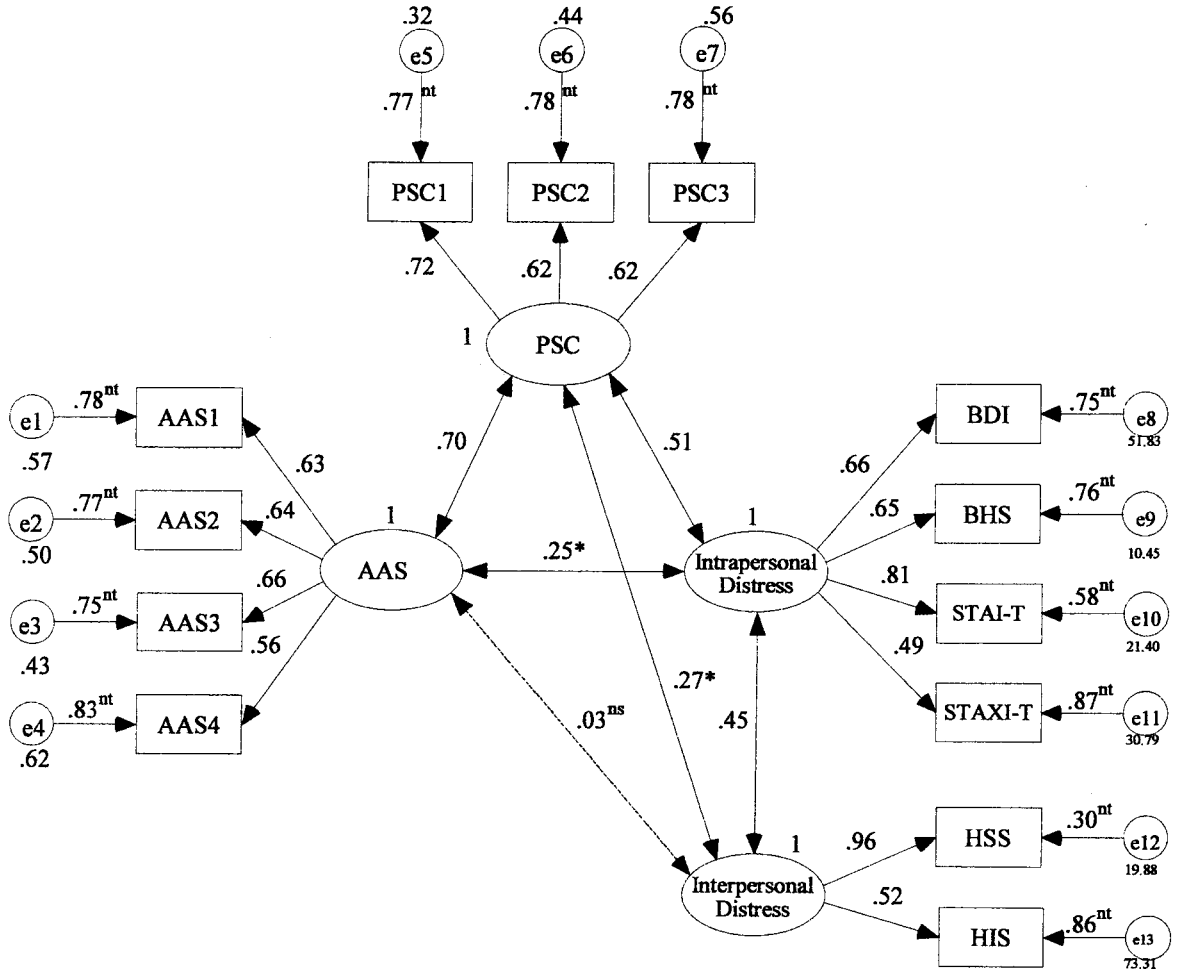

Figure 4. The measurement model. The rectangles are measured variables, the large ovals are latent constructs, and the small circles are residual variances. Factor loadings are standardized and all are significant ($p < .001$), except for these designated paths: * $p < .01$; ns = not significant, nt = fixed at 1. AAS = Approach–Avoidance Style; PSC = Problem-Solving Confidence. Intrapersonal distress latent variables: BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale; STAI–T = State–Trait Anxiety Inventory—Trait; STAXI–T = State–Trait Anger Inventory—Trait. Interpersonal distress latent variables: HSS = Hard to Be Sociable Scale; HIS = Hard to Be Intimate Scale.

cating more interpersonal distress. The HIS and HSS subscales have demonstrated alpha coefficients of .88 and .94 and test–retest reliabilities over a 10-week period of .87 and .80, respectively (Horowitz et al., 1988). In this study, the alpha coefficients for the HIS and HSS were .82 and .81, respectively. Content, criterion, and construct validity have all been previously demonstrated in several studies (Horowitz et al., 1988). To provide an estimate of construct validity for the HIS and HSS in a Black South African context, two separate CFAs, with 5 item-bundles each, were conducted on our data. The results yielded the following indices: for the HIS, $\chi^2(5, N = 237) = 18.44$, $p < .01$, CFI = .98, BL89 = .98, NNFI = .96, Mc = .97, RMSEA = .11; and for the HSS, $\chi^2(5, N = 239) = 16.28$, $p < .01$, CFI = .98, BL89 = .98, NNFI = .96, Mc = .98, RMSEA = .10. Thus, the results indicate that the data fit the models well for both the HIS and HSS.

The State–Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) is a widely used measure of anxiety. It consists of two subscales designed to measure anxiety proneness (Trait Anxiety) and situational anxiety (State Anxiety). In this study, only the Trait Anxiety subscale (STAI–T) was used because, in previous research, trait anxiety has been more strongly associated with the PSI than has state anxiety (e.g., Carscaddon, Poston, & Sachs, 1988). The Trait Anxiety subscale consists of 20 statements designed to assess the degree to which participants generally experience anxious feelings. The participants rate the items on a 4-point Likert scale ranging from 1 (*almost never*) to 4 (*almost always*), with higher scores indicating higher trait anxiety. Scores can range from 20 to 80. Test–retest reliability ranged from .73 to .86 over periods of 1 hour to 104 days, and the Trait Anxiety subscale has demonstrated good internal consistency, with alpha coefficients ranging from .83 to .92 (Maloney, Cheney, Spring, & Kanusky, 1986; Spielberger et al., 1970). In this study, the alpha coefficient for the STAI–T was .81. Wide ranges of validity estimates have been found for the Trait Anxiety subscale (Spielberger et al., 1970). Some studies also provided reliability and validity estimates for the STAI–T used in Black South African samples (Pretorius, 1993, 1998; Pretorius & Norman, 1992). Two studies reported high internal consistency

estimates (both alphas = .90) and slightly lower means and standard deviations for the STAI–T subscale (Pretorius, 1993, 1998) as compared with the results of the current study. In terms of concurrent validity, the STAI–T was significantly correlated with other anxiety and depression scales validated in South African samples (Pretorius, 1998; Pretorius & Norman, 1992).

The State–Trait Anger Inventory (STAXI; Spielberger, 1988) consists of 44 items designed to assess individual differences in the experience and expression of anger. The STAXI consists of six subscales; only the Trait Anger subscale (STAXI–T; 10 items, range = 10–40), measuring a general disposition to experience anger, was used in this study. Each item is presented on a 4-point Likert scale; higher scores indicate a higher intensity of angry feelings or a higher frequency of anger being experienced, expressed, suppressed, or controlled (Spielberger, 1988). Alpha coefficients for the STAXI–T subscale ranged from .82 to .84 across adolescent, college student, and adult samples (Spielberger, 1988). In this study, the alpha coefficient for the STAXI–T was .77. Estimates of concurrent validity were indicated by significant correlations with three hostility measures for both men and women across two samples (Spielberger, 1988). To provide an estimate of construct validity in the Black South African context, a CFA with 5 item-bundles was conducted with the STAXI-T on the data from this study. The results yielded the following indices: $\chi^2(5, N = 240) = 21.66$, $p < .001$, CFI = .95, BL89 = .95, NNFI = .89, Mc = .97, RMSEA = .12, indicating an acceptable level of fit to the data.

Results

Psychometric Properties of the PSI and Other Measures

Normative information. Means and standard deviations, skewness, and kurtosis indicators for 10 measured variables are shown in Table 3. The PSI means in Study 2 suggest that participants as a group rated their problem-solving appraisal slightly higher than in Study 1, and very similarly to U.S. samples of nonclinical college students (Heppner, 1988). In addition, the participants as a group reported themselves to be mildly to moderately depressed (Beck et al., 1988), mildly hopeless (Beck et al., 1974), moderately anxious (Spielberger et al., 1970), and moderately angry (Spielberger, 1988) and reported that it was somewhat easy for them to be sociable and intimate (Horowitz et al., 1988). The skewness and kurtosis statistics of the PSI scores, as well as almost all of the other variables, are less than one; this indicates that all of the variables were in the normal range, and the distributions of the variables were normal.

We again examined whether third variables might be influencing the results. Using the categorical demographic variables (language, urban/rural, gender, educational qualifications, religion, full- or part-time students, and course of study), we conducted analyses of variance (ANOVAs) on the primary variables (i.e., the PSI total and PSI factors as well as the six distress indices). In addition, we calculated correlations between the two continuous variables (age, and year in school) and the primary variables. Only two of the relationships were significant, Language × HIS, $F(7, 221) = 4.46$, $p < .01$, and Age × HIS ($r = .18$, $p < .01$). In sum, the results indicate that the demographic variables were not significantly associated with the PSI total or PSI factors nor with the distress indices.

Factor intercorrelations. The intercorrelations among the PSI factors ranged from .25 to .52, which were similar to but a little lower than in Study 1, which again suggests that the factors are somewhat interrelated.

Zero-order correlations between problem-solving appraisal and psychological distress. We hypothesized that the PSI would correlate significantly with the six indices of psychological distress. Table 1 shows that the correlations between the PSI total and all of the six indices of psychological distress (BDI, BHS, STAXI–T, STAI–T, HSS, and HIS) were statistically significant (all *p*s < .001). Previous research with Black South African samples found

Table 3
Means, Standard Deviations, Skewness, Kurtosis, and Zero-Order Correlations Among PSI, PC, AAS, PSC, and Intrapersonal and Interpersonal Distress Variables

Variable	1	2	3	4	5	6	7	8	9	10
1. PSI	—									
2. PC	.54***	—								
3. AAS	.89***	.30***	—							
4. PSC	.79***	.25**	.52***	—						
5. BDI	.23***	.17**	.14	.26***	—					
6. BHS	.31**	.21**	.18*	.34***	.48***	—				
7. STAXI–T	.31***	.34***	.23*	.21*	.31***	.24**	—			
8. STAI–T	.31***	.35***	.13	.34***	.51***	.52***	.38***	—		
9. HSS	.17**	.23**	.03	.21*	.24**	.23**	.35***	.37***	—	
10. HIS	.18**	.07	.14	.18*	.27***	.10	.20**	.17*	.53***	—
N	235	236	236	237	233	217	240	230	237	237
M	87.1	17.4	43.0	27.3	12.7	4.9	20.9	44.4	29.8	14.1
SD	18.2	4.7	10.8	7.6	9.6	4.2	5.2	10.6	13.0	10.0
Skewness	.20	.08	.38	.44	.89	1.05	.67	.16	−.01	.43
Kurtosis	−.57	−.39	−.29	−.28	.26	.51	.51	−.16	−.88	−.36

Note. PSI = Problem Solving Inventory; PC = Personal Control; AAS = Approach–Avoidance Style; PSC = Problem-Solving Confidence. Intrapersonal distress latent variables: BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale; STAXI–T = State–Trait Anger Inventory—Trait; STAI–T = State–Trait Anxiety Inventory—Trait. Interpersonal distress latent variables: HSS = Hard to Be Sociable Scale; HIS = Hard to Be Intimate Scale.
* $p < .01$. ** $p < .001$. *** $p < .0001$.

significant correlations between the PSI and depression (e.g., Pretorius, 1992, 1993), self-esteem, anxiety (Pretorius, 1993), and family environment (Pretorius, 1996). The results of the current study suggest that problem-solving appraisal is related to a broader range of measures of psychological distress in this Black South African sample, which is consistent with research based on U.S. samples (see Heppner & Lee, 2002). In sum, the first hypothesis of Study 2 was supported by our findings.

Measurement Model

A two-step procedure recommended by J. C. Anderson and Gerbing (1988) was used in the present study to test the mediational model. In the first step, a CFA was used to develop an acceptable measurement model, then the structural model was tested in the second step. Similarly to Study 1, we created 4 item-bundles to operationalize the AAS latent variable and 3 item-bundles for the PSC latent variable. The bundles consisted of the same items in Study 2 as in Study 1. In addition, we determined the adequacy of the model fit on the basis of the CFI, BL89, NNFI, Mc, and RMSEA. As noted in Study 1, the CFI, BL89, and NNFI (close to .95 or greater), the Mc (close to .90 or greater), and the RMSEA (close to .05 or less) are considered to be desirable. We also used chi-square difference tests to compare nested structural models.

In the measurement model, the latent variables are allowed to covary with each other. The maximum-likelihood analysis using CALIS in SAS (SAS Institute, 1991) was used to estimate the measurement model (see Figure 4). An initial test of the measurement model yielded a very good fit for the model, $\chi^2(59, N = 213) = 93.39$, $p < .01$, CFI = .95, BL89 = .95, NNFI = .93, Mc = .92, RMSEA = .05. In addition, all of the factor loadings were significant ($p < .001$), suggesting that the four latent variables (AAS, PSC, intrapersonal Distress, and interpersonal distress) were well represented by all of the indicators. Moreover, the correlations among the four variables were significant at the .01 level, except for the correlation between AAS and interpersonal distress ($r = .03$, $p > .05$). Given this lack of significance in the measurement model, there was no effect to mediate. Thus, interpersonal distress was removed from the subsequent structural models.

Structural Model for Tests of Mediation

The structural model (see Figure 4) was tested with a maximum-likelihood analysis using CALIS in SAS (SAS Institute, 1991). According to Holmbeck (1997), three models must be estimated in structural equation modeling to test for a mediational effect. First, a direct-effect model tests the effect of AAS on intrapersonal distress in the absence of the mediator, PSC. For the mediation to exist, the path coefficient (from the AAS to intrapersonal distress) in the direct-effect model must be significant to continue to test the mediational effect of PSC. If the path coefficient from AAS to intrapersonal distress was not significant, no mediational effect would exist. The direct path coefficient from AAS to intrapersonal distress was significant ($r = .26$, $p < .01$), which met Holmbeck's (1997) first step criterion for examining a mediational model.

The second step in Holmbeck's (1997) procedure is to test the partially mediated structural model that estimates the direct effect from AAS to intrapersonal distress and adds the paths from AAS to PSC as well as from PSC to intrapersonal distress. The results of the partially mediated structural model were very good: $\chi^2(41, N = 216) = 51.36$, $p > .05$, CFI = .98, BL89 = .98, NNFI = .98, Mc = .98, RMSEA = .03 (90% lower confidence limit = 0; 90% upper confidence limit = .06). The direct effect of AAS on intrapersonal distress was reduced in the first direct-effect model ($r = .26$, $p < .01$) and nonsignificantly associated in the partially mediated model ($r = -.20$, $p > .05$). Note that although the correlation was not significant, the size of the correlation was almost as large as the former correlation but in the opposite direction, suggesting the possibility of a suppressor.

The final step in Holmbeck's (1997) procedure is to compare the partially mediated model with the fully mediated model, in which the direct path from AAS to intrapersonal distress is constrained to zero. The fully mediated model revealed very good fit indices as well: $\chi^2(42, N = 216) = 52.97$, $p > .05$, CFI = .98, BL89 = .98, NNFI = .97, Mc = .98, RMSEA = .03 (90% lower confidence limit = 0; 90% upper confidence limit = .06; see Figure 5). A chi-square difference test showed no significant difference between the two models, $\Delta\chi^2 (1, N = 216) = 1.62$. For parsimonious purposes, the fully mediated model is considered a better fit for the data (as suggested by J. C. Anderson & Gerbing, 1988). In Figure 5, the magnitude of the mediational effect (i.e., the standardized estimate of the indirect effect size; see Kline, 1998) from AAS via PSC to intrapersonal distress is given by multiplying the path coefficients, $.69 \times .48 = .33$. In other words, nearly 11% of the variance in intrapersonal distress was accounted for by the mediation effect of PSC between AAS and intrapersonal distress. In addition, all factor loadings were significant ($p < .001$), indicating that the AAS, PSC, and intrapersonal distress variables were well represented by the indicators. In sum, the result suggests that PSC fully mediated the relationship between AAS and intrapersonal distress but not the relationship between AAS and interpersonal distress. Thus, the second hypothesis was partially supported. Parenthetically, an alternative model was explored that examined whether AAS could serve as a mediator between PSC and psychological distress. The result indicates that AAS failed to mediate the relationship between PSC and intrapersonal distress because the path from AAS to intrapersonal distress was not significant ($r = -.20$, $p < .05$) in this model.

Discussion

The results of this study extend previous research conducted with Black South African samples that has primarily found a significant association between problem-solving appraisal and depression (e.g., Pretorius, 1992, 1993; Pretorius & Diedricks, 1994). The results from this study indicate that the PSI was also significantly correlated with a much broader range of psychological distress indices than previously reported (hopelessness, anger, anxiety, intimacy, and sociability); the zero-order correlations ranged from .17 to .31 and accounted for 4% to 10% of the variance in the indices of psychological distress. Thus, the results are consistent with zero-order relationships between the PSI and indices of psychological distress reported in primarily White U.S. samples (see Heppner & Baker, 1997; Heppner & Lee, 2002). In short, these results reveal significant associations between problem-solving appraisal and the psychological distress indices in

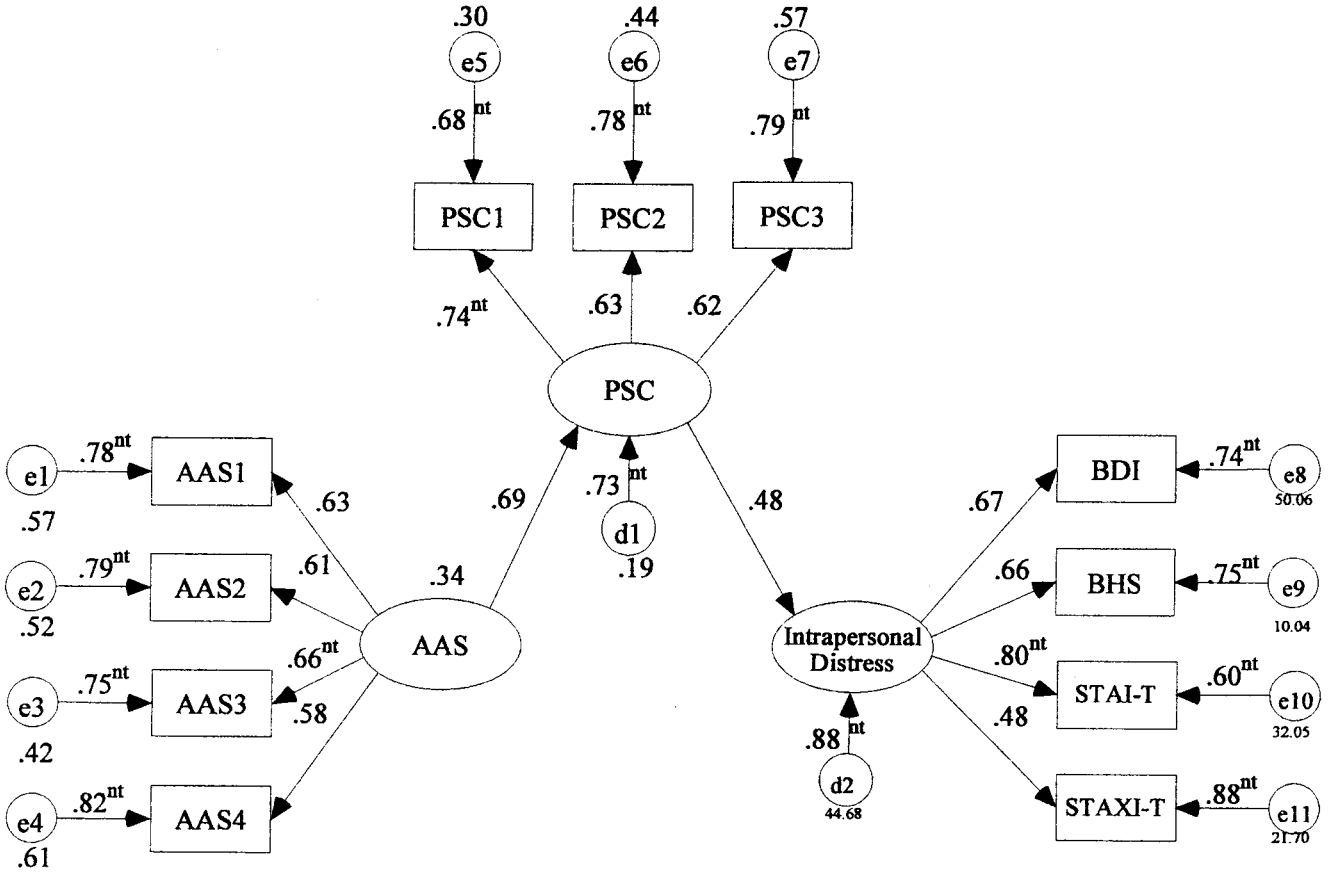

Figure 5. The fully mediated model. The rectangles are measured variables, the large ovals are latent constructs, and the small circles are residual or disturbance variances. Factor loadings are standardized and all are significant ($p < .001$), except for the paths designated "nt," which were fixed at 1. AAS = Approach–Avoidance Style; PSC = Problem-Solving Confidence. Intrapersonal distress latent variables: BDI = Beck Depression Inventory; BHS = Beck Hopelessness Scale; STAI–T = State–Trait Anxiety Inventory—Trait; STAXI–T = State–Trait Anger Inventory—Trait.

this Black South African sample, which provides additional support for the external validity or generalizability of previous PSI research within the United States.

Most important, the results of this study also strongly support and extend the problem-solving mediational model of psychological distress. Previously, two studies (Heppner et al., 2001; Witty et al., 2001) found that PSC mediated the relationship between AAS and indices of psychological distress in both chronic low-back pain patients and college students. In this study, psychological distress was divided into intrapersonal and interpersonal indices. The results of this study provide strong support for the notion that PSC mediates the relationship between AAS and a broad range of intrapersonal indices of psychological distress (depression, hopelessness, anger, and anxiety). Our results suggest that the consequences of approaching or avoiding problems are not directly associated with intrapersonal indices of psychological distress. Rather, the tendency to avoid problems is associated with lack of PSC, which in turn contributes to more psychological distress. In other words, the tendency to avoid problems not only reduces the chances of resolving life's problems (thus causing psychological distress from stressful events) but also is associated with a lower level of PSC for solving life's problems, which further contributes to psychological distress. It may also be important to note that when the variance due to PSC was removed, the previously positive relationship between AAS and distress changed to a negative relationship, suggesting that the remaining variance may have been associated with a decrease in psychological distress, perhaps indicating relief or even a temporary decrease in stress. Additional research is needed to examine the possibility of such a suppression effect with other samples in greater depth.

Applied problem solving is a highly complex task; previous researchers have called for more complexity in applied problem-solving theory and models (e.g., J. R. Anderson, 1993; Heppner & Krauskopf, 1987; Horan, 1979; Sternberg, 1982). The results of this study lend support for further investigation of more complex models of problem solving, particularly those that examine the relationships between different problem-solving appraisal components and psychological distress. Specifically, future research might examine the utility of the problem-solving mediational model in explaining psychological distress (e.g., substance abuse, suicidal ideation) as well as physical health and vocational adjustment.

The problem-solving mediational model implies that both reports of avoidant tendencies and a lack of PSC are important coping resources. These results suggest that it may be helpful for mental health practitioners to attend to not only avoidant tendencies in their clientele but also the relationship between the avoidant tendencies and clients' confidence in their problem-solving abilities. Psychological interventions may well be needed on both components of problem-solving appraisal. It is likely that there may be a wide range of cognitive and affective processes (perhaps deeply ingrained processes) that are intertwined with and directly affect these two important problem-solving activities (see Heppner & Krauskopf, 1987). Identifying the underlying cognitive and affective processes (e.g., perfectionism) may be helpful to alter clients' tendency to avoid problems as well as alter their PSC, which may in turn affect their psychological adjustment. In short, although clients' general problem-solving style may not always be related to situation-specific problem solving, our results on the problem-solving mediational model suggest that, in general, it may be useful to examine clients' tendency to avoid problems as well as their PSC when making interventions targeted toward clients' psychological distress.

The results when interpersonal indices of psychological distress were examined, however, were quite different. These results did not support the PSC mediational model of psychological distress. In this model, AAS was not associated with interpersonal psychological distress, which therefore did not meet one of the first criteria for a mediational model. This finding could be related to this particular South African sample or perhaps due to the unique cultures among Black South Africans, which may involve some unique interpersonal dynamics, perhaps more collectivistic than the predominant U.S. culture. Conversely, the findings could be related to the particular indices of interpersonal psychological distress or suggest different relationships between interpersonal and intrapersonal indices of psychological distress. It may be that other variables, particularly of an affiliative nature, may be needed to explain interpersonal psychological distress. For example, two studies have found evidence for the association between affiliative variables such as expressiveness and emotionality and interpersonal (as opposed to intrapersonal) indices of psychological distress (Sharpe & Heppner, 1991; Sharpe, Heppner, & Dixon, 1995). Another study found that social support was a consistent mediator between expressiveness/instrumentality and interpersonal indices of psychological distress (Wang, Heppner, & Berry, 1997). Finally, it is possible that emic approaches might provide more information about the role of problem solving within interpersonal distress in Black South Africans. Future research might continue to examine these and other hypotheses to explain interpersonal distress across different cultures.

General Discussion

The goals of the present research with Black South African samples were to test the generalizability of problem-solving appraisal as well as to examine more complex conceptual models of applied problem solving. The results of both studies suggest that problem-solving appraisal, and in particular the factor structure of the PSI (including a two-factor hierarchical model), appears to generalize to Black South African college student participants. Moreover, the estimates of various psychometric properties of the PSI in the two samples reported in this study appear to have similar characteristics to those reported in U.S. samples. Specifically, the scores have a similar normal distribution, few differences were found across participants' demographic information (e.g., sex), the intercorrelations among the PSI factors were similar, alpha coefficients were comparable (although the PC factor was lower in one sample), and the PSI means were comparable (although one sample's means were slightly lower than the typical U.S. sample). In essence, the CFA, and the various estimates of the psychometric properties of the PSI, cumulatively provide strong support for the generalizability of the PSI factor structure to Black South African college student samples. The zero-order correlations as well as the results supporting the problem-solving mediational model of psychological distress provide important validity estimates for the PSI with Black South African college student samples. In essence, these findings provide additional evidence for the generalizability of the psychological construct of problem-solving appraisal across quite different cultures.

The findings of this study also provide partial support for a PSC mediational model of psychological distress and may support previous research in the United States (Heppner et al., 2001; Witty et al., 2001). The results suggest that two of the components of problem-solving appraisal as measured by the PSI depict a more complex model of how problem-solving appraisal is related to intrapersonal indices of psychological adjustment but not to interpersonal distress. Whereas the results of Witty et al. (2001) and Heppner et al. (2001) were based on predominantly White U.S. samples, the results of this study were based on Black South African undergraduates in their early 20s. Thus, the results of this study not only support a problem-solving mediational model of intrapersonal psychological distress but suggest that this model is found across very different samples and cultures.

Although the results of this study on problem-solving appraisal with Black South African samples provide insight into the nature of problem-solving appraisal across some cultures, it is important to note some limitations of the study. Generalizations about problem-solving appraisal must be restricted to South African Black college students at an activist university at this time. Thus, additional research is needed to replicate the PSI factor structure (particularly given the .55 alpha coefficient found on the Personal Control factor in Study 2) as well as establish normative patterns with additional Black participants from other Black universities in South Africa and with Black adolescents and adults in the general population. Additional estimates of validity are also needed with Black South African samples, to not only replicate but also extend U.S.-based research on problem-solving appraisal. Moreover, future research might continue to examine the association between problem-solving appraisal and interpersonal distress and whether different exploratory models are needed. Given that only two scales from the entire IIP were used, the validity of the scale may have been compromised, which merits additional examination in future research. Finally, it is important to emphasize that there may be other components as well as other models of problem solving (including suppressor variables) that may play a significant role in coping with stressful events in the lives of Black South African college students. For example, research that uses an emic approach (Lonner, 1985) and integrates indigenous ways of coping in various Black populations (e.g., Zulu traditional spiritual practices) may be particularly useful for identifying culture-specific ap-

proaches to problem-solving appraisal in general and for broadening the scope of problem-solving research in South Africa. Moreover, it might be useful to examine the validity of the factor structure of the PSI in a more collectivistic culture (e.g., Asian culture) and emic approaches in how people from different cultures solve problems in stressful situations. Likewise, it might be useful to test other models of problem solving, such as a reciprocal model that would also predict distress being associated with lower confidence and problem avoidance (see Dixon, Heppner, Burnett, Anderson, & Wood, 1993).

Nonetheless, the study provides useful new information about the nature of problem-solving appraisal as well as a more complex model of problem solving and psychological distress. In particular, this study suggests that problem-solving appraisal seems to explain some of the constructs related to psychological adjustment in Black South African college student samples. Given the psychological distress associated with apartheid, and the transformation of the country since the end of apartheid, problem-solving research and psychosocial interventions have the potential to respond to the pressing psychological needs of diverse groups of people in South Africa and of other cultures around the world.

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Received January 16, 2001
Revision received January 4, 2002
Accepted January 7, 2002 ■