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**Psychological Well-Being among University Students:
Problem Solving, Career-Decision-Making Attitudes, and Program Commitment**

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**A thesis submitted to the School of Graduate Studies and Research of the University of
Ottawa as partial fulfilment of the requirements for the degree of Doctor of Philosophy**

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**This thesis is dedicated, with great respect,
to the memory of my father**

William D. Miller

**who instilled in me a sense of unshakeable confidence
that no obstacle is too great to overcome**

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Abstract

University administrators are becoming increasingly aware of the importance of the university experience on students' psychological well-being. Bivariate research studies have suggested that social problem solving orientation, career-decision-making attitudes, and program commitment may be related to student's psychological well-being. Their role in psychological well-being, as suggested by the literature, may not have been investigated completely. For example, these antecedent variables may change as a function of years of university experience. Also, there may be structural relationships between these variables that are better explained by a mediational model. Accordingly, the goals of this study are threefold. First, the relationships among students' social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being were investigated. Second, the role of years of university experience relative to social problem solving orientation and career-decision-making attitudes was explored. Third, a path analytic design was proposed to identify potential mediating relationships among the variables related to psychological well-being. Participants included 394 students from the faculties of Arts and Social Sciences at the University of Ottawa. The results confirmed that social problem solving orientation, career-decision-making attitudes, and university program commitment were all significantly positively correlated to students' psychological well-being. A one-way Anova and post-hoc analyses suggested that years of university experience was positively related to social problem solving orientation and career-decision-making attitudes. However, the hypothesized path model was not supported. Rather, the final cross-validated path design begins with years of university experience leading to social problem solving orientation and career-decision-making attitudes. Career-decision-making attitudes was, in turn, directly related to psychological well-being while social problem solving orientation's influence on psychological

well-being was mediated by university program commitment and career-decision-making attitudes. These results point to two major implications. First, future research should adopt a multidimensional longitudinal strategy that takes into account the developmental sequence of variables related to students' psychological well-being. Second, university administrators, career counsellors, and academic advisors should consider ways to develop students' social problem solving orientation to facilitate their career-decision-making attitudes, program commitment, and psychological well-being.

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Chapter 1

Introduction

Throughout their university experience, students are faced with a variety of complex choices that may influence their psychological well-being (Bragg, 1994). The most salient of these tasks involves choosing an appropriate program of study, committing to it, and carrying out the necessary steps to follow it through to completion. The forthcoming review of research findings suggests that successful transition through these tasks requires students to demonstrate proficiency in social problem solving orientation, develop mature career-decision-making attitudes, and display university program commitment. Accordingly, this study endeavors to integrate into a mediational model research on social problem solving orientation, career-decision-making attitudes, and university program commitment as it relates to the psychological well-being of university students.

Statement of the Problem

University administrators are becoming increasingly aware of the importance of the university experience on students' psychological well-being. For example, Hampton (1983) maintained that a currently satisfied or happy student is essential to retain and attract new students. Accordingly, the author argued that students' happiness (i.e., psychological well-being) should be the focus of future research (Hampton, 1983). Focusing on the obverse, many studies have investigated students' negative psychological adjustment to university life such as stress, anxiety, and depression (Maydeu-Olivares & D'Zurilla, 1996). There have also been several studies to suggest that students who experience significantly lower psychosocial adjustment to college life also tend to be dissatisfied with college guidance services (Bragg, 1994; Mohr, Eiche, & Sedlacek, 1998). Although these findings suggest that the university experience plays an

important role in students' negative psychological adjustment, they do not elucidate the more positive aspects of students' functioning. Furthermore, two problems still face university administrators, academic advisors, and career counsellors. First, there is little agreement in the literature regarding what constitutes psychological well-being (e.g., Diener, Larson, Levine, & Emmons, 1985; Ryff & Keyes, 1995). Second, there is little indication of what constitutes the most salient antecedents of psychological well-being in university students. In short, not only is psychological well-being ill-defined, but little is known about its antecedents in university students.

Defining Well-Being

The history of happiness or psychological well-being research is the history of confusion. Part of the problem is that the term "happiness" has carried many different meanings which has hindered productive thinking on the topic. Historically, Greek philosophers considered happiness to be the highest good and ultimate motivation for human action (Diener, 1984). Although psychologists had explored human unhappiness in depth, it was not until the 1960's that more modern conceptualizations of happiness began to emerge. In 1967, Wilson conducted a review of subjective well-being and based upon the limited data available at the time, arrived at two broad conclusions. First, the happy person is a "young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, high job morale, modest aspirations, of either sex and a wide range of intelligence". Second, little theoretical progress in understanding happiness has been made in the two millennia since the time of the Greek philosophers (Wilson, 1967).

Although Wilson's study stimulated considerable research regarding the demographic characteristics that correlate with well-being, scant attention was paid to developing a greater

conceptual understanding of well-being. For the past three decades, studies of psychological well-being have been guided by two primary conceptions of positive functioning. The first was Bradburn's (1969) hypothesis that happiness should be defined as the balance between positive and negative affect. However, this formulation was criticized because it failed to distinguish between the intensity and frequency of affect (Diener, et al., 1985). A related criticism was that measurement could be influenced by momentary affective states (e.g., those produced by the weather) at the time of completing the scale (Diener, 1984; Schwarz & Clore, 1983). The second primary conception of positive functioning emphasized life satisfaction as the key indicator of psychological well-being. Viewed as a cognitive component, life satisfaction was thought to complement happiness - the more affective dimension of positive functioning (Bryant & Veroff, 1982). However, this formulation was criticized for having too few items to offer a finely differentiated view of a person's well-being (Diener, 1984). In a recent review of the literature, Diener and his colleagues (1999) acknowledged that well-being should not be treated as a monolithic entity. These authors concluded that there are likely "separable components" (i.e., different life domains) that exhibit unique patterns of relations with different formulations of well-being (Diener, et al., 1999).

Previous conceptions of psychological well-being were also criticized for their lack of theoretical underpinning, their failure to recognize the multidimensional nature of psychological well-being (Ryff & Keyes, 1995), and their focus on the practical applications of research findings rather than the essential meanings of wellness (Bryant & Veroff, 1982). More recent research by Ryff and her colleagues (1995) seems to have surmounted many of the criticisms of prior formulations of psychological well-being. In particular, her conception of psychological well-being represents a convergence and integration of prior theories of life course development,

clinical accounts of positive functioning, and mental health conceptions culminating in a multidimensional view of psychological well-being (Ryff & Keyes, 1995). Specifically, the developmental theories included Erikson's (1959) psychosocial stages, Buhler's (1935) basic life tendencies, and Neugarten's (1973) personality changes articulate wellness as trajectories of continued growth across the life cycle. The clinical accounts of positive functioning included Maslow's (1968) conception of self-actualization, Allport's (1961) formulation of maturity, Roger's (1961) depiction of the fully functioning person, and Jung's (1933) account of individuation. The mental health conceptions were taken from Birren and Renner (1980) and Jahoda (1958) (as cited in Ryff & Keyes, 1995). From these theories, Ryff identified and operationalized six distinct aspects of positive psychological functioning: (1) autonomy, a sense of independence and self-determination, (2) environmental mastery, a sense of mastery and competence in managing one's environment, (3) personal growth, a sense of continued growth and development as a person, (4) positive relations with others, the presence of warm, satisfying, trusting relationships with others, (5) purpose in life, a sense of directedness and having goals in life, and (6) self-acceptance, a positive attitude about oneself and one's past life (Ryff, 1995).

Although Ryff's measure of well-being is relatively new, it has been used as an outcome measure in several recent studies. For example, Ryff and Heidrich (1997) found that movement through the "standard hurdles" of life (e.g., getting an education, a job, married, having a family) were significant predictors of multiple aspects of present and future well-being in a sample of 308 males ($n=155$) and females ($n=153$). Another study by Marmot and his colleagues (1998) examined the relationship between several aspects of social class and three health outcomes: self-reported physical health, waist:hip ratio, and psychological well-being in a nationally representative sample of 3032 people living in the United States. The results indicated that the

group with the lowest education had lower levels on all three health outcomes including psychological well-being (Marmot, et al., 1998). Although these studies suggest that Ryff's conceptualization of psychological well-being has been gaining increasing acceptance among researchers, it has not yet been used to examine the more salient antecedents of psychological well-being in university students. Furthermore, scant attention has been given to the antecedents of the key elements of her proposed conceptualisation.

Antecedents of Psychological Well-Being

University administrators have no where to turn for information on strategies to improve students' well-being. The field has not yet evolved to the point where macro-level theories would allow them to derive variables that fit under a general conceptual framework of students' well-being. The literature on students' well-being is in disarray with several antecedent variables being explored, but not brought together in one study. It seems reasonable that the more salient antecedents of well-being would be those that are common to all students, and important for their success in university. For example, all university students must choose an appropriate program of study, commit to it, and carry out the necessary steps to follow it through to completion. Successful transition through these tasks requires students to demonstrate proficiency in social problem solving orientation, develop mature career-decision-making attitudes, and display university program commitment. The forthcoming discussion describes the direct and indirect evidence linking these factors to psychological well-being.

Social Problem Solving Orientation and Psychological Well-Being

Social problem solving orientation is a term that refers to problem solving as it occurs in the real world (Maydeu-Olivares & D'Zurilla, 1996). Indeed, it has been defined as "the self-directed cognitive-behavioral process by which a person attempts to identify or discover effective

or adaptive ways of coping with problematic situations encountered in the course of everyday living” (D’Zurilla, Nezu, & Maydeu-Olivares, 1996). Social problem solving orientation includes (1) positive problem orientation; the general disposition to appraise a problem as a challenge, to approach it, (2) negative problem orientation (reverse-scored); the general tendency to view a problem as a significant threat to psychological well-being, to avoid it, and (3) impulsivity-carelessness (reverse-scored); a dysfunctional problem solving pattern characterized by impulsive, careless, hurried, and/or incomplete decisions or solutions.

There is some evidence to suggest that social problem solving orientation represents an important variable throughout students’ university experience. In particular, students with low social problem solving orientation, and high negative problem orientation in particular, have been found to experience greater psychological stress (D’Zurilla & Sheedy, 1991), pessimism (Maydeu-Olivares & D’Zurilla, 1996), and depression (D’Zurilla, Nezu, & Maydeu-Olivares, 1996; Nezu & Ronan, 1988), and thus lower psychological well-being than students with a higher positive problem orientation (see figure 1.1). D’Zurilla and Sheedy (1991) employed a prospective design involving undergraduate students enrolled in an introductory psychology course ($N=127$) and found that those students who reported higher negative problem orientation scores early in the semester also reported significantly higher levels of psychological stress later in the semester than did the high positive problem orientation scorers. The authors concluded that because high positive problem orientation scorers tended to believe that problems are solvable, they are more likely to envision a future that is less threatening and less stressful than might be conjectured by high negative problem orientation individuals (D’Zurilla & Sheedy, 1991).

In addition to psychological stress, social problem solving orientation has been linked to the spectrum of optimism, pessimism, and depression. Indeed, it has already been established that

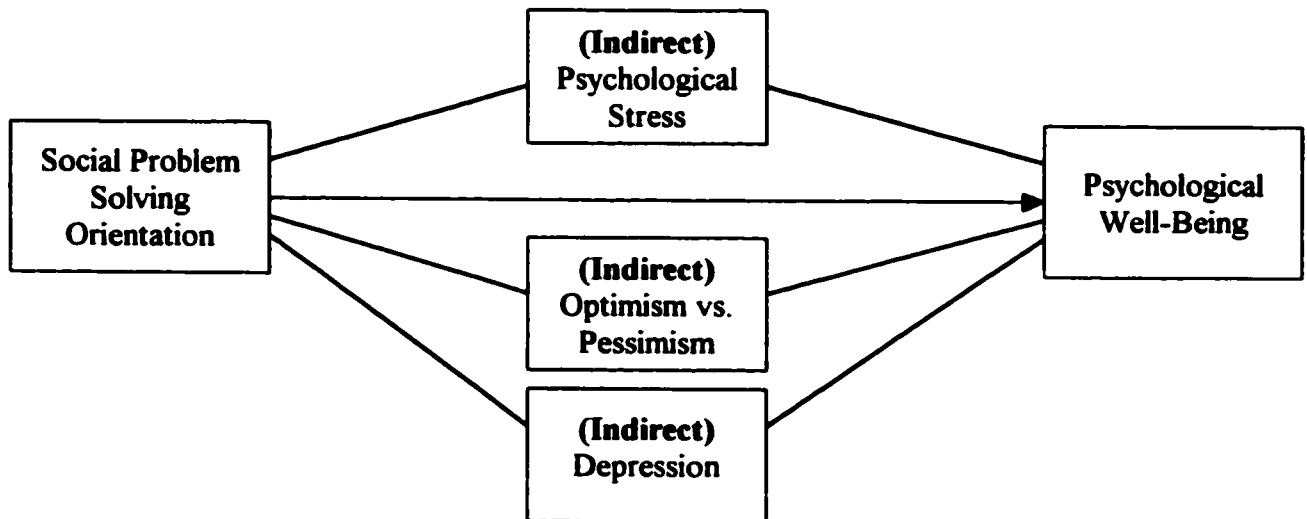


Figure 1.1. Conceptual diagram illustrating the bivariate studies that have directly and indirectly linked social problem solving orientation and psychological well-being

positive problem orientation is associated with optimism whereas negative problem orientation is associated with pessimism (Maydeu-Olivares & D’Zurilla, 1996). Moreover, one study examined the correlations between the Social Problem Solving Inventory – Revised (SPSI-R; D’Zurilla, Nezu, & Maydeu-Olivares, 1996) and depression in a sample of college students ($N=262$) and found that positive problem orientation was negatively correlated with depression whereas negative problem orientation and impulsivity/carelessness were positively correlated with depression (D’Zurilla, Nezu, & Maydeu-Olivares, 1996).

There is evidence to suggest that psychological stress, and the spectrum of optimism, pessimism, and depression may act together in their relationship to social problem solving orientation. For example, a prospective study (spanning three months) involving undergraduate and graduate university students ($N=150$) revealed that social problem solving orientation served as a moderator of stress-related depressive symptoms even after controlling for initial symptom levels (Nezu & Ronan, 1988). The authors concluded that (1) experiencing negative stressful events often leads to an increase in problems, (2) the success with which individuals cope with these problems is a function of their social problem solving orientation, and (3) successful resolution of problems decreases the probability of depressive symptomatology (Nezu & Ronan, 1988).

Given the likelihood that psychological stress, pessimism, and depression are interrelated in their effects on social problem solving orientation, it seems likely that when individuals who possess a negative problem orientation and impulsivity/carelessness encounter stressful events (e.g., making career decisions), they may experience difficulty coping effectively with the corresponding increase in problems (e.g., family and/or peer pressure to choose a career). This in turn, may precipitate pessimistic social cognition. Accordingly, given that psychological stress is

associated with pessimism and depression, and given that depression is essentially the antithesis of happiness or well-being, it may be that people who experience significant psychological stress, pessimism and/or depression are more likely to be lower in psychological well-being.

Career-Decision-Making Attitudes and Psychological Well-Being

The construct of career-decision-making attitudes has been the subject of much research for more than four decades (Naidoo, 1998). In general, career-decision-making attitudes refer to the maturity of individuals' attitudes or dispositional response tendencies toward career-decision-making (Crites, 1978). It was based on this generally accepted definition that Crites (1995) conceptualized career-decision-making attitudes as a composite of (1) decisiveness, the extent to which an individual is definite about making a career choice, (2) involvement, the extent to which an individual is actively participating in the process of making a choice, (3) independence, the extent to which an individual is autonomous or relies upon others in the choice of an occupation, (4) orientation, the extent to which an individual prefers to work or play, and (5) compromise, the extent to which an individual is realistic about career options.

Career-decision-making attitudes seem particularly relevant to university students who are faced with vocational and career-decision-making. Indeed, an estimated 20% to 50% of all students entering college report indecision in choosing a program of study (Gordon, 1981). Moreover, one study involving undergraduate university students ($N=124$) found that individuals who reported indecision in choosing a program of study were likely to have reported the same level of indecision in choosing a career (Bergeron & Romano, 1994). Accordingly, given the importance of deciding upon an appropriate program of study, it seems reasonable that students who score lower on career-decision-making attitudes would also score lower on measures of

psychological well-being. In contrast, students who possess more mature career-decision-making attitudes are likely to experience a greater sense of psychological well-being.

Career-decision-making attitudes have been directly related to psychological well-being (Arnold, 1989) and also indirectly related through extroversion (Demakis & McAdams, 1992; Headey & Wearing, 1989), locus of control, personal identity (Hartman, Fuqua, & Blum, 1985), self-esteem (Harren, 1979; Niles, 1989) as well as autonomy, interpersonal maturity, and sense of purpose (Harren, 1979) (see figure 1.2). In the direct case, Arnold (1989) conducted a two-cohort longitudinal study (1983-84) of career decideness and psychological well-being (i.e., adjustment, self-assurance, and life-satisfaction) in undergraduate students ($n=124$) and recent graduates ($n=157$). In general, the results indicated that career decideness and psychological well-being were significantly related – especially for students who sustained their decision and reached the transition of graduation during the research period. That is, for the 1983 graduates, making a career decision improved the life-satisfaction element of psychological well-being, yet not the adjustment nor the self-assurance components (Arnold, 1989).

Separate studies have also shown that extroversion is related to both career-decision-making attitudes and psychological well-being. For example, Demakis and McAdams (1992) tested college students ($N=64$) at the beginning and end of their first semester in college and found that extroversion was significantly and consistently related to psychological well-being and life satisfaction as measured by the Profile of Mood States (POMS; Lorr & McNair, 1971) and the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1986). Moreover, a five-year Australian panel study by Headey and Wearing (1989) found that high extroversion appears to predispose young adults ($N=942$) to experience more favourable life events in the career and

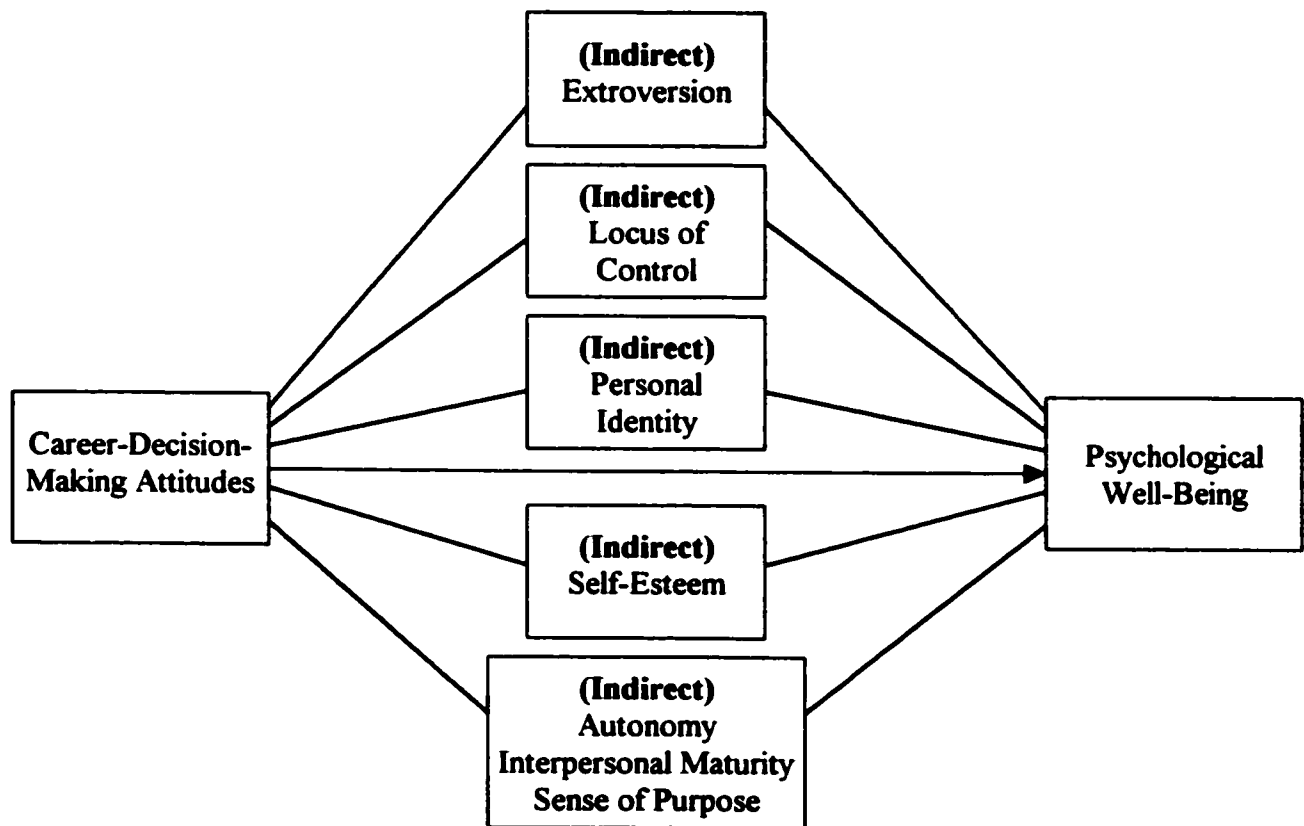


Figure 1.2. Conceptual diagram illustrating the bivariate studies that have directly and indirectly linked career-decision-making attitudes and psychological well-being.

interpersonal relationship domains which in turn serves to increase their extroversion and psychological well-being. However, this finding does not necessarily imply that introverts nor ambiverts experience lower psychological well-being.

Hartman and his colleagues conducted a path analytic study of high school ($n=155$) and university graduate students ($n=164$) to clarify the relationships among state-trait anxiety, locus of control, personal identity, and career indecision (Hartman, Fuqua, & Blum, 1985). Overall, the results indicated that the effects of trait anxiety on career indecision were mediated by personal identity and locus of control. The authors concluded that trait-anxious individuals are more likely to have a poorly developed sense of identity and an external locus of control because they tended to perceive a variety of situations as threatening and often experience difficulty in making decisions. Moreover, individuals with identity concerns and an external locus of control may have had difficulty matching their shifting sense of personal identity to one specific occupation and may have perceived career-decision-making as beyond their personal control (Hartman, Fuqua, & Blum, 1985). Locus of control and personal identity have also been found to be correlated with psychological well-being (Ryff, 1995; Ryff & Singer, 1996). In particular, individuals who possessed a strong sense of identity and an internal locus of control were capable of resisting social pressures to think and act in certain ways so as to gain social approval. Thus, they had a greater capacity for self-determination, independence, and autonomy which are important components of psychological well-being.

Career-decision-making attitudes and psychological well-being are also indirectly linked through self-esteem. In particular, Harren (1979) developed a multidimensional model of career-decision-making for college students based upon earlier models of career development (Tiedman, 1961), decision-making (Janis & Mann, 1977), cognitive dissonance (Wicklund & Brehm, 1976),

developmental theory (Chickering, 1969) and self-concept theory (Barrett & Harren, 1977) (as cited in Harren, 1979). Harren (1979) conceptualized college students' self-esteem as the evaluative component of their vocational self-concept (i.e., vocational attitudes or traits that they attribute to themselves). From this perspective, self-esteem is defined as one's subjective sense of satisfaction with who one is, based on previous and current evaluations by others. Thus, if a student's prior decisions were positively evaluated by others, then his or her level of self-esteem and career decisiveness would tend to be higher (Harren, 1979). According to Niles (1989), university students' sense of self-esteem is also strongly related to their sense of self-efficacy such that if they experience a sense of incompetence and/or dubious worth, then they tend to equate their decision making with failure. This combination of low self-esteem and poor decision making may lead to vacillation in career goals. Higher self-esteem has also been positively related to environmental mastery, positive relations with others, and self-acceptance which are integral components of psychological well-being (Ryff, 1989a; Ryff, 1989b; Ryff, 1995).

Harren (1979) describes three developmental tasks that are particularly relevant to college students' career-decision-making: autonomy, interpersonal maturity, and sense of purpose. Autonomy involves developing the capacity for active involvement and independence in developmental decision-making tasks such as leaving home, going to college, choosing a major, and finding a job. Interpersonal maturity involves the capacity to develop flexible and mutually trusting positive relations with others as well as the capacity to make long-term commitments. Associated developmental decision-making tasks include choosing a roommate, finding a life partner, marrying, and dissolving relationships when necessary. Developing a sense of purpose involves conscious educational planning, selecting a college major, achieving a balance between academic pursuits and other aspects of collegiate life, and choosing a career. Progress through

these developmental tasks further establishes the student's sense of vocational and personal identity (Harren, 1979).

The developmental career-decision-making tasks of autonomy, interpersonal maturity, and sense of purpose described in Harren's model (1979) seem parallel to Ryff's psychological well-being components of autonomy, positive relations with others, and purpose in life. However, the context of Harren's model seems more closely related to the concept of career-decision-making (Harren, 1979) whereas Ryff's concept of psychological well-being appears to represent a broader spectrum of life experiences (Ryff & Keyes, 1995). Thus, there is some reason to believe that Harren's developmental career-decision-making successes will exert an influence on the corresponding well-being components.

University Program Commitment and Psychological Well-Being

Locke and his colleagues refer to commitment as "one's attachment to or determination to reach a goal, regardless of the goal's origin" (Locke, Latham, & Erez, 1988). For students, one of the most important goals may be to commit and follow through to completion their chosen program of study. After all, the selection of a university program is generally considered to represent an active form of commitment to one's future vocation (Holland, 1985). As such, it seems reasonable that it would play an important role in university students' psychological well-being. There is some evidence that a student's level of university program commitment may be determined by five components: interest-program match (Holland, 1996), prestige-program match (Tracey & Rounds, 1996), success expectancy (viz., motivation; Vroom, 1964), program involvement (Locke, Latham, & Erez, 1988), and program satisfaction (Shim & Morgan, 1990). Accordingly, the following represents a review of these five components and their relationship to

students' university program commitment. This will be followed by a study that elucidates the relationship between commitment and well-being.

The first component of university program commitment involves the concept of interest-program match and is derived from Holland's theory of occupational preference which is based on the congruence of two dimensions: personality or personal interests and occupational characteristics. In particular, he proposed that there are six personality types and occupational environments: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional (Holland, 1985). Holland maintains that people tend to search out and commit themselves to work environments that are congruent with their personality and personal interests. Similarly, university students who choose a program of study that provides a good match to their personal interests may be said to be more committed to that program. Indeed, Holland's predictions regarding person-environment congruence have generally revealed positive correlations between congruence and academic persistence, stability of major, stability of occupational choice, job satisfaction and perceived congruence (Camp & Chartrand, 1992).

The second component of university program commitment represents an extension of Holland's theory as it relates to the concept of person-environment congruence. Tracey and Rounds (1996) argue that Holland's theory should also incorporate vocational prestige. In their formulation, prestige is broadly defined as the construct underlying social status, educational level, behavioral control, and responsibility and is measured by the individual's occupational attribute preferences. In general, more prestigious occupations require higher education, pay greater salaries, are more complex, exercise more power, and require greater cognitive ability than lower prestige occupations (Gottfredson, 1996). Based on a series of studies involving college students, Tracey and Rounds (1996) found that prestige represents an important aspect of

vocational interests that serves to increase the predictive power of Holland's theory. Accordingly, there is reason to believe that, as the congruence between students' program and vocational interests and prestige satisfaction increases, so too would their overall university program commitment.

The motivational component of university program commitment, success expectancy, refers to the extent to which students believe that they are capable of successfully completing their program of study. According to Vroom (1964), expectancy motivation is a result of "the subjective probability of attainment" of a goal multiplied by the desirability or valence of a goal. In a test of Vroom's expectancy model, Brooks and Betz (1990) reasoned that undergraduate college students ($N=188$) would perceive attainment as a composite of several tasks necessary to implement an occupational choice. For example, students' expectations of completing their program, and expectations of getting a job in the field. The results indicated that the expectancy by valence cross-product was not significantly better than expectancy alone in predicting likelihood of choice (Brooks & Betz, 1990). In addition, Locke and his colleagues (1988) cite a number of studies indicating that as the perceived chances of reaching a goal decline, the person's commitment to the goal also declines (Locke, Latham, & Erez, 1988). Accordingly, it seems likely that as students' success expectancy increases, so does their university program commitment and the likelihood of goal attainment (e.g., successful program completion).

The fourth component of university program commitment, program involvement, refers to the behavioral consequence of being committed to a particular program of study (Locke, Latham, & Erez, 1988). In other words, if a student is involved in a program, it seems reasonable that he or she would also be actively committed to the incursion of psychological and person-year costs

associated with its successful completion. Moreover, a student who is interested and involved in a program is also theoretically more likely to be committed to it.

The final component of university program commitment is program satisfaction and is defined as a positive attitude or preference towards a particular program of study (Shim & Morgan, 1990). In a study involving 718 students from 16 major universities across the United States, Shim and Morgan (1990) found that the strongest predictors of attitudes towards a major and satisfaction with a program were course perceptions and perceived career image (i.e., prestige). Moreover, they found that those who were more committed to their program were likely to have more favourable course perceptions and career potential as well as a greater degree of self influence in their selection of a major. Thus, in addition to interest-program match, prestige-program match, success expectancy, and program involvement, it seems reasonable that a measure of program commitment should include students' ratings of their satisfaction with their program. In general, these findings suggest that students would attribute significant psychological importance to committing and following through to completion a chosen program of study. Accordingly, it seems likely that students who are more committed to their program will also experience greater psychological well-being.

Wiener and his colleagues (1987) used a sample of young adult music store managers ($N=257$; mean age=25 years) to test the hypothesis that those who were more committed to their work would also experience greater personal well-being. The researchers defined well-being as "the extent of satisfaction and happiness with the overall quality of life experienced by an individual" (Wiener, Muczyk, & Gable, 1987). The results confirmed that as individuals' commitment to their work increased, so did their feelings of personal well-being. No support was found for a second hypothesis that individuals who were over-committed to their work (e.g.,

workaholics) might experience lower personal well-being (presumably because they might be so absorbed in their work that they might neglect other areas of their life) (Wiener, Muczyk, & Gable, 1987). Accordingly, the study suggests that the relationship between commitment and personal well-being is linear. The authors concluded that their study provided support for the hypothesis that personal commitment to a central domain of life (e.g., career) contributes to personal well-being.

The studies cited provide some theoretical and empirical support for the hypothesis that social problem solving orientation, career-decision-making attitudes, and university program commitment are related to psychological well-being in university students. However, these studies may not adequately explain the relationship among these constructs.

Towards an Integration

There are currently significant gaps, limitations, and contradictions in the literature concerning the nature of the relationship between social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being in university students. At a methodological level, there have been numerous studies that have examined different aspects of students' university experience and negative adjustment (e.g., D'Zurilla & Nezu, 1990; Maydeu-Olivares & D'Zurilla, 1996; Nezu, 1985; Williams & Kleinfelter, 1989). There have even been some studies that have examined students' university experience and psychological well-being (e.g., Arnold, 1989), but they have typically involved measures that do not reflect the more recent theoretical, conceptual, and empirical advances in the measurement of psychological well-being (Ryff, 1995).

There is also some controversy in the literature regarding the evolutionary nature of the relationships among social problem solving orientation, career-decision-making attitudes, and

university program commitment relative to students' psychological well-being. For example, most of the studies reviewed fail to acknowledge the possibility that social problem solving orientation, career-decision-making attitudes (e.g., Naidoo, 1998), and university program commitment may change as a function of university experience. This is important because these variables may have a specific developmental sequence that is influenced by environmental factors. It seems likely that social problem solving orientation would reach a certain level of development before students enter university at which time career-decision-making attitudes and program commitment usually become more salient and relevant developmental components. Accordingly, research that examines the effects of university experience on these variables may help to explain some of the discordant findings in the research literature.

An important limitation of the studies reviewed is that they are largely bivariate in nature. That is, although these studies have examined separately the relationships between social problem solving orientation, career-decision-making attitudes, program/work commitment, and psychological well-being (e.g., Arnold, 1989; D'Zurilla & Sheedy, 1991; Wiener, Muczyk, & Gable, 1987), they fail to consider the possibility of mediating relationships among the variables. In other words, most of these studies appear to be based on the assumption that social problem solving orientation, career-decision-making attitudes and university program commitment are unrelated in their effects on psychological well-being in university students. This may help to explain the paucity of multivariate research on the antecedents and correlates of psychological well-being in university students.

Given the gaps, limitations, and contradictions in the literature, as well as the importance of the aforementioned aspects of the university experience on students' psychological well-being,

there is a need for additional research in this area. To this end, the next section offers a theoretical rationale for a mediational path model that aims to identify the dynamic nature of the relationship among years of university experience, social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being.

A Theoretical Path Model

The following represents a theoretical rationale for a mediational path model in which years of university experience leads to a more positive social problem solving orientation and mature career-decision-making attitudes. These latter two variables then lead to university program commitment, which in turn, influences students' psychological well-being (see figure 1.3).

As students' educational experience unfolds, they may develop their social problem solving orientation to the point where it facilitates their approach and commitment to a program of study. For example, one study by Larson and Heppner (1985) involving university students ($N=64$) found that subjects who perceived themselves as positive problem solvers were more confident about their decision-making ability and occupational potential, more likely to have related their abilities to an occupational field, less likely to view the source of indecision outside themselves, and less likely to acknowledge antecedents of career indecision.

As their educational experience unfolds, students are also likely to become increasingly equipped with the attitudes and skills associated with more mature career-decision-making attitudes (Luzzo, 1993). Indeed, there have been several studies involving university students that suggest mature career-decision-making attitudes increase with age and greater exposure to general information about occupations (Healy, O'Shea, & Crook, 1985; Nevill & Super, 1988). In

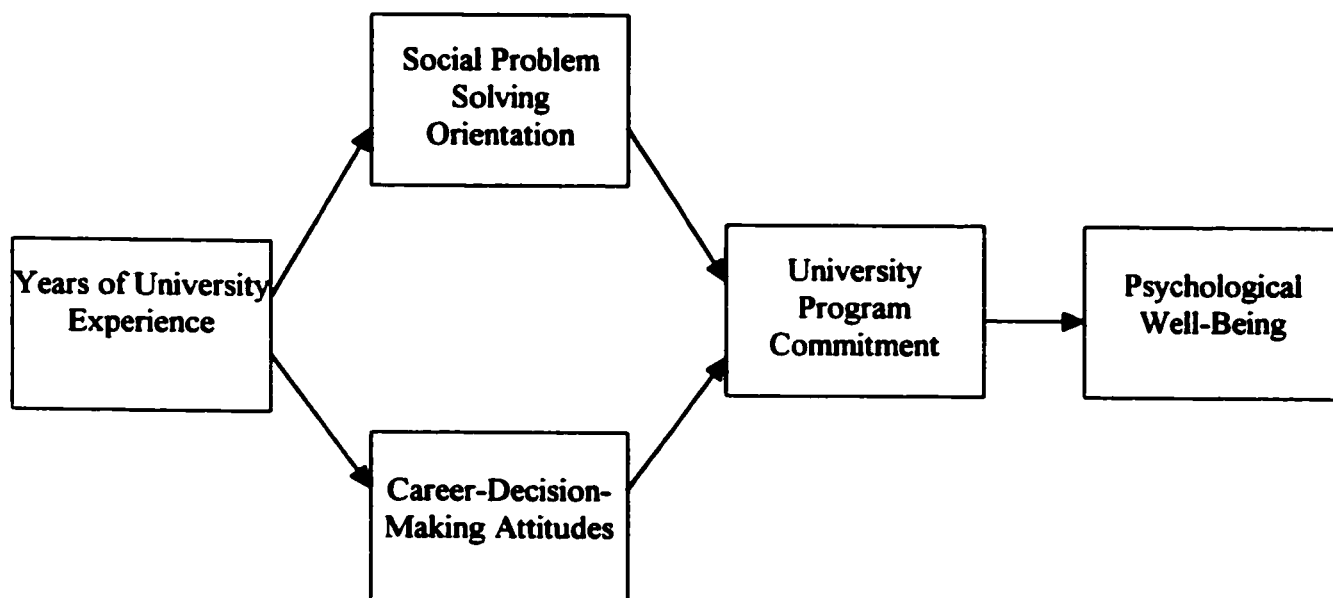


Figure 1.3. Hypothesized path model of years of university experience leading to social problem solving orientation and career-decision-making attitudes. These latter two variables then lead to university program commitment, which in turn, may influence students' psychological well-being.

addition, as students develop more mature career-decision-making attitudes, they may be more likely to commit to a specific program of study (Nevill & Super, 1988). Indeed, Lewallen (1992) conducted an extensive review of the literature and found that career-decided students had higher degree aspirations and were more committed to their program of study than career-undecided students. Moreover, Savickas (1990) found that individuals who possess mature career attitudes were more likely to have successful careers because they display greater awareness of the career-decision-making process, try to relate their present behavior to future goals, possess higher levels of self-reliance in making career decisions, and are more committed to making career choices than individuals who have not yet developed more mature career attitudes.

The aforementioned research suggests that as students gain more years of university experience and their social problem solving increases, they may be more likely to commit to a specific program of study. Similarly, as they gain increased knowledge about different careers, they may be more likely to commit to a specific program of study that is congruent with their interests, aptitudes, and abilities. Accordingly, given that social problem solving orientation and career-decision-making attitudes may lead to program commitment, and given that all three variables are hypothesized to be related to psychological well-being, there is some reason to believe that program commitment may serve as a mediator to psychological well-being.

The important and central role of university program commitment is corroborated by research which suggests that personal commitment to a central life domain (e.g., university, work, career) can have a significant influence on overall well-being (Lance, Lautenschlager, Sloan, & Varca, 1989; Wiener, et al., 1987). Although social problem solving orientation and career-decision-making attitudes may also be related to psychological well-being, their influence may be attenuated by the mediating effects of university program commitment. Accordingly, the complete

path model begins with years of university experience leading to a more positive social problem solving orientation and mature career-decision-making attitudes. These latter two variables then lead to university program commitment, which in turn, influences students' psychological well-being.

Given the hypothesized effects of university experience on the developmental sequence of social problem solving orientation, career-decision-making attitudes and university program commitment (as they relate to psychological well-being), the theoretical path model depicted in figure 1.3 is proposed for examination.

Chapter 2

Method

Overview

This section first describes the participants, measures, and procedures to be incorporated in the main study. This is followed by a pilot study section that provides measurement validation data on the years of university experience, social problem solving orientation, career-decision-making attitudes, university program commitment, and psychological well-being variables.

Participants

For the main study, the sample included 394 students from a variety of programs in order to ensure a heterogeneous group generally representative of the faculties of Arts and Social Sciences at the University of Ottawa. This was accomplished by identifying a broad sample of Arts and Social Sciences courses listed in the university timetable, and then recruiting volunteers from these classes to fill out the questionnaires. The courses sampled from include Anthropology, Communication, Criminology, Economics, English, Geography, History, Leisure Studies, Linguistics, Philosophy, Psychology, Political Science, Sociology, and Women's Studies. Participant representation was based on the proportion of courses listed in the timetable. For example, if a given program offered more courses with larger class sizes, they would likely be more represented than programs that offered fewer courses with smaller class sizes. The only exclusion criteria was students not enrolled in Arts and Social Sciences courses. Of the total sample, 325 were females (82%), and 69 were males (18%) with a combined mean age of 24 years and 2.3 years of university experience. Students' level of university experience ranged from 0 to 6 years and breaks down as follows: 0=15, 1=89, 2=122, 3=111, 4=38, 5=15, and 6=4.

Measures

The main study included the following measures of social problem solving orientation, career-decision-making attitudes, university program commitment, and psychological well-being. The actual items for each measure are presented in detail in Appendix B.

Social problem solving orientation. The Social Problem Solving Inventory - Revised was designed to assess problem solving as it occurs in the real world (D’Zurilla, Nezu, & Maydeu-Olivares, 1996). It contains 52 items which are measured on a 5-point Likert scale ranging from “not at all true of me” to “extremely true of me”. High scores indicate more effective or facilitative problem solving whereas low scores indicate more ineffective or dysfunctional problem solving. Although the inventory contains five subscales, only three were used in the present study: Positive Problem Orientation, Negative Problem Orientation, and Impulsivity/Carelessness. A high score on the Positive Problem Orientation (5-items) subscale indicates a general disposition to appraise a problem as a challenge to be approached. In contrast, a high score on Negative Problem Orientation (10-items) indicates a general tendency to view a problem as a significant threat to psychological well-being that should be avoided. This latter subscale is reverse-scored when calculating the global score. A high score on Impulsivity/Carelessness (10-items) indicates a dysfunctional problem solving pattern characterized by impulsive, careless, hurried, and/or incomplete decisions or solutions. It is also reverse-scored when calculating the global score.

In the interests of parsimony, the other two subscales were excluded from the analysis. The Avoidance subscale (7-items) was designed to assess individuals tendency to avoid problems through procrastination, inaction, and dependency. It was omitted because of its high correlation with Negative Problem Orientation ($r=.74$) in college students (D’Zurilla, Nezu, & Maydeu-

Olivares, 1996). The Rational Problem Solving subscale (20-items) was designed to assess individuals tendency to approach problems logically and systematically. It was also excluded because of its high correlation with Positive Problem Orientation ($r=.73$).

Career-decision-making attitudes. The Career Maturity Inventory - Attitude Scale was designed to assess the maturity of individuals' attitudes or dispositional response tendencies toward career-decision-making (Crites, 1995). It contains 25 items which are measured on a forced-choice scale. That is, individuals may "agree or mostly agree" or "disagree or mostly disagree" with each of the items. A high score indicates an individual who approaches career-decision-making in a mature, decisive, involved, independent, and realistic manner.

University program commitment. The University Program Commitment Scale was developed to assess students' level of commitment to their program of study. It contains a total of 9 items that encompass interest-program match (2 items), prestige-program match (2 items), success expectancy (2 items), program involvement (1 item), and program satisfaction (2 items) for students' current program of study. The items are based on a variety of 7-point Likert scales that are illustrated in Appendix B.3. High scores indicate students who are strongly committed to their program of study.

Psychological well-being. The Psychological Well-Being scales were designed to assess several distinct aspects of positive psychological functioning (Ryff, 1995). More precisely, it is comprised of six subscales: Autonomy, Environmental Mastery, Personal Growth, Positive Relations with Others, Purpose in Life, and Self-Acceptance. The measure contains a total of 84 items (14 per subscale) which are measured on a Likert scale ranging from "strongly disagree" to "strongly agree". High scores indicate higher levels of positive functioning or psychological well-being.

Students were also requested to provide information about their age, gender, and number of years of university experience (148 items in total). The latter question was phrased as “How many years have you completed at University?” Finally, the four measures in each questionnaire were arranged and distributed in four counterbalanced sequences to control for order effects.

Procedure

During the 1999-2000 academic year, professors from various courses in the Arts and Social Sciences faculties of the University of Ottawa were contacted by telephone in order to request permission to visit their classes and recruit participants for the study. The process involved reading a recruitment script that included, as an incentive, a draw for 15 Famous Player Theatre movie passes that was conducted at the completion of all data collection. Upon the return of completed questionnaires, students were given a letter of debriefing and instructions regarding how to obtain the results of the study.

Pilot Study: Measurement Validation

Data was collected in March and August 1998 (respectively) to assess the reliability and correlations of the selected measures. The first sample consisted of students ($N=161$) enrolled in 1st to 4th year undergraduate psychology classes at the University of Ottawa. Students were asked to complete a 139-item questionnaire that included the Career Maturity Inventory - Attitude Scale (Crites, 1995), Ryff's Scales of Psychology Well-Being (Ryff, 1995), and the Positive Problem Orientation, Negative Problem Orientation (reverse-scored), and Impulsivity/Carelessness (reverse-scored) scales of the Social Problem-Solving Inventory - Revised (D'Zurilla, Nezu, & Maydeu-Olivares, 1996). The forms were in three counterbalanced sequences and included questions about student age, gender, and years of university experience. A draw for six free movie passes was offered as an incentive for participation.

The data ($N=161$) were screened for missing values, outliers, normality, linearity, homoscedasticity, multicollinearity, and order effects of measures. First, the missing Social Problem Solving Inventory - Revised, Career Maturity Inventory - Attitude Scale, and Psychological Well-Being values were assigned the average of the subjects' overall score on the respective measure. Second, a total of 12 univariate outliers (i.e., standardized scores $> |3|$), and 3 multivariate outliers (Mahalanobis distance: $\chi^2_{(Max\ 2df)} > 13.82$, $p > .001$) were deleted leaving a final sample of 146. Third, in terms of normality, the means, standard deviations, kurtosis and skewness values of these variables are reported in detail in Appendix A.1. In general, kurtosis values ranged between .31 and .65 whereas skewness values ranged from -.78 to .72. These results fall within the acceptable range of 0 to 1.00 suggested by Tabachnick and Fidell (1996). Fourth, a visual inspection of the bivariate scatterplots revealed no significant departures from linearity and no evidence of heteroscedasticity. Fifth, the correlations between all possible pairs of variables yielded no evidence of multicollinearity. In particular, all correlations were below $r = .90$ ($r_{max} = .69$) as recommended by Tabachnick and Fidell (1996). Finally, a one-way Anova (IV=form number; DV=group means) indicated borderline significant order or sequence effects for social problem solving orientation $F(2, 143) = 3.16$, $p = .05$ and psychological well-being $F(2, 143) = 3.08$, $p = .05$ (see table 2.1 for Anova and variable means). However, this finding may be an artifact of the relatively small sample size for each form ($n=44$, $n=54$, and $n=48$, respectively).

The final sample of 146 students included 131 females (90%) and 15 males (10%). A 2 x 4 Manova means analysis revealed no gender effects for years of university experience, social problem solving orientation, career-decision-making attitudes or psychological well-being. The non-significant Wilk's Lambda statistic was $F(1, 144) = 1.64$, $p > .05$ (see Appendix A.2). Accordingly, the sample of females ($n=131$) and males ($n=15$) were pooled together with a

Table 2.1

Social problem solving orientation, career-decision-making attitudes, and psychological well-being as a function of counterbalanced form number

a) ANOVA Summary Table

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Social Problem Solving Orientation	16.20 367.04	2 143	8.10 2.57	3.16*	0.05
Career-decision Making Attitudes	8.65 777.85	2 143	4.32 5.44	0.80 _{ns}	0.45
Psychological Well-being	11,908.66 276,925.83	2 143	5954.33 1936.54	3.08*	0.05

N=146

* $p=.05$

ns = not significant ($p>.05$)

b) Variable means

Source	Form Number, Sample Size, and Means		
	1 (<u>n</u> =44)	2 (<u>n</u> =54)	3 (<u>n</u> =48)
Social Problem Solving Orientation	8.20	8.75	9.12
Career-decision Making Attitudes	18.14	18.67	18.67
Psychological Well-being	378.32	394.26	400.46

N=146

combined mean age of 24 years and 2.4 years of university experience. Students' level of university experience ranged from 0 to 6 years and breaks down as follows: 0=3, 1=33, 2=49, 3=35, 4=16, 5=6, and 6=4. With reference to reliability, the Cronbach alpha for the Social Problem Solving Inventory - Revised scale was $\alpha=.89$ with subscale coefficients ranging from $\alpha=.78$ to $\alpha=.89$. The corresponding alpha for Ryff's Scales of Psychological Well-Being was $\alpha=.96$ with subscales ranging from $\alpha=.85$ to $\alpha=.92$. Finally, the alpha for the Career Maturity Inventory - Attitude Scale was $\alpha=.68$. These values provide some evidence in favor of the reliability of the measures. The correlation matrix of years of university experience, social problem solving orientation, career-decision-making attitudes, and psychological well-being is illustrated in table 2.2. With the exception of years of university experience, all variables are significantly related to psychological well-being ($p<.01$).

A second sample ($N=20$) of University of Ottawa psychology students were tested in August 1998 in order to assess the reliability of the university program commitment measure. Of the total sample, 12 were females and 8 were males with a combined mean age of 24 years and 4.1 years of university experience. The Cronbach alpha for the university program commitment scale was $\alpha=.78$. The subscale coefficients were as follows: interest-program match $\alpha=.79$; prestige satisfaction $\alpha=.68$; success expectancy $\alpha=.83$; program involvement $\alpha=.77$; and program satisfaction $\alpha=.41$. Although the sample size was relatively low ($N=20$), these data provide some support in favour of the reliability of the university program commitment measure. In general, the pilot study indicates adequate reliability and correlations of the measures to be included in the study.

In terms of validity, there is no data available for the measures constructed specifically for this study (years of university experience and the University Program Commitment Scale).

Table 2.2

Correlation coefficients of years of university experience, social problem solving orientation, career-decision-making attitudes, and psychological well-being

Variables	Variables			
	1	2	3	4
1. Years of University Experience	1.00			
2. Social Problem Solving Orientation	.13	1.00		
3. Career-Decision Making Attitudes	.03	.42**	1.00	
4. Psychological Well-being	.07	.69**	.43**	1.00

N=146

** $p < .01$

However, there is some scale development and validity data available for the other measures included in the study. For example, the Social Problem Solving Inventory - Revised has its roots in a model of social problem solving originally introduced by D’Zurilla and Goldfried (1971). The model suggests that people’s problem orientation and problem solving skills determine their success in dealing with real-world tasks (such as those faced by university students). Based on this idea, D’Zurilla and his colleagues created the Social Problem Solving Inventory - Revised consisting of 5 subscales (D’Zurilla, Nezu, & Maydeu-Olivares, 1996). These authors also conducted a confirmatory factor analysis using 2 separate samples of college students ($N=601$ and $N=323$) which confirmed the 5-factor solution of the measure (D’Zurilla, Nezu, & Maydeu-Olivares, 1996). They also found that the measure showed moderate to moderately high correlations with the Problem Solving Inventory (a measure of problem solving attitudes and behavior; Heppner, 1988), but not enough to be redundant ($r=.54$ to $r=.67$; $N=120$). Finally, D’Zurilla and his colleagues (1996) reported that the measure showed significant positive correlations with the Satisfaction with Life Scale (SLS; Diener, Emmons, Larson, & Griffen, 1985) ($r=.15$ to $r=.46$; $N=262$), and significant negative correlations with the Beck Depression Inventory (BDI; Beck, et al., 1961) ($r=-.12$ to $r=-.49$; $N=262$).

The Career Maturity Inventory - Revised (Crites, 1995) has its roots in Super’s Career Pattern Study (Super, et al., 1957). It was originally known as the Vocational Development Inventory (1961) and contained 50 items on Career Choice Attitudes. In 1973, its name was changed to the Career Maturity Inventory and it included a Career Choice Competence Scale (Crites, 1973). In 1978, a new version of the Career Maturity Inventory was released that included an additional 25 new items to the Attitude Scale (for a total of 75 items) (Crites, 1978).

In 1995, the Career Maturity Inventory - (Revised) Attitude Scale was released and contained a subset of the best items from the 1978 version, and updated wording on some items to apply to post-secondary students (Crites, 1995). At the time of the current study, there is no published validity data for the 1995 version.

Ryff's Scales of Psychological Well-Being (1996) has its roots in a variety of theories of life course development and clinical accounts of positive functioning (as described in the introduction). From these theories, Ryff identified and operationalized six distinct aspects of positive psychological functioning. A confirmatory factor analysis supported the 6-factor solution of the measure in a nationally representative sample of 1108 people (Ryff & Singer, 1996). These authors also reported that the measure showed significant positive correlations with Affect Balance ($r=.25$ to $r=.66$; $N=133$) and the Life Satisfaction Index ($r=.26$ to $r=.73$; $N=133$), and significant negative correlations with the Zung Depression Scale ($r=-.33$ to $r=-.60$; $N=133$).

In general, the available information provides some evidence in favor of the reliability and validity of the measures selected for the current study.

Chapter 3

Results

Overview of the Analyses

For ease of reference, the results are reported in three sections: preliminary analyses, main analyses, and secondary analyses. The preliminary analyses first provide information on data screening including outliers, normality, linearity, homoscedasticity, multicollinearity, and final sample characteristics. Second, an Anova is performed to assess the order effects of the measures which were administered in four counterbalanced sequences. Third, an exploratory factor analysis is performed to assess the independence of the social problem solving orientation and psychological well-being subscales. Fourth, an Anova and post-hoc analyses are performed to test the hypothesis that as students gain more university experience, they are likely to have more developed social problem solving orientation and mature career-decision-making attitudes. Finally, to prepare for later path analytic cross-validation procedures, the total sample ($N=394$) is divided into two random samples stratified by years of university experience (i.e., sample A=197 and sample B=197). As an added validity check, a Manova is performed to assess differences between the global variable means of samples A and B.

The main analyses involves assessing the goodness-of-fit of the path analytic model on sample A using the program LISREL VIII.iii (Jöreskog & Sörbom, 1996). This initial model begins with years of university experience leading to social problem solving orientation and career-decision-making attitudes. These latter two variables then lead to university program commitment, which in turn, is directly related to psychological well-being (see figure 1.3). Next, the sequence of model revisions according to theoretical considerations and LISREL modification indices are illustrated. Based on these criteria, the best-fitting path model is identified and cross-

validated on sample B. The secondary analyses are exploratory in nature and focus on the relationship between social problem solving orientation subscales (viz., positive problem orientation, negative problem orientation, and impulsivity/carelessness) and the global variables of career-decision-making attitudes and university program commitment. This analysis is done to identify any differential correlations from the social problem solving orientation subscales. To this end, a z-score matrix is created using the total sample of students ($N=394$).

Preliminary Analyses

Maximum Likelihood estimation and path analysis modeling procedures are valid to the extent that the data conform to a certain number of basic assumptions. Accordingly, the purpose of the preliminary analyses is to assess whether these assumptions were met for the data sample under consideration.

Data Screening

Preliminary screening of the total sample ($N=410$) revealed several missing values. These omissions were assigned the average of the subjects' overall score on the respective measure.

Absence of outliers. Univariate outliers were identified by examining the distribution of standardized scores for all variables included in the path model. This procedure revealed a total of 16 cases with standardized scores greater than $|3|$ -- the majority of which were in the years of university experience and career-decision-making attitudes variables. These 16 cases were deleted reducing the total sample size to 394. Multivariate outliers were assessed by computing multivariate standardized residuals, Cook and Mahalanobis' distances. Multivariate standardized residuals were acceptable and ranged from -1.55 to 2.02. Cook's distance values were also acceptable ranging from .00 to .03 (below 1.00 are considered satisfactory; Tabachnick & Fidell, 1996). Mahalanobis distance scores were satisfactory and ranged from .00 to 13.72 ($\chi^2_{(Max. 2df)} <$

13.82, $p < .001$). In the absence of significant multivariate outliers, no further cases were deleted from the sample ($N=394$).

Normality. To ensure normality, the summary statistics for all variables included in the path model were examined. The means, standard deviations, kurtosis and skewness values of these variables are reported in detail in Appendix C.1. A visual inspection of the means and standard deviation values suggest an adequate level of dispersion. Kurtosis values ranged between $-.28$ and $.10$ whereas skewness values ranged from $-.55$ to $.43$. These results fall within the acceptable range of 0 to 1.00 suggested by Tabachnick and Fidell (1996). In general, the summary statistics provided no reason to suspect that the distribution of variables departed significantly from normality. Moreover, the distribution of multivariate standardized residuals appeared normal.

Linearity. A visual inspection of the bivariate scatterplots revealed no significant departures from linearity. Again, this is consistent with the finding that the multivariate standardized residuals appeared normal.

Homoscedasticity. A visual inspection of the bivariate scatterplots yielded no significantly uneven distributions of the variance between the pairs of variables. There was no evidence of heteroscedasticity.

Absence of multicollinearity. The correlations between all possible pairs of variables included in the analyses were examined for evidence of multicollinearity. All correlations were below $r = .90$ as recommended by Tabachnick and Fidell (1996). In particular, the highest correlation was between social problem solving orientation and psychological well-being ($r = .70$, $p < .01$).

Sample characteristics. After the initial data screening procedures, the total sample size was 394. The sample included 325 females (82%) and 69 males (18%). A 2 x 5 Manova means analysis revealed significant gender effects for years of university experience and psychological well-being. The significant Wilk's Lambda statistic was $F(1, 392)=3.51, p<.05$ (see table 3.1). More precisely, males had more university experience (2.59 versus 2.27 years) whereas females had greater psychological well-being (384.89 versus 371.74). A further 2 x 6 Manova means analysis of the psychological well-being subscales confirmed the presence of gender effects. The significant Wilk's Lambda statistic was $F(1, 392)=4.69, p<.05$ (see table 3.2). More precisely, females scored higher on purpose in life (66.85 versus 62.28) and positive relations with others (66.40 versus 62.14) than males. These results are in contrast to the non-significant gender effects found in the pilot study. Moreover, given that the possible range of scores on these subscales is 6 to 84, and given that the 4-point differences on both of these measures represents only about .5 of one standard deviation, the sample of females (n=325) and males (n=69) were pooled together to form a total sample size of 394.

In general, the minimum acceptable sample size requirements for path analysis using LISREL is 200 subjects (Tabachnick & Fidell, 1996). However, because the best-fitting path model will be estimated on sample A ($n=197$) and then cross-validated on sample B ($n=197$), it was decided that the 197 subjects in each sample would be adequate (i.e., $394/2=197$). With respect to reliability, the Cronbach alpha for the Social Problem Solving Inventory - Revised scale was $\alpha=.80$ with subscale coefficients ranging from $\alpha=.71$ to $\alpha=.90$. The corresponding alpha for Ryff's Scales of Psychological Well-Being was $\alpha=.96$ with subscales ranging from $\alpha=.85$ to $\alpha=.90$. Finally, the alphas for the Career Maturity Inventory - Attitude Scale was $\alpha=.64$, and the University Program Commitment construct was $\alpha=.78$. In general, these reliabilities are

Table 3.1

Years of university experience, social problem solving orientation, career-decision-making attitudes, university program commitment, and psychological well-being as a function of gender

a) MANOVA Summary Table (Wilk's Lambda significant at $F(1, 392)=3.51, p<.05$)

	Univariate F	p	Male Mean	Female Mean
Years of University Experience	4.15*	0.04	2.59	2.27
Social Problem Solving Orientation	.23	0.63	8.33	8.23
Career-Decision Making Attitudes	2.51	0.11	17.90	18.43
University Program Commitment	2.24	0.14	80.77	84.54
Psychological Well-Being	4.30*	0.04	371.74	384.89

$N=394$ (69 males, 325 females)

* $p<.05$

Table 3.2

Psychological well-being subscales as a function of gendera) MANOVA Summary Table (Wilk's Lambda significant at $F(1, 392)=4.69, p<.05$)

	Univariate F	p	Male Mean	Female Mean
Autonomy	.01	0.96	60.09	60.03
Environmental Mastery	1.86	0.17	57.84	59.70
Personal Growth	.02	0.89	69.10	68.96
Purpose in Life	12.50*	0.01	62.28 (SD=9.9)	66.85
Positive Relations with Others	9.13*	0.01	62.14 (SD=10.7)	66.40
Self-Acceptance	3.04	0.08	60.29	62.96

 $N=394$ (69 males, 325 females)* $p<.05$

comparable to those in the initial measure validation procedure and provide further support in favour of the construct validity of the measures. The correlation matrix for all the variables to be included in the path analyses are reported in table 3.3. With the exception of years of university experience, all variables are significantly related to psychological well-being ($p < .01$).

Anova to Test for Order Effects of Measures

In order to control for possible order effects of the measures, they were administered in four counterbalanced sequences. A one-way Anova confirmed the absence of significant order effects for the main variables included in the analysis. These results are reported in detail in Appendix C.2. In short, the values ranged from $F(3, 390) = 0.33$ to 0.54 , $p > .05$.

Factor Analysis of Social Problem Solving Orientation and Psychological Well-being

Given the relatively strong correlation between social problem solving orientation and psychological well-being ($r = .70$, $p < .01$), an exploratory factor analysis was performed to assess the independence of these variables' subscales. Specifically, a factor analysis of the three social problem solving orientation and six psychological well-being subscales was performed using Maximum Likelihood (ML) extraction, followed by oblimin rotation with Kaiser normalization. An initial run specifying two factors revealed that factor 1 extracted an eigenvalue of 4.40 that accounted for 48.9% of the variance whereas the comparable figures for factor 2 were 0.41 and 4.6%, respectively. Thus, the two-factor solution extracted a total of 53.4% (rounded) of the variance. Another criterion for determining the number of factors is the scree test of initial eigenvalues plotted against factors. According to Tabachnick and Fidell (1996), it is the point where a line drawn through the data points in the scree plot noticeably changes slope. The initial run suggested that the change in slope was greatest after the first two factors (see figure 3.1).

Table 3.3

Correlation coefficients of years of university experience, social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being

Variables	Variables				
	1	2	3	4	5
1. Years of University Experience	1.00				
2. Social Problem Solving Orientation	.12*	1.00			
3. Career-decision Making Attitudes	.11*	.33**	1.00		
4. University Program Commitment	-.06	.35**	.24**	1.00	
5. Psychological Well-being	.06	.70**	.39**	.41**	1.00

N=394

* $p < .05$

** $p < .01$

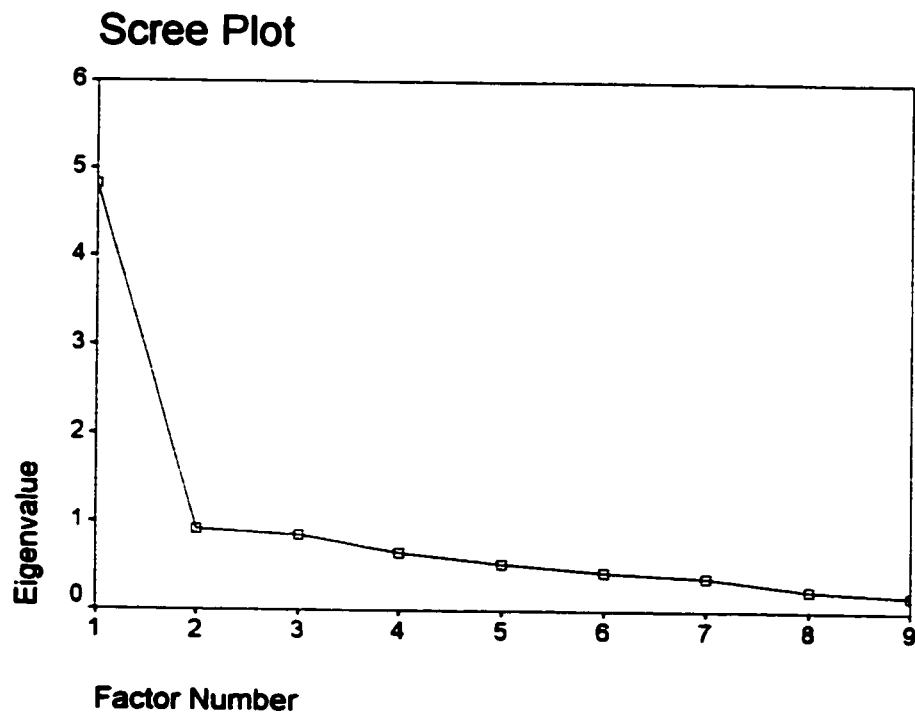


Figure 3.1. Scree plot of initial eigenvalues plotted against factors for the initially specified two-factor solution of exploratory factor analysis of three social problem solving orientation and six psychological well-being subscales.

Although the chi-square likelihood ratio was significant at $\chi^2(19, n=394)=125.45, p<.01$, this is perhaps not surprising given that chi-square tends to be oversensitive to sample size (Byrne, 1998). Nevertheless, the cross-loadings indicated some overlap among the nine subscales. In factor analysis, the set of loadings are interdependent. That is, if you remove one loading, the others may change. Accordingly, the selected strategy was to eliminate, one at a time, the subscale with the highest cross-loading. In the first factor analysis, the autonomy subscale of psychological well-being had significant cross-loadings on the social problem solving orientation factor (.66) (see table 3.4). Accordingly, the autonomy subscale was removed, and a second factor analysis (same settings) was performed on the remaining eight subscales.

The second factor analysis of the three social problem solving orientation and five (previously six) psychological well-being subscales yielded an improved solution. In particular, the second run specifying two factors revealed that factor 1 had extracted an eigenvalue of 4.05 that accounted for 50.7% of the variance whereas the comparable figures for factor 2 were 0.40 and 5.0%, respectively. Thus, the new two-factor solution extracted a total of 55.7% of the variance. In addition, the scree plot of initial eigenvalues plotted against factors revealed that the change in slope was still greatest after the first two factors (see figure 3.2). Although the χ^2 statistic was still significant at $\chi^2(13, n=394)=85.44, p<.01$, the chi-square difference test indicated a significant improvement in fit over the previous model $\chi^2_{diff}(1, n=394)= 40.01, p<.01$.

Factor 1 was defined by 5 variables with factor pattern loadings greater than $|.30|$. That is, with the autonomy subscale removed, psychological well-being emerged with a clear factor structure comprised of environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance subscales. Factor 2 was defined by 3 variables with factor

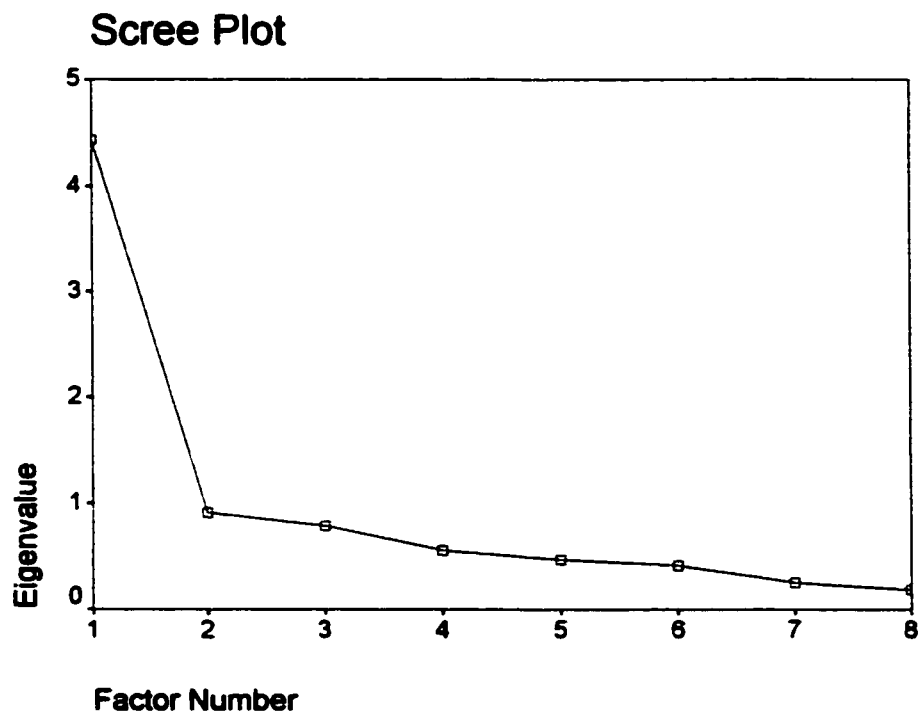


Figure 3.2. Scree plot of initial eigenvalues plotted against factors for the modified two-factor solution of exploratory factor analysis of three social problem solving orientation and five psychological well-being subscales

pattern loadings greater than $|.30|$, and 1 variable (impulsivity/carelessness) with a loading of $|.28|$ (see table 3.5). Although $|.30|$ has traditionally been used as the cut-off point for significance, the impulsivity-carelessness loading of $|.28|$ was considered adequate given that previous research has shown it to be part of the social problem solving construct (D'Zurilla, Nezu, & Maydeu-Olivares, 1996). Thus, in the interest of theoretical completeness, impulsivity/carelessness was retained as part of the construct. Although Environmental Mastery had a relatively high cross-loading of $|.31|$ on social problem solving orientation, it also had a loading of $|.60|$ on psychological well-being. Accordingly, given that Environmental Mastery appears to represent a better measure of psychological well-being than social problem solving orientation, it was not eliminated from the analysis. In summary, social problem solving orientation emerged with an adequate factor structure that consisted of positive problem orientation, negative problem orientation, and impulsivity/carelessness. The results of this second factor analysis provided some evidence for the independence of the social problem solving orientation and revised psychological well-being measures. Moreover, the Cronbach alpha for the latter revised construct remained unchanged at $\alpha=.96$. Accordingly, no further changes to the factor structures of these variables were made.

Anova to Test Relationship between Years of University Experience and Main Variables

An assumption of the initial path model was that as students' gain more university experience, they also tend to become increasingly equipped with the attitudes and skills associated with higher social problem solving orientation and mature career-decision-making attitudes. To test this assumption, a one-way Anova of all the variables to be included in the initial path model was performed, followed by post-hoc means analyses of significant results. However, given the differential sample sizes associated with each of the 0 to 6 years of university experience, it was decided to combine years 0 and 1 ($n=104$), 2 and 3 ($n=233$), and 4 to 6 ($n=57$) together to form

Table 3.5

Modified two-factor solution of exploratory factor analysis of three social problem solving orientation and five psychological well-being subscales

a) Factor pattern matrix, communalities, and percentage of variance.

Variables	Factors		Communalities ML Extraction
	I	II	
Environmental Mastery	.60	-.31	.71
Personal Growth	.58	-.13	.45
Positive Relations with Others	.78	.14	.48
Purpose in Life	.80	-.06	.71
Self-acceptance	.80	-.15	.82
Positive Problem Orientation	.28	-.40	.39
Negative Problem Orientation	.05	.89	.74
Impulsivity/Carelessness	-.15	.28	.15
Percentage of variance explained (Extracted)	50.7%	5.0%	

b) Factor correlation matrix

Factor I	1.00	
Factor II	0.67	1.00

Suggested factor labels:

I	Psychological Well-being
II	Social Problem Solving Orientation

three separate groups (within years of university experience). As predicted, the Anova results confirmed significant main effects for social problem solving orientation, $F(2, 391)=2.99, p=.05$, and career-decision-making attitudes, $F(2, 391)=3.59, p<.05$. In contrast, no significant effects were found for university program commitment and psychological well-being (see table 3.6).

Post-hoc means analyses using the Tukey-Kramer HSD statistic (for unequal n 's) revealed significant increases in social problem solving orientation $Q(2, 392)=2.93, p<.05$ and career-decision-making attitudes $Q(2, 392)=3.61, p<.05$ from the first to second time period only (see table 3.7). That is, both variables showed a significant increase from students who had 0 to 1 year of university experience to those who had 2 to 3 years of university experience. Although not statistically significant $Q(2, 392)=1.05, p>.05$, the means plot for social problem solving orientation show a continued increase from the second to third time period (see figure 3.3). Although cross-sectional in nature, these results suggest that the largest increase in students' social problem solving orientation occurs during their first 2 or 3 years in university and continues to increase at a slower rate over their 4th to 6th years. A visual inspection of the means plot for career-decision-making attitudes indicates a marginal, non-significant increase $Q(2, 392)=0.19, p>.05$ from the second to third time period (see figure 3.4). In general, these results suggest that students' career-decision-making attitudes may reach a plateau after their first 2 or 3 years in university.

Creation of Two Random Samples Stratified by Years of University Experience

In preparation for LISREL path analyses and cross-validation, the total sample ($N=394$) was divided into two random samples stratified by years of university experience. This was done to ensure that sample A ($n=197$) and sample B ($n=197$) both contained students with comparable levels of university experience. At the same time, it was assumed that this procedure would

Table 3.6

ANOVA Summary Table

Social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being as a function of years of university experience

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Social Problem Solving Orientation	16.06 1050.04	2 391	8.03 2.69	2.99*	0.05
Career-decision Making Attitudes	45.74 2492.37	2 391	22.87 6.37	3.59**	0.03
University Program Commitment	227.50 142,304.65	2 391	113.75 363.95	0.31 <u>ns</u>	0.73
Psychological Well-being	4758.38 902,928.71	2 391	2379.19 2315.20	1.35 <u>ns</u>	0.26

* $p=.05$

** $p<.05$

ns = not significant ($p>.05$)

Table 3.7

Post-hoc means analyses using Tukey-Kramer's HSD (for unequal n's) of social problem solving orientation and career-decision-making attitudes as a function of three levels of years of university experience

	Means Being Contrasted ¹	Degrees of Freedom	Q-Statistic
Social Problem Solving Orientation	(1) 7.93 → (2) 8.33 (2) 8.33 → (3) 8.51	2, 391 2, 391	2.93* 1.05 <u>ns</u>
Career-decision Making Attitudes	(1) 17.77 → (2) 18.53 (2) 18.53 → (3) 18.58	2, 391 2, 391	3.61* 0.19 <u>ns</u>

¹ Means being contrasted are in parentheses

* $p < .05$

ns = not significant ($p > .05$)

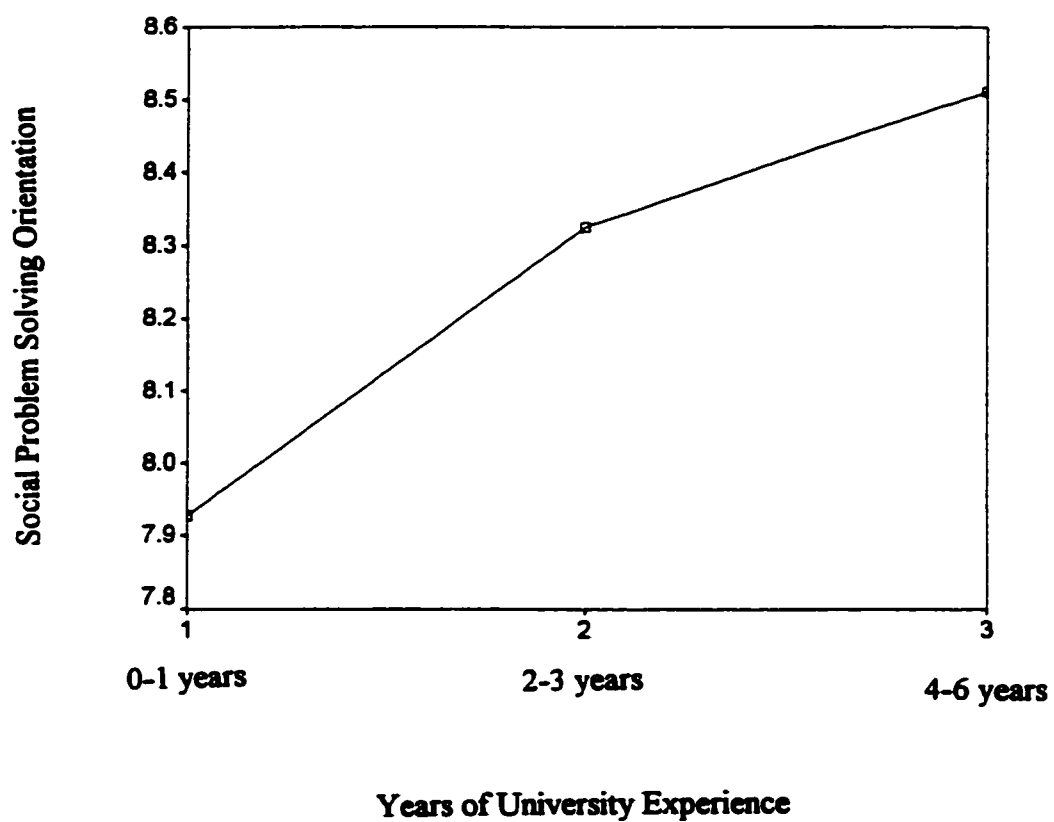


Figure 3.3. Means plot of social problem solving orientation as a function of students' years of university experience

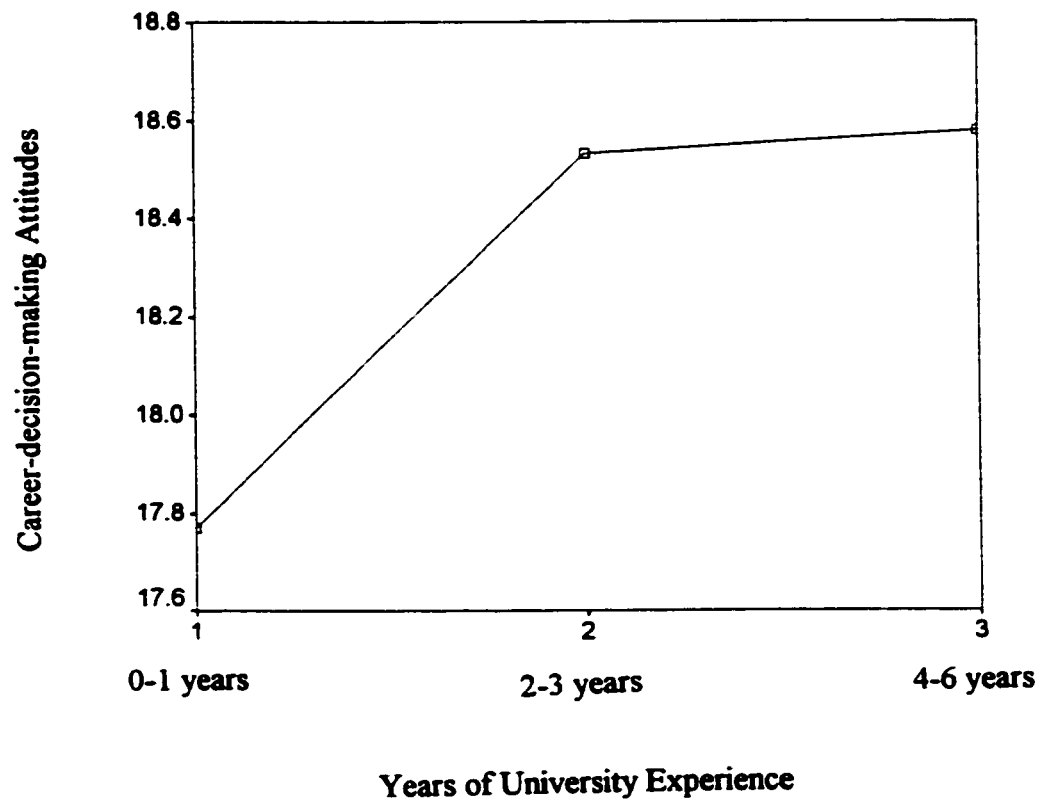


Figure 3.4. Means plot of career-decision-making attitudes as a function of students' years of university experience

produce comparable sample means on the other variables to be included in the path analyses. In order to test this assumption, a Manova means analysis was performed.

Manova to Test Relationship Between Sample Means

To ensure that the means of all variables to be included in the path model were not significantly different across samples A and B, a 2 x 5 Manova means analysis was performed. This was accomplished by using a dummy variable (coded 1 for sample A, and 2 for sample B) as the independent variable, and all variables to be included in the path model as the dependent variables. The results yielded no significant main effects (details are reported in Appendix C.3). The non-significant Wilk's Lambda statistic was $F(1, 392) = .38, p > .05$. Accordingly, there is no reason to believe that the means of the two samples are significantly different.

Main Analyses

The main analyses involve testing the hypothesized path model on sample A, illustrating the sequence of model revisions, arriving at the best-fitting model, and cross-validating it on sample B.

All estimation procedures were performed using the maximum likelihood (ML) fitting function of the program LISREL VIII.iii (Jöreskog & Sörbom, 1996). Given the current lack of consensus regarding the best index of overall fit for evaluating path analytic models (Hoyle, 1995), multiple indexes will be described and reported. First, the chi-square likelihood ratio evaluates whether the estimated covariance matrix differs from the sample covariance matrix. Accordingly, a significant chi-square value would suggest a poor fit to the data. Second, the chi-square difference test is used to determine whether the addition of a path significantly improves the model (Tabachnick & Fidell, 1996). Third, the standardized root mean square residual (SRMR) evaluates, for each degree of freedom, the estimated discrepancy between the population covariance matrix (if it were available) and the model.

According to Byrne (1998), SRMR values less than .05 represent a good fit, and values as high as .08 indicate a reasonable fit. Fourth, the goodness-of-fit index (GFI) is an absolute fit index which represents the proportion of variance in the sample covariance matrix that is accounted for by the estimated model. Fifth, the adjusted goodness-of-fit index (AGFI) represents the GFI adjusted for the number of degrees of freedom in the specified model. Finally, the comparative fit index (CFI) compares the chi-square of the estimated model to the chi-square of a null model in which it is assumed that all observed variables are completely independent. The GFI, AGFI, and CFI all have a theoretical range of 0 to 1 with values greater than .90 indicating an acceptable fit to the data (Byrne, 1998). Finally, the amount of variance in well-being accounted for by each of the final models as a whole will be reported. This value is equal to one minus the diagonal well-being value in the PSI matrix (i.e., error variance).

Testing the Hypothesized Path Model

The hypothesized model depicted in figure 1.3 was tested using LISREL VIII.iii (Jöreskog & Sörbom, 1996). The covariance matrices to be analyzed for the current sample A ($n=197$), along with sample B ($n=197$), are reproduced in Appendix D.1 and D.2, respectively. The diagonal elements of the THETA EPSILON matrix (TE or ϵ), which represent measurement error, were assigned the value of 1 minus the Cronbach alpha for each measure ($1-\alpha$). However, because years of university experience represents the only element of the THETA DELTA matrix (TD or δ), it is assumed to be measured virtually without error ($\delta=.01$).

The results of the initial analyses provided poor support for the hypothesized model. In particular, the chi-square index was significant at $\chi^2(5, n=197)=133.72, p<.01, SRMR=.20, GFI=.79, AGFI=.37, CFI=.32$ (see table 3.8). Accordingly, the initial hypothesis that the residuals obtained by subtracting the reproduced covariance matrix from the sample covariance matrix are equal to 0, was rejected. Nevertheless, the results of the initial path analysis are depicted in Figure 3.5, and

Table 3.8

Summary of path model revisionsSample A (n=197)

	Competing Models	χ^2	df	χ^2_{diff} ^a	df _{diff}	SRMR ^b	GFI ^c	AGFI ^d	CFI ^e
0	Initial Model	133.72*	5			.20	.79	.37	.32
1	Model 1 with θ_{ϵ} 4,1 free	44.54*	4	89.18	1	.14	.92	.71	.79
2	Model 2 with θ_{ϵ} 3,1 free	40.59*	3	3.95	1	.14	.93	.65	.80
3	Model 3 with β 4,2 free	29.36*	2	11.23	1	.12	.95	.60	.86
4	Model 4 with β 2,1 free	1.96 _{ns}	1	27.40	1	.03	1.00	.94	.99
5A	Model 3 with β 3,2 removed	7.26 _{ns}	2	5.30	1	.04	.99	.89	.97

^a $\chi^2_{diff} > 3.84$ ($p < .05$) whereas $\chi^2_{diff} > 6.64$ ($p < .01$)

^b Standardized Root Mean Square Residual

^c Goodness-of-Fit Index

^d Adjusted Goodness-of-Fit Index

^e Comparison Fit Index

* $p < .01$

ns = not significant ($p > .01$)

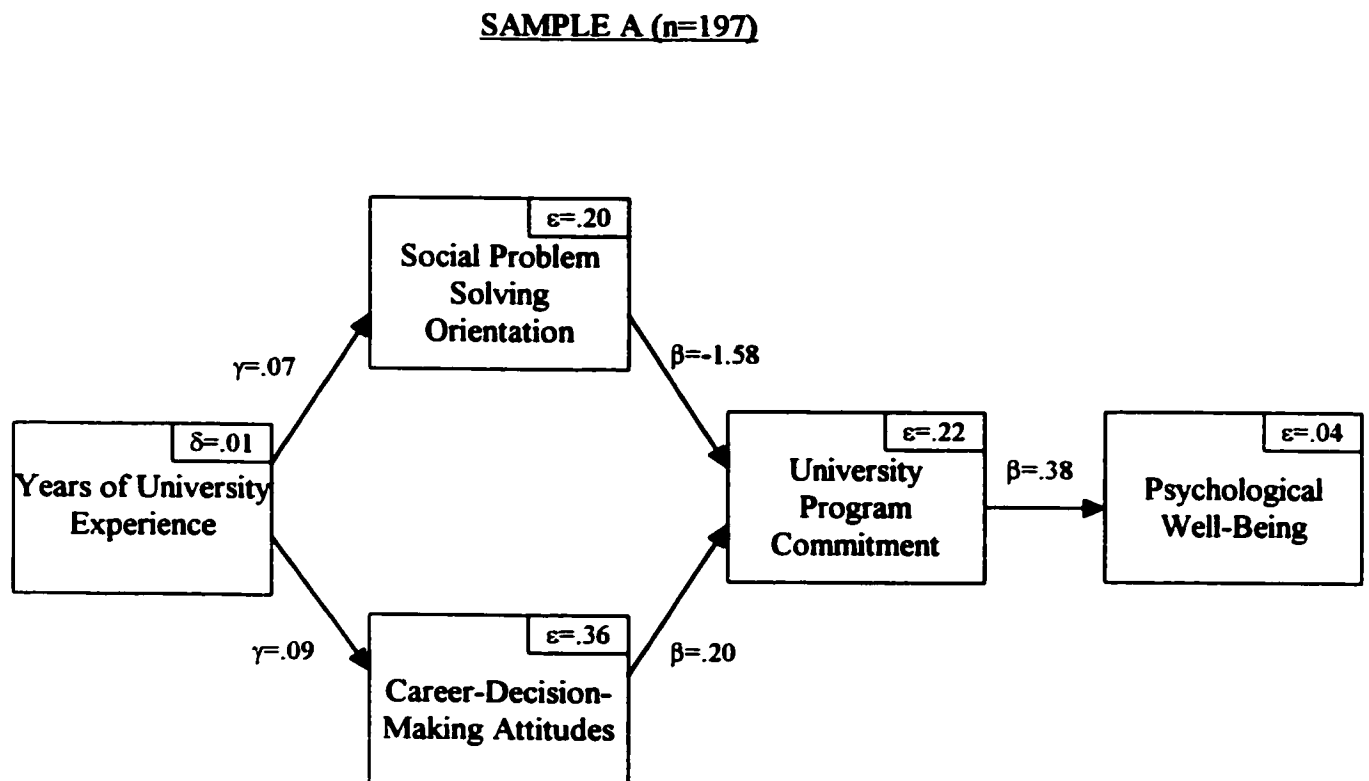


Figure 3.5. Initial path analytic model applied to sample A

the direct and indirect effects are presented in table 3.9. Given that the hypothesized model did not adequately fit the data, it was subjected to a series of revisions according to LISREL modification indices and theoretical considerations.

Sequence of Model Revisions

Following the rejection of the initial model, the LISREL modification indices suggested that the covariance between errors of measurement for social problem solving orientation and psychological well-being ($\theta_{\epsilon 4,1}$) should be freely estimated. The results of this first model revision yielded a significant $\chi^2(4, n=197)=44.54, p<.01, SRMR=.14, GFI=.92, AGFI=.71, CFI=.79$ (see table 3.8). Although these values represent a generally poor fit to the data, the chi-square difference test indicated that this first revision represented a significant improvement in fit over the initial model $\chi^2_{diff}(1, n=197)=89.18, p<.01$.

A second path model revision was performed on the basis of the LISREL modification indices which suggested that the covariance between errors of measurement for social problem solving orientation and university program commitment ($\theta_{\epsilon 3,1}$) should be freely estimated. The results of this second model revision yielded a significant $\chi^2(3, n=197)=40.59, p<.01, SRMR=.14, GFI=.93, AGFI=.65, CFI=.80$ (see table 3.8). Although these values still indicate a generally poor fit to the data, the chi-square difference test demonstrated a significant improvement over the first model revision $\chi^2_{diff}(1, n=197)=3.95, p<.05$.

The third path model revision was performed on the basis of the LISREL modification indices which suggested that the path between career-decision-making attitudes and psychological well-being ($\beta_{4,2}$) should be freely estimated. The results of this third path model revision yielded a significant $\chi^2(2, n=197)=29.36, p<.01, SRMR=.12, GFI=.95, AGFI=.60, CFI=.86$ (see table 3.8). Although the chi-square difference test indicated that this third revision represented a

Table 3.9

Table of direct and indirect effects of initial model applied to sample A

Variables	Variables				
	1	2	3	4	5
1. Years of University Experience	--				
2. Social Problem Solving Orientation	.07	--			
3. Career-decision Making Attitudes	.09	--	--		
4. University Program Commitment	-.09	-1.58	.20*	--	
5. Psychological Well-being	-.04	-.60	.08	.38*	--

N=197

* p<.05

significant improvement in fit over the previous model $\chi^2_{diff}(1, n=197)=11.23, p<.01$, the chi-square and SRMR values suggested the need for further path model revisions.

A fourth path model revision was performed on the basis of the LISREL modification indices which suggested that the path from social problem solving orientation to career-decision-making attitudes ($\beta 2,1$) should be freely estimated. This change resulted in a non-significant $\chi^2(1, n=197)=1.96, p>.01$, SRMR=.03, GFI=1.00, AGFI=.94, CFI=.99 (see table 3.8). Moreover, the chi-square difference test indicated that this change represented a significant improvement in fit over the third model revision $\chi^2_{diff}(1, n=197)=27.40, p<.01$. However, although the LISREL modification indices were not significant (i.e., all $\chi^2<6$), an inspection of the t-scores for the model paths suggested the need for a further revision.

Final Path Model

The fifth and final path model revision was performed on the basis of a non-significant t-score ($t<|1.96|$) for the path between career-decision-making attitudes and university program commitment ($\beta 3,2$). With this path removed, the result was still a non-significant $\chi^2(2, n=197)=7.26, p>.01$, SRMR=.04, GFI=.99, AGFI=.89, CFI=.97 (see table 3.8). The amount of variance in well-being accounted for by the final model A as a whole was 30% (1-70% error variance as indicated by the diagonal of the PSI matrix). Moreover, this final revision resulted in significant t-scores ($t_s>|1.96|$) for all beta paths in the model. Although the gamma paths (γ) did not reach significance, they were left in the model for several reasons. First, they stand in contrast to the significant results achieved in the preliminary analyses (see page 46). Second, they illustrate the theoretical importance associated with years of university experience. Third, the LISREL goodness-of-fit indexes indicate a close match to the data. Accordingly, the final model begins with years of university experience leading to social problem solving orientation and career-

decision-making attitudes. Career-decision-making attitudes was, in turn, directly related to psychological well-being while social problem solving orientation's influence on psychological well-being was mediated by university program commitment and career-decision-making attitudes (see figure 3.6). As illustrated, the standardized estimate of the relationship between years of university experience and social problem solving orientation is $\gamma=.08$ while the comparable figure for career-decision-making attitudes is $\gamma=.09$. The following standardized estimates of beta paths were all significant ($t_s > |1.96|$): social problem solving orientation to career-decision-making attitudes ($\beta=.39$); social problem solving orientation to university program commitment ($\beta=.59$); university program commitment to psychological well-being ($\beta=.31$); and career-decision-making attitudes to psychological well-being ($\beta=.38$) (see figure 3.6).

Interestingly, when the mediating effects of university program commitment and career-decision making attitudes are taken into account, the strength of the relationship between social problem solving orientation and psychological well-being is only $\beta=.33$ (see table 3.10). These results are suggestive of a mediational path model. However, these results are based on path model revisions using sample A ($n=197$) only, and need to be cross-validated on sample B ($n=197$).

Cross-Validation of Final Path Model

Having arrived at the final path model using sample A ($n=197$), the next step was to cross-validate the model on sample B ($n=197$). This was done using the same LISREL settings as before. The sample B cross-validation results also indicated a non-significant $\chi^2(2, n=197)=2.02$, $p > .01$, RMSEA=.02, GFI=1.00, AGFI=.97, CFI=1.00 (see table 3.11). The amount of variance in well-being accounted for by the final model B as a whole was 26% (1-74% error variance as indicated by the diagonal of the PSI matrix). Moreover, the chi-square difference test revealed a

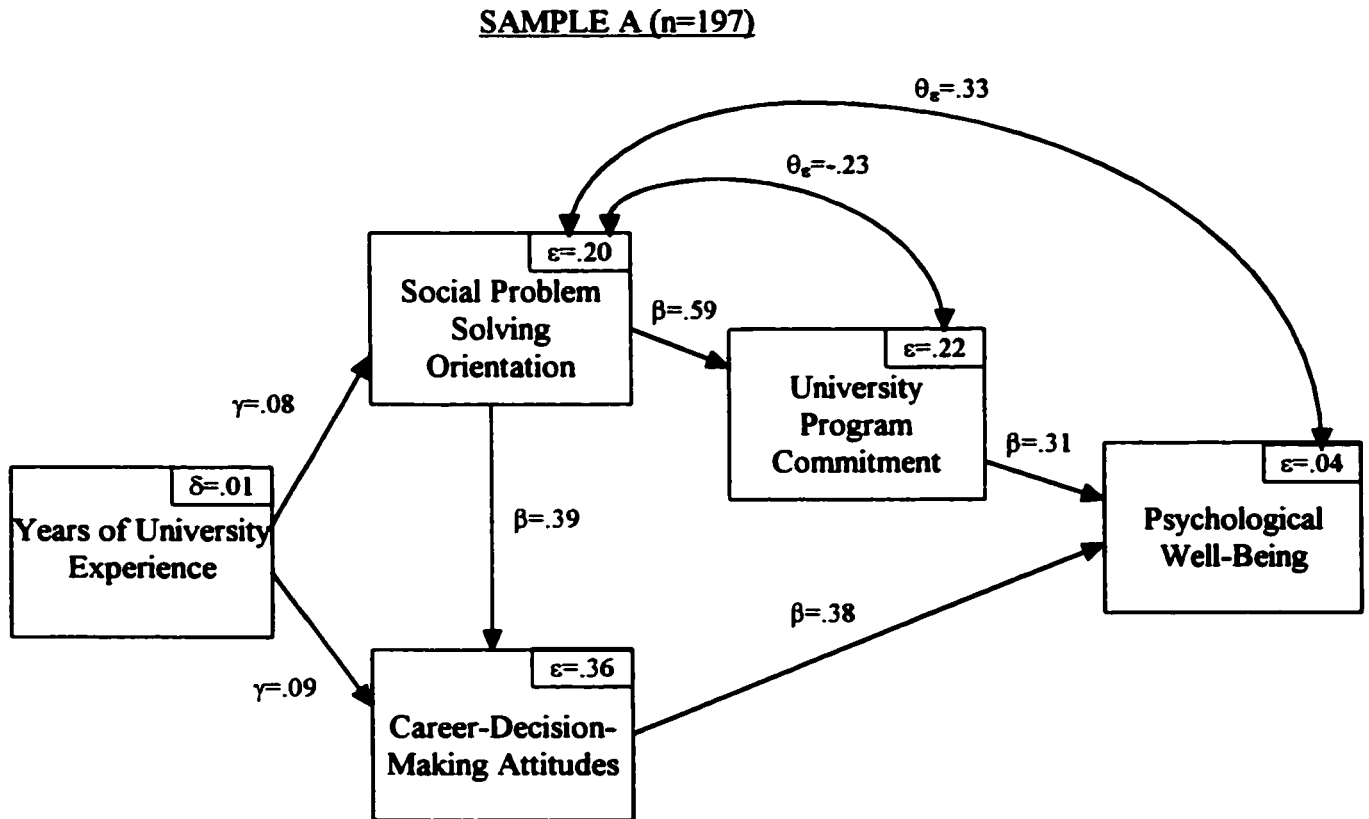


Figure 3.6. Final path analytic model applied to sample A.

Table 3.10

Table of direct and indirect effects of final model applied to sample A

Variables	Variables				
	1	2	3	4	5
1. Years of University Experience	--				
2. Social Problem Solving Orientation	.08	--			
3. Career-decision Making Attitudes	.09	.39*	--		
4. University Program Commitment	.04	.59*	--	--	
5. Psychological Well-being	.05	.33*	.38*	.31*	--

N=197

* $p < .05$

Table 3.11

Cross-validation of final path analytic model applied to sample B**Sample B (n=197)**

	Cross - Validation	χ^2	df	χ^2_{diff} ^a	df _{diff}	SRMR ^b	GFI ^c	AGFI ^d	CFI ^e
5B	Same as Model 5A	2.02 _{ns}	2	5.24	1	.02	1.00	.97	1.00

^a $\chi^2_{diff} > 3.84$ ($p < .05$) whereas $\chi^2_{diff} > 6.64$ ($p < .01$)

^b Standardized Root Mean Square Residual

^c Goodness-of-Fit Index

^d Adjusted Goodness-of-Fit Index

^e Comparison Fit Index

* $p < .01$

ns = not significant ($p > .01$)

non-significant difference between the final model tested on sample A, and the same model tested on sample B: $\chi^2_{diff}(1, n=197)=5.24, p>.01$. Accordingly, the cross-validation procedure confirmed the structure of the final model (see figures 3.6 and 3.7). As in sample A, the final model tested on sample B resulted in significant t-scores for all beta paths in the model ($ts>|1.96|$), but non-significant t-scores for the gamma paths (γ) (see table 3.12). For sample B, the standardized estimate of the relationship between years of university experience and social problem solving orientation is $\gamma=.04$ while the comparable figure for career-decision-making attitudes is $\gamma=.14$. The following standardized estimates of beta paths were all significant ($ts>|1.96|$): social problem solving orientation to career-decision-making attitudes ($\beta=.32$); social problem solving orientation to university program commitment ($\beta=.75$); university program commitment to psychological well-being ($\beta=.39$); and career-decision-making attitudes to psychological well-being ($\beta=.24$) (see figure 3.7 and table 3.12).

Finally, when the mediating effects of university program commitment and career-decision making attitudes are taken into account, the strength of the relationship between social problem solving orientation and psychological well-being is only $\beta=.37$. These cross-validation procedures provide additional evidence in support of a mediational path model. With this in mind, the next step involves performing secondary analyses to identify any differential social problem solving orientation subscale correlations with the mediating variables of career-decision-making attitudes and university program commitment.

Secondary Analyses

The secondary analyses are exploratory in nature and focus on the relationship between social problem solving orientation subscales (viz., positive problem orientation, negative problem orientation, and impulsivity/carelessness) and the global mediating variables of career-decision-making attitudes and

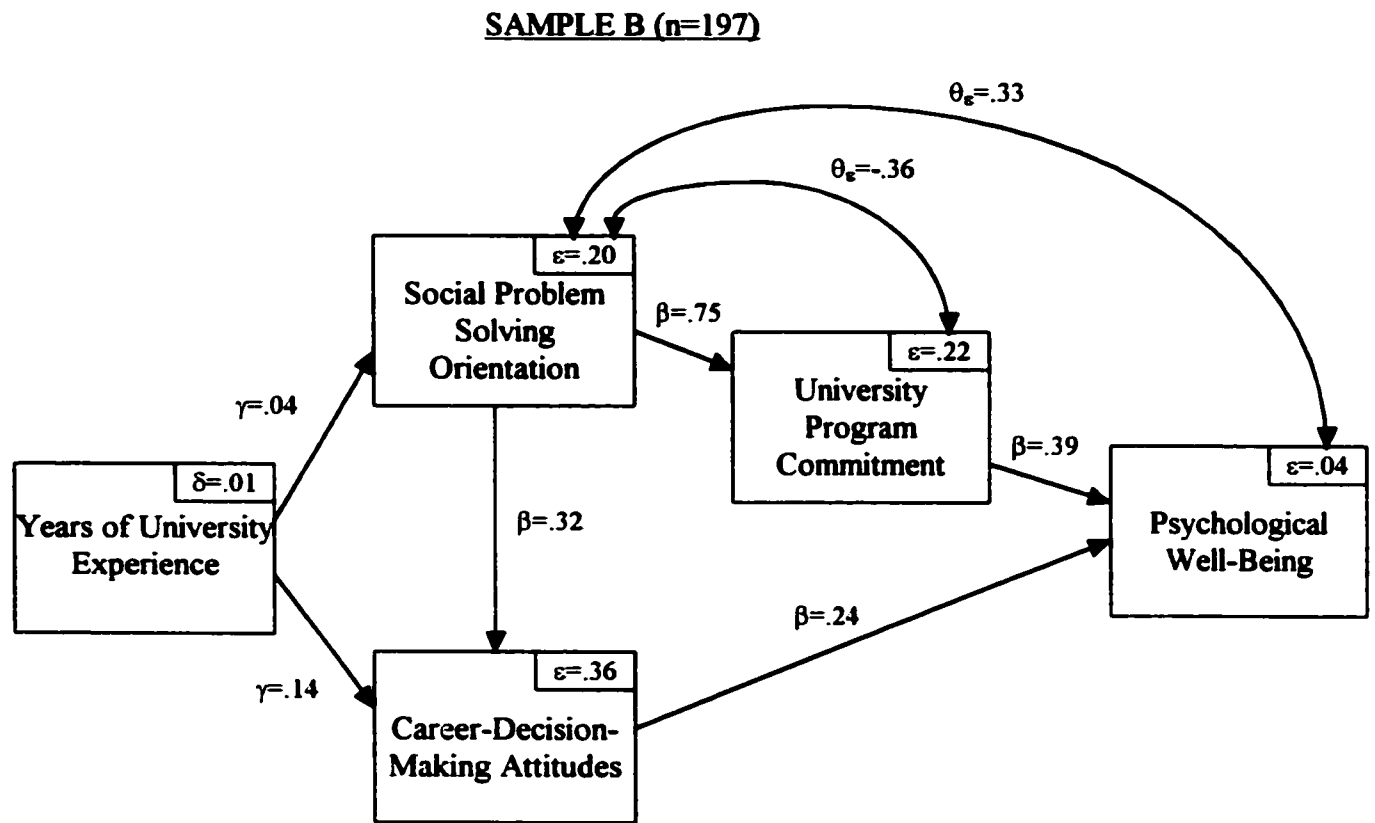


Figure 3.7. Cross-validation of final path analytic model applied to sample B

Table 3.12

Table of direct and indirect effects of final model applied to sample B

Variables	Variables				
	1	2	3	4	5
1. Years of University Experience	--				
2. Social Problem Solving Orientation	.04	--			
3. Career-decision Making Attitudes	.14	.32*	--		
4. University Program Commitment	.03	.75*	--	--	
5. Psychological Well-being	.05	.37*	.24*	.39*	--

N=197

* p<.05

university program commitment. With this in mind, negative problem orientation and impulsivity/carelessness had to be reverse-scored so they could be compared on an equal foundation with positive problem orientation. The full correlation matrix of all of these variables is reproduced in table 3.13.

Z-Score Matrix of Subscale Indicators with Mediating Variables

A z-score matrix was created using the total sample of students ($N=394$) with the aim of identifying any differential correlations from the social problem solving orientation subscales to the global mediating variables. This procedure was performed using the Meng, Rosenthal, and Rubin (1992) z-score test of correlated correlations involving a common variable. Essentially, this test answers the question of whether the correlation between X and Y is significantly different from the correlation between X and Z . The z-score matrix is illustrated in table 3.14. In general, the results indicated that the social problem solving orientation subscales were not differentially related to career-decision-making attitudes. More precisely, the z-scores ranged from $z(394)=-1.43$ to $.54$, $p>.05$ (see table 3.14a). However, positive problem orientation was significantly more correlated with university program commitment than either negative problem orientation (reverse-scored) $z(394)=2.51$, $p<.05$, or impulsivity/carelessness (reverse-scored) $z(394)=3.52$, $p<.05$ (see table 3.14b). The latter two subscales were not differentially related to university program commitment $z(394)=1.77$, $p>.05$. In general, the results suggest that students who view their program as a challenge to be confronted may be more likely to be committed to it.

Table 3.13

Correlation coefficients of positive problem orientation, negative problem orientation (reverse-scored), impulsivity/carelessness (reverse-scored), career-decision-making attitudes, and university program commitment¹

Variables	Variables ¹				
	1	2	3	4	5
1. Positive Problem Orientation	1.00	.49	.15	.21	.37
2. Negative Problem Orientation ²	.49	1.00	.34	.28	.25
3. Impulsivity/Carelessness ²	.15	.34	1.00	.25	.15
4. Career-Decision Making Attitudes	.21	.28	.25	1.00	.24
5. University Program Commitment	.37	.25	.15	.24	1.00

N=394

¹ All correlations significant at $p < .01$

² Reverse-scored subscales

Table 3.14

Z-score test matrix of the correlations between social problem solving orientation subscales and career-decision-making attitudes and university program commitment

(a) Career-Decision-Making Attitudes

Subscales	Social Problem Solving Orientation		
	1	2	3
1. Positive Problem Orientation			
2. Negative Problem Orientation ¹	-1.43 _{ns}		
3. Impulsivity/Carelessness ¹	-.63 _{ns}	.54 _{ns}	

(b) University Program Commitment

Subscales	Social Problem Solving Orientation		
	1	2	3
1. Positive Problem Orientation			
2. Negative Problem Orientation ¹	2.51*		
3. Impulsivity/Carelessness ¹	3.52*	1.77 _{ns}	

N=394

¹ Reverse-scored subscales

* $p < .05$

ns = not significant ($p > .05$)

Chapter 4

General Discussion and Conclusion

Although university administrators are becoming increasingly aware of the importance of the university experience on students' psychological well-being (Hampton, 1983), the paucity of research in this area would seem to raise more questions than answers. For example, what are some of the salient variables that are related to students' psychological well-being? Do these variables change as students gain more university experience? Are these variables somehow interrelated in their effects on psychological well-being? In an attempt to answer these questions, this study first examined the relationship of social problem solving orientation, career-decision-making attitudes, and university program commitment to psychological well-being. Second, this research investigated whether social problem solving orientation and career-decision-making attitudes increased as a function of years of university experience. Finally, this study involved the identification and cross-validation of a mediational path model with respect to the effects of years of university experience, social problem solving orientation, career-decision-making attitudes, and university program commitment on students' psychological well-being.

The results support the premise that social problem solving orientation, career-decision-making attitudes and university program commitment are significantly positively related to psychological well-being. Moreover, although not conclusive, the results of the study suggested that as students gain more years of university experience, they also tend to develop more social problem solving orientation and mature career-decision-making attitudes. Finally, the study found that the relationship between social problem solving orientation and psychological well-being is mediated by career-decision-making attitudes and university program commitment. These findings have theoretical implications for future research, and practical implications for universities.

Psychological Well-Being in University Students

Before examining the results in detail, it is important to note that there has been some controversy in the literature regarding the directionality of the relationship between global and life facet satisfaction. In general, “bottom-up” models propose that specific life domains (such as university life) affect global life satisfaction (Near, Rice, & Hunt, 1980). In contrast, proponents of “top-down” models argue that global life satisfaction may affect satisfaction in specific life domains (Staw & Ross, 1985). Finally, “bi-directional” models suggest that global life satisfaction both determines, and results from, satisfaction with specific life domains (Diener, 1984). In terms of this thesis, the relevant question is whether it is possible that psychological well-being itself may affect social problem solving orientation, career-decision-making attitudes, and/or university program commitment levels.

The more recent literature suggests that the initial formulations of bottom-up, top-down, and bidirectional models may have been over-simplifications of a more complex phenomenon. For example, in a more recent study of university professors, Lance and his colleagues concluded that directionality varied across life domains (Lance, et al., 1989). More precisely, these researchers argued that specific, critical, and central life domains (such as university life) may be more likely to contribute to global life satisfaction. In contrast, satisfaction with broader, less critical, and less central life facets may be more likely to be affected by global life satisfaction. With this in mind, it is argued here that deciding upon an appropriate program of study, choosing courses to be taken, and completing the specific assignments and tasks required represent specific, critical, and central tasks that are more likely to affect, than be affected by, students’ psychological well-being.

Limitations of the Current Study

The results of the current study must be interpreted cautiously within the context of its limitations. For example, this study used a cross-sectional design and self-report measures. The former may have played a role in the mixed findings regarding the relationship between years of university experience and social problem solving orientation and career-decision-making attitudes. Another limitation is reflected in the relatively weak factor structure of the social problem solving orientation construct. Also, the sample of students was taken from various programs in the faculties of Arts and Social Sciences of the University of Ottawa. Testing only these faculties may limit the generalizability of results. Although the pilot study showed no gender effects, and the main study showed minimal gender effects, the current sample consisted mainly of females (82%) which may further limit the generalizability of the results. In addition, although Ryff's measure has been employed as an outcome measure in several recent studies (e.g., Marmot, et al., 1998; Ryff & Heidrich, 1997), it nevertheless reflects relatively recent developments in the study of psychological well-being. As such, in future studies, it may be useful to compare Ryff's scales with more established well-being measures. Finally, the current study is limited in that it did not consider other life areas such as family and community that may influence psychological well-being.

With the above limitations in mind, the current study found that social problem solving orientation, career-decision-making attitudes, and university program commitment are all significantly positively related to psychological well-being in university students. Moreover, the measure of psychological well-being used in this study represents a more comprehensive and clinically relevant measure than has been employed in previous studies involving university students (e.g., Arnold, 1989). These findings further illustrate the salience and power of social

problem solving orientation, career-decision-making attitudes, and program commitment to exert a broad-based influence on students' psychological well-being during their university experience. Moreover, unlike previous studies that have focused on students' university experience and negative psychological adjustment (e.g., D'Zurilla & Nezu, 1990; Maydeu-Olivares & D'Zurilla, 1996; Nezu, 1985; Williams & Kleinfelter, 1989), the current study identified several aspects of students' university experience and positive psychological adjustment.

Having identified some of the salient variables related to psychological well-being in university students, the next question was whether these variables change as students gain more university experience. Although not confirmed in the path analyses, the preliminary analyses suggested that as students gain more years of university experience, they also increase their social problem solving orientation and career-decision-making attitudes, but not their university program commitment or psychological well-being. However, it is important to note that those students with the weakest university program commitment and the lowest psychological well-being may have already dropped out and thus would not have been included in the current study. This idea is corroborated by attrition studies which suggest that students who drop out tend to be dissatisfied with the quality of their education (Mohr, Eiche, & Sedlacek, 1998), and experience significantly lower psychosocial adjustment to college life (Bragg, 1994). This highlights the importance of identifying salient precursors to university program commitment and psychological well-being.

The preliminary analyses finding that social problem solving orientation and career-decision-making attitudes may increase as a function of students' years of university experience has important theoretical implications. For example, it may be that as students progress from the relatively easy tasks associated with completing entry-level first-year university courses to the more demanding tasks associated with more advanced courses, they may be forced to develop

their social problem solving orientation or face the inevitable negative consequences. Put another way, the university environment forces increasingly difficult tasks on university students over time. How well they deal with these tasks may depend of their current level of social problem solving orientation, and their ability to further develop it in the face of the mounting demands imposed upon them by the university environment. Students who fail to complete the necessary tasks associated with timely progress through their program (e.g., completing readings and assignments on schedule) may face poor grades, being left behind, academic probation, forced attrition (i.e., being asked to leave the program), or changing programs. Students with little or no university experience may be caught in a catch-22 situation. That is, they require a positive social problem solving orientation to deal effectively with university-related tasks, but they may not have had enough university or similar types of experiences to develop it sufficiently.

The failure of many studies to take into account students' years of university experience (e.g., D'Zurilla & Sheedy, 1991; Nezu & Ronan, 1988) may be a confounding factor in cross-study comparisons involving social problem solving in particular, but also career-decision-making attitudes. That is, these variables may have a specific developmental trajectory that is influenced by environmental factors (e.g., exposure to university-related tasks) which has not been recognized or acknowledged in cross-study comparisons. Nevertheless, it is important to note that the preliminary analyses finding was not confirmed in the path analyses. However, these latter non-significant results may be a function of the way in which LISREL simultaneously considers all possible relationships among the variables in the model. In particular, because the LISREL solution represents a composite of all variables, the gamma and beta weights may be expected to vary depending on the nature of the variables included in the model. Accordingly, the addition of university program commitment and psychological well-being to the path model may have

detracted somewhat from the variance associated with the gamma paths from years of university experience to social problem solving orientation and career-decision-making attitudes.

Nevertheless, further research is needed to clarify the developmental nature of these latter variables.

The primary purpose of the current study was to address the question of whether social problem solving orientation, career-decision-making attitudes, and university program commitment might be interrelated in their effects on students' psychological well-being. With this in mind, the path design depicted in figure 1.3. was proposed and tested. Although the initial path model was not supported, the end result of model building and trimming yielded a somewhat similar solution. More precisely, the study found that the relationship between social problem solving orientation and psychological well-being was mediated by both university program commitment and career-decision-making attitudes (see figure 3.6). This final path model was successfully cross-validated on a second sample of equal size (see figure 3.7). Although the gamma paths did not reach significance, they were left in the model because (1) they stand in contrast to the significant results achieved in the preliminary analyses (see page 46), (2) they illustrate the theoretical importance associated with years of university experience, and (3) the LISREL goodness-of-fit indexes indicate a close match to the data.

Despite some similarities, the final path model (see figure 3.7) differs in two important ways from the initially proposed model (see figure 1.3).

First, the final model revealed that social problem solving orientation was significantly related to career-decision-making attitudes. This suggests that social problem solving orientation may influence the degree to which university students seek out career-related information. That is, all students are faced with the tasks of informing themselves about career-related options, and

deciding upon an appropriate program of study. Social problem solving theory dictates that peoples' ability to deal effectively with specific problems or tasks (e.g., the need to choose a university program or career) is determined by their generalized view of the problems (e.g., viewing problems as challenges to be approached versus threats to be avoided), and their problem solving skills. Accordingly, students who possess a positive social problem solving orientation may be more likely to actively and systematically approach the task of acquiring career-related knowledge. In contrast, students who possess a negative social problem solving orientation may view career-decision-making as threatening, and may be more likely to avoid making a decision. This interpretation of the results is consistent with a study conducted by Gribben and Keital (1994) involving 120 college students. These authors concluded that students possessing a positive problem orientation may view career-decision-making as challenging, possess confidence in initiating career-decision-making activities, and therefore be less likely to experience career indecision than students with a negative problem orientation (Gribben & Keitel, 1994).

Second, the final model revealed that career-decision-making attitudes was not significantly related to program commitment, but was significantly related to psychological well-being. This failure to verify the initially proposed path model may be somewhat related to the bivariate nature of the previous research on which it was partially based (the other part being theory). In short, although bivariate research may show a specific relationship between two variables, a very different pattern may emerge when other variables are added to the equation.

The final path model has several important theoretical implications. For example, the current study suggests that although career-decision-making attitudes may increase somewhat as a result of years of university experience ($\gamma=.14$), it may be even more strongly influenced by social problem solving orientation ($\beta=.32$) (see figure 3.7). The relative importance of social problem

solving orientation on career-decision-making attitudes is evident because of the multidimensional nature of this study. That is, although previous studies have looked at the effects of university experience on career-decision-making (Naidoo, 1998), the current research is the first to investigate both of these variables and social problem solving orientation together in one study. The present findings suggest that previous research which focused on a wide range of personal, educational, and psychological predictors of students' career-decision-making attitudes (e.g., Bergeron & Romano, 1994; Healy, O'Shea, & Crook, 1985; Luzzo, 1993; Naidoo, 1998) may have neglected one of the most important predictors: social problem solving orientation.

As predicted, the current study found that social problem solving orientation leads to university program commitment which in turn leads to psychological well-being. However, the initial hypothesis that career-decision-making attitudes also leads to university program commitment was not supported. Instead, career-decision-making attitudes was found to be directly related to psychological well-being (see figure 3.7). Although this is consistent with one study that found career decideness to be related to the life-satisfaction element of psychological well-being (Arnold, 1989), it is inconsistent with several studies that suggest career-decision-making attitudes are related to university program commitment (e.g., Nevill & Super, 1988; Savickas, 1990). However, this latter finding appears to be based largely on bivariate studies that did not take into account other more salient variables.

Implications for Applications

The current study may have practical implications for university administrators, academic advisors, and career counsellors in their efforts to increase students' psychological well-being. In particular, it clearly identifies social problem solving orientation, career-decision-making attitudes and university program commitment as important variables to consider when developing programs

to increase students' psychological well-being. In addition, if social problem solving orientation and career-decision-making attitudes can improve with experience as the preliminary analyses suggest, then these variables can also theoretically be taught to university students. The development of these programs could be especially useful for beginning students who may be overwhelmed by the competitive academic nature of the university environment and the associated pressures to decide upon a program of study.

University administrators have traditionally focused on developing and offering a variety of programs designed to improve students' career-decision-making attitudes and increase their program commitment. In general, these various types of programs have met with mixed success (Brusoski, Golin, Gallagher, & Moore, 1993). However, the current findings suggest that social problem solving orientation may have been neglected as a prerequisite to career-decision-making attitudes and university program commitment. That is, the study suggests that social problem solving orientation may lead to both career-decision-making attitudes and university program commitment which in turn may lead to psychological well-being. With this in mind, it may be more effective to develop programs to promote students' social problem solving orientation (which might lead to greater program commitment) while at the same time providing students with career-related information. This strategy might also reduce the number of attrition-prone students who experience critically low levels of university program commitment and psychological well-being.

In developing programs to promote students' social problem solving orientation, university administrators may be able to draw ideas from existing programs that teach social problem solving techniques to individuals suffering from unipolar depression (e.g., Nezu, 1986; Nezu & Perri, 1989). These existing programs have their roots in social problem solving theory

(D’Zurilla & Goldfried, 1971), and are based on the model of social problem solving training developed by D’Zurilla and Nezu (1982). In particular, training in problem orientation consists of providing people with a rational, positive, and constructive set to problems in living and problem solving as a means of coping with them. The goal is to change those attitudes or beliefs that may interfere with attempts to engage in the problem solving process. Individuals are taught to label emotions as cues that help identify the existence of problems, and to inhibit the tendency to respond automatically to problems and instead engage in the problem solving process. Training in problem solving tasks include teaching subjects to better define and formulate the nature of the problem, generate a wide range of alternative solutions, systematically evaluate the potential consequences of solutions and select the most optimal ones to implement, and evaluate and monitor that actual solution outcome after its implementation (D’Zurilla & Nezu, 1982). This model of social problem solving training could be adapted to focus on those tasks that are most relevant to students during university (e.g., choosing an appropriate program, committing to it, and following it through to completion). This strategy could help to provide students with some of the tools required to deal with the developmental tasks associated with university life.

The current finding that career-decision-making attitudes is not significantly related to university program commitment is inconsistent with some studies (e.g., Nevill & Super, 1988; Savickas, 1990). Nevertheless, the present study suggests that there is more to being committed to a program of study than mature career-decision-making attitudes. For example, there may be some students who know what type of career is best for them, yet may not be committed to carrying out the tasks required to attain their goal. If this is the case, then university programs designed to develop mature career-decision-attitudes may not always be sufficient to ensure students’ program commitment. On the other hand, the current findings suggest that programs

designed to promote social problem solving orientation may facilitate the tasks associated with university program commitment which in turn may lead to psychological well-being. This strategy may also have the effect of improving institutional support and enhancing the reputation of the university in the eyes of current and prospective students.

Directions for Future Research

The findings of the current study point to several avenues for future research. First, there may be other salient variables that are related to psychological well-being in university students. For example, these variables may include locus of control and state-trait anxiety whereas more objectively measurable variables might include grade point average and academic persistence. In addition, these other variables may be interrelated in complex ways with social problem solving orientation, career-decision-making attitudes, and university program commitment relative to psychological well-being in students. Although bivariate studies contribute something to our understanding of variables related to psychological well-being in university students, they can not in isolation fully explain the complex nature of their interrelationships. The path analytic design and cross-validation techniques used in the current study illustrates the importance of taking a multidimensional approach to examining those variables related to psychological well-being in university students. Indeed, the findings of the current study demonstrate that the nature of the relationships among variables related to psychological well-being are complex and thus demand complex research strategies.

Second, there is some indication that the variables related to students' psychological well-being may be expected to change during the course of their university experience. Although not confirmed in the path analyses, the preliminary analyses suggested that as students gain more years of university experience, they also increase their social problem solving orientation and

career-decision-making attitudes, but not their university program commitment or psychological well-being. However, this latter finding may be artifact of the cross-sectional nature of this study. That is, it may be that students with the lowest levels of university program commitment and psychological well-being may have dropped out. This illustrates the importance of employing longitudinal designs in future research in this area. This strategy might also lead to the development of different path models for students with varying degrees of university experience.

Third, although all students face similar tasks at some point (e.g., deciding upon and committing to a program of study), there may be variations in how these tasks are dealt with depending on the characteristics of the individual, program, faculty, and/or university. It is generally accepted that the purpose of the research should determine the scope and characteristics of the sample. For example, if the purpose is to contribute to general knowledge of psychological well-being in university students, then the sample should include subjects from a random sample of individuals, programs, faculties and universities in the target area. In contrast, if the purpose is to investigate the precursors of psychological well-being in a specific program at a certain university, then the sample should be randomly selected from that environment. Also, because the current study is the first of its kind to investigate several variables at once relative to psychological well-being, it should be replicated on a variety of student populations. For example, future research could investigate whether there are process differences between females and males.

Conclusion

Promoting the psychological well-being of students requires an in-depth understanding of the specific, critical, and central developmental tasks associated with university life. The current study clarifies, integrates, and extends previous bivariate research by identifying several salient

variables related to psychological well-being, examining their developmental sequence, and investigating their interrelationships. The current findings reveal that (1) social problem solving orientation, career-decision-making attitudes, and university program commitment are positively related to psychological well-being in university students, (2) although not conclusive, social problem solving orientation and career-decision-making attitudes may increase as a function of years of university experience, and (3) the relationship between social problem solving orientation and psychological well-being is mediated by university program commitment and career-decision-making attitudes.

While acknowledging its limitations, the findings of the current study point to two major implications. First, future research should adopt a multidimensional longitudinal strategy that takes into account the developmental sequence of variables related to students' psychological well-being. Second, university administrators, career counsellors, and academic advisors should consider ways to develop students' social problem solving orientation to facilitate their career-decision-making attitudes, program commitment, and psychological well-being. In the end, it is only through a greater understanding of those variables that are related to psychological well-being in students that universities may develop more effective programs and services.

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APPENDIX A

Measurement Validation

Table of non-significant effects

Appendix A.1

Summary statistics for years of university experience, social problem solving orientation, and psychological well-being

Variables	Mean	Standard Deviation	Kurtosis	Skewness
Years of University Experience	2.42	1.27	.37	.72
Social Problem Solving Orientation	8.73	1.63	.65	-.78
Career-decision Making Attitudes	18.51	2.33	.31	-.55
Psychological Well-being	391.50	44.63	.47	-.70

N=146

Appendix A.2

Years of university experience, social problem solving orientation, career-decision-making attitudes, and psychological well-being as a function of gendera) MANOVA Summary Table (Wilk's Lambda not significant at $F(1, 144)=1.64, p>.05$)

	Univariate F	p	Male Mean	Female Mean
Years of University Experience	4.34*	0.04	3.07	2.35
Social Problem Solving Orientation	1.49	0.22	9.21	8.67
Career-Decision Making Attitudes	.09	0.76	18.33	18.53
Psychological Well-Being	.01	0.90	392.93	391.33

 $N=146$ (15 males, 131 females)* $p<.05$

APPENDIX B

Description of measures

Appendix B.1

Instructions and items for Social Problem Solving Orientation

Below are some ways that you might think, feel, and act when faced with **PROBLEMS** or **CHALLENGES** in everyday living. Of course, you will not have to specifically identify the problems or challenges. We are **not** talking about the common hassles and pressures that you handle successfully everyday. In this questionnaire, a problem is something important in your life that bothers you a lot but you don't know immediately how to make it better or stop it from bothering you so much. The problem could be something about yourself (such as your thoughts, feelings, behavior, health, or appearance), your relationships with other people (such as your family, friends, teachers, or boss), or your environment and the things that you own (such as your house, car, property, money). Please read each statement carefully and choose one of the numbers below that best shows how much the statement is true of you. See yourself as you **usually** think, feel, and act when you are faced with important problems in your life **these days**.

- 0 = Not at all true of me
- 1 = Slightly true of me
- 2 = Moderately true of me
- 3 = Very true of me
- 4 = Extremely true of me

Please write your answers on the computer answer sheet (choosing only one option). You do so by darkening the oval that corresponds to the number you choose.

1. I spend too much time worrying about my problems instead of trying to solve them.
2. I feel threatened and afraid when I have an important problem to solve.
3. When making decisions, I do not evaluate all my options carefully enough.
4. When I have a decision to make, I fail to consider the effects that each option is likely to have on the well-being of other people.
5. I feel nervous and unsure of myself when I have an important decision to make.
6. When my first efforts to solve a problem fail, I know if I persist and do not give up too easily, I will be able to eventually find a good solution.
7. When I am attempting to solve a problem, I act on the first idea that occurs to me.
8. Whenever I have a problem, I believe that it can be solved.
9. When my first efforts to solve a problem fail, I get very frustrated.

Social Problem Solving Orientation (Continued)

- 0 = Not at all true of me
- 1 = Slightly true of me
- 2 = Moderately true of me
- 3 = Very true of me
- 4 = Extremely true of me

10. When I am faced with a difficult problem, I doubt that I will be able to solve it on my own no matter how hard I try.
11. After carrying out a solution to a problem, I do not take the time to evaluate all of the results carefully.
12. Difficult problems make me very upset.
13. When problems occur in my life, I like to deal with them as soon as possible.
14. When I am trying to solve a problem, I go with the first good idea that comes to mind.
15. When I try to think of different possible solutions to a problem, I cannot come up with many ideas.
16. When I am faced with a difficult problem, I believe I will be able to solve it on my own if I try hard enough.
17. When I am trying to solve a problem, I get so upset that I cannot think clearly.
18. When I have a decision to make, I do not take the time to consider the pros and cons of each option.
19. I hate having to solve the problems that occur in my life.
20. When I have a problem, I try to see it as a challenge or opportunity to benefit in some positive way from having a problem.
21. I become depressed and immobilized when I have an important problem to solve.
22. When making decisions, I go with my "gut feeling" without thinking too much about the consequences of each option.
23. When my first efforts to solve a problem fail, I get discouraged and depressed.

Social Problem Solving Orientation (Continued)

- 0 = Not at all true of me
 1 = Slightly true of me
 2 = Moderately true of me
 3 = Very true of me
 4 = Extremely true of me

24. When a solution that I have carried out does not solve my problem satisfactorily, I do not take the time to examine carefully why it did not work.
25. I am too impulsive when it comes to making decisions.

Social Problem Solving Orientation

Subscales	Item Numbers
Positive Problem Orientation	6, 8, 13, 16, 20
Negative Problem Orientation¹	1, 2, 5, 9, 10, 12, 17, 19, 21, 23
Impulsivity/Carelessness¹	3, 4, 7, 11, 14, 15, 18, 22, 24, 25

¹ Reverse-scored for global construct

Appendix B.2

Instructions and items for Career-Decision-Making Attitudes

There are a number of statements about career choice in this section. Career choice means the kind of job or work which you think you will probably be doing when you have finished all of your schooling. If you **Agree or Mostly Agree** with the statement, use your pencil to blacken the oval marked with a '0' on the computer answer sheet. If you **Disagree or Mostly Disagree** with the statement, blacken the oval marked with a '1'. Be sure that your marks are heavy and black and that they completely fill the ovals. Erase completely any answer you wish to change

0 = Agree or Mostly Agree

1 = Disagree or Mostly Disagree

1. Everyone seems to tell me something different; as a result I don't know which kind of work to choose.
2. It's probably just as easy to be successful in one occupation as it is in another.
3. I have little or no idea of what working will be like.
4. Once you choose a job, you can't choose another one.
5. I keep wondering how I can reconcile the kind of person I am with the kind of person I want to be in my future occupation.
6. Sometimes you have to take a job that is not your first choice.
7. Work is dull and unpleasant.
8. I can't understand how some people can be so set about what they want to do.
9. As far as choosing an occupation is concerned, something will come along sooner or later.
10. Choosing an occupation is something you have to do on your own.
11. As long as I can remember, I've known what kind of work I want to do.
12. There may not be any openings in the job I want most.
13. I don't know how to go about getting into the kind of work I want to do.
14. There is no point in deciding on a job when the future is so uncertain.
15. I spend a lot of time wishing I could do work I know I can never do.

Career-Decision-Making Attitudes (Continued)**0 = Agree or Mostly Agree****1 = Disagree or Mostly Disagree**

16. **If someone would tell me what occupation to enter, I would feel much better.**
17. **I know very little about the requirements of jobs.**
18. **When choosing an occupation, you should consider several different ones.**
19. **There is only one occupation for each person.**
20. **The best thing to do is to try out several jobs, and then choose the one you like best.**
21. **You get into an occupation mostly by chance.**
22. **I seldom think about the job I want to enter.**
23. **You almost always have to settle for a job that's less than you had hoped for.**
24. **I really can't find any work that has much appeal to me.**
25. **I'd rather work than play.**

Appendix B.3

Instructions and items for University Program Commitment

The following questions request information concerning your thoughts and feelings about your program(s) of study. Give the response which first comes to mind and darken the oval on the computer answer sheet that corresponds to the number you choose.

1. What are your expectations concerning your ability to successfully complete your current program of study?
 0. Extremely unlikely
 1. Very unlikely
 2. Somewhat unlikely
 3. Neutral
 4. Somewhat likely
 5. Very likely
 6. Extremely likely

2. Assuming that you will complete your current program, what are your expectations regarding your ability to get a job in this field?
 0. Extremely unlikely
 1. Very unlikely
 2. Somewhat unlikely
 3. Neutral
 4. Somewhat likely
 5. Very likely
 6. Extremely likely

3. How committed are you to your program of study?
 0. Extremely weak commitment
 1. Very weak commitment
 2. Somewhat weak commitment
 3. Neutral
 4. Somewhat strong commitment
 5. Very strong commitment
 6. Extremely strong commitment

University Program Commitment (Continued)

4. How satisfied are you with the prestige level of your program of study?

- 0. Extremely dissatisfied**
- 1. Very dissatisfied**
- 2. Somewhat dissatisfied**
- 3. Neutral**
- 4. Somewhat satisfied**
- 5. Very satisfied**
- 6. Extremely satisfied**

5. How important to you is the prestige level of your program of study?

- 0. Extremely unimportant**
- 1. Very unimportant**
- 2. Somewhat unimportant**
- 3. Neutral**
- 4. Somewhat important**
- 5. Very important**
- 6. Extremely important**

6. In general, how satisfied are you with your program of study?

- 0. Extremely dissatisfied**
- 1. Very dissatisfied**
- 2. Somewhat dissatisfied**
- 3. Neutral**
- 4. Somewhat satisfied**
- 5. Very satisfied**
- 6. Extremely satisfied**

7. How important is it for you to be satisfied with your program of study?

- 0. Extremely unimportant**
- 1. Very unimportant**
- 2. Somewhat unimportant**
- 3. Neutral**
- 4. Somewhat important**
- 5. Very important**
- 6. Extremely important**

University Program Commitment (Continued)

8. To what extent do your personal interests match or fit your program of study?

0. Extremely weak match
1. Very weak match
2. Somewhat weak match
3. Neutral
4. Somewhat strong match
5. Very strong match
6. Extremely strong match

9. To what extent does your program of study match your career interests or goals?

0. Extremely weak match
1. Very weak match
2. Somewhat weak match
3. Neutral
4. Somewhat strong match
5. Very strong match
6. Extremely strong match

Appendix B.4

Instructions and items for Psychological Well-Being

The following section asks about your attitudes toward yourself and your life. You will be asked the degree to which you agree with each statement. Each statement has six response options. Select the option which best reflects you. The options are the following:

- 0 = Strongly Disagree
- 1 = Disagree
- 2 = Slightly Disagree
- 3 = Slightly Agree
- 4 = Agree
- 5 = Strongly Agree

There are no right or wrong answers. Do not dwell on each question for too long. Give the response which first comes to your mind and darken the oval on the computer answer sheet that corresponds to the number you choose. If you cannot decide, flip a coin to make your decision. Be sure to answer every statement.

1. Sometimes I change the way I act or think to be more like those around me.
2. In general, I feel I am in charge of the situation in which I live.
3. I am not interested in activities that will expand my horizons.
4. Most people see me as loving and affectionate.
5. I feel good when I think of what I've done in the past and what I hope to do in the future.
6. When I look at the story of my life, I am pleased with how things have turned out.
7. I am not afraid to voice my opinions, even when they are in opposition to the opinions of most people.
8. The demands of everyday life often get me down.
9. In general, I feel that I continue to learn more about myself as time goes by.
10. Maintaining close relationships has been difficult and frustrating for me.
11. I live life one day at a time and don't really think about the future.
12. In general, I feel confident and positive about myself.

Psychological Well-Being (Continued)**0 = Strongly Disagree****1 = Disagree****2 = Slightly Disagree****3 = Slightly Agree****4 = Agree****5 = Strongly Agree**

13. **My decisions are not usually influenced by what everyone else is doing.**
14. **I do not fit very well with the people and the community around me.**
15. **I am the kind of person who likes to give new things a try.**
16. **I often feel lonely because I have few close friends with whom to share my concerns.**
17. **I tend to focus on the present, because the future nearly always brings me problems.**
18. **I feel like many of the people I know have gotten more out of life than I have.**
19. **I tend to worry about what other people think of me.**
20. **I am quite good at managing the many responsibilities of my daily life.**
21. **I don't want to try new ways of doing things – my life is fine the way it is.**
22. **I enjoy personal and mutual conversations with family members or friends.**
23. **I have a sense of direction and purpose in life.**
24. **Given the opportunity, there are many things about myself that I would change.**
25. **Being happy with myself is more important to me than having others approve of me.**
26. **I often feel overwhelmed by my responsibilities.**
27. **I think it is important to have new experiences that challenge how you think about yourself and the world.**
28. **It is important to me to be a good listener when close friends talk to me about their problems.**
29. **My daily activities often seem trivial and unimportant to me.**

Psychological Well-Being (Continued)

- 0 = Strongly Disagree**
- 1 = Disagree**
- 2 = Slightly Disagree**
- 3 = Slightly Agree**
- 4 = Agree**
- 5 = Strongly Agree**

- 30. I like most aspects of my personality.**
- 31. I tend to be influenced by people with strong opinions.**
- 32. If I were unhappy with my living situation, I would take effective steps to change it.**
- 33. When I think about it, I haven't really improved much as a person over the years.**
- 34. I don't have many people who want to listen when I need to talk.**
- 35. I don't have a good sense of what it is I'm trying to accomplish in life.**
- 36. I made some mistakes in the past, but I feel that all in all everything has worked out for the best.**
- 37. People rarely talk me into doing things I don't want to do.**
- 38. I generally do a good job of taking care of my personal finances and affairs.**
- 39. In my view, people of every age are able to continue growing and developing.**
- 40. I feel like I get a lot out of my friendships.**
- 41. I used to set goals for myself, but that now seems like a waste of time.**
- 42. In many ways, I feel disappointed about my achievements in life.**
- 43. It is more important to me to "fit in" with others than to stand alone on my principles.**
- 44. I find it stressful that I can't keep up with all of the things I have to do each day.**
- 45. With time, I have gained a lot of insight about life that has made me a stronger, more capable person.**
- 46. It seems to me that most other people have more friends than I do.**

Psychological Well-Being (Continued)

- 0 = Strongly Disagree
- 1 = Disagree
- 2 = Slightly Disagree
- 3 = Slightly Agree
- 4 = Agree
- 5 = Strongly Agree

- 47. I enjoy making plans for the future and working to make them a reality.
- 48. For the most part, I am proud of who I am and the life I lead.
- 49. I have confidence in my own opinions, even if they are contrary to the general consensus.
- 50. I am good at juggling my time so that I can fit everything in that needs to get done.
- 51. I have the sense that I have developed a lot as a person over time.
- 52. People would describe me as a giving person, willing to share my time with others.
- 53. I am an active person in carrying out the plans I set for myself.
- 54. I envy most people for the lives they lead.
- 55. It's difficult for me to voice my own opinions on controversial matters.
- 56. My daily life is busy, but I derive a sense of satisfaction from keeping up with everything.
- 57. I do not enjoy being in new situations that require me to change my old familiar ways of doing things.
- 58. I have not experienced many warm and trusting relationships with others.
- 59. Some people wander aimlessly through life, but I am not one of them.
- 60. My attitude about myself is probably not as positive as most people feel about themselves.
- 61. I often change my mind about decisions if my friends or family disagree.
- 62. I get frustrated when trying to plan my daily activities because I never accomplish the things I set out to do.
- 63. For me, life has been a continuous process of learning, changing and growth.

Psychological Well-Being (Continued)**0 = Strongly Disagree****1 = Disagree****2 = Slightly Disagree****3 = Slightly Agree****4 = Agree****5 = Strongly Agree**

64. I often feel like I'm on the outside looking in when it comes to friendships.
65. I sometimes feel as if I've done all there is to do in life.
66. Many days I wake up feeling discouraged about how I have lived my life.
67. I am not the kind of person who gives in to social pressures to think or act in certain ways.
68. My efforts to find the kinds of activities and relationships that I need have been quite successful.
69. I enjoy seeing how my views have changed and matured over the years.
70. I know that I can trust my friends, and they know they can trust me.
71. My aims in life have been more a source of satisfaction than frustration to me.
72. The past had its ups and downs, but in general, I wouldn't want to change it.
73. I am concerned about how other people evaluate the choices I have made in my life.
74. I have difficulty arranging my life in a way that is satisfying to me.
75. I gave up trying to make big improvements or changes in my life a long time ago.
76. I find it difficult to really open up when I talk to others.
77. I find it satisfying to think about what I have accomplished in life.
78. When I compare myself to friends and acquaintances, it makes me feel good about who I am.
79. I judge myself by what I think is important, not by the values of what others think is important.
80. I have been able to build a home and a lifestyle for myself that is much to my liking.

Psychological Well-Being (Continued)

- 0 = Strongly Disagree
 1 = Disagree
 2 = Slightly Disagree
 3 = Slightly Agree
 4 = Agree
 5 = Strongly Agree

81. There is truth to the saying you can't teach an old dog new tricks.
 82. My friends and I sympathize with each others' problems.
 83. In the final analysis, I'm not so sure that my life adds up to much.
 84. Everyone has their weaknesses, but I seem to have more than my share.

Psychological Well-Being

Subscales	Item Numbers ¹
Autonomy ²	1r, 7, 13, 19r, 25, 31r, 37, 43r, 49, 55r, 61r, 67, 73r, 79
Environmental Mastery	2, 8r, 14r, 20, 26r, 32, 38, 44r, 50, 56, 62r, 68, 74r, 80
Personal Growth	3r, 9, 15, 21r, 27, 33r, 39, 45, 51, 57r, 63, 69, 75r, 81r
Positive Relations with Others	4, 10r, 16r, 22, 28, 34r, 40, 46r, 52, 58r, 64r, 70, 76r, 82
Purpose in Life	5, 11r, 17r, 23, 29r, 35r, 41r, 47, 53, 59, 65r, 71, 77, 83r
Self-Acceptance	6, 12, 18r, 24r, 30, 36, 42r, 48, 54r, 60r, 66r, 72, 78, 84r

¹ Item numbers followed by the letter 'r' are reverse-scored

² Autonomy scale was deleted because of overlap with social problem solving orientation

APPENDIX C

Preliminary Analyses

Tables of non-significant effects

Appendix C.1

Summary statistics for all variables to be included in the path model

Variables	Mean	Standard Deviation	Kurtosis	Skewness
Years of University Experience	2.33	1.20	.10	.43
Social Problem Solving Orientation	8.25	1.65	-.13	-.48
Career-decision Making Attitudes	18.34	2.54	.02	-.55
University Program Commitment	83.88	9.04	-.03	-.26
Psychological Well-being	382.59	48.03	-.28	-.29

N=394

Appendix C.2

Social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being as a function of counterbalanced form number

a) ANOVA Summary Table

Source	Sum of Squares	Degrees of Freedom	Mean Square	F	p
Social Problem Solving Orientation	2.71 1063.39	3 390	0.90 2.73	0.33 _{ns}	0.80
Career-decision Making Attitudes	7.63 2530.47	3 390	2.54 6.49	0.39 _{ns}	0.76
University Program Commitment	532.91 141,999.24	3 390	177.64 364.10	0.49 _{ns}	0.69
Psychological Well-being	3766.68 902,928.71	3 390	1255.56 2315.20	0.54 _{ns}	0.65

N=394

ns = not significant ($p > .05$)

b) Variable means

Source	Form Number, Sample Size, and Means			
	1 (<u>n</u> =100)	2 (<u>n</u> =108)	3 (<u>n</u> =92)	4 (<u>n</u> =94)
Social Problem Solving Orientation	8.16	8.22	8.23	8.39
Career-decision Making Attitudes	18.20	18.38	18.55	18.22
University Program Commitment	84.08	83.56	85.64	82.31
Psychological Well-being	379.10	381.27	382.82	387.60

N=394

Appendix C.3

MANOVA Summary Table

Means analyses of years of university experience, social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being across sample A (n=197) and sample B (n=197)

Source	Type III Sum of Squares	Degrees of Freedom	Mean Square	F	p
Years of University Experience	.00 568.76	1 392	.00 1.45	0.00 <u>ns</u>	0.97
Social Problem Solving Orientation	0.68 1065.42	1 392	0.68 2.72	0.25 <u>ns</u>	0.62
Career-decision Making Attitudes	2.14 2535.97	1 392	2.14 6.47	0.33 <u>ns</u>	0.57
University Program Commitment	4.06 142,528.09	1 392	4.06 363.59	0.01 <u>ns</u>	0.92
Psychological Well-being	2280.98 691,150.61	1 392	2280.98 1763.14	1.29 <u>ns</u>	0.26

N=394

ns = not significant ($p > .05$)

APPENDIX D

Main Analyses

Covariance matrices for years of university experience, social problem solving orientation, career-decision-making attitudes, university program commitment and psychological well-being

Appendix D.1

Covariance matrix to be analyzed:Sample A (n=197)

Variables	Variables				
	1	2	3	4	5
1. Years of University Experience	1.48				
2. Social Problem Solving Orientation	.28	2.54			
3. Career-decision Making Attitudes	.25	1.42	5.97		
4. University Program Commitment	-1.92	9.24	10.28	302.00	
5. Psychological Well-being	4.63	45.05	46.66	303.34	1871.57

Appendix D.2

Covariance matrix to be analyzed:Sample B (n=197)

Variables	Variables				
	1	2	3	4	5
1. Years of University Experience	1.42				
2. Social Problem Solving Orientation	.18	2.90			
3. Career-decision Making Attitudes	.42	1.37	6.97		
4. University Program Commitment	-.77	12.81	12.88	425.18	
5. Psychological Well-being	3.36	47.80	35.20	375.68	1654.71