MULTILEVEL ANALYSIS OF SCHOOL CONTEXT IMPACT ON CAREER MATURITY OF SOUTH KOREAN ADOLESCENTS

by

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(Under the Direction of Jay W. Rojewski)

ABSTRACT

The importance of school context in adolescent career maturity was assessed by analyzing data from the Korean Youth Panel Survey (KYPS). Participants were 3,449 middle school juniors (boys = 1,725, girls = 1,724) from 104 schools located throughout Korea. Several forms of multilevel models were tested to examine the influence of school differences to explain student career maturity, school contextual factors that created school differences, and the moderating role of school environments on the effects of individual determinants on career maturity. Although significant school differences (τ_{00} = .19, p = .004) in student career maturity existed, the school-level variation (ICC = .013) was not large, most likely reflecting the strongly homogeneous school characteristics due to the effects of school equalization policies in Korea. School-level SES, teacher-student relationships, and the proportion of students not living with two parents significantly affected individual student career maturity as well as school average career maturity, explaining 34.3% of school-level variance. At the individual level, academic achievement and parent-adolescent relationships significantly influenced adolescents' career maturity, while SES indirectly affected career maturity through academic achievement. Students in schools with better teacher-student relationships were likely to experience steeper increases in

career maturity with increases in academic achievement, while the individual teacher-student relationship affected student career maturity more positively as school-level SES increased. The negative influences of low-level school SES by direct and moderation effects suggest that policy makers need to prepare differentiated career education programs for schools in disadvantaged areas given the widening income gap between regions and classes in Korea. The positive effects of single-parent student concentration imply that schools are mitigating the negative influences of the concentration of disadvantaged students and suggest that strengthening pre-service and in-service teacher training for career education may enhance the positive school roles further. The significant influences of academic achievement and parent-adolescent relationships raise the need for parental education to help parents guide their children to realistic and effective career choices. Future research is required to investigate school variations in career maturity at the high school level, since high school students are more stratified in terms of academic achievement, SES, and school programs.

INDEX WORDS: Career Maturity, Multilevel Analysis, School Context, Korean Adolescent, Career Development

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DEDICATION

To my parents who loved their children the most and sacrificed themselves to educate them

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CHAPTER I

INTRODUCTION

Rationale

Although its meaning and importance have changed with time, work has been an essential part of human existence throughout history. In contemporary society, individuals' successful participation in the world of work is vital to both a high quality personal life and progression of society. People choose work as a means of attaining values, such as accomplishment, self-expression, and connection to society, beyond the basic function of work for earning a livelihood (Chalofsky, 2003; Morse & Weiss, 1955; Savickas, 2005; Vondracek, 1998). The type of work people pursue plays a critical role in defining how they live and who they are by determining their socioeconomic status (SES), roles in their community, and the manner in which they participate in and contribute to the larger society (Niles & Harris-Bowlsbey, 2008; Vondracek, Ferreira, & Santos, 2010).

Given the central position of work in human life, preparation for one's vocational future in adolescence is a core developmental task for effective transition to adulthood (Super, 1980, 1990). The quickly changing world of work caused by economic globalization and the rapid technological advances of the 21st century highlights the importance of adolescents' career preparation (Karoly & Panis, 2004; Rojewski, 2002; Savickas, 2005). The increasing competition, complexity, and volatility in the labor market, represented by the restructuring of occupations, transformation of the labor force, and frequent job transitions, are making

individuals' successful participation in the work role more challenging (Cartwright & Holmes, 2006) and requiring that adolescents prepare for their future careers more thoroughly.

While the importance of adolescents' career preparation has been recognized throughout the world (Organization for Economic Co-operation and Development [OECD], 2004), adolescents in South Korea (hereafter, referred to as Korea) are not always well prepared for future careers. Recently, a survey of Korean adolescents' career development (Oh, Lee, & Yun, 2007) found that the number of occupations listed as future career goals by half of about 7,000 high school students was only 17 among 12,000 possible occupations, indicating their very limited information about the job world. In another survey (Ko, Kim, No, Byun, & Kim, 2008), 32.3% of Korean high school student participants were undecided about their future occupations because of a lack of knowledge about interests, aptitude and abilities, insufficient information about the job world, or indifference toward their future career. Further, 75.7% of these participants reported a lack of confidence in the possibility of achieving their future career goals. Thus, promoting effective career preparation of adolescents has been regarded as a serious challenge for Korean educators and policy makers (Ministry of Education, Science and Technology [MEST], 2011).

A construct central to understanding adolescents' career choice and preparation is career maturity, defined as the readiness to make career choices (Savickas, 1984, 1994). Since its introduction by Super (1955), career maturity has been extensively studied for over 50 years as a construct that represents individuals' career development status. Based on social expectations for individuals' vocational behavior, Super (1980, 1990) conceptualized career development as age-related career stages from childhood through adolescence, adulthood, and old age and developmental tasks to be mastered at each stage for a smooth transition to the next stage.

Adolescents in the *exploration* stage (ages 14 to 24) are expected to plan and prepare for their vocational future by crystallizing, specifying, and implementing career options to actualize vocational self-concepts. This perspective characterizes individuals' vocational choices as an on-going, developmental process over the life span, not a single life event. Since developmental tasks are viewed as a series of career choices, adolescents' career maturity is crucial in addressing the tasks and successful career progression.

Although there is a lack of consensus on the components of career maturity, the properties commonly identified in career maturity measures, such as the Career Maturity Inventory (CMI, Crites, 1978) and Career Development Inventory (CDI, Thompson & Lindeman, 1981), include self-knowledge, career information, career decision-making skills, integration of knowledge about self and occupations, and career planning (Coertse & Schepers, 2004; Watson, 2008).

The concept of career maturity provides important insights into career intervention strategies by attending to the process of occupational choices in addition to their content (Savickas, 1997; Super, Savickas, & Super, 1996). The trait-factor approach, which emerged as a dominant career theory in the early 20th century, aims to help individuals make appropriate vocational choices by providing information about career options compatible with their personal characteristics using standardized tests or inventories (Betz, Fitzgerald, & Hill, 1989; Savickas & Baker, 2005; Super, 1983). Although this matching model is still useful and widely used, some limitations exist in assisting individuals' career development by (a) viewing career choices as static and single point-in-time events (Betz et al., 1989; Super, 1955) and (b) overlooking the nature of ever-changing individual traits and the nature of work (Super, Osborne, Walsh, Brown, & Niles, 1992). This approach also fails to consider that interest and ability assessment may be

less effective unless individuals are sufficiently ready for educational or career planning and that the interpretation of the data may be distorted without sufficient information and knowledge about self and occupation (Super, 1983; Super et al., 1996). Thus, the developmental approach complements the trait-factor approach by taking into account career maturity as a basic requirement to utilize career inventories for adolescents' positive vocational progression (Niles, 2001; Savickas, 2001).

The viability of career maturity has been criticized on several grounds, most strongly for its assumption of normative, predictable sequences of vocational development (Savickas et al., 2009; Vondracek & Porfeli, 2008). One criticism is that career maturity does not have a universal meaning as a measure of career development because individual gaps in career maturity may be affected by systemic differences in social expectations for career behavior depending on historical and cultural contexts (Reitzle, Vondracek, & Silbereisen, 1998; Vondracek & Reitzle, 1998). However, the developmental-contextual perspective (Vondracek, Lerner, & Schulenberg, 1986), which approaches career behavior as the result of person-environment interactions, does not devalue the usefulness of comparing individuals' career maturity in a society with common cultures and norms regarding career development (Raskin, 1998; Vondracek & Reitzle, 1998). Rather, this perspective raises the need for more research to investigate contextual influences on career maturity for a deeper understanding of individuals' vocational development (Fouad, 2001; Noack, Kracke, Gniewosz, & Dietrich, 2010; Patton & Creed, 2001).

Another criticism suggests that an individual's career in the post-industrial economy grows by adapting to unexpected and traumatic challenges rather than by addressing sequential tasks (Hartung, Porfeli, & Vondracek, 2008; Niles & Harris-Bowlsbey, 2008) and, thus, career

maturity should be replaced with the concept of career adaptability, which focuses on personal resources to address unpredictable changes in work and work conditions as well as predictable tasks (Savickas, 1997). This argument is meaningful in that unpredictability and instability in career development is common in the rapidly changing world of work. However, studies regarding career adaptability (Savickas, 2002, 2005; Creed, Fallon, & Hood, 2009; Hartung et al., 2008; Hirschi, 2009; Savickas & Porfeli, 2011) do not clearly propose how the dimensions of career adaptability and related tasks in adolescence are differentiated from career maturity.

Although it is expected that career maturity gradually increases with age as a maturation process, it is a psychosocial construct whose development is differentiated among individuals by personal attributes, experiences, and environments, not a biological construct (Super, 1990; Thompson & Lindeman, 1984). Given the importance of career maturity in adolescents' career development, a multitude of studies have examined individual and family factors that influence career maturity. Despite some inconsistency in results, a majority of research has demonstrated gender differences in career maturity by reporting higher maturity for women adolescents than for men (Creed & Patton, 2003; Keller & Whiston, 2008; Rojewski, Wicklein, & Schell, 1995; Super & Nevill, 1984). Studies have also revealed positive associations between academic performance and career maturity (Healy, O'Shea, & Crook, 1985; Khan & Alvi, 1983; Lawrence & Brown, 1976; Luzzo, 1993; West, 1988) and between participation in career-related activities and career development (Fretz, 1981; Oliver & Spokane, 1988; Whiston, Brecheisen, & Stephens, 2003). A broad range of family demographic characteristics has been identified as influential in adolescents' vocational development, including socioeconomic status (SES), race/ethnicity, family structure, and quality of parent-child relationships (Schulenberg, Vondracek, & Crouter, 1984; Whiston & Keller, 2004). While family SES has been regarded as

a critical determinant of career maturity given the disadvantages of low-income students, such as a lack of career information, role models, and employment opportunities (Rojewski, 1994), only a few studies have reported significant SES influences on career maturity (Lee, 1984; McNair & Brown, 1983; Watson & Van Aarde, 1986). Studies on the determinants of adolescents' career maturity in Korea have also examined the associations of career maturity with individual and family factors. While research has generally reported higher career maturity for women adolescents (Kim & Lee, 2006; Park & Sung, 2008), the relationships between academic achievement and career maturity have not been consistent (Kim, 2008). Studies have also reported significant impacts of family SES (Choi, 2007; Kim, 2007), parent-child relationships (Ki & Lim, 2010; Park & Sung, 2008), and parents' career guidance (Kim, 2009) on career maturity.

Career theories have also emphasized the important role of other proximal and distal contexts in addition to family environments in determining individuals' vocational behavior (Gottfredson, 2005; Super, 1980; Vondracek et al., 1986). In particular, schools have been thought of as an immediate determinant of occupational careers (Super, 1980) and as an important proximal context in which adolescents' career development occurs (Vondracek et al., 1986; Young, 1983). Empirical studies have demonstrated significant effects of contextual differences in work values (Naidoo, Bowman, & Gerstein, 1998), the career choice process (Hardin, Leong, & Osipow, 2001; Leong, 1991), and educational and political systems (Fouad, 1988; Patton, Watson, & Creed, 2004; Schmitt-Rodermund & Silbereisen, 1998) on adolescent career maturity. In contrast, empirical research regarding school influences on adolescent career development is very limited. Although a few studies in Korea have investigated the impact of school factors, including curriculum track (Kim, 2008), teacher-student relationships (Kim,

2007), and career-related activities in schools (Kim, 2008; Kim, 2009; Song & Park, 2006), analyses were conducted only at the individual level and did not investigate systemic differences in students' career maturity due to school factors. However, significant influences of school environment on adolescents' development have been well established in research from various fields. An extensive body of studies has demonstrated the significant impact of school characteristics, which include school-level SES, school size, school location, concentration of single parent children, teacher-student relationships, and minority concentration, on adolescents' academic performance (Bryk & Thum, 1989; Ma & Klinger, 2000; Pong, 1998; Rumberger & Palardy, 2005a; Sirin, 2005) and psychological outcomes (Eccles, Lord, & Midgley, 1991; Goodman, Huang, Wade, & Kahn, 2003; Wickrama & Vazsonyi, 2011).

Notwithstanding the limited research on the associations between school context and adolescents' career maturity, the significant school influences on adolescents' development revealed in previous studies and the importance of schools as proximal contexts that provide adolescents with experiences leading to career preparation (Noack et al., 2010) suggest the possible school effects on students' career development. However, unlike increasing social concern about widening school inequalities in academic achievement (Byun & Kim, 2010), little attention has been paid in Korea to the possible school gaps in career development, even though facilitating adolescents' career development is an important school function. Therefore, it is critical to examine school differences in adolescents' career maturity and identify school characteristics which create the differences to effectively assist adolescents' career preparation.

Purpose Statement

Using multilevel regression analysis, this study assessed the importance of school context on the career maturity of South Korean adolescents. Specific school characteristics were also

identified that created differences in career maturity and in the effects of individual and family determinants on career maturity across schools.

Career maturity was defined as readiness for career choice (Savickas, 1994; Super, 1955, 1990) and assessed by summing six items measuring self-knowledge about career interest and aptitude, knowledge about the world of work, career decisiveness, future career concern, and independence as reported by middle school juniors in the first wave of the Korean Youth Panel Survey (KYPS, National Youth Policy Institute [NYPI], 2010).

Individual determinants included gender, academic achievement, teacher-student relationship, and participation in career-related activities. Academic achievement was measured as the percentile attained by students in a school-wide academic achievement test, and participation in career-related activities as the degree of a student's experiences in career guidance lectures, career counseling, and other activities intended to assist adolescents' career development. Teacher-student relationship was assessed by the degree of participants' positive perceptions about their relationships with teachers. Family determinants included family structure, SES, and parent-adolescent relationships. Family structure was defined by whether students were living with two parents or not, while SES was assessed using composite scores of parents' income, educational level, and occupation. Parent-adolescent relationship was measured by the degree of warmth and support that parents show for their children. School context included school-wide family structure, school-level SES, school-level teacher-student relationship, and school location. Family structure was assessed by the proportion of students living with two parents at each school. School-level SES was measured by students' mean SES per school, while school location was defined as rural area, small city, and Metropolitan city

according to geographical area. Teacher-student relationship was assessed by the school average of students' positive perceptions about their relationships with teachers.

In this study, individual and family determinants were treated as individual-level variables and school context as group-level variables.

Research Questions

1. Does students' career maturity vary across schools?
2. What proportion of the total variation in students' career maturity is explained by the school variation in career maturity?
3. Which school contextual factors make a significant contribution to the variation in students' career maturity across schools?
4. Does the association between each individual determinant and students' career maturity vary across schools?
5. Which school contextual factors moderate the association between each individual determinant and students' career maturity?

Conceptual Framework

The conceptual framework guiding this study drew from two developmental perspectives on vocational behavior, Super's (1980, 1990) life-span, life-space theory and the developmental-contextual perspective of Vondracek et al. (1986).

Super's (1990) life-span life-space theory focuses on how and why people develop their careers rather than what they choose as their occupations (Savickas, 2001) by explaining vocational behavior as a longitudinal process across the entire life course and by attending to the relative importance of the work role compared to other life roles, which varies among individuals. This theory suggests that an individual encounters a series of career choices along a

set of normative, predictable career stages over the life span–*growth* (ages 4 to 14), *exploration* (ages 14 to 24), *establishment* (ages 25 to 45), *maintenance* (ages 45 to 65), and *disengagement* (over age 65)–and performs multiple life roles, including the work role, simultaneously and throughout life. Career choices are viewed as developmental tasks that re-occur over the life span. Specific tasks must be completed at each stage for a successful transition to the next stage, not a single life event that occurs when individuals enter the job world.

The construct of career maturity was created to assess adolescents' readiness for educational and occupational decision-making as reflecting their career development status (Super, 1955). A career mature person is expected to effectively negotiate career choice tasks by actively engaging in career planning and exploration with sufficient knowledge of self and occupation and with appropriate decision-making skills (Super, 1990).

According to Super's (1980, 1990) career theory, self-concept, which is how individuals view themselves and their surrounding situations, is a critical determinant of career development in that it guides individuals' life role participation and career decision-making. Self-concept determines the degree of individuals' commitment to the work role and, thus, influences the growth of career maturity because people need to integrate work as a salient aspect of their lives for successful career choices (Nevill & Super, 1988; Super & Nevill, 1984). Career decision-making is also a life-long process to implement vocational self-concept due to continuously changing self-concepts and situations. Self-concept develops by the interactions between personal factors (e.g., needs, interests, values) and situational factors (e.g., family, community, school, society). However, this perspective takes an individual as the focal point of the interaction in that career decision-making is viewed as a process to seek occupational

environments that are congruent with personal characteristics. Thus, it is limited in attending to the impacts of social circumstances on career development (Schoon & Parsons, 2002).

While Super's (1980, 1990) theory regards individuals as the main determinant of vocational behavior, the developmental-contextual perspective (Vondracek et al., 1986) views career development as the result of dynamic interactions between developing individuals and ever-changing environments, which are mutually embedded. This theory provides a meta-theoretical framework, which guides research to address the complexities of vocational behavior, by integrating key ideas from life-span theories and contextual perspectives (Vondracek & Porfeli, 2008). The dynamic interaction between persons and environments in this theory suggests that the same personal attributes may result in different vocational progress when interacting with different contexts, just as the same contexts may affect individuals' career development differently (Lerner, 1996; Reitzle et al., 1998; Vondracek & Reitzle, 1998).

Contexts are seen as being composed of multiple levels of proximal and distal systems interconnected with each other (Vondracek et al., 1986, 2010). Proximal systems include family, school, peer group, and workplace that directly influence individuals' career behavior, while distal systems have indirect impacts mediated by more immediate contexts and contain social class, parents' workplaces, and cultural or societal norms and customs.

The whole line of reasoning about vocational behavior from a developmental-contextual perspective points to a need to delve into the influences of contextual factors and their interactions with personal factors on adolescents' career maturity (Vondracek & Reitzle, 1998). In particular, while school is recognized as a salient proximal factor exerting a significant influence on the career development in adolescence through various school activities, interpersonal relations with teachers, and its physical, structural, and material features (Young,

1983), there is a lack of research that has investigated associations between school contexts and adolescents' career maturity. The developmental-contextual perspective also raises the need to employ multilevel methods, in which each level of the context is studied with respect to its unique influence, not reduced to the individual level (Vondracek et al., 1986).

Using career development and developmental-contextual career theories, this study examined school contextual effects on Korean adolescents' career maturity over and beyond the influences of individual and family factors. Specifically, this dissertation study focused on the impacts of structural characteristics of schools, which have been identified as influential factors for adolescent academic achievement and psychological development.

Importance of Study

This research addressed the imbalance between theoretical approaches and empirical studies that exists in the literature on career development by investigating school impacts on adolescent career maturity. The consideration of environmental influences has been emphasized in vocational theories as being critical to an understanding of adolescents' career behavior (Gottfredson, 1981; Hotchkiss & Borow, 1996; Savickas, 2005; Super, 1980; Vondracek et al., 1986). However, studies of school influences on adolescents' career maturity have been rare, although school is a presumed determinant of adolescents' vocational behavior and career maturity has been intensively studied as an important indicator of career development.

Also, multilevel methods employed in this study provide insights into how to precisely capture structural differences in adolescents' career development due to contextual determinants by disentangling individual and contextual effects. The ordinary least squares (OLS) methods analyze individual and contextual factors of nested data at the same level by disaggregating higher level data into lower level or aggregating lower level data into higher level. Statistical

treatments which ignore the multilevel structure of data may provide biased estimation of both individual and contextual effects by violating independent observation assumptions or by losing information included in individual-level data (Hox, 2002; Raudenbush & Bryk, 2002; Snijders & Bosker, 2010).

In a practical sense, this study provides educators and policy makers in Korea with important implications for adolescents' career development. Recently, there has been a strong emphasis on school responsibility which requires educators to successfully prepare adolescents for transition to the world of work (MEST, 2011). On the other hand, unlike policies in academic achievement, there have not been differentiated programs or funding to correct possible school gaps in adolescents' career development. This research suggests new directions for establishing career intervention policies by providing valuable information on the structural characteristics of schools which are vulnerable in terms of students' career development.

CHAPTER II

REVIEW OF LITERATURE

This chapter is organized into three sections. In the first section, career development theories that explain career from developmental and contextual perspectives were examined. The second section discussed career maturity models in terms of definition and measurement. A review of literature investigated factors that contribute to the development of adolescents' career maturity. The final section examined the importance of context in determining adolescent career development outcomes, including career maturity, and suggested the possible association between school contexts and career maturity.

Career Development Theories

Super's Life Span Life Space Theory

While Super (Super, 1955, 1980, 1990; Super et al., 1996) employed a developmental perspective as a basic framework for his career theory, he also incorporated a variety of insights from differential and personality psychology, and sociology in order to adequately address the complexity of individuals' vocational behavior. Super's life span life space theory deals with career choice in terms of time and space, focusing on how and why people develop their careers (Herr, 1997; Savickas, 2001; Super et al., 1996). As depicted in the life-career rainbow (Super, 1980) and archway models (Super, 1990), career decision-making is an unfolding process which evolves along a continuum of career life stages. It also facilitates redesigning one's life structure, which is the combination of multiple life roles, especially at the time of transition from one career stage to the next. This whole process is viewed as an attempt to implement self-concepts

shaped through interactions between personal and situational factors (Super, 1980, 1981, 1990; Super, Starishevsky, Matlin, & Jordaan, 1963). However, Super's (1990) perspective has not been proposed as a unified theory, but "a loosely unified set of theories" (p. 199) addressing specific dimensions of career development. The following section discusses each segment of his theory, including the life span, life space, and self-concept.

Life Span. Super (1953, 1955, 1957) elaborated his life span perspective on vocational behavior based on general developmental theory and developmental tasks theory (Crites, 1961, 1973). This developmental perspective views career choice as a developmental behavior which consists of a series of *mini-decisions* and *maxi-decisions*, not as a point-in-time phenomenon (Herr, 1997; Super, 1990). This perspective assumes that an individual's career development undergoes a sequential course over the life span, similar to other dimensions of a person's development. In particular, career behavior in adolescence represents a characteristic of the general maturation process (Crites, 1965, 1976; Savickas, 1994; Super, 1955). However, the process of career development in adulthood is distinguished from other development in that vocational behavior in adulthood occurs as the process of adaptation to changing situations, rather than development, and is not differentiated in terms of chronological age (Super & Kidd, 1979; Super & Knasel, 1981).

The life course of a career is conceptualized as consisting of five major career stages loosely linked to chronological age. At each career stage, an individual encounters unique developmental tasks, which society expects those who reach the stage to complete appropriately for a smooth transition to the next stage. Tasks are composed of a series of choices that relate directly and indirectly to the world of work. It is also assumed that success in accomplishing earlier tasks predicts success in later tasks (Crites, 1989; Super, 1980, 1990; Super et al., 1996).

The first stage, *growth* (ages 4 to 14), involves the tasks of increasing future career concerns, a sense of control over one's own life, and confidence in one's capability to make decisions and to work. Adolescents during the *exploration* stage (ages 14 to 24) are required to crystallize their occupational preferences using self and occupational information, specify an occupational choice through broad exploration of the job world, and implement their career choice by gaining knowledge necessary for the occupation through further training or education or by securing a position in the specified occupation. These tasks are completed within three substages of tentative, transition, and trial. The development tasks in the *establishment* stage (ages 25 to 45) include stabilizing, consolidating, and advancing in an occupational position. People are expected to stabilize and consolidate their positions by adjusting to organizational cultures, demonstrating successful performance, and developing positive reputations in the workplace. Advancing to a position of higher pay and responsibility is sometimes achieved as the result of stabilizing and consolidating. The tasks of the *maintenance* stage (ages 45 to 65) include holding, updating, and innovating. If individuals decide to continue to stay in their current occupations, workers are required to improve their level of performance by updating and innovating knowledge and skills. The *disengagement* stage (over age 65) involves the developmental tasks of deceleration, retirement planning, and retirement living (Super et al., 1957, 1996).

Despite the flexibility in the ages of career transitions, people's career life stages are relatively homogeneous and predictable in light of the *maxi-cycle* of the five major stages. However, each individual's career development process may vary greatly in terms of the *mini-cycle*. That is, people, especially adult workers, engage differently in recycling one or more of the career stages, such as reexploration and reestablishment, during transitions or within each

stage of the maxi-cycles in search of career choices which would allow for more satisfactory self-actualization (Savickas, 1994; Super, 1990; Super et al., 1996).

Life Space. While the life span perspective addresses a longitudinal process of an individual's career, focusing on an individual's work life, the life space perspective extends the concept of career to include various social positions, roles, and occupations which people engage in throughout his or her lifetime. The sequential combination of life roles constitutes life space. From this perspective, the work role is only one among multiple life roles that an individual plays over a life span (Super, 1980, 1990; Super et al., 1996).

Super (1980) identified nine major life roles that most people assume in chronological order over the course of their life-times, including child, student, leisure, citizen, worker, spouse, homemaker, parent, and pensioner. These roles are played mainly in four contexts; home, community, school, and workplace. It is usual that each role is played in one context, but sometimes roles can occur in multiple contexts. With an increase in age, people engage in several roles simultaneously that impact each other and success in one role is assumed to facilitate success in other roles. Multiple roles may lead to life satisfaction when their interaction is supportive or complementary. However, conflicts between roles tend to overburden a person's life (Super, 1980, 1990; Super et al., 1996).

Societal expectation differentiates people's life roles, which people need to perform over the course of their lifetimes, into core and peripheral roles. However, individuals differentiate the degree of commitment to each life role, that is, *role salience*, according to its subjective meaning and importance to their lives. Thus, role salience shapes the pattern of each individual's engagement in society and work life. People endow special meaning to the roles that may function as outlets for their self-concept, including interests, abilities, and values. Role salience

is also affected by a personal assessment of social situations and structures, including employment, school, community, and family (Niles, 2001; Super, 1980, 1990).

A person's life structure experiences changes especially with transitions between stages. The core life roles change responding to changing situations along the career stages. For example, an individual is expected to focus on his or her role as a worker with the transition from exploration to establishment stage. The life structure redesign that meets social expectation is implemented by completing the developmental tasks adequately at each stage (Super, 1990; Super et al., 1996). For appropriate career transition and successful reestablishment of the life structure expected from society, work role salience is critical. Without commitment to the work role, an individual is not likely to address career choice tasks appropriately and participate in the worker role successfully (Nevill & Super, 1988; Super, 1983; Super et al., 1992). Incompletion of developmental tasks in one stage negatively affects the next career stage and failure in one role may be linked to failure in other roles. Thus, a lack of commitment to work leads to less career success and life satisfaction (Niles, 2001; Patton & Lokan, 2001; Savickas, 2001; Super, 1980; Super et al., 1996).

Self-concept. It is the construct of self-concept that occupies the central position in the life span-life space perspective of career development (Niles & Harris-Bowlsbey, 2008; Super et al., 1996). Self-concept is one's picture of oneself, which is recognized subjectively by an individual. This construct is composed of the personal meanings of abilities, interests, values, and choices and a personal assessment of changing social situations and structures. Self-concept, which is an individual' view of *self-as-subject*, evolves through the interactions between the personal and situational factors. From Super's approach, self-concept is distinguished from people's view on *self-as-objective*, which is formed by other people's evaluations and their own

assessments on themselves based on feedback from others. This concept reflects an objective idea on an individual's traits, such as interest, ability, and attitude, which can be identified by comparing himself or herself with others. (Niles & Harris-Bowlsbey, 2008; Super, 1981, 1990; Super et al., 1963, 1996).

Self-concept is a critical determinant of the content of career decision-making as it affects individuals' role salience and, in turn, characterizes their life structures. In terms of the developmental perspective on career that focuses on the work role, career choice is a process of translating occupational self-concept, which is differentiated from general self-concept, into career terms by connecting the self to situations (Super, 1990; Super et al., 1963, 1996).

Objective and subjective self-images supplement each other in the process of individuals' career-choices. They improve an individual's understanding on the situations of career decision-making. Individuals continue to search for occupations where the requirements are congruent with their objective traits and provide at the same time a better opportunity to implement subjective self-concepts. People improve their congruence through education or training with the occupations in which they can express their self-concepts effectively (Savickas, 1997; Super et al., 1996). Career choice is made as a consequence of compromise between self-concept and reality through this process (Super, 1981; Super et al., 1963).

Hence, Super's (1990) self-concept approach on career choice embraces a perspective of a matching theory (Holland, 1997), which concentrates on the fitness between people's traits and occupational requirements. At the same time, this perspective complements differential psychology by emphasizing the role of an individual's personal assessment of self and changing situations in career choice and by regarding career choice as an on-going process that is never

completed due to continuously changing self-concept and situations (Savickas, 1997; Super, 1990; Super et al., 1996).

In conclusion, the life span–life space theory has provided a comprehensive paradigm to understand the complexities of vocational behavior, approaching career as "the life course of a person encountering a series of developmental tasks and attempting to handle them in such a way as to become the kind of person he or she wants to be" (Super et al., 1996, p. 140). On the other hand, personal and situational factors indicated as critical determinants of career development are not delineated clearly and, thus, further studies are required for refinement of the theory to identify specific personal and situational determinants (Herr, 1997) and the process of interactions between them (Salomone, 1996).

Theory of Circumscription and Compromise

While Super's (1980) life-span life-space theory delineates how people create their career patterns using the constructs of developmental tasks, life roles, and self-concepts (Savickas, 2001), Gottffredson's (1981, 2002) theory of circumscription and compromise pays primary attention to the impact of gender, social prestige, and interests on the differences among individuals' career aspirations. In particular, this theory addresses the process that individuals within the same group develop different career goals by employing the nature-nurture partnership theory, which explains individual differences as a result of the mutual influences of genetics and environment (Gottfredson, 2002, 2005). The circumscription and compromise theory also shares many of the fundamental assumptions of other career theories including Holland's (1997) trait-factor theory and Super's (1990) developmental perspective in the sense that it views career choice as a developmental behavior that implements one's preferred self-concept by *circumscribing* and *compromising* between occupational alternatives.

Circumscription is a process of eliminating occupations that are not compatible with one's self-concept. It is implemented along with individuals' cognitive growth from concrete to abstract thinking. As they grow, children begin to comprehend more complex, differentiated, and abstract dimensions of self. They also develop and share a cognitive map of occupations, which distinguishes occupations along several dimensions, such as gender, prestige level, abilities, and interests. Children remove occupational options that are not acceptable by comparing their self-images, including who they would like to be in the future, with the attributes of occupations. Increases in the complexity and clarity of self-concept add new criteria to determine an occupations' compatibility. Children rule out more and more occupations as unsuitable, further narrowing the range of acceptable occupational options. The eliminated occupational alternatives are not usually reconsidered unless there are considerable stimuli from outside. The circumscription process creates social space, which is the range of acceptable occupational alternatives, although there may be some differences in individual's preferences for alternatives. Because career decision- making is the process of positioning oneself in the social order in terms of occupations, the social space represents an individual's view of how and where he or she fits into society (Gottfredson, 1981, 1996).

Circumscription is implemented along four stages associated with age (Gottfredson, 1981, 1996). Children of the same age, however, may reveal considerable differences in their mental competence. Children at the first stage (ages 3 to 5) classify people in terms of size and power. They recognize occupations as adult roles and apprehend observable differences in gender. At the next stage (ages 6 to 8), individuals shape tolerable sex boundaries in their social spaces by consolidating gender self-concepts and rejecting occupations that are not appropriate for their gender. Social class and abilities are incorporated into self-concepts in the next stage

(age 9 to 13) and children determine the lower (tolerable *level* boundary) and higher (tolerable *effort* boundary) limits of the range of their acceptable occupations. Children differentiate career options in terms of hierarchy and eliminate occupational options with excessively low prestige from their social space considering the social standing of their reference groups, including families and communities. They also reject unacceptably difficult occupations in comparison to their general abilities. In the next stage (ages 14 and above), adolescents generate more internal, unique senses of self and have a deep understanding of different fields of work. Instead of eliminating unacceptable alternatives, adolescents at this stage begin to explore occupational alternatives that appear most congruent with their vocational interests. They also consider the balance between work and other life roles. Compromise of occupational preferences is initiated at this stage as adolescents begin to progress from idealistic occupational aspirations to realistic aspirations modulated by perceived accessibility (Gottfredson, 2005).

Compromise involves adjusting their career aspiration to external realities by identifying alternatives that are less compatible but more accessible (Gottfredson, 1981, 1996). The assessment of accessibility depends on information about barriers and opportunities in implementing occupational alternatives. However, people usually are not willing to spend money or make efforts to collect information on optimal choices. They also do not want to endure uncertainty of situations. As a result, people tend to be satisfied with choices that are good enough, although not necessarily the best available (Gottfredson, 2005).

It is also common that few occupations exist that are compatible with all aspects of one's self-image within alternatives that appear accessible. When adequate options are not available, people are forced to shift to other alternatives, compromising one or more dimensions of the self-concept. The relative importance of the elements of self-concept varies with the severity of

compromise. When faced with the most threatening situations in which alternatives are unacceptable in all aspects of self-concepts, individuals choose among options that protect gender. If gender is, at least, tolerable, the prestige level of occupation is subsequently protected. When sex type and prestige levels of occupational alternatives are minimally suitable, individuals choose alternatives in fields of work that are most congruent with their interests (Gottfredson, 1996, 2002).

Similar to the perspectives of other career theories (Holland, 1997; Super, 1980), the theory of circumscription and compromise approaches career choice as a continuing process of improving the congruence between internal traits and occupational traits. However, the theory is differentiated from others in that it addresses the developmental process of self-concept by delineating when each dimension of self-concept becomes salient and how these dimensions create differences in career aspirations among people at individual and group levels. Group differences in occupational preferences are accounted for by social, public elements of self-image, such as gender role and social class, which are nurtured in the earlier stages primarily by social environments like group-based identities (Gottfredson, 1996). In contrast, unique, internal self-concepts contribute to the variations in career aspiration among individuals within groups. With age, individuals articulate personal, psychological self-concepts, such as interests, abilities, and values, through interactions of their natures and social experiences and are inclined to pursue occupational alternatives which are more suitable for their individualized images (Gottfredson, 2002, 2005).

The circumscription and compromise approach to career decision-making implies the importance of career maturity in career development, especially in the earlier periods of the life stages. For adolescents, a lack of active involvement in career information seeking behaviors

leads to inadequate self-knowledge and occupational information and, in turn, results in unnecessary elimination of occupational options, which may be more appropriate to implement their self-concepts (Gottfredson, 2005). In particular, the theory emphasizes childhood and early adolescence as critical periods for career choice in that during these periods, individuals form zones of acceptable occupational alternatives. People with mistaken beliefs about gender roles and their own abilities are apt to confine their career opportunities too narrowly or incorrectly (Gottfredson, 2002, 2005). Therefore, in order to assist individuals' career decision-making, it is crucial to advance career maturity by providing broad career-relevant experiences and information.

A Developmental-Contextual Perspective

A developmental-contextual perspective addresses individuals' career development within a framework of general human development (Vondracek et al., 1986). This perspective suggests that a deep consideration of changes in individuals and their contexts and their dynamic interactions across the life span is crucial to understanding human development, including vocational behavior. Accordingly, theoretical perspectives that assume constancy of people's traits, occupational requirements, and social environments and which do not take into account the active roles of individuals do not address vocational development appropriately (Vondracek et al., 1986, 2010; Vondracek & Porfeli, 2008; Vondracek & Reitzle, 1998).

This developmental-contextual perspective synthesizes key ideas from contextualism and organicism to supplement the shortcomings of each perspective in accounting for human development. Although the organicism, contextualism, and developmental-contextualism commonly approach human development as a consequence of the interactions of individuals and

contexts, the three models are differentiated in terms of which of the two factors makes main contributions to human development (Vondracek et al., 1986)

The focal point of the interactions in the organismic perspective lies in humans who actively respond to the environment by structuring themselves and giving meaning to their behaviors. From this approach, the end state or process of development is predetermined by the individuals' inherent nature, as shown in the concept of maturation, and the context cannot alter the quality of the process or its sequential universality. Although the context may moderate developmental progression, individual differences are mainly attributed to the individual characteristics. Thus, the organismic perspective assumes that individuals are more likely to engage in behaviors necessary for the transition to the world of work with age as a maturation process. In contrast, the contextual approach does not admit the predetermined directionality of career development. Instead, this approach assumes that the immediate contextual conditions that exist at the time determine an individual's career development (Vondracek et al., 1986; Vondracek & Reitzle, 1998).

From the developmental-contextual perspective, vocational development is a complex life-span process that is determined by developing individuals in interaction with their changing contexts. The interactions between persons and environments, which are mutually embedded, imply not only that the context makes differences in individuals' development, but also that the context itself is influenced by personal characteristics (Lerner, 1996). This perspective, thus, suggests that the same attributes of individuals or the same contextual conditions lead to individual differences in developmental trajectories depending on the characteristics of the corresponding conditions or individuals. This approach also emphasizes the impact of the timing of the interactions between persons and environments on individuals' career development

because the characteristics of individuals and contexts vary depending on the interaction timing (Lerner, 1991, 1996; Vondracek & Porfeli, 2008; Vondracek & Reitzle, 1998).

Bronfenbrenner's (1979, 1994) ecological framework allows a comprehensive examination of the contexts in which vocational behavior takes place (Vondracek et al., 1986; Young, 1983). Although the ecological perspective has some differences from the developmental-contextual view, including relative emphasis on context, the two perspectives coincide in conceptualizing human development as a consequence of the dynamic interaction between the developing individual and the ever-changing context (Vondracek et al., 1986). The interconnectedness of ecological subsystems is also equivalent to the assumption of multiple levels of context, which are mutually embedded and change interdependently across time. These assumptions suggest that examination of the impact of one subsystem or context on human behavior is meaningful only when considering its relationship to the other subsystems or contexts at other levels because the variables and processes at different levels affect each other (Lerner, 1996; Vondracek et al., 1986). According to the ecological perspective (Bronfenbrenner, 1979, 1994), the proximal and distal contextual factors that influence vocational behavior are categorized into four subsystems: microsystem, mesosystem, exosystem, and macrosystem (Vondracek et al., 1986; Young, 1983).

The microsystem has the most direct influence on the individual since it contains the developing person. The microsystem settings that seem to be appropriate to understanding the career development of children and adolescents include family, school, peer group, and workplace. The mesosystem is defined as a set of interrelations between two or more settings in which the developing personal is an active participant, such as the interrelations among the family, school, peer groups, and workplace. A most important issue related to the mesosystem is

the ecological transition, such as school to work transition, which is viewed as occurring across the entire life-span (Lerner, 1991; Reitzle et al., 1998; Vondracek et al., 1986; Young, 1983). From the developmental-contextual perspective, the timing of the transition plays a critical role in determining the developmental outcomes of the transition (Reitzle et al., 1998). The exosystem represents one or more settings that do not involve the developing individual as an active participant but in which events occur that affect human development. The exosystems that may be important to children and adolescent career development include social class, maternal employment, media, family social network, parents' workplace, and public policy (Young, 1983). The macrosystem is represented as culture, belief system, or ideology that affects individuals' vocational behavior through variables at lower level systems. The progression of careers is always under the influence of the broad social climate and belief system, as shown in the change in the status of minorities in workplace or systemic differences in people's career development across cultures (Vondracek et al., 1986; Young, 1983).

In a rapidly changing society, the developmental-contextual perspective is significant in that it emphasizes the importance of contexts in addressing the complexities of career development (Vondracek & Porfeli, 2008; Vondracek & Reitzle, 1998). This approach raises the need to use multilevel designs in career behavior research to precisely capture the influences of contexts in which individuals are embedded on vocational behavior (Lerner, 1996; Vondracek & Hartung, 2002; Vondracek et al., 1986; Vondracek & Porfeli, 2008). This perspective also emphasizes the employment of longitudinal designs to identify intra-individual changes as well as inter-individual differences in career behavior as the results of the interactions between the continuously changing persons and environments (Lerner, 1996; Vondracek & Reitzle, 1998).

The developmental-contextual approach points to the limitation in general principles of normative, sequential career development in Super's (1980) developmental perspective, such as age-related career stages and developmental tasks, by paying primary attention to the role of dynamic interactions between developing individuals and changing contexts in career development. However, the assessment of career maturity in a relatively stable, common environment is still meaningful (Vondracek & Reitzle, 1998) and the examination of the contextual variables influencing career behavior provides useful information to assist individuals' vocational development (Fouad, 2001; Noack et al., 2010; Patton & Creed, 2001).

The school context in the developmental-contextual view is conceived of as a salient microsystem exerting a significant influence on the career progression of children and adolescents through various school activities, interpersonal relations with teachers, and its physical, structural, and material features (Vondracek et al., 1986; Young, 1983). The multilevel analysis in this dissertation attempted to disentangle the unique effects of school context on adolescents' career maturity and investigated school context which make systemic differences in adolescents' career maturity by interacting with individual characteristics.

Career Construction Theory

Career construction theory has been articulated as an attempt to advance and integrate the segments of Super's (1990) career development theory by transforming its central concepts using social constructionism as a meta-theoretical framework (Savickas, 2002, 2005). This theory approaches career construction as the interpretive and interpersonal processes through which individuals impose personal meaning and direction on their occupational experiences. It also shares the perspectives of differential and developmental approaches in conceptualizing career development as a series of attempts to implement a self-concept by improving the fitness

between self and occupations. At the same time, the career construction theory takes a contextualist perspective that views career development as adaptation to changing environment, rather than maturation. This theory moves its focus from linear causality to non-linear dynamics between self and context by questioning the stability of traits and environments and their predictability for future career, which are assumed in the positivist tradition. Thus, this perspective proposes that careers do not unfold in a normative and predictable way, but rather, variability and disorder are usual in career development (Savickas, 2002, 2005; Savickas et al., 2009; Young & Collin, 2004).

The career construction theory employs vocational personality, career adaptability, and life themes as main constructs to delineate contents, process, and motivation of an individual's career behavior. Individuals construct their careers by imposing meanings on vocational behavior they choose to implement their self-concepts adapting to social, economic, and historical contexts. The process of career construction is guided by life themes associated with people's work lives (Savickas, 2002, 2005).

Vocational personality refers to an individual's career-related abilities, values, and interests. Career construction theory views the traits as socially constituted meanings that depend on time, place, and culture that support them. Further, vocational personality types are not stable objects or realities that predict the future, but dynamic processes that present possibilities in career development. Hence, vocational personality type is just one indicator to consider when individuals choose occupations and should not be prioritized as anything more than similarities, although they provide a useful approach for identifying individual differences and suitable occupational groups (Savickas, 2002, 2005).

The life theme component of career construction theory emerges from Super's postulate of career behavior as implementing a self-concept. The process of career construction is described by meaningful stories that reflect life themes patterning people's work lives and allow them to contextualize themselves in time, place, and role (Rehfuss, 2009; Savickas et al., 2009; Young & Collin, 2004). Career stories reshape individuals' past so that it supports their current goals and constructs a possible future. The stories not only make use of vocational personality traits to address developmental tasks, occupational transitions, and personal traumas but also evaluate the opportunities and barriers to adaptation. The life themes revealed in self-defining stories explain why people made particular choices and what meanings they imposed on those choices. Life themes also make individuals care about what meaning their work holds for others in that career construction is interpersonal process as well (Savickas, 2002, 2005).

Career adaptability refers to the attitudes, behaviors, and competences that individuals use when they extend their personalities into occupational roles. This construct occupies a central position in career construction theory in that it addresses how individuals construct careers. That is, by adjusting to developmental tasks, occupational transitions, and personal traumas, individuals progress toward a better fit between themselves and occupational situations to implement their self-concepts (Hartung et al., 2008; Savickas, 2002). Career construct theory suggests that the maxi-cycle of career stages with an orderly sequence of predictable tasks in Super's (1980) life span theory is not appropriate as the grand narrative to structure people's work lives in the post-industrial society because it was established to depict societal expectations for male life in a relatively stable environment. Thus, the career construction theory focuses on the mini-cycles of the career stages through which people recycle within or across the maxi-

stages and emphasizes their abilities to cope with changes that are unpredicted and complex (Savickas, 2005; Savickas et al., 2009).

While acknowledging that the effectiveness of adaptive behaviors varies depending on the situations in which individuals are nested, Savickas (2002, 2005) tried to conceptualize global dimensions of the career adaptability model, which can be applied across different contexts. According to this model, the adaptive resources to negotiate critical tasks, transitions, and traumas are categorized into four dimensions: concern (career planning), control (career decision-making), curiosity (career exploration), and confidence (problem-solving skills).

Career concern means a sense that it is important to prepare for the future. This is the most important dimension because it is a fundamental condition for career planning and exploration. Career control assumes individuals' autonomy and responsibility in their career construction. This dimension is described as decisiveness or independence. Career curiosity involves exploration of self and the world of work. Active engagement in career exploration increases knowledge about self and occupations and leads to realistic choices that match self to situations. Career confidence refers to self-efficacy in one's ability to deal with vocational choices. Without career confidence, individuals cannot cope with the challenges and overcome obstacles for successful career construction (Savickas, 2002, 2005).

Although career adaptability is a meaningful construct given that instability and uncertainty in career development is predominant in the post-industrial economy (Hartung et al., 2008; Niles & Harris-Bowlsbey, 2008; Savickas, 2005), career construction theory is not clear about how career adaptability in adolescence differs from career maturity. Despite its emphasis on mini-cycles, the theory does not clarify the differences between present and past in the career development at the exploration stage and does not specify the tasks related to career adaptability,

which are differentiated from predictable tasks of age-related career stages. It also does not clearly delineate how its proposed dimensions relate to addressing adaptation challenges, which vary depending on career stages, such as unplanned job changes, assimilating an organizational culture, and establishing good relationships with co-workers. Further, it was argued that the instruments to measure adolescent career maturity are useful in assessing career adaptability (Savickas, 2005). Also, empirical studies on career adaptability have not clearly distinguished the construct from career maturity by using the two terms interchangeably (Hartung et al., 2008) or by discussing the correlates of career adaptability citing the literature regarding those for career maturity and employing a career maturity measure to assess career adaptability (Hirschi, 2009).

Notwithstanding the confusions in the meaning of career adaptability, career construction theory provides significant implications for adolescent career development in that this perspective is comprehensive in delineating individuals' vocational behavior by embracing the what, how, and why of career construction. This theory focuses on personal construction of career and contextual influences on individuals' vocational behavior, indicating that adolescents need to lead their career lives as active agents by effectively adapting to rapidly changing environments in the current society. Thus, this perspective proposes that it is important to understand contextual factors as well as individual factors, which bring about differences in adolescents' ability to cope with current and imminent developmental tasks, to support adolescent career development effectively.

Models of Adolescents' Career Maturity

Super's Career Maturity Model

While characterizing career behavior as a developmental process over the life span, Super (1955; Super & Overstreet, 1960) was concerned with measuring the degree of adolescents' maturation for educational and occupational choices and identifying experiences which differentiate their career development. In this vein, he created the construct of career maturity to define and assess adolescents' career choice readiness as an indicator of an individual's career development. Because Super's (1980, 1990) life span perspective views developmental tasks as a series of career choices, adolescents' career maturity is critical to successful career progression.

Initially, Super (1955; Super et al., 1957; Super & Overstreet, 1960) addressed career maturity in terms of both career stage and career behavior, which were defined as Career Maturity I (CM I) and Career Maturity II (CM II), respectively. CM I is determined by comparing the actual career stage, identified by developmental tasks which an individual is encountering, with the expected stage given one's chronological age. CM II is assessed by the appropriateness of a person's behavior to deal with developmental tasks relative to other individuals engaged in the same career stage. While Super et al. (1957) maintained that this approach was reasonable because it took into account that career behavior evolves along a continuum of career life stages, Crites (1961) argued that this approach could not adequately assess career maturity because an individual who was mature in terms of career stage might not be mature in terms of behavior,

However, in his efforts to construct a measure of career maturity, Super (Savickas, 1994; Super et al., 1957) concentrated on identifying coping resources to deal with developmental tasks in terms of CM II, assuming that most people negotiate homogeneous career choice tasks typical

for their chronological age. He initially proposed five dimensions along which adolescents' career behavior evolves and on which career maturity can be measured: (a) orientation to vocational choice, (b) vocational information, (c) consistency of vocational preferences, (d) crystallization of traits, and (e) wisdom of vocational preferences (Super, 1955; Super et al., 1957).

Through the empirical tests of the Career Pattern Study (CPS), a longitudinal examination of vocational behavior of adolescents in the exploration and establishment stage (Super et al., 1957; Super & Overstreet, 1960), the dimensions were refined several times. Because most adolescents were involved in the same developmental tasks, coping skills to address developmental tasks were effectively identified and organized into a structural model of career maturity, which was made up of attitudes and knowledge that are necessary to accomplish developmental tasks (Super, 1974; Thompson & Lindeman, 1981). The attitudinal dimensions in the model contain (a) an orientation and planful attitude toward future career and (b) willingness to explore the world of work. The cognitive dimension includes (a) information regarding the world of work and occupational options, (b) knowledge of decision-making principles and practice, and (c) realistic judgment about one's self and suitable occupation (Thompson & Lindeman, 1981).

Using the dimensions demonstrated on the structural model of career maturity, Super and his colleagues (Thompson & Lindeman, 1981) also developed the Career Development Inventory (CDI) School Version (Form S) and College and University Version (Form CU) as measures of adolescent career maturity. Both the CDI Form S and CU have two parts and five subscales and consist of 120 items. Part I includes four subscales measuring attitudinal dimensions: Career Planning (CP) and Career Exploration (CE), and cognitive dimensions:

World of Work Information (WW) and Career Decision-Making (DM). Part II consists of one subscale measuring Knowledge of Preferred Occupational Group (PO), but this scale was not recommended for use because it was not significantly related to adolescent career maturity. The CDI provides three composite scores to assess career maturity as well as scores for each of the five scales: Career Development Attitude (CDA) summing the CP and CE scores, Career Development Knowledge and Skill (CDK) combining the DM and WW scales, and Career Orientation Total (COT) summing all scores of Part I.

Scores of the CDI at the secondary level were reported to have a reasonable level of internal consistency reliability. The coefficients ranged from .75 to .90 for the two attitude scales and from .53 to .87 for the three cognitive scales. The CDA and CDK were reported to have internal reliability coefficients higher than .75, and the COT coefficients were .85 and higher (Super et al., 1992). The test-retest reliability usually ranged between .60 and .80 for 5 subscales and between .70 and .90 for CDA, CDK, and COT. The factor analysis showed that the CDI has two factors consistent with the career maturity model. The concurrent validity of the CDI was examined in terms of its relationship with grade, gender, and curriculum track, academic achievement, and other career development measures. The research results generally revealed positive associations between the CDI scores and grade and reported significantly higher scores for women students. While the knowledge dimension scores were positively associated with academic ability, the attitudinal dimensions did not exhibit significant associations with it. The students in academic track also reported higher scores than those in other tracks in the cognitive dimensions but not in attitudinal dimensions (Savickas & Hartung, 1996; Thompson & Lindeman, 1984).

In relation to the criteria to examine predictive validity of career maturity measures, it was proposed that subsequent coping responses in the immediate future be used given the initial purpose of constructing career maturity to measure adolescents' readiness for pre-occupational decisions (Savickas, 1993) and the dissimilarities in developmental tasks between adolescence and adulthood (Raskin, 1998). Although a positive relationship was assumed between career maturity in earlier stages and career success later, however, few studies have reported a meaningful association between the CDI scores and success in later developmental tasks or career success (Blustein, 1997; Savickas, 1993; Savickas & Hartung, 1996).

While the CDI worked well with adolescents as the assumption of career development as a maturation process was suitable for adolescents in that they commonly engaged in exploration stage tasks, general dimensions of career maturity for adults could not be established because the assumption of the linkage between biological ages and career stages was not suitable for adults as it was for adolescents and adults varied in their career stages and developmental tasks, especially in terms of mini-cycles of career stages. Thus, the resources to address career tasks for adults were conceptualized as career adaptability, which indicates abilities to adapt to change in work and work conditions (Savickas, 1997; Super, 1983; Super & Kidd, 1979; Super & Knasel, 1981).

Crites' Career Maturity Model

Criticizing Super's (Super & Overstreet, 1960) initial approach which deals with tasks and behavior separately, Crites (1961) proposed that career development could be adequately measured by assessing the behaviors to complete developmental tasks at the career stage appropriate to chronological age. He also defined career maturity in terms of degree and rate of career development. Degree of career maturity indicates an absolute status of career development

as assessed by comparing an individual's behavior to that of the oldest within the same career stage, which function as the criterion group. Rate of career development refers to the status of an individual relative to the norm group of one's own age (Crites, 1961). However, this approach is limited to adolescents since it assumes career development as a maturation process, which means a closer link between career stages and biological ages (Crites, 1973; Savickas & Porfeli, 2011).

To formulate his perspective into a conceptual framework, Crites (1965) structured a hierarchical and multidimensional model of career maturity by reorganizing Super's (1955; Super et al., 1957) initial dimensions of career maturity in the CPS study. He incorporated developmental and differential perspectives into his model by making distinctions between career choice *content* and career choice *process* in addressing career behavior in adolescence (Crites, 1965).

The dimension of career choice content consists of consistency and realism in career choice contents. Consistency of career choices is evaluated by how consistent an individual's occupational preferences are across time points in terms of field and level. Consistency relates to career maturity because it demonstrates the degree of an individual's awareness and knowledge of his or her capabilities. Realism refers to the congruency between individuals' attributes including aptitude, interest, and personality and those required by preferred occupations. It is a critical determinant of job success and satisfaction. Realism increases with age as a result of maturation in adolescence (Crites, 1989).

Crites (1965) also identified the components of career maturity in terms of how career choices are made. Like Super's (Super, 1974; Thompson & Lindeman, 1981) model of career maturity, the career choice process consists of attitudinal and cognitive dimensions associated with coping skills to negotiate career choice tasks in adolescence. Crites (1973) hypothesized

that competencies in career decision-making indirectly affect the content of choice through attitudes toward career choice. The attitudinal dimension of career choice includes (a) decisiveness in making a career choice, (b) involvement in the choice process, (c) independence in decision-making, (d) orientation toward work, and (e) the ability to compromise between one's own needs and reality. The dimension of competencies is composed of (a) self-appraisal about one's own interests, abilities, and values, (b) occupational information, (c) goal selection which match self-knowledge to occupations, (d) planning to implement one's vocational goal, and (e) problem-solving in the face of obstacles occurring in the career choice process.

Based on his career maturity model, Crites (1978) constructed the Career Maturity Inventory (CMI) to measure the degree of career development in terms of career choice process. The CMI Attitude Scale and Competence Test measure five attitudinal and five knowledge dimensions, respectively, identified in his career maturity model. The CMI Attitude Scale is available in two forms, Counseling Form (B-1) with 75 items and Screening Form (A-2) with 50 items. The Competence Test includes 100 items. Acceptable internal consistency coefficients were reported for scores of both the Attitude Scale (.65-.84) and the five subscales of the Competence Test (.58-.90) for adolescents in grade 6 through 12. The content validity for the CMI was argued based on the fact that the items were deduced from central concepts in career development theories and selected according to empirical studies. The criterion validity of the CMI was also examined in terms of its significant correlations with grade, intelligence, and other comparable measures (Alvi & Khan, 1983; Crites, 1978; Guthrie & Herman, 1982). Despite criticisms about the presumed multidimensionality of the CMI model (Westbrook, Cutts, Madison, & Arcia, 1980), the results of hierarchical factor analysis convincingly proved its

hierarchical, multidimensional factor structure (Crites, Wallbrown, & Blaha, 1985; Wallbrown, Silling, & Crites, 1986).

In 1995, the CMI was revised to address issues raised since its publication in 1978, including long administrative time, limited applicability to postsecondary students and adults, and incompleteness in scoring options (Crites & Savickas, 1996). The CMI-Revised (CMI-R) included appropriate items for adults and reduced the item numbers of both CMI Attitude Scale and Competence Test to 25 items. The CMI-R eliminated the subscales of CMI because of low reliabilities and instead provided two overall scores for career maturity attitude and competence and their total score. The response format was also changed from multiple choice format in the competence test and true or false format in the attitude scale to an agree or disagree response format. However, the CMI-R has not been successful because it has not been used for adults and students (Savickas & Porfeli, 2011).

Criticisms on Career Maturity

The two models of career maturity assume that the construct shows a monotonous increase with age as a maturation process revealing individual differences affected by personal traits, experiences, and environments (Crites, 1965; Thompson & Lindeman, 1984). Despite a little difference between those models, they commonly suggest that career maturity evolves along the dimensions of self-knowledge, occupational information, and decision-making skills. However, the viability of career maturity in the post-industrial society has been criticized mainly for its assumption of normative, predictable sequences of career stages and developmental tasks, which were conceived in a stable society compared to the current rapidly changing world (Savickas et al., 2009; Vondracek & Porfeli, 2008).

From the developmental-contextual perspective, career maturity does not have a universal meaning as a measure of career development because the construct does not reflect that social expectations for career behavior vary depending on the historical and cultural contexts in which individuals are embedded. That is, systemic differences in career maturity may occur among groups in different contexts because the timing of career transitions and developmental tasks may vary depending on educational systems or economic situations. Thus, it is meaningless to impose values on gaps in career development among culturally different groups by interpreting those gaps as individual differences (Fouad, 1988; Reitzle et al., 1998; Vondracek & Reitzle, 1998). However, this perspective does not deny the usefulness of assessing adolescent career maturity in a society with common cultures and norms regarding vocational behavior in assisting their positive career development (Raskin, 1998; Vondracek & Reitzle, 1998).

Another criticism suggests that career maturity should be replaced with career adaptability since an individual's career progresses in the knowledge based society by adapting to changing situations rather than through an orderly and normative sequences (Hartung et al., 2008; Niles & Harris-Bowlsbey, 2005; Savickas, 2005). Initially, career adaptability was proposed as a construct to represent coping resources to address career tasks in adulthood since adaption to changes is a central process in the career development for adults in that they usually experience recycling of one or more career stages during transition or within major career stages (Super, 1990; Super & Knasel, 1981). Since then, Savickas (1997) argued for replacing career maturity with career adaptability, defining career adaptability as "the readiness to cope with the predictable tasks of preparing for and participating in the work role and with the unpredictable adjustments prompted by changes in work and working conditions" (p. 254). He maintained that the notion of adaptability better reflects the resources required to address adaptive challenges

rather than career maturity. Savickas (1997) also contended that career adaptability is useful as a broad construct to integrate the segments of Super's (1990) life-span, life-space theory because fitting self to situation, interaction with environments, and career development through childhood, adolescence, and adulthood can all be understood as an adaptation process. However, it is not still clear how the dimensions of career adaptability and the related tasks are differentiated from career maturity.

Despite the criticisms on the viability of career maturity, the rapidly changing world of work in the global economy, represented by restructuring of occupations, transformation of the labor force, and frequent job transitions, are requiring that adolescents more thoroughly prepare for their career choices for successful participation in the work role (Karoly & Panis, 2004; Rojewski, 2002; Savickas, 2002). Thus, examining proximal contextual factors which make differences in career maturity between individuals situated in the same distal context, including educational system and cultural values on vocational behavior, provide useful information to assist their effective career development (Fouad, 2001; Noack et al., 2010; Patton & Creed, 2001). Further, the dimensions of career maturity, that is, enhancing self and career awareness through continuous involvement in career planning and exploratin and improving decision-making skills, are still and more important for successful career progression in the current society (Blustein, 1997), as shown in that those dimensions have been equally emphasized in career adaptability as essential properties for career success (Savickas, 1997, 2005).

Correlates of Career Maturity

Although career maturity assumes a maturation process, it is a psychosocial construct which is affected by personal experiences and backgrounds, not a biological construct (Super, 1990; Thompson & Lindeman, 1984). Various individual and family characteristics have been

examined as important correlates of career maturity, including age, gender, race/ethnicity, socioeconomic status (SES), intellectual capacities, and participation in career related activities (Patton & Lokan, 2001; Powell & Luzzo, 1998; Thompson & Lindeman, 1981).

Career related psychological constructs, such as career decision status, career decision-making self-efficacy, self-esteem, and work-role salience, have also been investigated (Creed, Patton, & Prideaux, 2007). However, it is not clear whether it is appropriate to deal with the constructs as predictors of career maturity because they may also be part of career maturity dimensions (Super, 1983).

This section reviewed literature on the individual and family determinants of career maturity that were analyzed in this study.

Individual Determinants

Gender. Research on the impact of gender on career maturity has produced somewhat inconsistent results, although mostly supporting the association of gender with career maturity. While a majority of research has revealed that women have higher scores on career maturity than men (Busacca & Taber, 2002; Herr & Enderlein, 1976; Keller & Whiston, 2008; Omvig & Thomas, 1977; Patton & Creed, 2002), a few studies have reported higher scores for men (Achebe, 1982) or failed to find systemic differences in career maturity based on gender (King, 1989; Nevill & Super, 1988; Powell & Luzzo, 1998).

Gender differences varied depending on age groups or factors of career maturity. Patton and Creed (2001), who explored age and gender differences in career maturity for Australian high school students, reported that while women participants had lower scores than their men counterparts at age 13 years and higher scores at ages 15 and 17 years in the attitude dimension of career maturity, they were higher in the knowledge score than men across all age levels. In

another study, they also reported a significant association between gender with the knowledge dimension of career maturity favoring women, but not with attitudinal dimension (Creed & Patton, 2003). Rojewski et al. (1995) found significantly higher scores for women than men in career maturity attitudes, but not in competence, when they examined the influences of gender and academic-risk behavior on career maturity of rural adolescents using the CMI. While Super and Nevill (1984) also found significant but slightly higher scores for female high school students in cognitive subscales of the CDI, they did not find any significant gender differences for college students (Nevill & Super, 1988).

Although significant gender differences were not found on career maturity, King (1989) explained gender differences by the differences in factors affecting career maturity. For men, the significant influential factors were, in order of importance age, locus of control, family cohesion, and parental aspiration, while for women, they were family cohesion, locus of control, age, and cultural participation.

Despite gender differences revealed in prior empirical research, theoretical explanations for the gender issue are far from well-established. The gender gap in verbal ability (Super & Nevill, 1984) and academic achievement (Omvig & Thomas, 1977) have been suggested as a cause of gender differences in career maturity. Additionally, the gender gap in maturation rate and the bias of career maturity instruments in favor of women have been proposed as possible reasons for gender differences in career maturity (Omvig & Thomas, 1977).

Intelligence. Research has examined a link between career maturity and intelligence, usually conceptualized as academic achievement. Studies reported significant associations between academic performance and career maturity in college (Healy et al., 1985; Luzzo, 1993; West, 1988), high school (Khan & Alvi, 1983), and sixth grade students (Dillard, 1976).

Intelligence was also identified as a critical determinant of high school student career maturity across racial/ethnic groups (Lawrence & Brown, 1976). Significant gender differences in career maturity are sometimes attributed to the achievement gap between men and women students because of a significant association between intellectual ability and career maturity (Patton & Creed, 2001; Super & Nevill, 1984). Herr and Enderlein (1976) explained the higher career maturity for academic track students as compared to general or vocational track students in terms of intelligence influences on career maturity.

In contrast, other research found nonsignificant influences of school achievement on career maturity in Australian (Creed & Patton, 2003) and U.S. high school students (Powell & Luzzo, 1998). The studies ascribed the nonsignificant results to the elimination of intelligence bias in the Career Maturity Inventory-Revised (CMI-R) (Powell & Luzzo, 1998) and a relatively heterogeneous sample in terms of social class (Creed & Patton, 2003; Powell & Luzzo, 1998).

Participation in career-related activities. Studies on the effects of career intervention programs or activities on career development outcomes have generally demonstrated that participation in career-related activities makes a positive difference on career development (Fretz, 1981; Oliver & Spokane, 1988; Whiston et al., 2003). Oliver & Spokane (1988) reported in the meta-analysis of 58 studies from 1950 to 1982 that career development interventions positively influenced participants' career decision-making, understanding of careers, and career-related adjustment with the variance in the effects depending on the type of intervention. A meta-analysis (Whiston et al., 2003) of 57 studies published between 1975 and 2000 to compare the effectiveness of different types of career interventions found that career interventions accompanied by career counseling are more effective compared to other treatments without a

counseling component (e.g., reading occupational information) and that structured workshop or counseling is more helpful than non-structured type.

Studies have also provided evidence of the positive influences of career intervention programs on adolescent career maturity. High school students who took a career-decision making course reduced career decision-making difficulties and increased understanding of the association between the present and future to achieve long-term goals (Savickas, 1990). Middle-school students who worked with DISCOVER for a two-week period showed significant gains in career maturity compared with a control group (Luzzo & Taylor, 1995).

Additionally, studies also revealed that career intervention programs significantly enhanced the career maturity of minority students (Dunn & Veltman, 1989) and students with learning disabilities and at-risk students (Hutchinson, Freeman, Downey, & Kilbreath, 1992).

Family Determinants

Family is regarded as the most important context for adolescents' career development (Palmer & Cochran, 1988; Vondracek et al., 1986). In particular, parents were reported to exert the strongest influences on adolescents' career choices in Korea (MEST , 2012) as well as in the United States (Kotrlik & Harrison, 1989; Paa & McWhirter, 2000). Studies of family influences on career development have mainly focused on the effects of family structural features, including parents' SES and marital status, and relational factors (Schulenberg et al., 1984; Whiston & Keller, 2004).

Socioeconomic status (SES). Family's social class in career development has been emphasized as a reference in an individual's specification of career alternatives (Gottfredson, 2005) and as a critical determinant of career pattern (Super, 1990) or career attainment (Hotchkiss & Borow, 1996; Schulenberg et al., 1984). Parents' SES is also an influential factor

for adolescent career maturity since disadvantages of low-SES students, including lack of adequate occupational information, role models, and the perceived lack of employment opportunities, are thought to negatively affect career choice readiness (Rojewski, 1994). However, it seems difficult to generalize the direct association between SES and career maturity given prior research results.

While a few studies have reported SES to be a significant determinant of career maturity in sixth grade (Dillard, 1976) and high school students (Lee, 1984; McNair & Brown, 1983; Watson & Van Aarde, 1986), many studies have failed to find any significant influences of SES on career maturity in school-age adolescents (Creed & Patton, 2003; Crites, 1978; Lawrence & Brown, 1976; Super & Nevill, 1984; Trebilco, 1984) or in university students (Nevill & Super, 1988).

Some researchers suggested that the nonsignificant effects of SES on career maturity were due to the limited range of SES in the sample and recommended using extreme groups instead of the whole range of SES (Nevill & Super, 1988) or examining students across wider SES categories (Creed & Patton, 2003; Powell & Luzzo, 1998) to prove the significant associations between SES and career maturity. Although they did not find any significant association between SES and career maturity, Nevill and Super (1988) emphasized the important contribution of SES to career maturity by assuming its indirect effects mediated through an individual's work role salience, which was an immediate determinant of career maturity. Using a causal model of commitment to work, causality, SES, sex, and education level, a study (Naidoo et al., 1998) confirmed the mediating role of work role salience in the effects of SES on career maturity.

Parent-adolescent relationship. Research has also documented significant associations between adolescent vocational behavior and parental relationships from the perspectives of family systems theory, attachment to parents and parental behavior.

The family systems theory, which regards family as a unit or a system in which relational process evolves and the relational aspects have significant influences on the behaviors of individual members (Whiston, 1996), implies that adolescent career development may be directly influenced by the quality of parent–adolescent relationships (Hargrove, Inman, & Crane, 2005). Secure attachment has been identified as an important determinant of adolescent vocational behavior, including career decision-making (Blustein, Walbridge, Friedlander, & Palladino, 1991; Germeijs & Verschueren, 2009), career self-efficacy (Lease & Dahlbeck, 2009; Ryan, Solberg, & Brown, 1996), career exploration (Ketterson & Blustein, 1997; Vignoli, Croity-Belz, Chapeland, de Fillipis, & Garcia, 2005), and career planfulness (Kenny, 1990). Parenting style characterized by support and warmth as well as career-specific parental behavior has also been significantly related to career exploration (Dietrich & Kracke, 2009; Kracke, 1997, 2002).

Even though career maturity has been a most important construct which has been the subject of numerous studies related to vocational development, very little is known about the influence of parent-adolescent relationships on career maturity (Keller & Whiston, 2008; Lee & Hughey, 2001). The sole study (Keller & Whiston, 2008) available indicates positive influences of parental support and career-specific parental behavior on career maturity as well as career-decision making self-efficacy.

Family structure. As a factor conditioning family interaction, parents' marital status has also received a little attention in terms of its impact on individuals' career behavior, such as the

formation of career goals (Barber & Eccles, 1992), career decidedness (Scott & Church, 2001), and vocational identity (Johnson, Buboltz, & Nichols, 1999). While studies have assumed the negative impact of parents' divorce and single parenthood on the attainment of developmental tasks, they have failed to provide evidence of a general relationship between children's career development and family structure assessed by parents' marital status. In contrast, there is a lack of studies which examined the relationship between single parenthood and career maturity. However, it is crucial in order to promote positive career progression of adolescents with various backgrounds to examine the impact of family structure on career maturity given the critical influences of parents on adolescent's career decision-making, which is a core developmental task during adolescence.

Importance of Context in Adolescent Career Maturity

Contextual Influences on Career Development

Vocational behavior theories (Gottfredson, 1981; Hotchkiss & Borow, 1996; Savickas, 2002; Super, 1990; Vondracek & Reitzle, 1998) have emphasized the critical influences of contexts in which individuals are embedded on their career development outcomes, although there are some differences in the importance of environments relative to personal factors.

Super (1980, 1990) thought of an individuals' vocational development as a process to implement his or her occupational self-concept, which is how individuals view themselves and their surrounding situations. Self-concept is accomplished through dynamic interactions of individuals and situations and determines individuals' commitment to the work role among multiple life roles. This perspective implies that cultural values for African-Americans, which put a stronger emphasis on the roles in home and family than work roles (Naidoo et al., 1998), may explain their lower career choice readiness as compared to White Americans. The higher

values women place on relations with others may also affect vocational self-concepts and lead women to choose careers that allow for more relationships with others as compared to men (Fouad & Arbona, 1994).

Gender differences in work values and occupational sex stereotypes may also vary depending on cultures (Brown, 2002). The theory of circumscription and compromise (Gottfredson, 1981) views career choice as a developmental process to narrow career options compatible with self-concept, which is shaped by perceived gender roles, social prestige, and personal interests. This approach suggests that cultural differences in the occupational sex stereotype are likely to create variations in the gender differences of career development patterns across cultures by affecting the development of individuals' occupational self-concepts (Cook, Heppner, & O'Brien, 2005; Gottfredson, 1996).

The contextual-developmental perspective (Vondracek et al., 1986) , which views career behavior as the result of dynamic interactions between persons and environments, suggests that the same individual determinants may result in differences in career maturity depending on contexts, including family, educational system, social institutions, and cultural norms. Several studies have been conducted to examine the influences of contextual influences on career maturity. A study (Fouad, 1988) which compared adolescents' career maturity between the U.S. and Israel maintained that the compulsory military service in Israel caused Israel students to postpone career decisions and score lower in career maturity than U.S. students. Another study (Patton et al., 2004) examined the career maturity of Australian and South African high school students. This study interpreted higher attitude scores for South African students as reflecting the differences in subject choice timing and career education and the higher knowledge scores for Australian women students as differences in occupational gender stereotypes between the two

countries. The systemic differences between East German and West German adolescents in their career maturation (Schmitt-Rodermund & Silbereisen, 1998) and career transition timing (Reitzle et al., 1998; Silbereisen, Vondracek, & Berg, 1997) have also demonstrated the significant influences of the differences in educational and political system on adolescent career development. Additionally, a few studies have examined racial differences in the development of career maturity. A study (Lee, 1984) that examined the differences between races in the determinants of career maturity reported the stronger influences of parents in African American and Native American students compared to White Americans.

In addition, systemic differences in career maturity may be created by the heterogeneity in the cultural contexts for career decision-making. A qualtive research study (Fouad et al., 2008) which examined career development of Asian Americans looked for reasons of the overrepresentation of Asian Americans in some occupational fields (e.g., science, professional, and technology) in the collectivistic cultures of Asian countries for career choices. The collectivistic orientation emphasizes family responsibilities and obligations to one another. In this study, most participants indicated parental expectation as the most salient factor in deciding careers and reported that they were comfortable with making choices congruent with parental expectations rather than their own interests and values. This result is consistent with the previous study (Tang, Fouad, & Smith, 1999) that found that Asian American college students who were more acculturated to American culture were more likely to choose occupations congruent with their interests. Empirical studies (Hardin et al., 2001; Leong, 1991) also reported higher levels of interdependent decision-making styles and lower career maturity for Asian American college students as compared to European American college students. These studies raised cultural bias issues for the CMI (Crites, 1978), indicating that while individuals with low openness to parental

guidance and strong self-reliance is assessed as more career mature, those who respect parents' expectations in career choices are characterized as less career mature without taking into account cultural differences in career decision-making.

Those research findings are consistent with the developmental-contextual perspective (Vondracek & Reitzle, 1998) and indicate that career theories need to incorporate social contexts in which career behavior occurs in order to gain a deeper understanding of individuals' career behavior across cultures.

School Context and Career Maturity

In vocational behavior theories, school has been emphasized as an immediate determinant of occupational careers, which affects individuals' preferences, choices, and entry into the labor force (Super, 1980) and as a salient proximal context exerting a significant influence on adolescents' vocational behavior through various school activities, interpersonal relations with teachers, and its physical, structural, and material features (Vondracek et al., 1986; Young, 1983). Schools' structural differences, such as student demographics, size, and school curriculum, as well as individual differences in learning experiences within schools, are also thought to influence individuals' career attainment through their impacts on academic achievement (Johnson & Mortimer, 2002).

Nonetheless, research on contextual influences on career maturity has mainly focused on the impacts of distal contexts, such as educational and political systems and cultural norms or values, and empirical studies that have examined school influences are very limited. While a small body of research has investigated the associations between teacher support and adolescents' career constructs, such as career aspirations (Farmer, 1985; Marjoribanks, 1990) and career decision-making self-efficacies and career outcome expectations (Ali & McWhirter,

2006; Metheny, McWhirter, & O'Neil, 2008), little has been known about teacher influences on career maturity. Although a few studies in Korea have investigated the impacts of school factors, including curriculum track (Kim, 2008), teacher-student relationship (Kim, 2007), and career-related activities in schools (Kim, 2009; Kim, 2008; Song & Park, 2006), analyses were conducted by treating the variables only at the individual level and did not investigate systemic differences across schools in students' career maturity due to structural school differences.

However, significant influences of school contexts on adolescent development have been well documented in work of various fields (Lerner & Galambos, 1998). Numerous studies have investigated the compositional effects on adolescents' academic achievement, which has important implications for career outcomes, of school-level SES (Caldas & Bankston III, 1997; Ma & Klinger, 2000; Myers Jr, Kim, & Mandala, 2004; Rumberger & Palardy, 2005a; Sirin, 2005), concentration of single parent children (Bankston III & Caldas, 1998; Pong, 1997, 1998), and minority concentration (Hanushek, Kain, & Rivkin, 2009; Hopson & Lee, 2011; Lleras, 2008), above and beyond individual-level measures associated with them. School location, which is assessed by urbanicity (Lleras, 2008; Rumberger & Palardy, 2005b; Sirin, 2005), students' perception about their teachers (Bryk & Thum, 1989; Lee & Bryk, 1989), and students' at-risk behaviors (Bryk & Thum, 1989; Lee & Bryk, 1989) have been found to significantly influence school performance. Those school context components have also been revealed to have a significant association with adolescents' psychological development, such as depressive symptom (Goodman et al., 2003; Wickrama & Vazsonyi, 2011), motivation (Anderman & Maehr, 1994; Eccles et al., 1996), and students' delinquency (Crosnoe, Johnson, & Elder, 2004).

Thus, despite the limited research on the school influences on adolescents' career maturity, the significant school effects on adolescents' development found in previous studies

and the importance of schools as an important proximal context in which adolescents spend a great deal of time provide insights into the possible school effects on students' career maturity.

CHAPTER III

METHOD

Purpose Statement

Using multilevel regression analysis, this study assessed the importance of school context on the career maturity of South Korean adolescents. Specific school characteristics were also identified that create differences in career maturity and in the effects of individual and family determinants on career maturity across schools.

Career maturity was defined as readiness for career choice (Savickas, 1994; Super, 1955, 1990) and assessed by summing six items measuring self-knowledge about career interest and aptitude, knowledge about the world of work, career decisiveness, future career concern, and independence as reported by middle school juniors in the first wave of the Korean Youth Panel Survey (KYPS, National Youth Policy Institute [NYPI], 2010).

Individual determinants included gender, academic achievement, teacher-student relationship, and participation in career-related activities. Academic achievement was measured as the percentile attained by students in a school-wide academic achievement test, and participation in career-related activities as the degree of a student's experiences in career guidance lectures, career counseling, and other activities intended to assist adolescents' career development. Teacher-student relationship was assessed by the degree of participants' positive perceptions about their relationships with teachers. Family determinants included family structure, SES, and parent-adolescent relationships. Family structure was defined by whether students were living with two parents or not, while SES was assessed using composite scores of

parents' income, educational level, and occupation. Parent-adolescent relationship was measured by the degree of warmth and support that parents showed for their children. School context included school-wide family structure, school-level SES, school-level teacher-student relationship, and school location. Family structure was assessed by the proportion of students living with two parents at each school. School-level SES was measured by students' mean SES per school, while school location was defined as rural area, small city, and Metropolitan city according to geographical area. Teacher-student relationship was assessed by the school average of students' positive perceptions about their relationships with teachers.

In this study, individual and family determinants were treated as individual-level variables and school context as group-level variables.

Research Questions

1. Does students' career maturity vary across schools?
2. What proportion of the total variation in students' career maturity is explained by the school variation in career maturity?
3. Which school contextual factors make a significant contribution to the variation in students' career maturity across schools?
4. Does the association between each individual determinant and students' career maturity vary across schools?
5. Which school contextual factors moderate the association between each individual determinant and students' career maturity?

Research Design

A nonexperimental research design was employed to explore the unique influence of school context on students' career maturity using data from the Korean Youth Panel Survey (KYPS) (NYPI, 2010).

The KYPS research was conducted by the National Youth Policy Institute (NYPI) in South Korea from 2003 through 2008 as a government-sponsored project with the purpose of providing information about the actual conditions of Korean adolescents' attitudes and behaviors, patterns of their changes, and causes of these changes in such areas as career choice and preparation, deviance, and self-identity (NYPI, 2010). The KYPS research was processed targeting two nationally-representative samples, one from middle school juniors in 2003 and the other from 4th-year students in elementary school in 2004. Specifically, this proposed research study used the data gathered from the sample of middle school juniors in the first wave of the KYPS (hereafter, this proposal refers only to the 2003 middle school junior sample). Although the data were not collected recently, analysis of the data may give useful information about the influences of personal and environmental characteristics on adolescents' career development given the relatively stable properties of career maturity and the interactions between influential factors and career development. Further, the characteristic of the sample as a nationally-representative one increases the generalizability of the research results.

Survey questionnaires for student participants in the KYPS research examined personal characteristics such as gender, age, and school, career attitudes and behavior including career choice and career preparation, educational experiences within and outside schools, attachment to peers, teachers, and parents, working experiences, deviant experiences of the respondents and their close friends, self-identity, and experiences of leisure activities. Parents or guardians were

also investigated with regard to family structure, educational levels, income, and occupation, and expenses for their children's private education (NYPI, 2010).

Nonexperimental study differs from experimental study in that the researcher does not manipulate independent variables to examine their effects on dependent variables. This type of research is useful when it is impossible or unethical to manipulate independent variables, as is common in studies dealing with human participants (Johnson & Christensen, 2007). Nonexperimental designs have been widely used in the field of career development studies (Patton & Lokan, 2001; Powell & Luzzo, 1998; Prideaux & Creed, 2001). This study examined the impact of school contextual variables, which cannot be manipulated, on the outcome variable. Thus, nonexperimental research design was appropriate for this study.

Nonexperimental research investigates variables that have already occurred. The ambiguous precedence between independent and dependent variables poses potential threats to the internal validity of causal relationships examined in studies (Johnson & Christensen, 2007). Thus, studies using nonexperiemental designs may have some limitations in interpreting associations between independent and dependent variables as causal relationships, except those independent variables of which influences on the dependent variable are proved to be unidirectional by prior research. Additionally, it may be difficult to generalize the relationships between independent and dependent variables when there are systemic differences in characteristics among the selected sample and the target population. The possibilities of selection bias of participants were minimized by random sampling in the KYPS.

Participants

Participants of this research included 3,449 juniors (boys = 1,725, girls = 1,724) in 104 middles schools selected for inclusion in the KYPS as a sample representing the population of

618,100 students in 2,808 schools nationwide on April 1, 2003, exclusive of Jeju Island where a field survey could not be conducted.

The sampling framework for KYPS included all middle schools in Korea and sampling was conducted using a stratified multi-stage cluster sampling strategy (NYPI, 2010). The first step in sampling was to divide the country into 12 regions and the size of sample was allocated to each region in proportion to the number of middle school juniors in each of the 12 regions. Next, the size of the school sample for each region was determined by dividing the required sample size of students for each region by the average class size of the 12 regions. A random sample of schools for each region was selected using probability sampling proportional to size (PPS) that reflected the number of middle school juniors by school, schools with average class size less than 20 being removed from the sampling pool. Next, one class per selected sample school was selected using random numbers. Classes formed based on superiority or inferiority of students, as well as special classes, were excluded in order to ensure the random sampling of participants. The principle of each school was asked to participate in the survey. If a selected school refused, it was replaced with the school listed next to the school. As the final step, participants whose parents did not consent to participation of the survey were removed and the final sample was confirmed.

This dataset at the middle school level is appropriate for multilevel regression analysis, which was employed as a main statistical method in this study, in that it has a nested data structure where individuals reside within each school, a higher level unit (Raudenbush & Bryk, 2002), and has sufficient sample size both at school (N = 104) and individual (n= average 34) levels (Maas & Hox, 2005).

Measures

Large scale survey datasets (LSSDs) provide various advantages to researchers. Study results using LSSDs are more generalizable to the entire population in that samples are often nationally representative. LSSDs also include valuable information about participants' social contexts, such as participants' parents and teachers, for which an individual faces limitations in collecting. On the other hand, LSSDs have several weaknesses, including that a construct of interest may be measured by fewer and different items than traditional scales and that the items may be worded differently from original items (Diemer, 2008).

Like other LSSDs, the KYPS data also provide a variety of information about career-related attitudes and behaviors of Korean adolescents as well as personal and family characteristics, which are expected to affect adolescents' vocational behavior. Student and family characteristics were obtained from self- and parents-reports: gender, attended school, academic achievement, participation in career-related activities, and family structure. The following measures were also constructed using student and parent self-report data: career maturity, teacher-student relationship, parent-adolescent relationship, and family SES. School geographical location was identified according to regional codes.

Career Maturity

A measure of career maturity was constructed by summing six items from the KYPS database, which reflect whether participants (a) possess sufficient knowledge about their career interests and aptitudes, (b) possess sufficient information about occupations to make appropriate career choices, (c) identify preferred career options, (d) keep changing their future career goals, (e) choose future careers without conflicts with their parents, and (f) are concerned about their future career. Although the career maturity scale in the KYPS data originally included seven

items, one item which ask whether participants usually follow their parents' recommendation rather than their choices was removed in this study. Because it scored reliance on parents as immature, the item was regarded as inappropriate in assessing career maturity in that the parental involvement may be a social norm in the collectivist cultures (Hardin et al., 2001; Savickas & Porfeli, 2011), which are predominant in Korea.

Respondents rated each career maturity item using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The response option also included an "I do not know" category, which is coded as 0. The "don't know" option has a different meaning from the "neutral" or "3" response. Participants may choose "I do not know" option to avoid answering the question because participants do not have sufficient information to respond to the item or because they are reluctant to express their opinion (Krosnick & Presser, 2010). In this vein, an "I do not know" response was treated as a missing value (Acock, 2005) and replaced with alternative values estimated using the expectation-maximization (EM) algorithm. Because questions were negatively worded, scores were generated after reverse-coding. Scores ranged from 6 to 30, higher scores representing greater career maturity.

Like measures in other LSSDs, the items to assess career maturity in the KYPS research are fewer than conventional measures of career maturity, such as the Career Maturity Inventory (CMI, Crites, 1978) or Career Development Inventory (CDI, Thompson & Lindeman, 1981), because they were selected from the previously developed measures. In spite of validity issues, past validated instruments could not be used in the KYPS database due to the time and cost limitations in administrating those measures (Lee, personal communication, September 28, 2011). However, it provides evidence for content validity of the career maturity items that they reflect theoretical dimensions of career maturity models: self-knowledge, career information,

career decisiveness, independence, and career planning. In particular, the items included similar items to the items in the CMI Screening Form (Savickas & Porfeli, 2011), which was developed as a single indicator of career adaptability. The principal component analysis was conducted to examine the number of underlying factors of the career maturity scale. The results are shown in Table 1. Although there is no objective rule in determining the number of factors in the items, the relatively larger eigenvalue of and variance explained by the first component supported the unidimensionality of the factor structure in the items. Because the KYPS study did not report the internal reliability coefficient of this scale, it was calculated by the author. The internal reliability coefficient was .67 and reasonable given the small number of the items.

Table 3.1

Principal Component Analysis for Career Maturity Items

Principal component	Initial Eigenvalues	% of Variance	Cumulative %
1	2.384	39.726	39.726
2	1.095	18.245	57.971
3	.948	15.795	73.766

Further, the self-report test format in the items may reduce bias related to intelligence or reading ability, which has been indicated as a serious issue in career maturity measures (Watson, 2008). Notwithstanding the validity issues, the KYPS has made a significant contribution to facilitating research on adolescent career maturity in Korea because the KYPS was the first longitudinal survey research on adolescent career development.

Individual Level Variables

Individual determinants. Gender was coded as 0 for boy and 1 for girl students. Academic achievement was measured by the percentile attained in school-wide academic assessment tests administered in the first semester as reported by participants. The percentile

indicated a relative status of each student in academic performance to other students enrolled in the same school, and a higher percentile reflected a higher academic achievement level.

Participation in career-related activities was constructed by counting the number of positive responses to seven items of career-related activities (1 = yes; 0 = no). These items asked whether participants have participated in the following activities during the last year: (a) lectures or classes on career development, (b) small group activities on career, (c) vocational aptitude tests, (d) career counseling, (e) job experience programs, (f) vocational training, and (g) reading career-related books or magazines.

Teacher-student relationship was measured by summing three items, which asked participants whether (a) they can talk about their troubles to their teachers without reservation, (b) teachers treat them with love and affection, and (c) they want to become a person like their teachers in the future. The items were rated using a 5-point Likert scale (1= *very untrue*; 5 = *very true*). The higher scores indicated more positive perceptions of participants about their relationships with teachers. The internal reliability coefficient of this scale calculated by the author was .71.

Family determinants. Family structure was assessed according to whether participants live with two parents or not. Respondents living with two parents received a code of 0. Otherwise, respondents were assigned a code of 1.

A measure of parent-adolescent relationship was constructed by summing six items derived from the following questions: whether (a) My parents and I try to spend much time together, (b) My parents always treat me with love and affection, (c) My parents and I understand each other well, (d) My parents and I are likely to talk about everything, (e) I often tell my parents about my thoughts and what I experience outside home, and (f) My parents and I

often have conversations. The adolescents responded using a 5-point Likert scale (1= *very untrue*; 5 = *very true*). Higher scores indicated a closer relationship between parents and adolescents characterized with warmth, openness, and mutual understanding. The internal reliability coefficient of this scale was also calculated by the author and was .86.

As the KYPS study does not provide SES composite scores unlike the National Educational Longitudinal Survey of 1988 (Curtin, Ingels, Wu, Heuer, & Owings, 2002) and Educational Longitudinal Survey of 2002 (Ingels, Pratt, Rogers, Siegel, & Stutts, 2004), a measure of SES was constructed as a continuous composite variable using three items, including parents' education, parents' occupation, and family income. Parental education was assessed by the highest score from either parent. Values were assigned from 1 (no education) to 8 (doctoral degree or equivalent). Parental occupation was measured by the highest score from either parent on the occupational status index that was developed to evaluate socioeconomic status and prestige of occupations in South Korea (Yoo & Kim, 2006). Values on this index range from 0 to 100 with higher value representing higher occupational prestige. Family income was measured by the average income per month in Korean won reported by parents. Income was transformed with the natural log to adjust highly skewed data. Each variable was standardized to have a mean of zero and a standard deviation of one and regression-weighted composite score for SES index was constructed using principal component factor analysis.

School Context Variables

School family structure was measured by the proportion of students not living with two parents to whole number of students at each school. School location was identified by school region codes in the data and categorized into rural area ("Kun"), small city ("Si,") having a population of more than 50,000, and metropolitan city ("Teok-byeol-si" or "Kwangyeok-si")

having a population more than 1,000,000 (Ministry of Public Administration and Safety [MOPAS], 2011). Variables were dummy coded with the rural area set as the reference group. Teacher-student relationship at the school level was constructed by averaging individual teacher-student relationship scores for each school. School-level SES was measured by averaging students' SES at each school.

Procedure

The research activities in this study pertain to the one of the six categories which may be eligible for exemption from expedited or full review by the IRB in that this study analyzed existing data which are publicly available and that the anonymity of participants was guaranteed because KYPS participants were coded with numbers and the data set does not provide any information by which participants could be identified.

However, submitting the application for the approval was required, given that it is the institution, not the investigator that makes the determination of exemption (Hicks, 2011). An application to obtain approval for conducting this research was submitted to the Institutional Review Board (IRB) at the University of Georgia in September 07, 2012 and IRB approval was issued on October 03, 2012.

Data Analysis

Data analysis in this study followed two main steps. Preliminary analyses were conducted using the Statistical Package for the Social Science (SPSS) 19.0 to investigate descriptive statistics and to address issues related to data preparation, including missing value, normality and outliers, independent variables' location choice.

The next step was to analyze the data according to the proposed research questions. To answer the research questions, several forms of multilevel models, which are also referred to as

hierarchical linear models, contextual-effects models, random effects models, or variance component models (Hox, 1998; Teachman & Crowder, 2002), were tested using Hierarchical Linear Modeling (HLM) 6.0 software. The KYPS data have a nested structure with two levels: individual and school levels. Hence, multilevel regression analysis method was appropriate to estimate a set of random effects associated with school context variables.

Multilevel data, in which individuals are nested within groups, may violate the assumptions of independent observation for traditional ordinary least square (OLS) estimation methods in that individuals within the same group are likely to share properties. The dependence of observations reduces effective sample size and as a result increases the standard error. Thus, when hierarchical data are analyzed using OLS methods, which disaggregate higher level variables into individual level ones, the analysis is likely to underestimate standard error and lead to positively biased significance test results, that is, increased Type I errors. On the contrary, multilevel regression analysis methods provide more precise results of direct effects of all level variables and moderating effects of group level variables on the effects of individual level predictors on the outcome variable by analyzing variables from different levels at each level (Hofmann, 1997; Raudenbush & Bryk, 2002; Snijders & Bosker, 2010).

Multilevel models are generally categorized into random intercept and random slope models. While random intercept models, in which only intercept coefficients are viewed as random, examine the influences of group-level variables on the individual level outcome based on intercept differences, random slope models investigate the effects of group-level variables on variations among groups in the relationships between individual-level predictors and the outcome variable (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010).

The random intercept models include one-way ANOVA model, analysis of covariance (ANCOVA) model, and random-intercept model with predictors. The level-1, level-2, and combined equation for each model are provided in Table 3.2. The one-way ANOVA model in Table 3.2, which is also referred to as an empty model or the fully unconditional model, is the simplest form of multilevel models and provides information about the relative importance of group-level variables in determining the outcome variable by decomposing the total variance into between group variance and within group variance.

Table 3.2

Random Intercept Models

	One-way ANOVA	ANCOVA	Random intercept model with Predictors
Level-1	$Y_{ij} = \beta_{0j} + \varepsilon_{ij}$	$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij}$	$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij}$
Level-2	$\beta_{0j} = \gamma_{00} + \mu_{0j}$	$\beta_{0j} = \gamma_{00} + \mu_{0j}$ $\beta_{1j} = \gamma_{10}$	$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + \mu_{0j}$ $\beta_{1j} = \gamma_{10}$
Combined	$Y_{ij} = \gamma_{00} + \mu_{0j} + \varepsilon_{ij}$	$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \mu_{0j} + \varepsilon_{ij}$	$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \mu_{0j} + \varepsilon_{ij}$

The outcome (Y_{ij}) of the *i*th individual in the *j*th unit in this model is determined by the group mean (β_{0j}) for the unit and individual level residual (ε_{ij}). The β_{0j} is represented by a function of grand mean (γ_{00}) and group level residual (μ_{0j}). The random variable μ_{0j} indicates the main group effect, which is the deviation of β_{0j} from γ_{00}. The μ_{0j} is assumed to have a mean of zero and variance τ_{00}, representing between-group variation in the outcome variable. The ε_{ij} is assumed to have a mean of zero and variance δ^2, within group variation in the outcome, which is equal across groups. Also, the μ_{0j} and ε_{0j} are assumed to be mutually independent. The intra-class correlation (ICC), which is defined as ICC = $\tau_{00} / (\delta^2 + \tau_{00})$, indicates the proportion of group- level variance in the total variance of the individual-level outcome. If the τ_{00} is not

significantly different from zero, the group mean (β_{0j}) is the same across groups and the differences in the outcome are determined only by individual-level residual (ε_{ij}).

While the ANOVA model does not contain any individual and group factors that explain variations in the outcome, the ANCOVA model adds individual-level predictors as covariates fixed across groups. In the ANCOVA model in Table 3.2, the regression coefficient (γ_{10}) represents the impact of the individual level covariate X_{ij}, and the outcome (Y_{ij}) is determined by grand mean (γ_{00}), individual covariate (X_{ij}), group- level residual (μ_{0j}), and individual-level residual (ε_{ij}). This model's differences from ANOVA model are that the β_{0j} is the intercept adjusted for the X_{ij} and the variances of μ_{0j} and ε_{ij}, τ_{00} and δ^2, reflect the group-level and individual-level variances in the outcome variable, respectively, which are not explained by X_{ij}.

The random intercept models with predictors in Table 3.2 include group-level variables than account for the variation in the intercept. The outcome (Y_{ij}) in this model is determined by grand mean (γ_{00}), group level variable (Z_j), individual covariate (X_{ij}), group level residual (μ_{0j}), and individual level residual (ε_{ij}). The γ_{01} represents the additive effect or direct effect of the Z_j on the Y_{ij}. The μ_{0j} reflects the deviation of the average outcome in the *j*th group from the grand mean after controlling for the influences of Z_j and X_{ij}. The variance of μ_{0j}, τ_{00}, is also a conditional variance in β_{0j} after holding the effects of Z_j and X_{ij}.

Random slope models allow the level-1 slopes to vary across groups. The level-1, level-2, and combined equation for models with and without predictors are described in Table 3.3. The outcome (Y_{ij}) in the random slope model without predictors in Table 3.3 is determined by the average regression (fixed) part ($\gamma_{00} + \gamma_{10}X_{ij}$) and residual (random) part ($\mu_{0j} + \mu_{1j}X_{ij} + \varepsilon_{ij}$). The variance of μ_{1j}, τ_{11}, reflects between group variations in the effects of the individual level predictor (X_{ij}) on the outcome (Y_{ij}). Thus, significance of τ_{11} indicates that the relationships

between X_{ij} and Y_{ij} significantly vary across groups. In this model, the variance of μ_{0j} and μ_{1j}, τ_{00} and τ_{11}, are assumed to have a multivariate normal distribution, both with a mean of zero.

Table 3.3

*Random Slope Model*s

	Model without predictors	Model with predictors
Level-1	$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij}$	$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij}$
Level-2	$\beta_{0j} = \gamma_{00} + \mu_{0j}$ $\beta_{1j} = \gamma_{10} + \mu_{1j}$	$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + \mu_{0j}$ $\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + \mu_{1j}$
Combined	$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \mu_{0j} + \mu_{1j}X_{ij} + \varepsilon_{ij}$	$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \gamma_{11}Z_j X_{ij} + \mu_{0j} + \mu_{1j}X_{ij} + \varepsilon_{ij}$

The random coefficient model with predictors in Table 3.3 contains group-level characteristics that affect the influence of individual-level variable on the outcome variable. In this model, γ_{11} represents a cross-level interaction or moderation effect, which is the impact of the group-level predictor (Z_j) on the relationship between the individual variable (X_{ij}) and the outcome (Y_{ij}). That is, the significance of γ_{11} indicates that the influence of X_{ij} on the outcome variable varies across groups depending on Z_j. The variance of μ_{0j} , τ_{00}, represents between group variance in Y_{ij} which is not explained by Z_j and X_{ij}, and variance of ε_{ij}, δ^2, reflect within group variance not explained by X_{ij}. In addition, the variance of μ_{1j}, τ_{11}, reflects between group variance in the effects of X_{ij} on Y_{ij} which is not explained by Z_j.

For the first and second questions, this study analyzed the one-way ANOVA model to evaluate the significance of the variation in the average level of career maturity across schools and the importance of school context in explaining the variation in students' career maturity (Raudenbush & Bryk, 2002). Research question 3 involved the random intercept model with predictors to examine the main effects of school context variables on the variations in the school-level career maturity. The components of school context which made a significant contribution to

the variation in the career maturity across schools were identified by significance tests of each coefficient of school context variables.

For research question 4, the significance of the variation in the impact of each individual variable on career maturity were investigated by employing the random slope model without school-level predictors, which allows all level-one coefficients to randomly vary across schools. The significant variance of the error term in the slopes of individual-level variables suggested that the influences of the individual determinants on the career maturity varied across schools. The last research question investigated school context variables which influenced the variation in the effects of individual level variables on career maturity using the random slope model with school-level predictors. Any significant cross-level interaction in this model between individual-level and school context variables suggested that the association between the individual-level variable and career maturity varied depending on schools due to the function of the school context variables. That is, it indicated that the school context variables with significant interaction with individual-level variables moderated the influences of individual level variables on the outcome variable.

CHAPTER IV

ANALYSIS AND RESULTS

This chapter is organized according to the data analysis steps outlined in the previous chapter. Preliminary analyses to examine demographic characteristics, distribution, and correlation among variables were conducted for data screening and preparation. Several issues related to data preparation, including missing values, outliers, and individual variable locations, were identified and addressed. As the next step, a series of different models were analyzed using Hierarchical Linear Modeling (HLM) 6.0 software to answer the research questions, which were intended to contribute to a deeper understanding of the importance of school context in determining students' career maturity.

Data Preparation

Demographic Statistics

Demographic characteristics of student participants and their parents are displayed in Table 4.1. The participants of this study were 1,725 boy students (50%) and 1,724 girl students (50%) from 104 middle schools located throughout Korea. Most participants (n=3,120, 90.5%) were living with two parents, while 329 students (9.5%) were living with a single parent or other guardians. Of the participating schools, 50 schools (48.1%) were located in metropolitan cities, 46 schools (44.2%) in small cities, and 8 schools (7.7%) in rural areas. Most parents or guardians had a high school education (42.9% for fathers, 56.3% for mothers) or above (43.9% for fathers, 24.3% for mothers). The monthly income of 51% of families ranged between 2,000,000 and 3,990,000 Korean Won (KRW), or approximately between 1,800 and 3,600 U.S. dollars.

Table 4.1

Demographic Characteristics of Participants

Variable	Category	*N*	%
Gender	Boy	1,725	50
	Girl	1,724	50
Family structure	Two parents	3,120	90.5
	Others	329	9.5
School location	Metropolitan city	50	48.1
	Small city	46	44.2
	Rural area	8	7.7
Father's (or Guardian's) education	No education	9	.3
	Elementary school	120	3.5
	Middle school	274	7.9
	High school	1,481	42.9
	Two-year college	235	6.8
	Four-year college	1,025	29.7
	Master's degree	189	5.5
	Doctoral degree	47	1.4
Mother's (or Guardian's) education	No education	23	.7
	Elementary school	126	3.7
	Middle school	428	12.4
	High school	1,942	56.3
	Two-year college	165	4.8
	Four-year college	616	17.9
	Master's degree	52	1.5
	Doctoral degree	5	.1
Monthly income (Korean million Won)	− 1.99	714	20.7
	2.00 − 3.99	1,751	50.8
	4.00 –	274	7.9

Treating Missing Values

The proportion of missing values and incomplete cases are provided in Table 4.2. Since several individual-level variables were constructed by summing items, the percentage of missing values was reported for each item (Schlomer, Bauman, & Card, 2010). The proportion of missing

values ranged from about 3% to 13% for items, and the cumulative proportion of cases with missing values was 30.7%.

Table 4.2

Proportion of Missing Values and Missing Cases

	Missing values		Cases (Cumulative)	
Variable	*N*	%	*N*	%
Career maturity				
Self-knowledge	126	3.7	126	3.7
Career information	203	5.9	256	7.4
Career indecision	199	5.8	336	9.7
Career decisiveness	140	4.1	394	11.4
Independence	134	3.9	430	12.5
Career planning	196	5.7	503	14.6
SES				
Parents' education	36	1.0	528	15.3
Parents' occupation	70	2.0	577	16.7
Family's monthly income	208	6.0	712	20.64
Academic achievement	446	12.9	1,056	30.6
Participation in career activities	0	0	1,056	30.6
Parent-adolescent relationship				
Closeness	1	0	1,056	30.6
Respect	0	0	1,056	30.6
Mutual understanding	0	0	1,056	30.6
Openness	1	0	1,056	30.6
Communication	2	0.1	1,057	30.6
Frequency of communication	1	0	1,057	30.6
Teacher-student relationship				
Openness	0	0	1,057	30.6
Respect	1	0	1,057	30.6
Role model	3	.1	1,060	30.7
Gender	0	0	1,060	30.7
School location	0	0	1.060	30.7
Family structure	0	0	1,060	30.7

Missing values were imputed using the expectation maximization (EM) method, a two-step iterative procedure that generates estimated values for missing observations using expectation (E) and maximization (M) steps (Allison, 2001; Enders, 2001). In the E-step,

expected values are calculated based on observed data and an initial estimate of the covariance matrix. The M-step creates maximum likelihood estimates of the mean vector and the covariance matrix, which are used in the next E-step. This two-step process iterates until the values from iteration to iteration become sufficiently similar.

The EM imputation method was adopted for several reasons. First, although there is no general rule in determining whether the amount of missing data is large or small (Kline, 2010), the proportion of missing values in my data was substantial, and simple deletion of incomplete cases would likely have resulted in a severe loss of statistical power and biased parameter estimates (Croninger & Douglas, 2005; Enders, 2010; Musil, Warner, Yobas, & Jones, 2002; Roth, 1994). Also, the significant result (χ^2 = 3,034, *df* = 2,466, *p* = .000) of Little's (1988) MCAR test indicated that the missing data pattern was not *missing completely at random* (MCAR), in which missing data occurs without relation to any variable in the data set. Thus, traditional approaches to address missing data, including listwise or pairwise deletion and mean substitution, could not be employed because they require a small amount of missing data and an MCAR mechanism to ensure the validity and generalizability of research findings (Acock, 2005; Enders, 2010; Saunders et al., 2006).

Second, the most appropriate way to deal with missing values in hierarchical data under the assumption of *missing at random* (MAR) mechanism, in which a missing variable is related to other variables excluding the variable of interest, is to impute missing values using a model-based multiple imputation (MI) taking into account the multilevel data structure (Enders, 2010; Snijders & Bosker, 2010). It is not possible to test whether missing data mechanisms that do not satisfy the MCAR assumption belongs to MAR or *not missing at random* (NMAR), in which a missing variables is associated with the same variable (Allison, 2001; Enders, 2010). However, I

assumed that the missing data pattern in this data was MAR since a series of *t*-tests, which compared mean differences in the other variables between subgroups with and without missing values in career maturity items, showed significant results.

The model-based MI method, however, was not plausible for this study because it produces different sets of data depending on models. As a result, each multilevel model in this research would analyze different data sets. This method also reduces statistical power because it imputes missing values at the scale-level by regarding scale variables with even one missing value in the items that construct the scale as missing. Additionally, it is impossible to impute missing values of school-level variables that are constructed by summing individual-level variables based on the multilevel structure because those school-level variables could be created after individual-level missing values are replaced.

Lastly, the EM method produces unbiased estimates for missing values under the assumption of MCAR or MAR mechanisms (Acock, 2005; Musil et al., 2002). In particular, the EM method produces similar results to the MI method when data are generated by sufficiently large imputations using the MI method in the large sample size (Schafer, 1999).

Descriptive Statistics

Distribution. Table 4.3 provides means, standard deviations, skewness, and kurtosis for continuous individual and school-level variables. Since most variables in the KYPS data set were not coded as usable for this research, additional steps were conducted to transform the data. Those steps included adjusting for missing values, reverse coding, summing items to construct individual-level scales, and averaging individual-level variables to create school-level scales.

Table 4.3

Summary of Means, Standard Deviations, Skewness, and Kurtosis for Individual-level and School-level Variables

			Skewness		Kurtosis	
Variables	Mean	SD	Statistic	Std. error	Statistic	Std. error
Individual-level						
Career maturity	21.84	3.83	-.08	.04	-.06	.08
Academic achievement	57.61	25.79	-.25	.04	-.82	.08
Career activities	1.52	1.38	1.20	.04	1.78	.08
SES	.00	.96	.40	.04	.66	.08
Parent-student relationship	20.04	4.68	-.21	.04	-.02	.08
Teacher-student relationship	7.37	2.47	.16	.04	-.13	.08
School-level						
Career maturity	21.84	.79	.00	.24	.16	.47
Family structure	.10	.07	1.10	.24	1.73	.47
SES	.00	.43	.40	.24	.90	.47
Student-teacher relationship	7.38	.91	.11	.24	-.21	.47

The distributions of variables were checked by skewness and kurtosis statistics as well as visual inspection. The skewness and kurtosis values for career maturity scores at individual and school-levels were less than |1.0| in terms of *Z* score (statistic/std. error) and indicated normality in their dispersion (Meyers, Gamst, & Guarino, 2005). The *Z* value for each school unit was also examined and found to be less than |1.0| in all schools. Visual examination of the *Q*-*Q* plot and histogram also confirmed that the distributions were normal. Those results implied that the normal distribution assumptions at both levels in multilevel analysis (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010) would be met. The absolute values of skewness and kurtosis statistics for other independent variables were less than |2.0|, suggesting that distributions of other continuous variables could be considered normal (Johnson & Lady, 2005).

Although some cases suspected as outliers were identified according to the ±1.5 interquartile range (IQR) rule (Moore, 2010), those cases were retained, because I could not justify that they occurred due to systemic errors, such as mistakes in survey administration and

data coding, or that they were not meaningful or plausible. In addition, elimination of those cases would have led to a considerable loss of sample size and statistical power (Meyers et al., 2005; Walfish, 2006).

Bivariate correlations. The relationships among variables were examined by analyzing bivariate correlations. The results are shown in Table 4.4.

Table 4.4

Summary of Correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. CM	–													
2. Gender	.01	–												
3. SES	.07**	-.02	–											
4. AC	.09**	.06**	.33**	–										
5. CA	.01	.05**	.02	.02	–									
6. FS	.00	-.00	-.22**	-.16**	-.01	–								
7. PAR	.18**	.08**	.13**	.21**	.02	-.06**	–							
8. TSR	.07**	-.06**	.07**	.15**	.00	-.03	.25**	–						
9. SFS	.04*	-.00	-.17*	-.01	-.02	.22**	-.02	-.01	–					
10. SSES	.04*	-.03	.44**	.06**	.02	-.08**	.06**	.02	-.37**	–				
11. STSR	.04**	-.18**	.03	.02	.02	-.01	.05**	.37**	-.03	.06**	–			
12. Metro	.02	.01	.09**	.01	.00	-.03	.04*	-.03	-.14**	.21**	-.09**	–		
13. Small	-.01	-.04*	-.01	.01	-.01	.00	-.02	.00	.02	-.02	.02	-.87**	–	
14. Rural	-.02	.06**	-.16**	-.04*	.02	.05**	-.03	.05**	.24**	-.37**	.13**	-.25**	-.25**	–

Note. AC = Academic Achievement, CA = Career Activities, FS = Family Structure, PAR = Parent-Adolescent Relationship, TSR = Student-Teacher Relationship, SFS = School-level Family Structure, SSES = School-level SES, STSR= School-level Teacher-Student Relationship.
* $p < .05$, ** $p < .01$.

Career maturity was significantly associated with several individual and school variables, including academic achievement, SES, relationships with parents and teachers, school-level SES, and school-level family structure. Although the correlation analysis has limitations in identifying influential factors due to spurious effects (Simon, 1954) that indicate a false correlation between two variables caused by a third variable commonly related to the two variables and suppression (Sharpe & Roberts, 1997) effects that represent decline in the correlation by a suppressor

variable, the results imply that those variables were adequately selected as independent variables. Additionally, significant associations among independent variables posed potential problems of multicollinearity in model specification (Farrar & Glauber, 1967).

Choice of Independent Variable Metric

There are several options for choosing an independent variable metric in the multilevel analysis, including natural metric, group-mean centering, and grand-mean centering. Based on the several benefits of using group-mean centering option, I used group-mean centered variables by transforming all continuous individual-level variables to deviations from their group means.

The primary purpose of this study was to investigate school differences in Korean students' career maturity. While the intercept in the models with uncentered variables is the expected value when all independent variables are zero, which is not plausible, group-mean centering makes the intercept more meaningful and interpretable as it indicates a group mean (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010). Next, group-mean centering provides precise estimates of the associations between school characteristics and school mean career maturity by decomposing the relationships between independent variables and the dependent variable into within-and between-group components. The scaling method also takes into account the nested data structure in that it estimates individual-level relationships within each school by employing student characteristics relative to their peers in the same school as independent variables (Snijders & Bosker, 2010). Thus, the within-group relationships are interpreted as the effects of students' relative position within schools for each individual-level variables, not those of their absolute status in the total participants, on the outcome variable. The final reason to choose group-mean centering was that it improves numerical stability in estimating multilevel models by removing correlations between student and school variables and, as a result,

confounding effects, especially when research uses aggregate variables of individual variables as in this study (Kreft & de Leeuw, 1998; Raudenbush & Bryk, 2002).

It is sometimes recommended to use a centered scale for categorical variables depending on research questions (Raudenbush & Bryk, 2002). However, categorical variables were not centered in this study because group-mean centering of those variables changes their meaning from personal characteristics into school variables, which indicate the proportions of students with dummy coded characteristics.

Multilevel Model Analysis

Analysis of a One-way ANOVA model for Research Question 1 and 2

The first and second research questions were whether students' career maturity varies across schools and what proportion of the total variation in students' career maturity is explained by the school variation in career maturity, respectively. In response to this question, a one-way analysis of variance (ANOVA) model was analyzed.

The first-level equation in this model, where career maturity of the *i*th student in the *j*th school is determined by school mean (β_{0j}) and individual-level residual (ε_{ij}), was:

$$Y_{ij} = \beta_{0j} + \varepsilon_{ij} \quad (1)$$

The second-level equation, in which average career maturity in the *j*th school was represented by a function of school grand mean (γ_{00}) and school-level residual (μ_{0j}), was:

$$\beta_{0j} = \gamma_{00} + \mu_{0j} \quad (2)$$

These two equations produce a mixed model, where career maturity of the *i*th student in the *j*th school is determined by school grand mean (γ_{00}), school-level residual (μ_{0j}), and individual-level error term (ε_{ij}):

$$Y_{ij} = \gamma_{00} + \mu_{0j} + \varepsilon_{ij} \quad (3)$$

The one-way ANOVA model examined whether there were significant differences in student career maturity among schools by partitioning the total variance in student career maturity into within and between school components and by testing the significance of school-level variance. The relative importance of school characteristics in determining the outcome variable was investigated by calculating intra-class correlation (ICC) coefficients, which is the proportion of group-level variance in the total variance. The results are displayed in Table 4.5.

Table 4.5

School-level and Student-level Variance in Career Maturity

Parameter	A One-way ANOVA model			
Fixed part	Coefficient	Std. error	*t(df)*	*p*
γ_{00}	21.85	.08	283.25(103)	.000
Random part	Variance	χ^2	*df*	*p*
τ_{00}	.19	145.86	103	.004
δ^2	14.50			
Deviance	Statistic	Parameter		
REML	19,047.54	2		
ML	19,042.42	3		
AIC	19,048.42	3		
BIC	19,056.35	3		

Note. γ_{00} = grand mean, τ_{00} = variance of school-level residual (μ_{0j}), δ^2 = variance of individual-level residual (ε_{ij}), REML = Restricted Maximum Likelihood, ML = Full Maximum Likelihood, AIC = Akaike information criterion, BIC = Bayesian information criterion.

The grand mean of student career maturity was 21.84 and the school-level residual variance (τ_{00} = .19) was significant (p = .004), confirming that systemic differences in students' career maturity existed across schools. The ICC coefficient was .013 = .19 / (.19 + 14.50) and indicated that 1.3% of the total variance in student career maturity score was explained by school-level.

Although low ICC value attenuates the need to employ multilevel analysis in that the ICC measures the dependence of observations within the same group, that is, the degree of OLS assumption violation in hierarchical data, it does not imply that multilevel models should not be

used for the hierarchical data analysis. Rather, the multilevel model is a better method than OLS analysis as far as the ICC value is positive and group-level effects are significant since it provides more trustful standard errors of the estimated coefficients compared to the OLS method (Snijders & Bosker, 2010). The ICC value may also depend on the sample sizes of group-level and individual-level units in that each level variance varies by sample size, smaller group number and larger individual observation making the ICC bigger. The design effect, which was $1.42 = 1 + (33.16 - 1) \times .13$, also suggests that the OLS method would use smaller standard errors by 1/1.42 times than the actual ones, resulting in inflated Type I errors (Hox, 2002). Thus, multilevel regression analysis was employed to address subsequent research questions.

Analysis of a Random Intercept Model for Research Question 3

Research question 3 asked which school contextual factors made a significant contribution to the variation in students' career maturity across schools. This question involved the random intercept model with predictors to identify school-level variables which have main effects on school-level career maturity. As a preliminary step, an ANCOVA model without school-level predictors was analyzed to examine the influences of student characteristics on career maturity and select appropriate level-l covariates. It was also necessary to test whether the school-level variance is still significant after adding individual-level variables since level-l predictors may influence level-2 variance (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010).

The first-level equation in this model was specified as:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}) + \beta_{2j}(\text{AC}) + \beta_{3j}(\text{CA}) + \beta_{4j}(\text{SES}) + \beta_{5j}(\text{PAR}) + \beta_{6j}(\text{TSR}) + \beta_{7j}(\text{FS}) + \varepsilon_{ij} \quad (4)$$

The second-level equation was:

$$\beta_{0j} = \gamma_{00} + \mu_{0j} \quad (5\text{-a})$$

$\beta_{nj} = \gamma_{n0}$, for n = 1, 2, · · ·, 7 (5-b)

The combined equation was:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(\text{Gender}) + \gamma_{20}(\text{AC}) + \gamma_{30}(\text{CA}) + \gamma_{40}(\text{SES}) + \gamma_{50}(\text{PAR}) + \gamma_{60}(\text{TSR}) + \gamma_{70}(\text{FS}) + \mu_{0j} + \varepsilon_{ij} \quad (6)$$

The regression coefficients (γ_{20}, γ_{30}, γ_{40}, γ_{50}, γ_{60}) for the continuous variables refer to the average associations across schools between a student's relative position in each variable within schools and career maturity because the variables were group-mean centered by deducting school mean from their original values. On the other hand, the dichotomous variables (gender and family structure) were not centered. Thus, the intercept (β_{0j}) is interpreted as school mean career maturity for girl students not living with two parents. The results are displayed in Table 4.6.

Table 4.6

Fixed Effects of Individual-level Predictors on Career Maturity

Parameter	An ANCOVA Model			
Fixed part	Coefficient	Std. error	*t* (*df*)	*p*
γ_{00}	21.81	.11	204.45(103)	.000
Level-1				
Gender (γ_{10})	.02 (.04)	.14	.15 (3,341)	.88
AC (γ_{20})	.01	.00	2.22 (3,341)	.03
CA (γ_{30})	.03 (.04)	.05	.72 (3.441)	.47
SES (γ_{40})	.11 (.17*)	.08	1.42 (3.441)	.16
PAR (γ_{50})	.13 (.14**)	.01	8.93 (3,441)	.00
TSR (γ_{60})	.03 (.03)	.03	.79 (3,441)	.43
FS (γ_{70})	.22 (.18)	.22	1.00 (3,441)	.32
Random part	Variance	χ^2	*Df*	*p*
τ_{00}	.20	149.94	103	.002
δ^2	14.03			
Deviance	Statistic	Parameter		
REML	18,962.61	2		
ML	18,926.70	10		
AIC	18,946.70	10		
BIC	18.973.14	10		

Note. The regression coefficients without controlling for academic achievement are in parentheses (*$p < .05$, **$p<.01$). AC = Academic Achievement, CA = Career Activities, FS = Family Structure, PAR = Parent-Adolescent Relationship, TSR = Teacher-Student Relationship.

According to the results, only academic achievement and parent-adolescent relationship significantly influenced career maturity. As a student's academic achievement and parent-adolescent relationship increased by one unit, career maturity increased by .01unit and .13 unit, respectively, controlling for other variables. However, the positive correlation between SES and academic achievement (r = .33, p <.01, see Table 4.4) and the significant effect of SES (r = .17, p = .03) before adding academic achievement demonstrated the indirect effect of SES through academic achievement. Since the effects of gender and family structure were not significantly different from zero, the β_{0j} referred to school mean career maturity for each school regardless of student's gender and family structure. While the individual-level variance was reduced by 3.2%, the school-level variance increased slightly and was still significant justifying the employment of multilevel model analysis (Snijders & Bosker, 2010).

Model fitness was compared between the one-way ANOVA and ANCOVA models by testing differences in deviance statistics, which are equal to -2log likelihood statistics. Deviance statistics under the full maximum likelihood (FIML) show how well regression coefficients, as well as covariance estimates, fit the sample data, whereas the restricted maximum likelihood (REML) method examines the fitness of covariance estimates into the data. Deviance statistics can be used only to compare two nested models, in which two models contain the same variables and one model has at least one additional variable. Because the two models had the same covariance structure and differed in the fixed effects, the deviance statistics by the FIML were used. The significant result (χ^2 = 115.85, p = .000) showed that the ANCOVA model fit the data better than the one-way ANOVA model. Additionally, the Akaike information criterion (AIC) and Bayesian information criterion (BIC), which consider model parsimony in assessing model

fitness by penalizing increase in the parameter numbers, also indicated a better model fit of the ANCOVA model.

Despite their nonsignificant effects, SES, student-teacher relationship, and family structure were retained in the random intercept model with predictors, in addition to academic achievement and parent-adolescent relationship, to obtain more precise main effects of school-level variables and examine the differences between individual- and school-level relationships since school means of those variables were used as school-level variables.

In the random intercept model with predictors, the level-1 equation was specified as:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(AC) + \beta_{2j}(SES) + \beta_{3j}(PAR) + \beta_{4j}(TSR) + \beta_{5j}(FS) + \varepsilon_{ij} \quad (7)$$

The level-2 equation was defined as:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(SSES) + \gamma_{02}(STSR) + \gamma_{03}(SFS) + \gamma_{04}(Metro) + \gamma_{05}(Small) + \mu_{0j} \quad (8\text{-a})$$

$$\beta_{nj} = \gamma_{n0}, \text{ for } n = 1, 2, \cdots, 7. \quad (8\text{-b})$$

The two equations produced a combined equation:

$$Y_{ij} = \gamma_{00} + \gamma_{01}(SSES) + \gamma_{02}(SAC) + \gamma_{03}(STSR) + \gamma_{04}(Metro) + \gamma_{05}(Small) + \gamma_{10}(AC) + \gamma_{20}(SES) + \gamma_{30}(PAR) + \gamma_{40}(STR) + \gamma_{50}(FS) + \mu_{0j} + \varepsilon_{ij} \quad (9)$$

The regression coefficients (γ_{01}, γ_{01}, γ_{01}) for continuous variables at school-level in this model reflect their main effects on school mean career maturity after holding other variables constant, while γ_{04} and γ_{05} indicate the difference in school mean career maturity between Metro city and rural area and between small city and rural area, respectively. Because significant differences in school career maturity by school location were not found, school location variables were removed from the model (see Table 4.7).

Table 4.7

Effects of Individual-level and School-level Predictors on Career Maturity

Parameter	Random intercept model with predictors			
Fixed part	Coefficient	Std. error	*t* (*df*)	*p*
γ_{00}	20.18 (20.21)	.60	33.48 (100)	.00
Level-2				
SSES (γ_{01})	.55	.18	2.49 (100)	.02
STSR (γ_{02})	.18 (.19*)	.08	2.48 (100)	.03
SFS (γ_{03})	3.49 (2.18†)	1.23	3.02 (100)	.01
Level-1				
AC (γ_{10})	.01	.00	2.20 (3,440)	.03
SES (γ_{20})	.11 (.16*)	.08	1.37 (3,440)	.17
PAR (γ_{30})	.13 (.14**)	.02	8.96 (3,440)	.00
TSR (γ_{40})	.02 (.03)	.03	.79 (3,440)	.43
FS (γ_{50})	.15 (.10)	.23	.66 (3,440)	.51
Random part	Variance	χ^2	*df*	*p*
τ_{00}	.12	125.03	98	.03
δ^2	14.00			
Deviance	Statistic	Parameter		
REML	18,944.16	2		
ML	18,909.71	11		
AIC	18,931.71	11		
BIC	18,960.79	11		

Note. The regression coefficients without controlling for school-level SES and academic achievement are in parentheses (†p <.10, *p < .05, **p<.01). SFS = School-level Family Structure, SSES = School-level SES, STSR= School-level Teacher-Student Relationship.

The results revealed significant associations of school mean career maturity with all school-level variables, indicating that school mean career maturity increased by .55 unit with one unit increase in school-level SES, .18 unit with one unit increase in school-level teacher-student relationship, and 3.49 units with one-unit increase in school family structure, respectively, when holding other variables constant. Because of the negative correlation (r = -.37, p <.01, see Table 4.4) between school average SES and the proportion of students not living with two parents, however, the effects reduced for school SES (r = .36, p =.04) and were significant for school family structure at α = .10 (r = 2.18, p =.07) without controlling for each other, demonstrating

suppression effects between the two variables. In contrast, SES (r = .10, p = .17), teacher-student relationships (r = .03, p = .43), and family structure (r = .15, p = .51) at the individual-level were not significantly related to students' career maturity. The indirect effect of SES on career maturity through academic achievement, however, was still significant.

The nonsignificant within-group relationships and significant between-group relationships of SES, teacher-student relationship, and family structure with the outcome variable suggested contextual effects of those variables on student career maturity. They occur when the aggregation of a student's characteristics significantly influences an individual's outcome even after controlling for the individual characteristic. When the relationship between dependent and independent variables is decomposed into within- and between-group components due to the group-mean centering, the contextual effect is calculated by subtracting the within-group components from the between-group components ($\gamma_{01}-\gamma_{20}$ for school-level SES, $\gamma_{02}-\gamma_{40}$ for school-level teacher-student relationship).

However, it was necessary to run the model with uncentered variables to test the significance of the school contextual effects. The results were significant for school-level SES at α = .05 (.44, p = .03), while significant for school-level teacher-student relationship at α = .10 (.16, p = .07). School-level family structure coefficient (r = 3.49, p = .01) directly referred to the contextual effect of family structure in that individual-level family structure was not group-mean centered. Those results indicated that when students' individual characteristics, including SES, teacher-student relationship, and family structure, were the same, their career maturity score was higher by .44, .16, and 3.49 units, respectively, as school-level SES, the quality of teacher-student relationship at the school level, and the proportion of students not living with two parents increased by one unit, when controlling for other variables.

The residual variances in this model were τ_{00} = .122 for school-level and δ^2 = 14.017 for individual level. The proportion of explained variance was calculated for each level by dividing the difference in the variances between the random intercept and the ANOVA model by the total variance in the ANOVA model as group-mean centered variables were used (Raudenbush & Bryk, 2002). While about 34.3% (= .186 – .122/.186) of school-level variance was accounted for by school-level predictors, only 3.3% (=14.489 – 14.017/14.489) of individual-level variance was explained by individual-level predictors.

Because the one-way ANOVA model was nested in the random-intercept model with predictors but differed in fixed effects, the deviance test using FIML was conducted to compare model fitness between the two models, and the random intercept model with predictors showed a better model fit (= 132.72, *df* = 8, *p* = .000). Also, the AIC and BIC statistics, which could be used to compare non-nested models, indicated the random intercept model with predictors fit the data better than the ANCOVA and one-way ANOVA models. In addition, since the explained variance by individual-level predictors was small, the deviance statistic of this model was compared to the model without individual-level predictors to test the significance of the effects of the individual-level predictors. There were significant χ^2 differences (χ^2 = 114.79, *df* = 8, *p* = .000) favoring the model with individual-level predictors and confirmed the significant effects of individual-level predictors on career maturity.

Analysis of a Random Slope Model for Research Question 4 and 5

Research question 4 and 5 asked whether the association between individual determinants and career maturity varies across schools and which school factors moderate the association between each individual determinant and students' career maturity, respectively. One of the benefits of using multilevel model analysis is that it allows examining whether the influences of

individual characteristics on the dependent variable vary depending on groups and what group characteristics create the variations.

For question 4, the significance of variation in the impact of each individual variable on career maturity was investigated using the random slope model without school-level predictors, which allows level-1coefficients to vary randomly across level-2 units. Since the relationship between each individual-level variable and the dependent variable may vary across schools although the fixed effects are not significant, all individual-level variables were tested for the variation in their effects on career maturity. Results showed that the influences of parent-adolescent relationship ($\tau = .01$, $p = .000$) and teacher-student relationship ($\tau = .04$, $p = .001$) on career maturity varied across schools. The positive effects of parent-adolescent relationship and its significant slope variance indicated that the relationship influenced students' career maturity more positively in some schools and less positively in other schools. The significant slope variance and nonsignificant fixed effect of teacher-student relationship also suggested that the variable affected career maturity positively in some schools and negatively in others and that the proportion of schools with positive and negative effects were almost equivalent.

The last research question involved the random slope model with predictors to identify school context variables which moderated the effects of individual variables on career maturity.

The level-1 equation was specified as:

$$Y_{ij} = \beta_{0j} + \beta_{1j}(AC) + \beta_{2j}(SES) + \beta_{3j}(PAR) + \beta_{4j}(TSR) + \beta_{5j}(FS) + \varepsilon_{ij} \quad (10)$$

The level-2 equation was defined as:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(SSES) + \gamma_{02}(STSR) + \gamma_{03}(SFS) + \mu_{0j} \quad (11\text{-a})$$

$$\beta_{1j} = \gamma_{10} \quad (11\text{-b})$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(SSES) + \gamma_{32}(STSR) + \gamma_{33}(SFS) + \gamma_{34}(Metro) + \gamma_{35}(Small) + \mu_{1j}$$

$$\beta_{4j} = \gamma_{40} + \gamma_{41}(SSES) + \gamma_{42}(STSR) + \gamma_{43}(SFS) + \gamma_{44}(Metro) + \gamma_{45}(Small) + \mu_{2j}$$

$$\beta_{5j} = \gamma_{50}$$

The two equations produced a combined equation:

$$\begin{aligned} Y_{ij} = {} & \gamma_{00} + \gamma_{01}(SSES) + \gamma_{02}(STSR) + \gamma_{03}(SFS) + \gamma_{10}(AC) + \gamma_{20}(SES) + \gamma_{30}(PAR) + \\ & \gamma_{40}(TSR) + \gamma_{50}(FS) + \gamma_{31}(SSES)\,(PAR) + \gamma_{32}(STSR)\,(PAR) + \gamma_{33}(SFS)\,(PAR) + \\ & \gamma_{34}(Metro)\,(PAR) + \gamma_{35}(Small)(PAR) + \gamma_{41}(SSES)\,(TSR) + \gamma_{42}(STSR)\,(TSR) + \\ & \gamma_{43}(SFS)\,(TSR) + \gamma_{44}(Metro)\,(TSR) + \gamma_{45}(Small)(TSR) + \mu_{0j} + (PAR)\mu_{3j} \\ & + (STR)\mu_{4j} + \varepsilon_{ij} \end{aligned} \qquad (12)$$

Results exhibited that school-level SES significantly moderated the relationship between teacher-student relationship and career maturity (γ_{41} = .19, p = .02), explaining 10% of the slope variance (= [.042 – .038]/.042). On the other hand, school factors that differentiated the effects of adolescent-student relationship on career maturity were not identified. As represented by (γ_{03} + γ_{41}[SSES]) (TSR), when school-level SES was higher by one unit, a student was likely to show steeper increase in career maturity by .19 unit with one unit increase in student's relative status in teacher-student relationship within schools. The moderation effect is displayed in Figure 4.1.

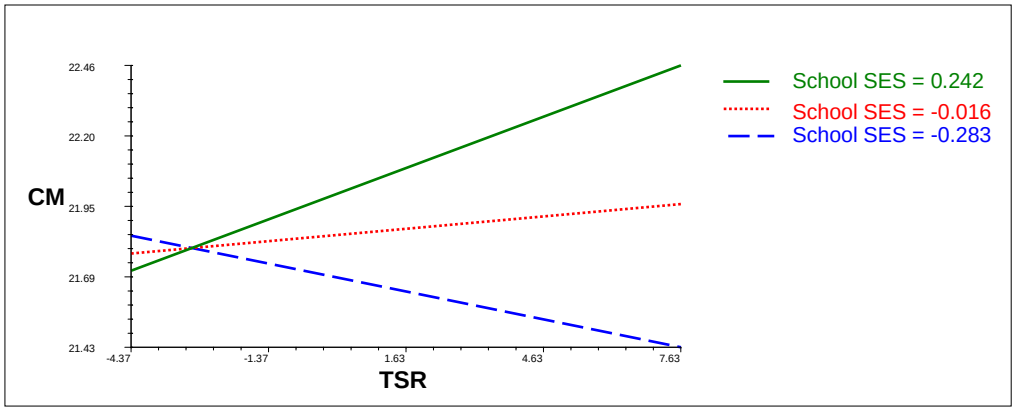

Figure 4.1. *Moderation effect of school-level SES for the influences of teacher-student relationships on career maturity*.

Additionally, it seems logical that there should not be moderation effects of group-level variables when there is no significant variance in a slope for an individual-level variable. However, literature (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010) recommends examining cross-level interaction effects even when significant slope variances do not exist because the power of the random slope test is not always larger than the interaction effect test. Thus, cross-level interaction effects were examined for all individual-level variables. The result revealed a significant cross-level interaction effect ($\gamma = .01$, $p = .02$) between school-level teacher-student relationship and academic achievement on career maturity. This suggesed that students attending schools with higher school-level teacher-student relationship tended to report more positive increase in career maturity with the increase in their relative position in academic achievement within schools. The moderation effect is displayed in Figure 4.2.

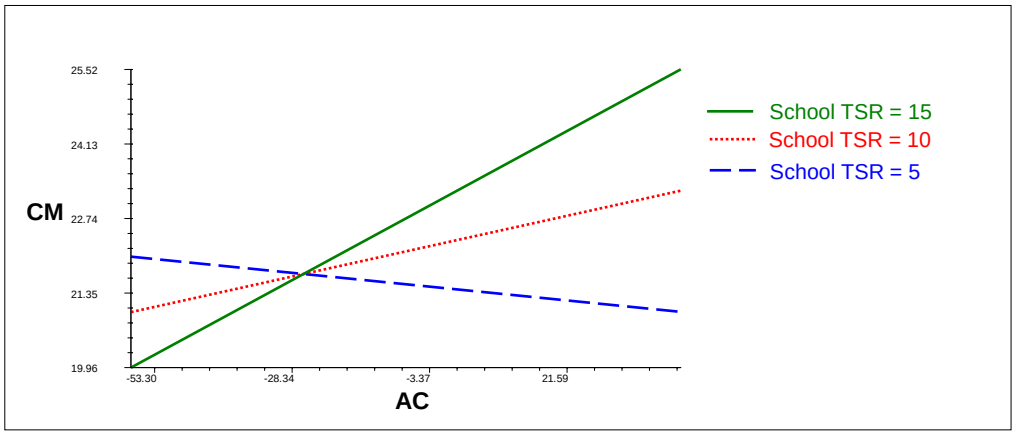

Figure 4.2. *Moderation effect of school-level teacher-student relationship for the influences of academic achievement on career maturity*.

Results for the random-slope model with predictors, in which nonsignificant random slopes were constrained to be zeros, are provided in Table 4.8. The model fitness of the random slope model with predictors was compared to the random intercept model with predictors using ML deviance statistics and showed that the random slope model with predictors fit the data better

than the random intercept model with predictors (χ^2 = 34.71, *df* = 7, *p* = .00). Also, the smaller AIC and BIC values confirmed that this model was better than the random-intercept model with predictors in explaing the associations between variables, even when taking into account model parsimony.

Table 4.8

Cross-level Interaction Effects between Individual-level and School-level Predictors

Parameter	Random slope model with predictors			
Fixed part	Coefficient	Std. error	*t* (*df*)	*P*
γ_{00}	20.20	.60	33.80 (100)	.000
Level-2				
SSES (γ_{01})	.56	.18	3.06 (100)	.00
STSR (γ_{02})	.17	.08	2.20 (100)	.03
SFS (γ_{03})	3.63	1.22	2.97 (100)	.00
Level-1				
AC (γ_{10})	– .04	.02	– 2.07 (3,438)	.04
SES (γ_{20})	.10	.08	1.38 (3,438)	.19
PAR (γ_{30})	.13	.02	7.09 (103)	.00
TSR (γ_{40})	.02	.04	.54 (102)	.61
FS (γ_{50})	.16	.23	.64 (3,438)	.50
STSR × AC (γ_{11})	.01	.06	2.36 (3,438)	.02
SSES × TSR (γ_{41})	.19	.08	2.40(102)	.02
Random part	Variance	χ^2	*Df*	*p*
τ_{00}	.13	131.50	100	.02
τ_{33}	.01	166.95	102	.00
τ_{44}	.04	148.93	103	.00
δ^2	13.52			
Deviance	Statistic	Parameter		
REML	18,921.90	7		
ML	18,875.00	18		
AIC	18.911.00	18		
BIC	18,958.60	18		

Note. τ_{33} = slope residual variance for parent-adolescent relationship, τ_{44} = slope residual variance for teacher-student relationship

In summary, while there were significant differences in students' career maturity across schools, the variation was not large. School-level SES, teacher-student relationship, and the proportion of students not living with two parents significantly predicted the school mean career

maturity, explaing 34.3% of the school-level variance. In particular, significant contextual effects of the school variables were revealed. Finally, students in schools with higher teacher-student relationship were likely to experience steeper increases in career maturity with increases in their academic achievement. The individual teacher-student relationship affected student career maturity more positively as school-level SES increased. All models are compared in Table 4.9.

Table 4.9

Multilevel Analysis for the Impacts of School Context on Student Career Maturity

Parameter	Model 1	Model 2	Model 3	Model 4
Fixed part				
γ_{00}	21.85***(.11)	21.81***(.60)	20.18***(.60)	20.20***(.60)
Level-2				
SSES (γ_{01})			.55*(.18)	.56**(.18)
STSR (γ_{02})			.18*(.08)	.17*(.08)
SFS (γ_{03})			3.49**(.23)	3.63**(1.22)
Level-1				
Gender (γ_{10})		.02(.14)		
AC (γ_{20})		.01*(.00)	.01*(.00)	-.04*(.02)
CA (γ_{30})		.03(.05)		
SES (γ_{40})		.11(.08)	.11(.08)	.10(.08)
PAR (γ_{50})		.13***(.01)	.13***(.02)	.13***(.02)
TSR (γ_{60})		.03(.03)	.02(.03)	.02(.04)
FS (γ_{70})		.22(.22)	.15(.23)	.16(.23)
STSR × AC (γ_{21})				.01*(.06)
SSES × TSR (γ_{61})				.19*(.08)
Random part				
τ_{00}	.19**	.20**	.12**	.13*
τ_{55}				.01***
τ_{66}				.04**
δ^2	14.50	14.03	14.01	13.52
Deviance				
REML	19,047.54	18,962.61	18,944.16	18,921.90
ML	19,042.42	18,926.70	18,909.71	18,875.00
AIC	19,048.42	18,946.70	18,931.71	18,911.00
BIC	19,056.35	18.973.14	18,960.79	18,958.60

Note. Std. errors for regression coefficients are in parentheses. Model 1= One-way ANOVA model, Model 2 = ANCOVA model, Model 3 = Random intercept model with predictors, Model 4 = random slope model with predictors.

***p <.001, **p <.01, *p <.05

CHAPTER V

SUMMARY AND DISCUSSION

This chapter summarizes Chapters 1-4 of this research study in the first section. Next, findings are discussed in terms of understanding Korean adolescents' career development and the theoretical and practical implications for researchers and educators. Limitations of this study and recommendations for future research are also discussed.

Summary

Introduction

Successful participation in the world of work is vital to quality of personal life and the progress of society. The type of work people choose defines who they are and how they live in that it determines socioeconomic status, roles in the community, and the manner of being connected to the larger society (Niles & Harris-Bowlsbey, 2008; Vondracek et al., 2010). Thus, preparation for a future career is a core developmental task during adolescence required for effective transition to adulthood (Super, 1980, 1990). The restructuring of occupations, transformation of the labor force, and frequent job transitions in a global economy are making individuals' successful participation in the work role more challenging and highlight the importance of adolescents' career preparation (Cartwright & Holmes, 2006; Rojewski, 2002; Savickas, 2005).

Recent survey studies (Ko et al., 2008; Oh et al., 2007) have indicated that Korean adolescents are not always well prepared for future careers by revealing their limited knowledge about self and the work world and indifferent attitudes toward their future career. As a result,

facilitating career preparation of adolescents has been a serious issue in Korean education and has drawn much attention from Korean educators and policy makers (MEST, 2011).

A construct central to understanding adolescent career preparation and development is career maturity, which is defined as readiness to make career choices (Savickas, 1984). Super's (1980, 1990) life-span career theory pays more attention to how and why people develop their careers than what they choose by understanding career choice behavior as an on-going, life-long process to actualize vocational self-concept across the entire life course, not a single life event that occurs when individuals enter the job world. This theory suggests that an individual encounters a series of career-related tasks along a set of normative, predictable career stages over the life span–*growth* (ages 4 to 14), *exploration* (ages 14 to 24), *establishment* (ages 25 to 45), *maintenance* (ages 45 to 65), and *disengagement* (over age 65). Adolescents in the exploration stage are required to crystallize and specify their vocational preferences by gaining information about self and the world of work and to implement occupational options by obtaining competencies necessary for those options through training or education. Since this perspective characterizes individuals' vocational choices as developmental tasks over the life span, which must be completed at each stage for a successful transition to the next stage, adolescents' career maturity is crucial in addressing the tasks and successful career progression.

Career maturity is conceptualized as an individual's resources to address career choice tasks relative to those of others who are negotiating similar tasks (Super, 1990; Super et al., 1957). The idea of career maturity works well with adolescents in that the exploration stage presents relatively uniform tasks and environments. However, general dimensions of career maturity have not been well established for adults because they are likely to recycle through one or more career stages, from exploration to disengagement. As a result, the concept of career

adaptability was proposed to describe one's ability to address changing work environments (Super & Kidd, 1979; Super & Knasel, 1981). Although there is a lack of consensus on the components of career maturity, the properties commonly identified in career maturity measures, such as the Career Maturity Inventory (CMI, Crites, 1978) and Career Development Inventory (CDI, Thompson & Lindeman, 1981), include self-knowledge, career information, career decision-making skills, integration of knowledge about self and occupations, and career planning (Coertse & Schepers, 2004; Watson, 2008). Career mature adolescents are expected to actively engage in long-term career planning with sufficient self and occupational information and appropriate decision-making skills through broad exploration of the job world.

Although career maturity is assumed to increase with age as a developmental process, it is a psychosocial construct is differentiated by personal attributes, experiences and environments (Super, 1990; Thompson & Lindeman, 1984). Recently, the viability of career maturity has been criticized most strongly for its assumption of normative, predictable sequences of vocational development (Savickas et al., 2009; Vondracek & Porfeli, 2008). One criticism is that career maturity does not have universal meaning as a measure of career development because individual gaps in career maturity may be affected by systemic differences in social expectations for career behavior depending on historical and cultural contexts (Reitzle et al., 1998; Vondracek & Reitzle, 1998). However, the developmental-contextual perspective (Vondracek et al., 1986), which approaches career behavior as the result of person-environment interactions, does not devalue the usefulness of comparing individuals' career maturity in a society with common cultures and norms regarding career development (Raskin, 1998; Vondracek & Reitzle, 1998). Rather, this perspective raises the need for more research to investigate contextual influences on

career maturity for a deeper understanding of individuals' vocational development (Fouad, 2001; Noack et al., 2010; Patton & Creed, 2001).

A multitude of studies have examined individual and family factors that affect career maturity. Despite somewhat mixed results, a majority of research has demonstrated gender differences in career maturity by reporting higher scores on career maturity for women adolescents than for men (Creed & Patton, 2003; Keller & Whiston, 2008; Rojewski et al., 1995; Super & Nevill, 1984). Positive influences of academic performance (Healy et al., 1985; Khan & Alvi, 1983; Lawrence & Brown, 1976; Luzzo, 1993; West, 1988), participation in career-related activities (Fretz, 1981; Oliver & Spokane, 1988; Whiston et al., 2003), and the quality of parent-adolescent relationship (Dietrich & Kracke, 2009; Hargrove et al., 2005; Ketterson & Blustein, 1997; Kracke, 1997, 2002; Lease & Dahlbeck, 2009) have also been reported. While family SES has been regarded as a critical determinant of career maturity (Rojewski, 1994), only a few studies have reported significant SES influences on career maturity (Lee, 1984; McNair & Brown, 1983; Watson & Van Aarde, 1986). Studies in Korea have also reported higher career maturity for women adolescents (Kim & Lee, 2006; Park & Sung, 2008) and significant impacts of family SES (Choi, 2007; Kim, 2007), parent-child relationships (Ki & Lim, 2010; Park & Sung, 2008), and parents' career guidance (Kim, 2009) on career maturity.

Career theories have also emphasized the critical interaction between person and environment in individuals' vocational behavior (Gottfredson, 2005; Super, 1980; Vondracek et al., 1986). In particular, schools have been regarded as an immediate determinant of occupational careers (Super, 1980) and as an important proximal context in which adolescents' career development occurs (Vondracek et al., 1986). Nonetheless, empirical studies that have examined school influences on adolescents' career maturity are very limited. Although a few studies in

Korea have investigated the impacts of school factors, including curriculum track (Kim, 2008), teacher-student relationship (Kim, 2007), and career-related activities in schools (Kim, 2008; Kim, 2009; Song & Park, 2006), analyses were conducted only at the individual level and did not investigate systemic differences in students' career maturity due to school factors. Research is needed to address this deficiency, since various school characteristics, including school-level SES, school size, school location, concentration of single parent children, teacher-student relationships, and minority concentration, have been found to be significantly associated with adolescent academic achievement (Bryk & Thum, 1989; Ma & Klinger, 2000; Pong, 1998; Rumberger & Palardy, 2005; Sirin, 2005) and psychological outcomes (Eccles et al., 1991; Goodman et al., 2003; Wickrama & Vazsonyi, 2011).

The significant school influences on adolescents' development and the importance of schools as proximal contexts that provide adolescents with experiences leading to career preparation (Noack et al., 2010) may be reasons for understanding the possible school gaps in students' career development. Nonetheless, little attention has been paid in Korea to school inequalities in career development caused by the differences in school environments, even though facilitating adolescents' career development is an important school function.

Purpose of the Study

In this vein, this study aimed to assess the importance of school context in adolescent career maturity in Korea and to identify school characteristics that created differences in career maturity and in the effects of individual and family determinants on career maturity across schools. Specific research questions addressed in this research asked (a) whether students' career maturity vary across schools, (b) what proportion of the total variation in students' career maturity is explained by school variation, (c) which school contextual factors make a significant

contribution to the variation in students' career maturity across schools, (d) whether the association between each individual determinant and students' career maturity vary across schools, and (e) which school contextual factors moderate the association between each individual determinant and students' career maturity.

Method

Data and participants. The data for this study came from the Korean Youth Panel Survey (KYPS). The KYPS research was conducted by the National Youth Policy Institute (NYPI) in Korea from 2003 through 2008 as a government-sponsored project to provide information about the actual conditions of adolescents' attitudes and behaviors, patterns of their changes, and causes of these changes in such areas as career choice and preparation, deviance, and self- identity (NYPI, 2010).

Participants of this research included 3,449 juniors (boys = 1,725, girls = 1,724) in 104 middles schools selected for inclusion in the KYPS as a sample representing the population of 618,100 students in 2,808 schools nationwide on April 1, 2003, exclusive of Jeju Island where a field survey could not be conducted. Survey questionnaires for student participants examined personal characteristics such as gender, age, and school, career attitudes and behavior including career choice and career preparation, educational experiences within and outside schools, relationship with peers, teachers, and parents, working experiences, deviant experiences, self-identity, and experiences of leisure activities. Parents or guardians were also investigated with regard to family structure, educational levels, income, and occupation, and expenses for their children's private education (NYPI, 2010).

Measures. The dependent variable was participants' career maturity, which was assessed by summing six items measuring self-knowledge about career interest and aptitude, knowledge

about the world of work, career decisiveness, future career concern, and independence. Respondents rated each item using a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The response option also included an "I do not know" category, which was treated as a missing value. As the questions were negatively worded, responses were reverse-coded before analysis for higher scores to represent greater career maturity. The internal reliability coefficient of the career maturity measure was .67.

Individual determinants included gender, academic achievement, teacher-student relationship, and participation in career related activities. Gender was coded as 0 for boy and 1 for girl students. Academic achievement was measured as the percentile attained by students in a school-wide academic achievement test. Participation in career-related activities was counted by counting the number of positive responses to seven items of career-related activities (1= yes; 0 = no), such as attending career guidance lectures, career counseling, and other activities to assist adolescents' career development. Teacher-student relationship was measured by summing three items, which asked participants the degree of positive perceptions about the relationships (e.g., "Teacher treats me with love and affection"). The items were rated using a 5-point Likert scale (1= *very untrue*; 5 = *very true*) and produced an internal reliability coefficient of .71.

Family determinants included family structure, SES, and parent-adolescent relationships. Family structure was assessed according to whether participants were living with two parents or not. Respondents living with two parents received a code of 0, while other respondents were assigned a code of 1. SES was measured by a continuous composite variable using three items, including parents' education, parents' occupation, and family income. Parental education was assessed by the highest score from either parent with values assigned from 1 (no education) to 8 (doctoral degree or equivalent). Parental occupation was measured by the highest score from

either parent on the occupational status index of South Korea (Yoo & Kim, 2006). The values on this index ranged from 0 to 100 with higher values representing occupations with higher prestige. Family income was measured by the average income per month in Korean won. Income was transformed with the natural log to adjust highly skewed data. Each variable was standardized to have a mean of zero and a standard deviation of one, and the regression-weighted composite score for the SES index was constructed using principal component factor analysis. A measure of parent-adolescent relationship was constructed by summing six items (e.g., "My parents and I try to spend much time together"). Higher scores indicated a more child-oriented relationship with warmth, openness, and mutual understanding. Adolescents responded using a 5-point Likert scale (1= *very untrue*; 5 = *very true*). The internal reliability coefficient of this scale was .86.

School variables included school-wide family structure, school-level SES, school-level teacher-student relationship, and school location. School family structure was assessed by the proportion of students not living with two parents at each school, while school-level SES was measured by averaging students' SES at each school. School location was defined as rural area, small city, and Metropolitan city according to geographical area and was dummy coded with the rural area set as the reference group. Teacher-student relationship at the school level was constructed by averaging individual teacher-student relationship scores for each school.

Data preparation. The proportion of missing values ranged from about 3% to 13% for individual items, while the incomplete cases were 30.7%. Missing values were imputed using the expectation maximization (EM) method, which is a two-step iterative procedure that generates estimated values for missing observations using expectation (E) and maximization (M) steps (Allison, 2001; Enders, 2001). The EM method produces unbiased estimates for missing values under the assumption of MCAR or MAR mechanisms (Acock, 2005; Musil et al., 2002). The

EM method also produces similar results to the MI method when data are generated by sufficiently large imputations using the MI method in the large sample size (Schafer, 1999).

This study used group-mean centered variables by transforming all continuous individual-level variables to deviations from their group means because group-mean centering makes the intercept more meaningful and interpretable for this study as it indicates a group mean (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010) and provides precise estimates of the associations between school characteristics and school mean career maturity by decomposing the relationships between independent variables and the dependent variable into within-and between-group components. The scaling method also improves numerical stability in estimating multilevel models by removing correlations between student and school variables in this study (Kreft & de Leeuw, 1998; Raudenbush & Bryk, 2002).

Analytic Approach and Results

To answer the research questions, several forms of multilevel models were tested using Hierarchical Linear Modeling (HLM) 6.0 software. Multilevel models are generally categorized into random intercept and random slope models.

Random intercept models, which allow the intercept to randomly vary across groups, examine the influences of group-level variables on the individual-level outcome based on the intercept differences. The random intercept models include one-way ANOVA model, analysis of covariance (ANCOVA) model, and random-intercept model with predictors. While the ANOVA model does not contain any individual and group factors that explain variations in the outcome, the ANCOVA model adds individual-level predictors as covariates fixed across groups, and the random intercept model with predictors includes group-level variables that account for the variation in the intercept. Random slope models allow the level-1 slopes to vary across groups.

While the random slope model without predictors examines variations in the associations between individual variables and the outcome variables without group-level variables accounting for the variations, the random slope model with predictors contains group-level characteristics that affect the influences of individual-level variables on the outcome variable (Raudenbush & Bryk, 2002; Snijders & Bosker, 2010).

For the first and second questions, a one-way ANOVA model was used to decompose the total variance into between-group and within-group variance. This strategy evaluated the significance of the variation in the average level of career maturity across schools and the relative importance of school context in determining individual-level career maturity. While the individual-level variance was 14.50, the school-level variance was .19 and significant (p = .004), confirming that systemic differences in students' career maturity existed across schools. However, the small proportion of school-level variance (ICC = .013) in the total variance of the outcome variable suggested that there were not large gaps between schools in student career development.

Research question 3 involved the random intercept model with predictors to examine school contextual variables that made a significant contribution to the variation in career maturity across schools. The ANCOVA model was analyzed as a preliminary step, to select appropriate level-l covariates and investigate if the school-level variance was still significant after adding individual-level variables since level-l predictors may explain level-2 variance. Academic achievement (r = .01, p = .03) and parent-adolescent relationship (r = .13, p = .00) significantly influenced career maturity. However, the positive correlation between SES and academic achievement (r = .33, p <.01) and the significant effect of SES (r = .17, p = .03) before adding academic achievement demonstrated the indirect effect of SES through academic

achievement. While the individual-level variance decreased by 3.2%, the school-level variance (τ_{00} = .20, p = .002) increased slightly and was still significant.

The results of the random intercept model with predictors revealed that school average career maturity increased by .55 unit with one unit increase in school-level SES, .18 unit with one unit increase in school-level teacher-student relationship, and 3.49 units with one-unit increase in school family structure, respectively, when holding other variables constant. However, the effects were less for school SES (r = .36, p =.04) and were significant for school family structure at the significance level of .10 (r = 2.12, p =.07) without controlling for each other because of the suppression effects between the two variables due to their negative correlation (r = -.37, p <.01).

The nonsignificant within-group relationships and significant between-group relationships of SES, teacher-student relationship, and family structure with the outcome variable suggested the contextual effects of those school variables. The results of models with uncentered SES and teacher-student relationship variables to test the contextual effects confirmed significant effects for school-level SES at α =.05 (r = .44, p = .03) and for teacher-student level relationship at α =.10 (r = .16, p = .07), respectively, even after controlling for the individual characteristics. School-level family structure coefficient (r = 3.49, p = .01) directly referred to the contextual effect of family structure in that individual-level family structure variables was not group-mean centered. Those results indicated that students with the same individual characteristics were likely to experience higher career maturity by .44, .16, and 3.49 units, respectively, as school-level SES, the quality of teacher-student relationship at the school level, and the proportion of students not living with two parents increased by one unit, when controlling for other variables.

While about 34.3% of school-level variance was accounted for by school-level predictors, only 3.3% of individual-level variance was explained by individual-level predictors.

For question 4, the significance of the variation in the impact of each individual variable on career maturity was investigated using the random slope model without school-level predictors. Although the fixed effects of individual-level variables were not significant, the relationship between each individual-level variable and career maturity may vary across schools in that the fixed effects indicate the average effects of individual-level variables across schools. Thus, all individual-level variables were examined for the variation in their effects on career maturity. Influences of parent-adolescent relationship (r = .01, p = .000) and teacher-student relationship (r = .04, p = .001) on career maturity varied across schools.

The last research question involved the random slope model with predictors to identify school context variables that moderate individual variable effects on career maturity. While school-level SES was found to significantly moderate the relationship between teacher-student relationship and career maturity (r = .19, p = .02), explaining 10% of the slope variance, school factors that differentiated the effects of adolescent-student relationship on career maturity were not identified. Cross-level interaction effects were also investigated for individual-level variables without significant variance in a slope because the power of random slope test is not always larger than interaction effect test (Snijders & Bosker, 2010). The result revealed significant cross-level interaction effects (r = .01, p = .02) between school-level teacher-student relationship and academic achievement on career maturity.

The model fitness indices for each model, including deviance statistic, AIC, and BIC, were examined to evaluate how well each model fits the data. The values of all indices decreased with more complex models reporting smaller values as the models changed from the ANOVA

model to the random slope model with predictors. The results suggested that the random slope model with predictors was the most appropriate in explaining the relationships among variables when taking into account both model fitness and parsimony.

Discussion

Similarity of Adolescent Career Development across Schools

Although significant school differences in student career maturity were found, the limited variance at the school-level suggests that the average level of student career maturity was very similar across schools. The small school differences may reflect strongly homogeneous school characteristics due to the effects of school equalization policies (Lee, Kim, & Byun, 2012; Seth, 2002), which have been strongly driven to relieve excessive educational competition in Korea since the late 1960s. The most salient feature of Korean primary and secondary schools is the highly standardized educational system, including teacher recruitment, student assignment, curriculum, and other school activities (Park, 2007). Teachers are hired through competitive examination, placed in schools based on wide area units by school district offices, and rotated periodically within school districts. The system also prevents school choice by randomly assigning students to schools within residential areas. Even private schools cannot select students but must accommodate students randomly assigned based on lottery. Schools, including private schools, are required to follow government standards for teaching and learning, and students are exposed to a uniform curriculum and other educational programs. Most financial resources come from the central government and are distributed across schools, focusing on schools in disadvantaged areas. Additionally, most parents are strongly involved in their children's education by discussing education with them at home and monitoring their behavior (Park, Byun, & Kim, 2011). Given that adolescent career behavior may be affected by various school

activities, interpersonal relations with teachers and peers within schools, and physical, structural, and material features of schools (Vondracek et al., 1986; Young, 1983), the equalized school qualities and structures may account for the small gap in student career maturity across schools. Although it is not plausible to compare school differences in Korean adolescent career maturity with other countries because related literature is not available, the limited school gap in this research is consistent with a previous study result (Byun & Kim, 2010) that reported school variation in Korean students' academic achievement far less than the United States. According to the study, approximately 9% of the variance in math achievement of Korean middle school students in 2003 was attributable to the school level, while school-level variance was about 35% in the United States.

Because data were not available, this study did not examine school variation in student career maturity at the high school level. However, larger gaps in adolescent career maturity may exist across high schools compared with middle schools. Since school curriculum and other educational programs vary depending on school types, such as general academic, vocational, magnet, and charter school, and students choose school type based on their academic achievement, parents' expectation, and SES, there are substantial differences among high schools. The significant differences in career development between academic and vocational high school students reported by previous studies in Korea (Kim, 2008; Kim & Lee, 2007; Lee & Rojewski, 2012) and in Switzerland (Noack et al., 2010) also suggest the systemic gaps between high schools in adolescent career maturity. The significant influences of academic achievement also suggest larger school gaps in career maturity at the high school level. Additionally, career maturity is expected to increase as career transition comes closer (Crites, 1978; Thompson & Lindeman, 1981), but students are likely to show uneven development of career maturity by

being involved in different career planning activities depending on school characteristics (Patton & Creed, 2001). As a result, career maturity may be more differentiated between schools as well as between individuals at the high school level. Further research, therefore, is required to investigate school differences at the high school level for a better understanding of Korean adolescent career development.

This research also used the career maturity scale with a self-report format to score participants' career maturity. Although the results are less affected by intellectual abilities such as reading skills, which are not directly related to career maturity, the scale may have limitations in detecting school gaps in that responses tend to be biased by participants' subjectivity and social desirability. Thus, it is necessary to measure career maturity using more objective instruments to obtain more reliable results.

Importance of School Environments in Adolescent Career Development

Even though only small differences were revealed between schools, the research findings suggest the importance of school environments in determining adolescent career maturity. When students' individual characteristics, including SES, teacher-student relationship, and family structure, were the same, students who were attending schools with higher school-level SES, more supportive teacher-student relationships, and a larger portion of students not living with two parents were likely to report higher career maturity. The contextual effects of SES, teacher-student relationship, and family structure at the school level indicated that the characteristics of schools that students are attending directly affect individual students' career maturity as well as school average career maturity.

The significant contextual influences of school-level SES on career maturity suggest that when students with higher SES background, who tend be exposed to more affluent career

information, various career-related activities, and higher educational and occupational expectations from their parents (Lindstrom, Doren, Metheny, Johnson, & Zane, 2007), are concentrated, they are likely to share their career knowledge and experiences through interactions with teachers and peers and stimulate each other in terms of career development within schools. This process may lead to increased career maturity of all students in the schools, including those from low SES families.

An interesting finding was the positive association between career maturity and the proportion of students with a single parent or guardians rather than two parents, when controlling for school-level SES and teacher-student relationship. Given that school SES was negatively associated with the school composition of student family structure, this result implies that the negative impacts of low school SES are offset by schools' educational function. That is, considering the students' disadvantaged situations, teachers in schools where single parent students are concentrated are more likely to emphasize the importance of career planning and exploration for their future and provide related information, experiences, and resources to facilitate student career development. Another plausible path for the positive influences of the school family structure on career maturity is peer interactions. Although the consideration of peer influences on adolescent vocational behavior have not drawn much attention, peer groups are an important proximal contexts which affect adolescent career development (Vondracek et al., 1986), and interactions with peers exert an important role in enhancing adolescents' mastery of career preparation tasks (Kracke, 2002). Thus, it is possible that students who are attending schools with a larger number of student not living with two parents advance career knowledge and specify their career goals through frequent talks with their friends about career-related issues.

While the influences of teacher-student relationships on adolescent career development has been discussed based on students' individual perceptions about the relationships (Ali & McWhirter, 2006; Farmer, 1985; Marjoribanks, 1990; Metheny et al., 2008), the research results suggest the importance of the quality of teacher-student relationships at the school level in determining students' vocational behavior. The results imply that students in schools with teacher-student relationships characterized by warmth and care may feel comfortable in talking with teachers about their future careers and in eliciting career guidance from teachers.

At the individual level, academic achievement and parent-adolescent relationship were significantly associated with career maturity, while SES indirectly affected career maturity through academic achievement. Although the significant influences of academic achievement appears to concur with the results of past research in Western countries (Khan & Alvi, 1983; Lawrence & Brown, 1976; Luzzo, 1993), its meaning may change in the Korean context. While the associations between academic achievement and career maturity in Western countries have sometimes been discussed in terms of the bias in career maturity measures related to reading skills (Dillard, 1976; Lawrence & Brown, 1976; Powell & Luzzo, 1998, Watson, 2008), the results of this study need to be viewed in terms of the severe academic competition peculiar to Korean society. Korean parents are usually willing to sacrifice themselves for their children's academic achievement, believing that their children's enrollment in prestigious education institutions is the best path to a successful career (Kim, 2004; Oh, 2000; Seth, 2002). Students are also more likely to consider parents' expectations in career decision-making, which prioritize occupational prestige (Seth, 2002), in that an individual's career decision-making is an important process to meet parental expectations rather than their own interests and needs in collectivist cultures which are predominant in Korea (Fouad et al., 2008). Thus, students with low academic

achievement are apt to be frustrated with the very limited career opportunities available to them and, as a result, experience difficulty in establishing appropriate career goals. This finding also raises the need for further research to investigate curriculum effects on career maturity while controlling for academic achievement. Given that students are generally assigned to academic or vocational high schools depending on their academic achievement, the low career maturity reported by vocational high school students in spite of the career specific school programs (Kim, 2008) may be due to the impacts of their low academic achievement, rather than curriculum effects. Additionally, the indirect effects of individual SES mediated by academic achievement suggest that the main path for the negative influences of low SES on career maturity is poor students' disadvantages in academic competition. In 2010, whereas 89% of Korean students whose monthly family income was more than 7,000,000 KRW (approximately 6,300 U.S. dollars) participated in shadow education for academic achievement, only 36% of students whose monthly family income was less than 1,000,000 KRW (approximately 900 U.S. dollars) received shadow education (Korea National Statistical Office [KNSO], 2012). The opportunity gap in shadow education between high-income and low-income children has, as a result, expanded the socioeconomic gap in student achievement (Byun & Kim, 2006).

The significant effects of the quality of the parent-adolescent relationship on career maturity, independent of family SES influences, coincide with previous studies (Cho, Choi, & Um, 2006; Choi, Hutchison, Lemberger, & Pope, 2012; Dietrich & Kracke, 2009; Hargrove, Inman et al., 2005; Ketterson & Blustein, 1997; Lease & Dahlbeck, 2009; Ryan et al., 1996), which have reported positive associations of secure attachment to parents, the quality of family interaction, and supportive parenting style with adolescent career development. This finding confirms the general notion that parenting styles oriented toward warmth, openness, and

reciprocity help adolescents to more effectively negotiate the developmental tasks of establishing self-identities and future career plans (Kracke, 1997, 2002).

Family structure at the individual level was not significantly associated with career maturity. This result indicates that career development of middle school students is more likely to be affected by students' academic achievement and the quality of their relationships with parents, rather than their family structure. These results concur with previous research which indicated that family functioning is a more reliable predictor of vocational identity than parental marital status (Johnson et al., 1999). Gender was also not related to adolescent career maturity. It may be because the career maturity scale in this study was not affected by reading skills, which usually show gender differences (Choi & Park, 2012), or because students' career maturity at the middle school level may not be differentiated in terms of gender. The influence of participation in career-related activities was nonsignificant as well, possibly due to the students' very limited experiences with those activities, as shown by students' average participation which was just 1.5 times.

The individual characteristics explained only 3.3% of the variance in student career maturity. While most past research did not report the effect size by individual factors, larger variance was accounted for by career related psychological constructs (Creed & Patton, 2003; Creed et al., 2007) which are strongly associated with career maturity. Thus, it is not possible to evaluate whether the effect size was small because important predictors were omitted or because it is difficult to assess young adolescent career maturity (Keller & Whiston, 2008). To confirm the research findings, further studies are required to investigate more personal factors and use more reliable career maturity measures.

Interaction between School Environments and Individual Characteristics

Significant cross-level interaction effects were found between academic achievement and school-level teacher-student relationship and between teacher-student relationship and school-level SES. The cross-level interaction effects indicate another way, distinguished from the contextual effects, in which school context influences individual students' career development.

The quality of teacher-student relationship at the school level moderated the influence of academic achievement on student career maturity. This result suggests that the positive influences of students' academic achievement on the negotiation of career development tasks are accelerated by a higher quality of teacher-student relationship at the school-level. Although the average effects across schools of students' individual relationships with their teachers on career maturity were not significant, the significant slope variance for teacher-student relationship indicated that the relationship significantly influenced student career maturity in different directions depending on school-level SES. The moderation effects of school-level SES suggest that as their individual relationships with teachers improves, students in higher SES schools are likely to easily develop a clear and stable picture of their career interest and goals by having frequent and comfortable talks with their teachers, while students in lower SES schools may encounter barriers in establishing their career goals by more talking about their disadvantages in choosing career options. While significant variance across schools in the effects of parent-adolescent relationship was found, school contextual variables which create the variation were not identified. Thus, future research should investigate school environments which differentiate the influences across schools of parent-adolescent relationship on career maturity.

Since empirical research which investigated the moderating roles of school environments does not exist, the generalizability of these findings is limited. However, the results in this

research support theoretical perspectives (Gottfredson, 2005; Savickas, 2002; Super, 1980; Vondracek et al., 1986) which emphasize the importance of interactions between personal factors and environments in adolescent career development. The moderation effects of environments on career development have generally been discussed in terms of lager contexts, such as gender (Brown, 2002; Cook et al, 2005; Fouad & Arbona, 1994), race/ethnicity (Lee, 1984; Naidoo et al., 1998), educational and political systems (Fouad, 1988; Patton et al., 2004; Reitzle et al., 1998; Schmitt-Rodermund & Silbereisen, 1998; Silbereisen et al., 1997), and social cultures (Fouad et al., 2008; Hardin et al., 2001; Leong, 1991; Tang et al., 1999). However, promoting adolescent career development is an important task for schools and, thus, it is critical to pay may more attention to the moderating roles of schools in adolescent career development.

Policy Implications

This study demonstrated the importance of school environments in adolescent career development and identified the characteristics of schools which are vulnerable in terms of career development by analyzing several types of multilevel models. The findings in this research provide meaningful implications for policy makers and educators in Korea.

Despite the small gap in student career maturity between schools, the negative impacts of concentration of students from low-SES family on individual students' career maturity as well as school average career maturity were revealed. The negative influences were also demonstrated in its effects on the associations between individual teacher-student relationship and career maturity. Although Korea has attained remarkable economic growth since the 1960s, inequality in income distribution between socioeconomic classes and between rural and urban areas has also expanded, especially, since the economic crisis in 1997. Indeed, the ratio of the average household income of the top 20% to that of the bottom 20% increased from 5.15 in 1999 to 6.12 in 2007 (Park,

2008). The household income in rural areas relative to urban areas decreased from 95.5 in 1995 % to 76.2% in 2003 and 65.3% in 2010 (KNSO, 2012). Given that residential areas are usually segregated by household incomes due to housing costs, those indicators suggest that the socioeconomic gap between schools is growing and, as a result, school inequality in career development may also increase. However, career education programs at the school level are still in the initial stage and are equalized across schools without taking into account the possible school gap in student career maturity. Thus, policy makers need to prepare differentiated career education programs for schools in disadvantaged areas and distribute budgets for career education on low SES schools by priority.

The concentration of students not living with two parents in schools positively affected students' individual career maturity. The number of single-parent families in Korea has steadily risen from 8.6% in 2005 to 9.3%, reflecting the continuous growth in the crude divorce rate (CDR: the number of divorce per 1,000 population) from 1.1% in 1991 to 2.5% in 2009 (KNSO, 2012). The positive influences of the single-parent children concentration may reflect the effectiveness of schools in mitigating the negative impacts of the concentration of disadvantaged students. The results suggest that strengthening pre-service and in-service teacher training related to career education as well as providing more resources for career guidance may enhance the positive school roles further, given that no systemic programs have been offered to pre-service and in-service teachers for career education. At the same time, the negative impacts of low school SES on the influences of individual teacher-student relationship on career maturity also raise the need to expand professional development opportunities for teachers. Teachers with sufficient information and competent skills may lead students in disadvantaged schools to

develop their vocational plans without severely compromising career options by providing various pathways to career achievement.

Finally, the influences of academic achievement and parent-adolescent relationship raise the need for parental education. Given the crucial influences of parents on their children's career choice in Korean society, parents need to be informed about the future job market to provide effective support for their children's career development. It is also critical that parents pay more attention to their children's career interests and values and be open to various career options congruent with their children's needs rather than focusing only on academic achievement and occupational prestige. The Korean parents' unusual educational fever has made a great contribution to the dramatic increase in the educational attainment level of the Korean population, as represented by the rapid growth in the college enrollment rate from 36.4% in 1985 to 72.5 in 2011 (KNSO, 2012). However, the severe college graduate unemployment rate which was 35% in 2011 (KNSO, 2012) shows that college graduation is not necessarily linked to successful career attainment. Thus, parents need to be equipped with the knowledge and attitudes to guide their children to realistic and effective choices.

Limitations of the Study

Several imitations in this study should be noted. First, the measure of career maturity used limited items in the KYPS data, raising reliability and validity issues. Career maturity also has a variety of dimensions (Savickas, 1994; Super et al., 1996), while this study assumed unidimensionality of career maturity. The influences of school and individual characteristics may vary depending on the subdimensions of career maturity. Thus, future research needs to employ well established measures to confirm the findings of this study. Next, the relational factors were assessed based on students' self-reported data. There may be differences between parents and

children and between teachers and students in the perceptions about parent-adolescent and teacher-student relationship. To advance understanding the effects of the relational process with parents and teachers on adolescent career development, future research needs to include more objective measures that take into account the perceptions of teachers and parents as well. Thirdly, this study included a limited number of school context variables, most of which were constructed by aggregating individual-level variables. Important school characteristics, such as principal leadership, teachers' attitudes toward and competence in career guidance, and school-level career education programs, need to be analyzed in future research to provide useful information for career guidance and intervention policies. Lastly, this study did not examine interaction effects between variables at the same level. School and individual variables may moderate the influences of other variables at the same level on student career maturity. Given the complex phenomenon of career development, future research needs to identify various pathways through which school environments and individual characteristics influence adolescent career development by examining more expanded models.

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APPENDIX A

MEAN DIFFERENCES IN OTHER VARIABLES BETWEEN SUBGROUPS WITH AND WITHOUT MISSING VALUES IN CAREER MATURITY ITEMS

Mean Differences in SES between Subgroups with and without Missing Values in Career Maturity Items

	SES			
Career maturity	Group without missing values	Group with missing values	*t*	*df*
Item 1	.017	-.520	6.0***	108.6
Item 2	.018	-.304	4.6***	198.7
Item 3	.012	-.215	3.3**	195.1
Item 4	.014	-.371	5.1***	132.8
Item 5	.014	-.371	4.5***	125.9
Item 6	.023	-.380	6.1***	207.5

Note. ** $p < .01$, *** $p < .001$

Mean Differences in Academic Achievement between Subgroups with and without Missing Values in Career Maturity Items

	Academic achievement			
Career maturity	Group without missing values	Group with missing values	*t*	*df*
Item 1	58.62	32.26	10.0***	108.8
Item 2	58.99	35.74	11.1***	181.6
Item 3	58.74	39.73	8.6***	178.4
Item 4	58.41	40.06	6.6***	118.7
Item 5	58.52	35.21	9.2***	110.7
Item 6	58.65	40.99	7.8**	174.0

Note. ** $p < .01$, *** $p < .001$

Mean Differences in Parent-Adolescent Relationship between Subgroups with and without Missing Values in Career Maturity Items

	Parent-adolescent relationship			
Career maturity	Group without missing values	Group with missing values	*t*	*df*
Item 1	20.09	18.67	3.0**	133.0
Item 2	20.12	18.73	3.9***	225.6
Item 3	20.13	18.63	4.0***	218.4
Item 4	20.11	18.45	4.0***	150.5
Item 5	20.11	18.34	4.0***	142.5
Item 6	20.12	18.60	4.2**	216.0

Note. ** $p < .01$, *** $p < .001$

Mean Differences in Teacher-Student Relationship between Subgroups with and without Missing Values in Career Maturity Items

	Teacher-student Relationship			
Career maturity	Group without missing values	Group with missing values	*t*	*df*
Item 1	7.40	6.64	3.4**	134.4
Item 2	7.40	6.96	2.5*	228.7
Item 3	7.40	7.02	2.1*	223.1
Item 4	7.40	6.89	2.3***	149.9
Item 5	7.39	7.00	1.7***	143.3
Item 6	7.41	6.71	3.7**	217.2

Note. * p <.05, ** p < .01, *** p <.001