

## Self-Efficacy Beliefs as Shapers of Children's Aspirations and Career Trajectories

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This prospective study tested with 272 children a structural model of the network of sociocognitive influences that shape children's career aspirations and trajectories. Familial socioeconomic status is linked to children's career trajectories only indirectly through its effects on parents' perceived efficacy and academic aspirations. The impact of parental self-efficacy and aspirations on their children's perceived career efficacy and choice is, in turn, entirely mediated through the children's perceived efficacy and academic aspirations. Children's perceived academic, social, and self-regulatory efficacy influence the types of occupational activities for which they judge themselves to be efficacious both directly and through their impact on academic aspirations. Perceived occupational self-efficacy gives direction to the kinds of career pursuits children seriously consider for their life's work and those they disfavor. Children's perceived efficacy rather than their actual academic achievement is the key determinant of their perceived occupational self-efficacy and preferred choice of work-life. Analyses of gender differences reveal that perceived occupational self-efficacy predicts traditionality of career choice.

### INTRODUCTION

A major part of people's daily life is spent in occupational activities. These pursuits do more than simply provide income for one's livelihood. Occupations structure a large part of people's everyday reality and serve as a major source of personal identity and self-evaluation. The occupational roles that people perform determine whether their worklife is lastingly challenging and fulfilling, repetitively boring, or burdensome and stressful. As an interdependent activity, occupational pursuits also structure a good part of people's daily social relations. The social interconnectedness is another aspect of worklife that contributes to people's psychosocial well-being. Moreover, experiences in the worklife have considerable social repercussions on other domains of functioning as well as personal effects. An aversive worklife has detrimental spillover effects on family relations, whereas a productive, fulfilling worklife has a positive spillover on the quality of life in a family (Bandura, 1997; Karasek & Theorell, 1990; Maslach, 1982; Ozer, 1995).

The choices made during formative periods of development shape the course of lives. Such choices determine which aspects of their potentialities people cultivate, and which they leave undeveloped. The self-development during formative periods forecloses some types of options and makes others realizable. Among the choices that affect life paths, those that center on career choice and development are, therefore, of special import for the reasons given. Although occupationally relevant choices play a key role in setting the course of lifestyle trajectories with

diverse impacts across the lifespan, this area of personal development has received surprisingly little attention in developmental psychology. The present research tested a proposed causal model of the pattern of sociocognitive influences governing children's perceived occupational efficacy and emerging occupational preferences and choices.

In the social cognitive theory guiding this program of research, people are self-organizing, proactive, and self-regulating agents of their psychosocial development (Bandura, 1997, 1999). It provides an agentic explanation of career choice and development. Among the mechanisms of human agency, none is more focal or pervading than people's perceived self-efficacy. Unless people believe they can produce desired outcomes by their actions, they have little incentive to act or to persevere in the face of difficulties. Whatever other factors may operate as guides and motivators, they are rooted in the core belief that one has the power to produce effects by one's actions. Perceived self-efficacy is, therefore, posited as a pivotal factor in career choice and development.

Perceived self-efficacy occupies a central role in the causal structure of social cognitive theory because efficacy beliefs affect adaptation and change not only in their own right, but through their impact on other determinants. Such beliefs influence aspirations and strength of commitments to them, the quality of analytic and strategic thinking, level of motivation and

perseverance in the face of difficulties and setbacks, resilience to adversity, causal attributions for successes and failures, and vulnerability to stress and depression (Bandura, 1995, 1997; Locke and Latham, 1990; Maddux, 1995; Schwarzer, 1992; Zimmerman & Schunk, 1989). Meta-analyses of the magnitude of effect sizes corroborate the predictiveness of perceived self-efficacy across age and diverse spheres of functioning (Holden, 1991; Holden, Moncher, Schinke, & Barker, 1990; Multon, Brown, & Lent, 1991; Stajkovic & Luthans, 1998).

Research with adults confirms that beliefs of personal efficacy play a highly influential role in occupational development and pursuits (Bandura, 1997; Betz & Hackett, 1986; Hackett, 1995; Lent, Brown, & Hackett, 1994). The higher people's perceived efficacy to fulfill educational requirements and occupational roles, the wider the career options they seriously consider pursuing, the greater the interest they have in them, the better they prepare themselves educationally for different occupational careers, and the greater their staying power in challenging career pursuits. People simply eliminate from consideration occupations they believe to be beyond their capabilities, however attractive the occupations may be. Efficacy beliefs predict occupational choices and level of mastery of educational requirements for those pursuits when variations in actual ability, prior level of academic achievement, scholastic aptitude and vocational interests are controlled (Brown, Lent, & Larkin, 1989; Lent, Brown, & Larkin, 1984, 1986, 1987; Lent, Lopez, & Bieschke, 1993).

Lent, Brown, and Larkin (1987) compared the predictive power of alternative theories of career choice and pursuits. Perceived self-efficacy predicted occupational choice, preparatory achievement, and perseverance in the chosen occupational pursuit, whereas theories based on personality matching (Holland, 1985) and consequential thinking about the potential difficulties that given options are likely to present (Janis & Mann, 1977) were nonpredictive. In comparison with expectancy-value theory (Wheeler, 1983), efficacy beliefs contributed more heavily to occupational preferences than outcome expectations, especially for women who base their occupational preferences more strongly on their perceived efficacy than on the allure of the potential benefits the vocations may provide.

Wide gender disparities exist in career aspirations and pursuits (Betz & Fitzgerald, 1987). Although women make up an increasing share of the workforce, not many of them are choosing careers in scientific and technical fields or, for that matter, in a variety of other occupations that have traditionally been dominated by men. The evidence is quite consistent

in showing that the career interests and pursuits of women are constricted by a sense of inefficacy for quantitative activities and skills necessary for occupations traditionally pursued by males (Betz & Hackett, 1983; Hackett, 1995; Lucas, Wanberg, & Zytowski, 1997; Matsui, Ikeda, & Ohnishi, 1989).

Male college students have an equally high sense of efficacy for both traditionally male-dominated and female-dominated occupations. In contrast, female students judge themselves more efficacious for the types of occupations traditionally held by women but have a weaker sense of efficacy that they can master the educational requirements and job functions of occupations dominated by males. These differential beliefs in occupational efficacy are especially striking because the groups do not differ in their actual verbal and quantitative ability on standardized tests (Betz & Hackett, 1981). Moreover, women have a high sense of efficacy for quantitative activities imbedded in stereotypically feminine activities but low perceived self-efficacy when these same quantitative activities are embedded in scientific pursuits (Betz & Hackett, 1983; Junge & Dretzke, 1995; Matsui & Tsukamoto, 1991).

There is a rapidly growing body of research on the role of perceived occupational efficacy in career choice and development in young adults, but we have little knowledge on how children develop their sense of occupational efficacy and how it affects the career paths they take. Much of the theorizing on career development has centered on progression through age-related career stages across the life course (Levinson, 1978; Super, 1992), and matching personality types to occupational activities (Holland, 1985). The present study examined the multifaceted sociocognitive origins of children's emerging belief about their occupational efficacy and its determinative impact on their career-related choices at a critical educationally branching transition in their lives. The proposed conceptual model of career self-efficacy and choice tested the paths of influence of socioeconomic, familial, self-referent factors and of academic achievement within a four-linked causal structure. In this conceptual model, familial socioeconomic status influences parental perceived efficacy and academic aspirations, which, in turn, affect their children's perceived efficacy, academic aspirations and scholastic achievement. The children's perceived efficacy and academic orientations shape their perceived efficacy for different types of career pursuits, which, in turn, plays a determinative role in the careers they choose and those they actively shun. The different forms of children's perceived personal efficacy, their perceived occupational effi-

cacy, and career choices were conceptually constructed and verified by factor analysis. The specific direct and mediated paths of influence posited in this multilinked structural model are specified in greater detail in the sections that follow.

The first link in the conceptual model concerns the impact of socioeconomic status on parental efficacy and aspirations. In social cognitive theory (Bandura, 1986, 1997), socioeconomic factors affect children's developmental courses principally through their impact on familial and self-processes. Different lines of research lend support for this agentic mediational view. In academic development, the impact of socioeconomic status of the families on children's level of academic achievement is entirely mediated through parental academic aspirations and children's prosocial behavior (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996a). Elder (1995) has shown that economic hardship affects the course of children's development through its influence on familial processes rather than directly by undermining parents' sense of efficacy to promote their children's competencies and to protect them from risky environments that can compromise successful development. Baldwin and his colleagues similarly found that when variations in parental child management practices are controlled, socioeconomic status has no independent effect on children's developmental outcomes (Baldwin, Baldwin, Sameroff, & Seifer, 1989). In the conceptual model being tested, increases in socioeconomic status raise parents' beliefs in their efficacy to promote their children's academic development and the academic aspirations they have for them.

Parental influence on children's academic development has been extensively researched (Bussey & Bandura 1999; Eccles, 1989; Steinberg, 1996), but how parents affect their children's career development has received little attention despite its centrality to the paths their children's lives will take. In the second pattern of influences in the structural model, parents exert their effect on career choice and development mainly through their impact on their children's self-efficacy appraisals, educational aspirations, and scholastic achievement. Efficacy beliefs vary across domains of psychosocial functioning rather than represent an undifferentiated disposition (Bandura, 1997). Because perceived academic efficacy plays a paramount role in career choice and preparatory educational development, parents were assessed for their belief in their efficacy to promote their children's valuation and engagement in academic pursuits. It was predicted that parents of high perceived efficacy would structure academic activities that enhance their children's academic efficacy. There is a growing

body of evidence that parents who believe that they can affect their children's development are more proactive and successful in cultivating their children's competencies than parents who doubt they can do much to influence their children's developmental course (Bandura et al., 1996a; Coleman & Karraker, 1997; Elder, 1995; Gross, Fogg, & Tucker, 1995; King & Elder, 1998; Schneewind, 1995; Teti & Gelfand, 1991). The developmental benefits of parent's beliefs in their efficacy have been verified across different socioeconomic statuses and family structures, under conditions of economic adversity that severely tax parental resilience, and in different cultural milieus.

Self-appraisal of capabilities determines goal aspirations. Indeed, the stronger the perceived self-efficacy, the higher the goal aspirations people adopt and the firmer is their commitment to them (Bandura, 1991; Locke & Latham, 1990). Hence, parents with high academic efficacy would favor high educational aspirations which, in turn, would foster scholastic aspirations and attainments in their children. Previous research corroborates the positive influence of parental academic aspirations on children's academic aspirations (Bandura et al., 1996a; Zimmerman, Bandura, & Martinez-Pons, 1992), and academic achievement (Bandura et al., 1996a; Entwisle & Hayduk, 1978; Kao & Tienda, 1998; Marjoribanks, 1979).

The goals held for others convey to them belief in their capability to fulfill them (Bandura, 1997). Through this persuasive process, parental academic aspirations can raise their children's perceived self-efficacy for academic pursuits. Findings are also supportive of this link in the conceptual model (Bandura et al., 1996a). Academically aspiring parents foster not only educational activities, but also development of social and self-management skills conducive to engagement in academic pursuits. Such parental influences help to raise children's beliefs in their social and self-regulatory efficacy. Moreover, aspiring parents with a strong sense of academic promotive efficacy would discourage consideration of occupational pursuits relying heavily on manual labor or routinized service.

The third phase in the proposed conceptual model specifies how children's perceived self-efficacy and academic aspirations affect scholastic achievement and perceived career efficacy. A high sense of efficacy for self-regulated learning and mastery of academic coursework fosters academic aspirations and scholastic achievement (Bandura et al., 1996a; Caprara, Barbaranelli, & Pastorelli, 1998; Zimmerman & Bandura, 1994; Zimmerman et al., 1992). The development of complex cognitive competencies requires high sustained investment of time and effort in intellectual pursuits. Heavy engagement in problem behaviors

often results in disengagement from academic activities (Bandura et al., 1996a; Dishion, 1990; Hinshaw, 1992; Jessor, Donovan, & Costa, 1991; Patterson, Capaldi, & Bank, 1991; Rutter, 1979). The link between perceived efficacy to manage troublesome situations and problem behavior is also well established (Bandura, Barbaranelli, Caprara, & Pastorelli, 1996b; Caprara et al., 1998). A high sense of efficacy to ward off peer pressure for transgressive and antisocial activities would support academic aspirations and achievement. Perceived social efficacy promotes satisfying and supportive interpersonal relationships (Bandura et al., 1996a; Holahan & Holahan, 1987a, 1987b; Leary & Atherton, 1986; Wheeler & Ladd, 1982). Perceived social efficacy does not, however, necessarily promote association with peers who are prosocially and academically oriented. It is in the context of perceived academic self-efficacy and parental academic aspirations that a secure sense of social efficacy is likely to foster peer affiliations that help create social support for academic achievement.

There are several pathways through which beliefs of personal efficacy affect the career choice process. Self-beliefs of efficacy govern aspirations, self-appraisal of occupational capabilities, level of motivation, development of occupational interests, and resilience to daunting impediments (Bandura, 1997; Betz & Hackett, 1997; Lent et al., 1994). This prospective study examined a vast array of career pursuits selected on the basis of conceptual analysis and prior identification of career structures to represent six distinct spheres of perceived occupational self-efficacy. They include scientific-technical; artistic-literary; educational-medical; commercial-managerial; military-legal; and agricultural-horticultural. These various occupational orientations differed in how heavily they draw upon cognitive, social, creative, organizational, and manual skills.

In the structure of the proposed conceptual model, perceived academic self-efficacy would contribute to a sense of personal efficacy for careers in scientific-technical, educational-medical, artistic-literary, and commercial-managerial careers because they all call for advanced knowledge and high-level cognitive skills. A strong sense of academic efficacy would enhance perceived efficacy for the latter types of careers both directly and through the mediation of academic aspirations and scholastic achievement.

Perceived social and self-regulatory efficacy would operate more as supplementary personal resources in the self-appraisal of occupational efficacy for careers requiring high-level cognitive skills. Sociableness and efficacy to curb transgressiveness are, by themselves, not enough to ensure occupational attainments. Ca-

reer development depends on a resilient sense of academic efficacy that supports and channels efforts needed to master requisite occupational competencies (Bandura, 1997; Lent et al., 1994). It was, therefore, predicted that their impact on self-judged efficacy for the occupational pursuits listed earlier would be mainly mediated through academic aspirations and achievement. Perceived social self-efficacy was expected, however, to have a direct effect as well on personal efficacy for commercial, sales, and managerial lines of work, all of which require social facility. It was further predicted that perceived self-efficacy to control involvement in transgressive activities would contribute to occupational efficacy both directly and through the mediation of academic attainments for benevolent occupations involving educational and health ministrations and to military and police security vocations that safeguard the public.

The occupations the students seriously considered for their lifework represented eight domains of career pursuits. These different domains of activities were based on the theorizing and research on occupational typologies (Holland, 1985, 1996), and verified factorially with the children's sample. Many of the occupations provide various forms of human services. Unlike the occupational orientations, which organized perceived self-efficacy by the underlying competencies required, career choices were further differentiated by whether the work served primarily commercial, mentoring, medical, educational, manual, or reparative purposes. The eight factors included professorial and creative pursuits; medically oriented careers; child mentoring and rehabilitative care; merchandising and other business-related operations; military and law enforcement vocations; agricultural and horticultural lines of work; service jobs involving waiting on customers; and jobs requiring manual labor, mechanized production, and reparative activities.

The following paths of influence between perceived occupational efficacy and career choices were posited as the final link in the causal structure of the conceptual model. Children of high scientific-technical efficacy would select professorial careers and creative architectural and design pursuits, but the technologically oriented are unlikely to be much attracted to child mentoring and rehabilitative care. It was therefore predicted that they would shun occupations committed to child mentoring, patient care, and routinized public service. Children of high medical-educational efficacy would choose occupations providing medical and mentoring services while avoiding the more mechanized, manual ones. Children who judge themselves to be efficacious in the creative arts would pick literary and artistic careers as their

calling. A high sense of efficacy for business operations and management of public services would foster career choices in business and finance and mentoring and attendant service jobs but disfavor professional medical careers or those placing heavy demands on manual labor. Perceived self-efficacy in the military-policing domain encompassed a variety of public protective functions performed interdependently with mechanized equipment within hierarchically organized systems. It was predicted that perceived self-efficacy in this realm of functioning would not only foster choice of military and public protection roles, but training in service and organizational efficacy would increase consideration of a worklife in business and instructional fields and those requiring manual and mechanical competencies. Children with this form of perceived efficacy would regard themselves as ill-suited for child-mentoring occupations.

Perceived self-efficacy in the agricultural-horticultural sphere encompassed farming (which is heavily mechanized), gardening, and the creative work of plant nurseries and florists. Children with a self-efficacy bent toward a life of cultivating crops and plants and tending plant life would select agricultural occupations—manual and mechanized ones, those servicing the public, and floral trades tapping creative design.

Given the gendered traditionality of career orientations, it was hypothesized that boys would have a higher sense of efficacy for scientific, mechanical, and quantitative activities, whereas girls would judge themselves to be more efficacious for social service, mentoring, and health-related pursuits. The nature of their career choices would be differentiated along these sets of perceived capabilities.

## METHOD

*Participants.* The participants in this study were 272 children ranging in age from 11 to 15 years at Time 1, with a mean age of 12 years. There were 142 males and 130 females. This longitudinal project includes a staggered, multiple cohort design. Of the two cohorts at the outset of this prospective study, 134 were sixth graders and 138 were seventh graders. The participants were drawn from two middle schools in a residential community located near Rome. The children enrolled in these schools as well as their mothers and teachers participated in the study.

An Italian site was selected and early adolescence made the focus because such a sample is ideally suited for examining the life-course branching power of sociocognitive influences of special theoretical interest. After completing middle school, the children

undergo a major transition in which they must choose one of seventeen educational systems involving classical, scientific, or artistic lyceums; professional schools in the fields of engineering, commerce, or education; or technical schools designed to prepare students for particular types of technical, social service, or agricultural and horticultural vocations. Career paths are chosen early in the developmental course. Perceived career self-efficacy and occupational choices were measured before an educational system was chosen. These choices largely shape the pathways the children will follow into adulthood.

This community represents a microcosm of the larger society; it contains families of skilled workers, farmers, professionals, and local merchants and their service staffs. Sixteen percent were in professional or managerial ranks, 41% were merchants or operators of other types of businesses, 20% were skilled workers, 21% were unskilled workers, and 2% were retired. The socioeconomic diversity of the sample adds to the generalizability of the findings.

This community adheres to a stringent consent procedure for the conduct of research in the schools. A research proposal must gain approval from a school council composed of parent and teacher representatives as well as student representatives at the junior high and high school levels. In addition, parents must give consent and children are free to decline to take part if they so choose. Informed consent was obtained from 100% of the families. The parents not only consented to the study but 84% of the mothers participated in the study themselves. The study was structured to the parents and children as a project designed to gain better understanding of how children develop.

Children were administered the sets of scales measuring the variables of theoretical interest in their classrooms by two female experimenters. The various sociocognitive measures were administered over a period of several days. In addition, data on academic achievement were obtained from the children's teachers.

*Perceived self-efficacy.* Children's beliefs in their perceived self-efficacy were measured by 37 items representing seven domains of functioning (Bandura, 1990; Bandura et al., 1996a). For each item, children used a 5-point response format to rate their belief in their level of capability to execute the designated activities.

Perceived self-efficacy for academic achievement measured the children's belief in their capabilities to master different areas of coursework. These included mathematics, science, reading and writing language skills, and social studies. A second set of scales mea-

sured perceived self-efficacy for regulating their own learning activities (Zimmerman et al., 1992). These scales assessed children's efficacy to structure environments conducive to learning, to plan and organize their academic activities, to use cognitive devices to enhance understanding and memory of the material being taught, to seek out information and get teachers and peers to help them with academic problems when needed, to motivate themselves to do their school work, to get themselves to complete scholastic assignments within deadlines, and to pursue academic activities when there are other interesting things to do. The item, "How well can you get teachers to help you when you get stuck on schoolwork?" measured perceived self-efficacy to enlist enabling social resources. The item, "How well can you study when there are other interesting things to do?" measured children's perceived efficacy to motivate themselves for academic pursuits in the face of competing attractions.

A third set of scales assessed efficacy for leisure and extracurricular activities involving mainly group activities. A fourth set of scales assessed children's self-regulatory efficacy to resist peer pressure to engage in high-risk activities involving alcohol, drugs, and transgressive behavior that can get them into trouble. For example, the following item assessed perceived self-regulatory efficacy to rebuff pressures exerted by peers to drink alcoholic beverages: "How well can you resist peer pressure to drink beer, wine or liquor?"

Perceived social self-efficacy measured children's beliefs in their capabilities to form and maintain social relationships, work cooperatively with others, and manage different types of interpersonal conflicts. Self-assertive efficacy measured children's beliefs in their capabilities to voice their opinions, stand up to mistreatment or harassment, and refuse unreasonable requests. "How well can you express your opinions when other classmates disagree with you?" is a sample item assessing perceived self-assertive efficacy. Perceived self-efficacy to meet others' expectations assessed children's beliefs in their capabilities to fulfill what their parents, teachers, and peers expect of them and to live up to what they expect of themselves. "How well can you live up to what your parents expect of you?" typifies items in the perceived efficacy domain to fulfill social expectations.

A principal components factor analysis with varimax orthogonal rotation revealed a three-factor structure. The original set of items was therefore restructured into three domains of personal efficacy. The first factor, *Perceived Academic Self-Efficacy*, included high loading on 19 items measuring perceived capability

to manage one's own learning; master academic subjects; and fulfill personal, parental, and teachers' academic expectations. The predictive validity of this aspect of children's beliefs in their efficacy is supported by findings of prior research (Bandura et al., 1996a; Zimmerman et al., 1992). *Perceived Social Self-Efficacy* constituted the second factor. The 13 items loading on this factor included perceived capability for peer relationships, self-assertiveness, and leisure-time social activities. The third factor, *Perceived Self-Regulatory Efficacy*, was represented by 5 items measuring perceived capability to resist peer pressure to engage in high-risk activities. The findings of previous research corroborate the predictiveness of the latter two forms of perceived efficacy as well (Bandura et al., 1996b). These three factors constituted 20%, 9%, and 7% of the variance, respectively. The triadic factor structure has been replicated cross-nationally with Italian, Hungarian, and Polish children (Pastorelli et al., in press).

The reliability of the factors of perceived self-efficacy was assessed by the Squared Multiple Correlations of factor scores. Coefficients of .70 or better are indicators of stable factors (Tabachnik & Fidell, 1989). The estimated reliabilities were .89 for academic self-efficacy, .76 for social self-efficacy, and .86 for self-regulatory efficacy.

*Parental perceived academic efficacy.* Parents' beliefs in their efficacy to promote their children's intellectual development were measured with an eight-item subscale selected from the multidimensional scales of perceived parenting efficacy (Bandura, 1990). The items encompassed a diverse set of activities parents have to manage in promoting their children's academic development. The mothers completed their ratings individually at home. Mothers recorded their sense of efficacy on 5-point scales varying in the amount of influence they believed they could exercise over their children's development. The scale measured the parents' judgments of their personal efficacy to promote their children's interest in, and valuation of, education, to motivate them for academic pursuits, assist them with their schoolwork, and help them to stay out of trouble in school. The following sample item measured parents' perceived capability to influence their children's schoolwork: "How much can you do to help your children to work hard at their schoolwork?" Parents with more than one child in the sample rated their perceived efficacy and academic aspirations separately for each child. Factor analysis of these items revealed a single factor that accounted for 55% of the variance. The  $\alpha$  reliability coefficient is .87.

*Parental and children's academic aspirations.* Academic aspirations and valuation of academic pursuits were

measured by a set of seven items. Children rated on 5-point scales the importance placed on academic attainments by themselves, their parents, and their friends and the level of academic performance expectations their parents had for them and they had for themselves. In addition, children rated the educational level they expected to complete and the educational aspirations their parents had for them. The educational levels ranged from completing middle school, high school, specialized technical school, or some college work to graduating from college. These items were combined into an index of academic valuation and aspiration. The mothers completed the four relevant items measuring their valuation of academic activities and the educational aspirations they had for their children. The  $\alpha$  coefficients were .73 and .74 for the child and parental ratings, respectively.

*Academic achievement.* The children were graded by their teachers for their level of academic achievement in mathematics, science, language, and social studies both at midyear and at the end of the academic term. For each subject area, the assessment comprised five gradations of academic attainment. The academic grades were combined across academic subjects and the two assessments to provide a composite measure of academic achievement. The various sociocognitive factors described earlier were measured before the assessments of academic achievement.

*Children's perceived occupational self-efficacy.* The measure of perceived occupational self-efficacy encompassed the diverse classes of occupational pursuits identified in the field of career choice and development. The final form of the scale was pared down to 69 items from a large pool of items and structured factor analytically to ensure good psychometric properties. The children were presented with the items, which described common occupational pursuits. They represented a wide range of occupational activities, including those traditionally chosen by males and by females. The occupational roles were presented in terms of the major functions characterizing a given occupation rather than merely by job titles or constituent skills (e.g., "Help scientists with laboratory work," "Wait on tables in a restaurant," "Develop ideas for television commercials").

Job titles are too general and nondescript, and fractionating occupations into constituent subskills and judging self-efficacy to perform the detached subskills can be misleading. Efficacy beliefs may be high for the subskills but low for their integrated use or when they subserve difficult occupations. As previously noted, perceived self-efficacy may be lower for the same quantitative skills used in technical pursuits than when used in nontechnical ones. Personal effi-

cacy was measured for occupational functions because occupationally situated execution of integrated competencies involves much more than the sum of isolated subskills, and occupational context can make a big difference in how subskills play out. For each occupational pursuit, the children used a 6-point response format ranging from very unsure to very sure, to rate their belief in their capability that they could learn to perform successfully the functions required by the occupations.

To determine the factor structure of occupational self-efficacy, a principal components factor analyses with direct Oblimin factor rotation was conducted. The screen test of eigenvalues (Cattell & Vogelmann, 1977) yielded six factors. The six-factor structure corresponds closely to major career self-efficacy domains identified with adult populations (Lucas et al., 1997; Matsui & Tsukamoto, 1991). One of the factors, representing *Science-Technology Efficacy*, comprised a cluster of technical and exploratory scientific activities performed by scientific researchers, engineers, architects, computer programmers and operators, and technicians in scientific laboratories. A second factor, *Education-Medical Efficacy*, centered on educational and health services performed by university professors, school teachers, physicians, nurses, dentists, dieticians, pharmacists, veterinarians, psychologists, and physiotherapists. The third factor, *Literature-Art Efficacy*, embodied the literary and artistic activities of novelists, publishers, fashion designers, advertisers, art critics, and film producers. The *Social Service-Managerial Efficacy* included the service functions carried out by business managers, clerks, secretaries, librarians, restaurateurs, sales agents, travel agents and tourist guides, and hair stylists. The factor representing *Military-Police Efficacy* included performance of various military, police, and prison management roles as well as firefighting. The final factor is concerned with *Agriculture-Horticulture Efficacy*. The occupational pursuits included farming, operating farm equipment and plant nurseries, growing produce, and raising livestock.

The reliability of the factors of perceived occupational self-efficacy was assessed by the Squared Multiple Correlations of factor scores. The initial numbers in the following presentation of results represent the estimated reliabilities and the numbers in parentheses are the percent of variance explained. The reliabilities are .89 for science-technology (11%); .89 for education-medical (13%); .82 for literature-art (6%); .87 for social service-managership (10%); .81 for military-police roles (6%); and .87 for agriculture/horticulture (10%). The six occupational self-efficacy factors accounted for 56% of the total variance.

*Occupational choices.* Children were presented with the 69 occupational options and rated, for each pursuit, how seriously they would consider choosing it for their lifework. A year later, at Time 2, they rated their occupational choices on a 3-point scale to indicate that they would not select the given occupation, might consider it, or would strongly consider it as their career choice.

A principal components factor analysis with direct Oblimin factor rotation was performed on the children's career choices. The analysis yielded eight clusters of occupational choices. Occupational choice yielded a broader factor structure than did perceived occupational self-efficacy because some of the capabilities could serve diverse career paths as, for example, perceived self-efficacy for social service subserving medical, educational, mercantile, and police roles. One career cluster encompassed higher *educational and creative pursuits* represented by professorial, literary, architectural, artistic, television, and fashion design careers. A second cluster involved *medically oriented careers* in the fields of medicine, dentistry, nursing, pharmacology, and biological research. A third cluster of careers, *child mentoring-rehabilitative care*, centered on serving others through teaching at the nursery school level, mentoring children with special problems, and providing rehabilitative care. A *clerical-sales* occupational cluster centered on clerical, sales, and other business services. The sample occupations included bankers, accountants, office personnel, and sales agents in real estate, merchandise, insurance, and the automobile business. A *military-policing* occupational cluster encompassed doing work in the armed forces and the police forces, serving as security guards, and conducting investigative inquiries. Another cluster, involving *farming and gardening pursuits*, represented agricultural jobs such as cultivating plants in nurseries, growing produce, and tending trees. The *waiter-attendant* cluster included service and attendant jobs in restaurants, cafeterias, and hotels. The final occupational cluster is heavily oriented toward jobs requiring *manual labor, mechanized production and reparative activities*. Sample jobs include doing mechanized factory work; doing manual construction; repairing appliances, radios, and television sets; arranging produce in stores; and servicing automobiles in gas stations.

The reliability of the factors using the Squared Multiple Correlations of factor scores for the various occupational choices and the percent of variance accounted for are as follows: .72 for the professional-creative factor (5%); .83 for the medically-oriented factor (7%); .84 for the educational-care factor (8%); .91 for the military-police factor (10%); .82 for the

clerical-sales factor (8%); .82 for the farming-gardening factor (5%); .86 for the service-attendant factor (5%); and .79 for the laborer-repairer factor (8%). These eight factors of occupational choice explain 54% of the total variance.

## RESULTS

Table 1 presents the means and variances for the different sets of variables. It also includes the matrix of relationships among the various sociocognitive factors and perceived occupational self-efficacy and career choice. There was little age variance and no significant age correlates were found for any of the variables. Significant gender differences were obtained on a number of the assessed factors. The degrees of freedom for these  $F$  values are 1 and 270.

The children did not differ in their overall perceived academic self-efficacy, but microanalyses of different facets of the scholastic domain revealed gender differences that bear special relevance to perceived career self-efficacy and choice. Boys had a higher sense of efficacy for mathematics,  $F = 6.29, p < .02$ , and geographic science,  $F = 4.13, p < .05$ , whereas girls judged themselves more efficacious for language coursework,  $F = 9.05, p < .01$ . Girls also judged themselves more efficacious to regulate different aspects of their own learning activities. In terms of specific self-regulatory strategies, girls surpassed boys in their perceived capabilities to create an environment conducive to learning,  $F = 4.05, p < .05$ , to motivate themselves for scholastic activities,  $F = 3.71, p = .05$ , to plan,  $F = 4.53, p < .04$ , and organize,  $F = 5.65, p < .02$ , their scholastic activities and to abstract instructional material,  $F = 11.13, p < .001$ . Although girls gained higher scholastic attainments than did boys, the difference fell short of statistical significance.

There were no overall gender differences in perceived social efficacy because a higher sense of efficacy for boys in some social facets was offset by higher perceived efficacy for girls in other facets. Boys judged themselves more efficacious in managing the social aspects of athletic teams,  $F = 10.30, p < .001$ , whereas girls judged themselves more socially efficacious to make and keep friends of the same sex,  $F = 7.89, p < .005$ , and opposite sex,  $F = 28.52, p < .001$ , to carry on social conversations,  $F = 3.92, p < .05$ , and work cooperatively in groups,  $F = 5.57, p < .02$ . The children did not differ by gender in their perceived self-efficacy to resist peer pressure for transgressive activities.

The gender differences in perceived career self-efficacy reflect the continued gendered differentiation of occupational pathways. Boys had a higher sense of



**Table 1** Correlation Matrix for Perceived Self-Efficacy, Socioeconomic Status, Academic Aspiration and Achievement, Perceived Occupational Self-Efficacy, and Occupational Choice

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Socioeconomic status	1.76	.75	.15	.35	.08	.07	.06	.26	.22	.05	.03	.07	-.10	-.07	.01	-.20	.09	.04	-.01	-.04	-.11	-.08	.01	
2. Parent's academic efficacy	3.83	.69		.30	.10	.02	.07	.21	.12	.05	.14	.12	.00	.01	-.07	-.07	-.01	.09	.05	.01	.03	-.10	-.05	
3. Parent's academic aspirations	3.68	1.04			.31	.21	.16	.63	.60	.24	.24	.32	.07	.05	-.07	-.24	.18	.08	.08	-.02	-.13	-.20	-.05	
4. Children's academic efficacy	3.93	.62				.07	.00	.30	.37	.14	.24	.27	.11	-.04	.03	-.05	.23	.11	.11	.03	.07	-.03	.04	
5. Children's social efficacy	4.29	.44					-.08	.27	.06	.21	.11	.21	.13	.20	.06	.02	.13	.04	.04	.11	.11	-.12	.05	
6. Children's self-regulatory efficacy	4.27	.73						.16	.18	.14	.14	.07	.12	.02	-.08	-.10	.00	-.03	.00	-.03	-.09	-.02	-.10	
7. Children's academic aspirations	4.25	.77							.40	.28	.26	.31	.07	.10	.04	-.22	.21	.15	.08	.03	-.03	-.16	.02	
8. Academic achievement	3.10	.77								.23	.19	.24	.11	.01	.00	-.15	.18	.05	.04	.02	-.05	-.06	-.02	
9. Agriculture horticulture efficacy	3.94	1.07									.28	.37	.11	.26	.18	-.26	.37	.15	-.02	.10	.18	-.07	.21	
10. Military police roles efficacy	3.73	1.28										.53	.29	.22	.29	-.03	.13	.40	.44	.12	.03	.09	-.06	
11. Social service managership efficacy	4.23	.91											.27	.27	.21	-.07	.48	.27	.37	.16	.10	-.04	.00	
12. Literature art efficacy	3.71	1.13												.24	.27	.32	.05	.02	.27	.07	.28	.12	-.07	
13. Education medical efficacy	4.04	1.10													.12	.05	.04	.24	.04	.57	.26	-.01	.22	
14. Science technology efficacy	4.06	1.12														.25	.18	.19	.15	.08	.17	.52	.24	
15. Clerical, sales work	.74	.46															.02	.12	.24	.14	.26	.40	.17	
16. Waiter, attendant	.69	.57																.27	.18	.19	.15	.09	.16	
17. Teacher, patient care	.66	.57																		.37	.39	.26	.20	.22
18. Farmer, gardener	.71	.56																			.17	.16	.11	.12
19. Military, police work	.83	.58																				.38	.10	.28
20. Professor, writer, designer	.74	.42																					.12	.30
21. Doctor, nurse, pharmacist	.71	.51																						.19
22. Manual, laborer, repairer	.45	.43																						

Note: Factor scores were used in the analyses for variables 9–22. The means and standard deviations in the table are the scores for the items loading on the factors divided by the number of items.

$r = .10, p < .05$ ;  $r = .14, p < .01$ ;  $r = .19, p < .001$ .

efficacy than girls for careers in science and technology,  $F = 16.94, p < .001$ , and service in military and police forces,  $F = 42.70, p < .001$ . Girls, in turn, judged themselves to be more efficacious for careers in educational and health-related fields,  $F = 20.72, p < .001$ , and occupational activities involving social services and office management work,  $F = 12.38, p < .001$ .

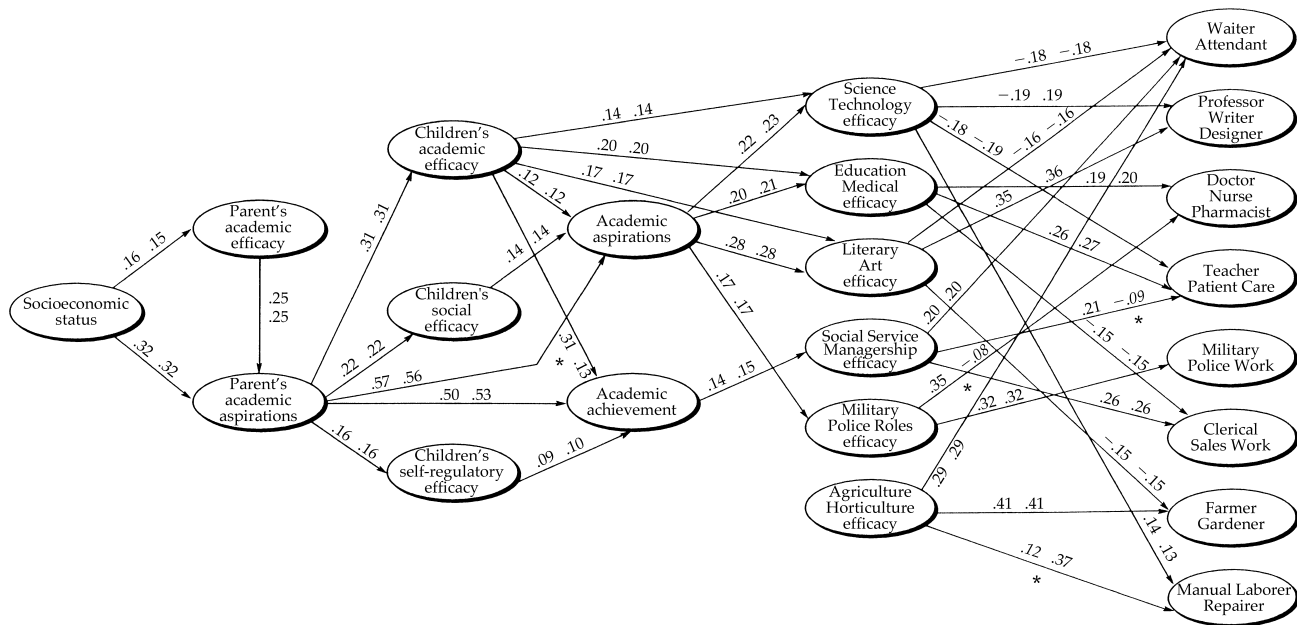
Some of the occupational choices also differed by gender. Boys were more likely than girls to seriously consider managership jobs in financial and sales organizations,  $F = 7.14, p < .01$ , military and police forces,  $F = 27.28, p < .001$ , and vocations requiring manual labor, mechanized production, and reparative work,  $F = 23.63, p < .001$ . Girls, on the other hand, gave higher consideration than boys to careers in elementary education, child mentoring, and patient rehabilitative care,  $F = 37.97, p < .001$ .

*Paths of influence.* The posited structural model of occupational efficacy and choice was tested on the covariance matrix by using the EQS program (Bentler, 1995). The parental and children's perceived efficacy and academic aspirations, level of academic achievement, and perceived occupational self-efficacy were assessed at Time 1 and their career choices were as-

essed at Time 2 one year later. Because of gender differences in some of the factors, the analysis of the structural model was conducted by using the multiple groups model approach, which estimated simultaneously the same pattern of relations among variables in the two samples of boys and girls. In this approach, equivalence among different samples is evaluated by constraints that impose identical estimates for the model's parameters (Byrne, 1994; Scott-Lennox & Scott-Lennox, 1995). In EQS the plausibility of these equality constraints is examined by the Lagrange Multipliers (LM) test (Bentler, 1995). For each of the constraints specified, the LM test provides evidence that the constraint applies to the populations involved. In the present study, the equality constraints were imposed on path coefficients across the gender groups.

The path coefficients significant beyond the  $p < .05$  significance in the structural equation modeling are presented in Figure 1. All of the predictive factors were measured at Time 1 and only the career choice was measured at Time 2.

Socioeconomic status has no direct effect either on children's perceived self-efficacy, academic aspira-



**Figure 1** Path analysis of the patterns of influence through which socioeconomic status, parental aspirations and perceived efficacy to promote academic development, and children's perceived self-efficacy, aspirations, and academic achievement affect children's perceived occupational efficacy and career choices. The first path coefficient on each of the structural links is for girls; the second coefficient is for boys. All the path coefficients are significant beyond the  $p < .05$  level except that, for boys, perceived social and managerial efficacy is unrelated to teaching and patient care, and efficacy for military and police roles is unrelated to doctoring and nursing. For girls, agricultural and horticultural efficacy is unrelated to manual and technical reparative work. These nonsignificant path coefficients are printed in italic type. The coefficients with an asterisk on the paths differ significantly across gender.

tions and achievement, perceived occupational efficacy, or occupational choices. Its impact is mediated entirely through its influence on parental perceived academic efficacy and educational aspirations. The higher the family's socioeconomic status, the stronger the parents' beliefs in their efficacy to promote their children's academic development and the higher the educational aspirations they have for them. Parents' beliefs in their efficacy to foster their children's educability also raises academic aspirations for their children.

Parental aspirations are positively linked to all three forms of children's perceived self-efficacy—academic, social, and self-regulatory. The aspirations parents hold for their children also have a strong impact on their children's academic aspirations and level of academic achievement. The impact of parental aspirations on their children's perceived occupational efficacy is entirely mediated through their children's perceived self-efficacy and academic achievement. Neither parents' perceived efficacy nor academic aspirations have any direct effect on their children's career considerations.

All three forms of children's perceived self-efficacy contribute to their beliefs in their occupational efficacy, but perceived academic self-efficacy has the most diverse impact. Children who have a secure sense of academic efficacy judge themselves to be efficacious for careers in science and technology, educational and medical fields, artistic and literary pursuits, and management of business and social service systems. In addition to its direct effects, children's beliefs in their academic capabilities fosters a sense of efficacy for these higher level occupational pursuits through its impact on academic aspirations and level of academic achievement. Moreover, perceived academic efficacy has an impact on perceived efficacy for management of businesses and social service systems by influencing children's level of academic achievement. The mediation through academic achievement is stronger for girls than for boys. Perceived academic efficacy also affects perceived efficacy for military and police roles but only indirectly through its influence on academic aspirations.

Children's beliefs in their social efficacy heighten their perceived efficacy for careers in science, technology, education, medicine, and art and literature only indirectly through academic aspirations. Children's perceived self-efficacy to resist social pressures for engagement in transgressive activities is positively linked to a high sense of efficacy for social service and managership roles that require responsibility for organizational functions and the welfare of others.

Interestingly, children grounded their sense of oc-

cupational efficacy in their beliefs about their academic capabilities rather than their actual academic achievement. The only class of pursuits where academic achievement made a difference in perceived occupational efficacy was for social service and managership roles. Perceived efficacy for agricultural and horticultural occupations was unrelated to the socio-cognitive factors. Agricultural pursuits vary widely in the extent to which they call on cognitive skills depending on whether the functions are performed mainly manually or with complicated machinery. Such pursuits do not call much for interpersonal skills. Whether perceived academic self-efficacy may be linked to efficacy for the more technologically based agricultural vocations remains to be determined.

The different types of perceived occupational self-efficacy were predictive of both adoption and rejection of particular classes of career pursuits. Children of high perceived scientific and technological efficacy chose career pursuits embracing professorial and creative activities but shunned those involving child mentoring, patient caretaking, and routinized social services. They also favored technical occupations requiring less in the way of cognitive skills, such as jobs involving mechanized production and technical reparative work. Those of high educational and medical efficacy selected medically oriented occupations, helping others through mentoring and rehabilitative care, but eschewed a worklife of clerical and sales activities. Social service and managership efficacy had multiple links to socially oriented occupations varying in the type of social ministrations and directiveness they required. Thus, children of high efficacy in this career domain were attracted to occupations offering business, retail, secretarial and recreational services, caring for patients, and waiting on people in hotels and restaurants. This efficacy domain also had a gendered effect on career choice. Girls who judged themselves to be efficacious for social service chose occupations offering child mentoring and patient care, but boys did not. A sense of literary and artistic efficacy had both positive and negative impact on career choice: it supported creative pursuits but dissuaded involvement in vocations centered on agricultural activities and routinized public service.

Perceived self-efficacy for the functions performed in military and police roles also had a gendered occupational link. Efficacy in this domain promoted choice of military and legal enforcement activities, but girls with this form of efficacy also favored medically oriented occupations such as nursing and doctoring, which are a vital part of medical services, whereas boys did not.

Children who have a high sense of efficacy for agricultural and horticultural activities chose occupations in farming and gardening and service jobs in which they wait on customers. They also selected other types of manual occupations requiring physical and mechanical skills. The latter occupational link is stronger for boys than for girls.

The preceding analyses traced the patterns of career preferences and aversions associated with particular forms of perceived occupational efficacy. Several of the classes of occupations involved human services, but they were distinguished by the types of services provided. The personal forms of perceived efficacy underpinning the perceived occupational efficacy seemed to be an influential determinant of whether children would gravitate toward medical, educational, business, manual, or attendant types of services.

Tests for the goodness of fit of the trimmed structural model to the empirical data using different indices yielded results that fell within the range indicating a good model fit. The various tests yielded a Comparative Fit Index (CFI) of .96, a Normed Fit Index (NFI) of .94, a Nonnormed Fit Index (NNFI) of .96, a Root Mean Square Error of Approximation (RMSEA) of .026, and a  $\chi^2(342, N = 272) = 402.30, p = .02$ . The dependence, however, of the  $\chi^2$  statistic on sample size makes it a less sensitive test with large samples, which often produces a significant value when, in fact, there is a good fit. The  $\chi^2/df$  is a fit index that weights the  $\chi^2$  statistic by the degrees of freedom. The ratio of 1.18 indicates a good fit to the model.

The percent of variance in career choice accounted for by the model is  $R^2 = .20$  for professorial-creative fields,  $R^2 = .20$  for elementary education-health care vocations,  $R^2 = .15$  for occupational choices in manual-reparative vocations, to  $R^2 = .24$  for military-police work,  $R^2 = .11$  for medically related professions,  $R^2 = .12$  for jobs in the clerical-sales realms,  $R^2 = .16$  for agricultural lines of work, and  $R^2 = .20$  for jobs attending to the general public.

## DISCUSSION

The findings of this prospective study provide substantial empirical support for the posited causal structure through which socioeconomic, familial, academic, and self-referent influences operate in concert to shape children's career trajectories. In accord with the conceptual model, familial socioeconomic status had only an indirect effect on children's perceived occupational efficacy and career choice by raising parental educational aspirations and belief in their efficacy to promote their children's academic develop-

ment. That socioeconomic influences are agentically mediated through their impact on parental sociocognitive orientations is consistent with findings regarding developmental outcomes in other spheres of childhood functioning (Baldwin et al., 1989; Bandura et al., 1996a; Elder, 1995).

The more strongly parents believe that they can play a part in their children's scholastic development, the higher the educational aspirations they hold for them. These findings also concur with a large body of evidence that a strong sense of efficacy promotes high aspirations in both children and adults (Bandura, 1997; Locke & Latham, 1990). The impact of parental aspirations on children's judgments of their occupational efficacy and career choice is entirely mediated through the effect on children's self-conceptions of efficacy, academic aspirations, and achievement. Aspiring parents act in ways that build their children's academic, social, and self-regulatory efficacy, raise their aspirations, and promote their scholastic achievements.

The patterning of children's perceived efficacy influences the types of occupations for which they believe they have the capabilities, which, in turn, is linked to the kinds of career pursuits they would choose for their life's work. Thus, children of high perceived academic efficacy achieve good academic progress and have high educational aspirations and a strong sense of efficacy for scientific, educational, literary, and medical pursuits. They favor career levels in these fields that require advanced educational development. In accord with the conceptual model, children's beliefs in their academic efficacy had the most pervasive direct impact on their judgments of their occupational efficacy. In addition, perceived academic efficacy affects perceived occupational capabilities through its impact on academic aspirations.

Perceiving oneself to be socially efficacious does not, in itself, shape occupational trajectories. It operates, however, through academic aspirations in raising perceived efficacy for the occupational pursuits described earlier. Nor does perceived efficacy to control transgressiveness operate directly on perceived occupational self-efficacy. Rather, its impact is mediated through academic achievement. Good self-regulators do better academically and view their capabilities as well suited for social service and managership roles, which require a sense of responsibility for the welfare of others and adherence to organizational standards. For these occupational pursuits, efficacious self-management was more important than just perceived sociableness.

The aggregate findings of this study reveal that the patterning of children's perceived occupational self-

efficacy shapes not only the types of career pursuits they favor, but also the occupational level they select within a given type of service vocation and the types of worklife they disfavor. The accelerated pace of informational, social, and technological change is altering the nature of careers from the traditional linear progression models grounded in environmental stability to dynamic models of multiform career adaptability to rapidly transforming environments (Sullivan, 1999). The new demands for repeated self-renewal are placing a premium on a firm sense of efficacy for occupational self-development throughout one's worklife (Bandura, 1997, 2001).

The structural linkages of the sociocognitive factors to each other and to perceived occupational self-efficacy did not differ as a function of gender; however, gendered traditionality of career choice emerged in the translation of perceived occupational self-efficacy to career choice. For example, high social service and managership efficacy was equally promotive of office and sales work across gender status, but this form of efficacy also fostered choice of careers in child mentoring and patient rehabilitative care in girls but not in boys. Traditionality of gendered pursuits is also interestingly reflected in the attraction to aspects of roles within multifaceted occupational domains. For example, girls chose careers in nursing but boys did not. Thus, perceived efficacy for military service promoted career choice in doctoring and nursing in girls but did not attract boys to these functional roles; boys were more oriented to the operational and combat aspects of a military career. High perceived efficacy for agricultural pursuits, where machines now do much of the work, was more likely to lead boys than girls to choose occupations involving mechanized factory production, manual labor, and technical reparative work.

Similar types of competencies may serve pursuits at different career levels. Thus, a high sense of efficacy for scientific and technological callings supports not only advanced educational and scientific pursuits, but also vocations requiring technical competencies such as repairing household appliances, radios, and televisions. Efficacy beliefs steer children not only toward careers that match their perceived capabilities, but away from vocations that call for quite different types of competencies. For example, children who view themselves as technologically efficacious avoid vocations that serve people in hotels and restaurants or who mentor and care for children.

A number of methodological features of this prospective study add to the reliability of the obtained relationships. Data for the different classes of variables were obtained by different methods (self-report and

academic performance) and from different sources (the participants themselves, their parents, and teachers). This diversity of assessment reduces common method and source biases. The self-efficacy and other psychosocial predictors were measured before academic achievement. The staggered design included two sets of cohorts to provide diversity of sample and contextual period of assessment. Moreover, a number of the key paths of influence posited in the conceptual scheme have been previously verified both through experimental modification of self-efficacy beliefs and by causal modeling of naturally occurring relationships (Bandura, 1997; Bandura et al., 1996a; Schunk, 1995; Wood & Bandura, 1989; Zimmerman & Bandura, 1994; Zimmerman et al., 1992). Children made their career choices a year after the sociocognitive predictors were assessed. These various features remove some of the ambiguity concerning the direction of causation and provide converging supportive evidence from divergent lines of research for the paths of influence.

The main disparity between the postulated structural model and the empirical data was in the mediational role of academic achievement in career self-efficacy. It was hypothesized that the impact of children's perceived academic and self-directive efficacy on beliefs about their capabilities for occupational pursuits requiring higher order cognitive skills would be partly mediated through their level of academic achievement. The direct path of influence from perceived academic self-efficacy to perceived career self-efficacy was verified. But academic achievement mediated only perceived self-efficacy for mercantile and managership activities in business organizations. The failure of academic achievement to add predictive value was unexpected. It seems that in this phase of their educational development, children view their scholastic subject matters as having little relevance to the functions and roles of different career pursuits. Hence, they apparently discount how well they do scholastically in judging their occupational efficacy. The predictive superiority of perceived academic self-efficacy over actual academic performance is in accord with a now-growing body of evidence across different spheres of functioning. People's motivation, future accomplishments, and affective states are governed more by their perceived self-efficacy than by their prior performances (Bandura, Adams, & Beyer, 1977; Bandura, Pastorelli, Barbaranelli, & Caprara, 1999; Collins, 1982; Litt, 1988; Schunk, 1984; Wood & Bandura, 1989; Zimmerman et al., 1992).

It would be recalled that perceived social and self-regulatory efficacy were considered to be a supplemental contributor to career paths because neither so-

ciableness nor transgressive restraint will necessarily spawn occupational attainments; however, the lack of any residual direct influence on perceived efficacy for socially oriented occupations after taking into account the influence of other sociocognitive contributors was another source of disparity with the structural model. In affective and interpersonal spheres of functioning, perceived self-regulatory and social efficacy operate as direct as well as mediating influences (Bandura et al., 1999; Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2000). In self-appraisal of occupational capabilities, however, both social and self-regulatory efficacy come into play through their impact on aspirations and academic achievement. This may be because the same capability can subserve different types of occupations, such as social facility in child mentoring or organizational managership, depending on career aspirations and the forms of academic preparation they require.

In previous research analyzing the pattern of influences governing children's academic achievement, parents' beliefs in their academic promotive efficacy enhanced their children's beliefs in their academic capabilities both directly and mediational through the educational aspirations parents held for their children (Bandura et al., 1996a). In the current research, parents' perceived academic efficacy was linked to children's academic self-beliefs solely through parental aspirations. This finding suggests that, within the context of career development, self-efficacious parents are most likely to enhance their children's academic self-beliefs by expressing their promotive efficacy through high aspirations. Expressions of aspiration convey faith in their children's academic capabilities. In choosing career paths, children are projecting far in the future. After controlling for variations in children's beliefs in their occupational efficacy, which are rooted in their perceived academic efficacy, parental aspirations remain as the significant contributors to children's perceived academic efficacy.

Children's aspirations and beliefs in their personal efficacy accounted for a significant share of the variance in career choice, but a fair amount of variance remains unexplained. In social cognitive theory, perceived efficacy and aspirations are by no means the whole story. These factors operate in conjunction with other sociocognitive contributors to the courses of action taken. For example, the types of perceived benefits provided by given occupational pursuits and the costs they entail contribute to career choice and development (Lent, Lopez, & Biesche, 1991; Wheeler, 1983). These outcome expectations may be material ones in the form of monetary rewards and burdensomeness of task demands; social outcomes in the form of

social status and the various social costs and benefits associated with different occupations; and the self-evaluative outcomes that take the form of pride and self-satisfaction derived from one's work or self-devaluation over some of the adverse things the occupations require one to do to succeed. The potential costs and benefits are weighed in terms of personal values that are reflected in career priorities. It should be noted that the directive and motivating potential of outcome expectancies is partly governed by beliefs of personal capabilities (Bandura, 1997). Many occupational activities, if done well, provide highly valued outcomes, but they are not pursued by people who seriously doubt they have what it takes to succeed (Betz & Hackett, 1986).

Another set of determinants is concerned with perceived opportunity structures and social and institutional impediments. The enabling aspects include the availability of requisite material resources, ease of entry into given occupations, and the opportunities they provide for self-development, advancement, and use of one's particular talents. The impediments represent the informal and institutional barriers erected to entry and advancement in given career pursuits. For example, vestiges of sex segregation of women in positions of lower status continue to impose obstacles to their pursuit of higher level careers and advancement in them, especially in those that have been traditionally dominated by men (Bussey & Bandura, 1999; Eccles & Hoffman, 1984; Jacobs, 1989; Stockard & Johnson, 1992).

The present study was primarily aimed at clarifying how socioeconomic conditions, parents' and children's educational aspirations, and perceived efficacy and scholastic accomplishments operate in concert in shaping children's beliefs about their occupational efficacy, career considerations, and actual preparatory choices. Having verified the impact of these core factors on career trajectories, further tests of social cognitive theory that encompass occupational outcome expectations, the value placed on those outcomes, and perceived opportunity structures and impediments should account for an even larger share of the variance in career choice and development.

The contribution of perceived self-efficacy to career choice has important bearing as well on theoretical conceptions of decision making. According to expectancy-value theories, people judge the instrumentality of possible options, weigh their costs and benefits, and then select the course of action with the highest expected value (Ajzen & Fishbein, 1980; Feather, 1982; Vroom, 1964). Instrumental value and outcome considerations are only a part of the basis of choice, and even the weighting of these factors is car-

ried out quite inefficiently (Behling & Starke, 1973; Brandt, 1979; Simon, 1978). People act on their beliefs about what they can do as well as their beliefs about the likely outcomes of various courses of action (Bandura, 1997; Lent et al., 1994). The findings of the present study indicate that self-efficacy beliefs determine the slate of options given serious consideration. People do not regard options in domains of perceived inefficacy as worth considering, whatever benefits they may hold. Such exclusions of large classes of options are made rapidly on self-efficacy grounds with little thought of costs and benefits.

Perceived efficacy not only sets the slate of options for consideration, but also influences other aspects of decision making. It affects what information is collected, how the considered factors are weighted, whether the opportunities or the risks of given pursuits are given salience, and the extent to which decisions are swayed by a foreshortened or extended time perspective (Bandura, 1997; Blustein, 1989; Eppel, Bandura, & Zimbardo, 1999; Kreuger & Dickson, 1993, 1994; Urekami, 1996). Making a decision is only part of the operation that in no way ends decisional processes. Implementing a decision and sticking to it, especially in the face of difficulties, are essential aspects of an agentic theory of decision making that rest heavily on beliefs of personal efficacy (Bandura, 1997). Having chosen a course of action, one must continue to make decisions during its implementation. A comprehensive psychology of decision making thus requires a psychology of action (Harré, 1983) grounded in enabling and sustaining efficacy beliefs. Indeed, students of high perceived self-efficacy not only act on their cognized preferences but stick it out through tough times in preparing themselves for occupations presenting daunting challenges (Lent et al., 1986, 1987).

As in the case of adults, the findings of the present study show that gender is significantly associated with perceived occupational efficacy, career choice, and preparatory development. The differences follow the stereotypic courses, with boys judging themselves more efficacious for careers in science and technology and girls reporting a higher sense of efficacy for social, educational and health services. The findings show that gender status affects occupational choices stereotypically as well. These differences in perceived occupational self-efficacy and choice are all the more telling because girls perform academically as well as boys. American college students exhibit the same gendered pattern (Betz & Hackett, 1981). Recent evidence shows that girls are catching up with boys in coursework in math and science in high school, but girls are still shunning careers in scientific and techni-

cal fields (Betz, 1994). Such findings suggest that the foreclosure of career options may rest more heavily on perceived inefficacy and sociostructural encumbrances than on background preparation.

Diverse lines of research lend support to the generalizability of the findings and to the cross-cultural applicability of the theory. There may be greater gender differentiation in Italian society. The studies cited previously, however, reveal a large gender gap in perceived occupational self-efficacy and career considerations among students in American high schools and colleges and in the careers pursued in the workforce. Occupational pursuits cluster in much the same way for American, Italian, and Japanese samples (Holland, 1996; Matsui & Tsukamoto, 1991). With regard to the generality of the theory, cross-national research yields essentially the same factor structures for children's self-efficacy beliefs in Poland, Hungary, and Italy (Pastorelli, in press). Moreover, efficacy beliefs operate similarly in the causal structures for Korean, Italian, and American children (Bandura et al., 1996a; Kwak & Bandura, 1999; Zimmerman et al., 1992).

Diverse lines of research provide converging evidence of societal practices that undermine women's sense of efficacy in academic domains critical to career choice and development (Bandura, 1997; Hackett & Betz, 1981). Low interest and inadequate preparation in mathematics is an especially serious barrier because it filters out a large number of career options requiring quantitative competencies (Sells, 1982). Females enroll in significantly fewer mathematics, science, and computer courses at the more advanced levels; have less interest in these subjects; and view them as less useful to their lives than do their male counterparts (American Association of University Women Educational Foundation, 1998; Bussey & Bandura, 1999).

Boys and girls do not differ initially in their perceived mathematical capabilities, but girls begin to lose confidence in their math ability and differ increasingly from boys in this regard as they move into high school. These declines in self-appraisal have their origins partly in parents' gender-linked beliefs about their children's capabilities. Parents generally subscribe to the cultural stereotype that girls are less talented in mathematics than boys, despite equivalent grades in mathematics (Eccles, 1989; Entwisle & Baker, 1983; Lummis & Stevenson, 1990; Phillips & Zimmerman, 1990).

The gender bias operates in classrooms as well as in homes and creeps into career guidance functions (Betz & Fitzgerald, 1987; Dweck, Davidson, Nelson, & Enna, 1978). When subjected to the same level of failure in mathematical activities, female students

judge themselves less efficacious and treat themselves more harshly than do male students (Campbell & Hackett, 1986). Given the negative stereotyping of mathematic abilities in women, they perform poorer on mathematical tests represented as sensitive to gender status, but not when portrayed as insensitive to gender status (Steele, 1997).

The peer system is another influential agency that creates further validation for the gender stereotypes of differential capability (Bussey & Bandura, 1999; Mazzella, Durkin, Cerini, & Buralli, 1992). Another major social influence is the stereotypic cultural modeling of gender roles in the television world (Furnham & Bitar, 1993; Kortenhuis & Demarest, 1993; Signorielli, 1990). Moreover, the gendered practices of familial, educational, peer, and media subsystems are essentially replicated in organizational structures and practices. These include extensive segregation of jobs along gender lines, concentration of women in lower level positions, inequitable wages for comparable performance, greater impediments for upper level mobility, and power imbalances in work relationships that erect barriers to equitable participation in organizational activities (Bussey & Bandura, 1999; Eccles & Hoffman, 1984; Jacobs, 1989; Stockard & Johnson, 1992).

Because women are disinclined to choose careers in scientific and technical fields traditionally dominated by men, such occupations lack female role models to inspire and encourage women to enter these career paths. The disparity in perceived efficacy for male-dominated and female-dominated occupations is largest for women who adopt the stereotypic gender role, have self-doubts about their quantitative capabilities, and believe there are few successful female models in traditionally male-dominated occupations (Matsui, Ikeda, & Ohmishi, 1989). To the extent that stereotypic masculine attributes such as aggressiveness and competitiveness are considered essential for success in given occupations, women who have not adopted these types of attributes express a lower sense of efficacy for such fields (Matsui & Onglatco, 1991). This is true even for occupations that do not require technical and quantitative skills.

The traditionality of children's gendered occupational efficacy, with boys oriented toward scientific and technological activities and girls toward social service, has important social implications. Sociostructural practices lag far behind the changing status of women and their growing participation in the workforce (Bandura, 1997; Riley, Kahn, & Foner, 1994). As a result, women's potential and their contribution to the scientific and economic life of a society are not fully realized. The demographic changes in college

populations indicate that our society will have to rely increasingly on the talents of women and ethnic minorities to maintain its scientific, technological, and economic viability. Our societal response to the discordance between occupational socialization practices and the human resources needed for technological and economic progress is to draw heavily on foreign nationals rather than cultivate broadly the scientific and high-tech capabilities of our youth.

In acknowledging the influential role of perceived self-efficacy in gender differences in career aspirations and pursuits, we should not lose sight of the fact that inequitable educational practices, cultural constraints, disparate incentive systems, and truncated opportunity structures are important contributors to women's career development. It should also be noted that there is substantial diversity within sexes. Neither boys nor girls are a uniform group. Therefore, modal gender characteristics in perceived self-efficacy should not be imputed to all members within each sex group. Indeed, women who take a more egalitarian view toward the roles of women display a higher sense of efficacy for traditionally male occupations and pursue such careers more often (Hackett, 1985). They construct different identities and futures for themselves.

The self-efficacy component of social cognitive theory does more than identify a contributory factor to career development. The theory provides the means for enhancing the personal source of control over the course of one's self-development (Bandura, 1997). The findings of the current study suggest that children's career trajectories are getting crystallized rather early in the developmental process. Hence, efforts to reduce sociostructural biases that constrict women's career development require early intervention. Modeling supplemented with guided mastery experiences provides an especially effective vehicle for building resilient self-efficacy. In efforts to reduce gender disparities arising from impairing self-beliefs, this approach instills a strong sense of efficacy and skill in domains of educational and occupational activities in which many women are beset with self-doubt (Betz & Schifano, 2000; Gist, Schwoerer, & Rosen, 1989; Schunk & Lilly, 1984).

Beneficial gender role development is a social matter, not just a personal one. Handicapping practices that are built into societal subsystems require social remedies. The social efforts must address the expectations, belief systems, and social practices in the home, school, mass media, and workplace that not only diminish personal efficacy and aspirations but erect institutional impediments to making the most of one's talents. Such efforts, however, do not have the singu-



lar aim of pushing women into nontraditional careers, but rather of removing stereotyping barriers that constrict enabling experiences and the range of career options open to women (Betz, 1989).

This prospective study has furthered our understanding of some of the origins of children's perceived occupational efficacy and how these self-beliefs, in turn, influence career choices that will shape the pathways the children follow into adulthood. Different courses of occupational development immerse one in particular types of social networks and normative influences that play important contributory roles in setting the courses that lives take. For example, choice of occupational pursuits is likely to determine the nature of friendship patterns, marital partnerships, avocational interests, and socioeconomic life conditions. This project will, therefore, examine longitudinally the impact of sociocognitive influences in the occupational realm on social and emotional functioning in late adolescence and early adulthood. Integrating the important, but essentially neglected, sphere of career development with the more traditional cognitive and socioemotional aspects should further advance understanding of the determinants of life-course trajectories.

## ACKNOWLEDGMENTS

The research reported in this article was supported by grants from the Grant Foundation, the Spencer Foundation, and the Jacobs Foundation.

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