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Momma Knows Best: Parental Impact on Intention to Major in IT

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ABSTRACT

According to the literature children's educational and behavioral outcomes are strongly influenced by their parents. Besides setting an example for their children, parents also shape their behavior and attitudes. The present study represents a step toward a better understanding of how parental education levels impact children's vocational and educational choices, by using data from 518 Midwestern high school students through the Social Cognitive Career Theory (SCCT) model. The results show that while a paternal level of education does not affect intent to major in IT, maternal level of education significantly moderates the relationship between intent to major through interest in IT and outcome expectations. Implications pertaining to parental education and IT as a major choice are discussed.

Keywords

Social cognitive career theory, high school, parents, mother, father.

INTRODUCTION

Education is one of the most significant determinants of an individual's success in life. Children's academic achievements and career paths are strongly influenced by their parents. Parents' behavior shapes their children's interests and beliefs about themselves as well as educational decisions, and career paths (Jodl et al. 2001). Furthermore, the educational level of parents has an important influence on the educational and behavioral outcomes of their children (Davis-Kean 2005). The career development process is comprehensively explained by Social Cognitive Career Theory (SCCT) (Lent et al. 1994), which incorporates Bandura's (1986) social-cognitive theory. The SCCT model was further elucidated by Lent et al. (2000), highlighting the importance of social support and career barriers in developing self-efficacy beliefs, interests, and outcome expectations. Previous research has looked at how parental support (Chohan and Khan 2010; Katz et al. 2018), involvement (Bresnihan et al. 2021; Fan and Williams 2010; Hoover-Dempsey and Sandler 1997), and socioeconomic status (Davis-Kean 2005; Idris et al. 2020) affect children's academic achievement and career choice; however, research has not examined the differential impact of parental education levels on the SCCT model. Specifically, this study addresses the gap in not examining the impact of parental education levels on SCCT model constructs.

In this research, we investigate the SCCT model to determine the impact of parental education on the intention of 518 Midwestern high school students to major in IT. According to our findings, while paternal level of education does not influence intention to major in IT, maternal level of education has a significant moderating impact on intent to major through interest in IT and outcome expectations. Our hope is that by better understanding the differential effects of parental education, parents and educators can design better strategies to support children's academic and career success in IT career aspirations.

BACKGROUND

Parental Impact on Education

Parental influence plays a crucial role in shaping children's job choices. According to Shoffner and Klemer (1973), parents play an important part in guiding their children's vocational choices by acting as role models, affecting self-concept, motivating interests and achievements, and providing the developmental environment and job information. There is a consistent pattern of evidence that parents' education contributes significantly to children's achievement (Davis-Kean 2005; Davis-Kean et al. 2021; Haveman and Wolfe 1995). While some parents may have specific plans and encourage their children to pursue certain careers, others may provide more general guidance and leave the decision-making to their children (Shoffner and Klemer 1973).

Regardless of the approach taken, parental guidance can provide children with a sense of purpose and direction for the future (Shoffner and Klemer 1973). Considering parental educational level, a mother's education is likely to have a greater impact on her children's education and career expectations than a father's (Gratz et al. 2006; Jodl et al. 2001; Marks 2008; Shoffner and Klemer 1973). Marks (2008) suggests that the mother's education level is likely to be more important since children are more exposed to their mother's values, aspirations, and attitudes due to spending more time with them.

Social Cognitive Career Theory

Social cognitive career theory (Lent et al. 1994) offers a comprehensive framework that can be used to understand the development of vocational interests, academic performance (Schaub and Tokar 2005), career choices, and career development (Gushue and Whitson 2006). Throughout the field of counseling and career psychology, SCCT has been extensively used as a method for examining how individuals develop vocational interests, select occupations, and achieve success (Luse et al. 2014). According to SCCT, individuals can shape their own career development and make choices that align with their interests and goals. SCCT recognizes that personal and environmental factors can either facilitate or hinder an individual's ability to make career decisions. A variety of factors can contribute to these dynamics, including educational opportunities, social and cultural norms, personal beliefs, and other situational or contextual factors (Lent et al. 1994; Lent et al. 2000). Consequently, SCCT takes a holistic and nuanced approach to career counseling by considering both individual choices and broader social and environmental factors. SCCT mainly focuses on three key variables to better understand how individuals develop their careers: self-efficacy beliefs, outcome expectations, and individual interests. In this study, we utilize the SCCT choice model (Lent et al. 1994) to examine how parental education levels affect their children's intention to major in IT.

SCCT emphasizes the important role played by cognitive variables, such as self-efficacy and outcome expectations, in career development (Gushue and Whitson 2006). It is imperative to have self-efficacy since completing a task successfully requires not only skill but also self-belief that the task can be accomplished (Scheibe et al. 2007). Adolescents' self-efficacy and behavior are largely shaped by their social environment (Bandura 1986). Parenting is responsible for influencing adolescents' self-efficacy development as well as providing observational models to help adolescents adjust their self-efficacy based on their experiences and relationships (Fan and Williams 2010). Support from parents is positively related to choosing a career based on self-efficacy (Gushue and Whitson 2006). We believe that children's confidence and self-belief in their ability to use technology effectively – information technology self-efficacy, or ITSE – is expected to influence the academic major they choose, which is further enhanced by their parents' educational degree. Accordingly, we propose the following hypothesis:

H1: The impact of ITSE on intent to major will be positively affected by parental education.

A person's level of self-efficacy in a certain activity is a key determinant of interest in that activity (Lent et al. 1994). Occupational interests are defined by Hansen (2013) as preferences, dislikes, and neutral attitudes about occupations and activities related to a career. These interests are expected to influence decisions about a career. Likewise, these interests are developed through parental participation. Through experiences in the home and specific parenting practices, parents can foster children's interests and activity choices (Jodl et al. 2001). Parents can impart values and beliefs of their children simply by involving them in different activities (Eccles et al. 1993). Parents and career counselors can develop the interests of children in a particular type of activity by providing them with opportunities to engage in similar activities and teaching them how to master these activities (Wong et al. 2011). Taking this into account, we hypothesize:

H2: The impact of interest on intent to major will be positively affected by parental education.

Bandura (1986) proposes that the outcomes of people's actions depend on their perceptions of what they are capable of doing (self-efficacy beliefs) and their expectations about what will happen (outcome expectations). Parents provide job information for their children (Shoffner and Klemer 1973) that influences their activity preferences, beliefs about themselves, and future choices regarding education and careers (Jodl et al. 2001). In adolescence, higher parental educational levels led to more optimistic educational aspirations or higher educational achievement, followed by more prestigious occupational prospects in adulthood (Dubow et al. 2009). Similarly, children's occupational and educational aspirations are associated with parents' educational and occupational status (Jodl et al. 2001). This background leads us to hypothesize:

H3: The impact of outcome expectations on intent to major will be positively affected by parental education.

Figure 1 depicts the research model including hypotheses.

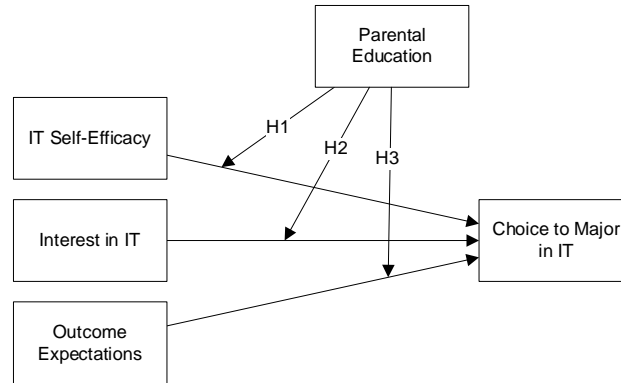


Figure 1. Research model.

METHODS

Data Collection

Subjects consisted of high school students from across a Midwestern State who participated in a yearly high school outreach program to interest students in IT. The data was collected over a six-year period. The survey was administered prior to the start of the program to mitigate any bias from the activities. Subjects were emailed a link to an online survey that included questions to measure SCCT. The items were developed from previous research to measure information technology self-efficacy (Davazdahemami et al. 2018; Luse and Rursch 2021), interest (Krieger and Luse 2022), and career expectations (Luse et al. 2014). Subjects also indicated the level of education of each of their parents as well as their intent to major in IT.

Results

In total, 545 subjects filled out the survey. Of those, 27 were removed due to missing data, leaving a total sample of 518 subjects. A measurement model (CFA) was run to assess the psychometric properties of the data. Satisfactory reliability (Cronbach's alpha and composite reliability) was found for each of the independent variables including IT self-efficacy ($\alpha=0.91$, $CR=0.88$), interest in IT ($\alpha=0.87$, $CR=0.87$), and career expectations ($\alpha=0.85$, $CR=0.85$). Convergent validity was found with all average variance extracted values greater than 0.5 for ITSE ($AVE=0.62$), interest ($AVE=0.57$), and career expectations ($AVE=0.54$). Furthermore, discriminant validity was found to exist as the square root of the AVE values was greater than any correlation with any other variable in the model.

An initial model was run to estimate the default SCCT model with the direct impact of parental degrees on intent to major in IT. While the primary independent variables in the SCCT model – including ITSE ($\beta = 0.13$, $p = 0.01$), interest ($\beta = 0.57$, $p < 0.001$), and career expectations ($\beta = 0.39$, $p < 0.001$) – were found to be significant predictors of intent to major in IT, neither father's degree ($\beta = -0.01$, $p = 0.81$) nor mother's degree ($\beta = 0.06$, $p = 0.38$) were found to have a direct effect on intent to major. A second model was then run to assess the moderating impact of parental degree on each of the independent variables. Results showed that while father's degree had no moderating impact, mother's degree had a moderating impact on two of the independent variables, including interest ($\beta = -0.13$, $p = 0.05$) and career expectations ($\beta = 0.25$, $p = 0.004$). While this showed support for H3, the significant interaction of mother's education with interest was significant, but not in the direction hypothesized for H2. Overall, the model explained 31 percent of the variance in intent to major in IT. Statistics for each model are given in Table 1.

	Model 1			Model 2		
	beta	std error	t-value	beta	std error	t-value
Intercept	-1.01	0.51	-1.97 *	0.79	1.51	0.52
ITSE	0.13	0.05	2.56 *	0.14	0.16	0.88
Interest	0.57	0.07	8.49 ***	0.84	0.22	3.79 ***
Career	0.39	0.08	4.81 ***	-0.15	0.26	-0.59
Father Degree	-0.01	0.06	-0.24	0.31	0.42	0.73
Mother Degree	0.06	0.06	0.89	-0.75	0.46	-1.64
ITSE * Father				0.00	0.04	-0.11
ITSE * Mother				0.00	0.05	0.01
Interest * Father				0.05	0.06	0.91
Interest * Mother				-0.13	0.07	-1.93 *
Career * Father				-0.10	0.07	-1.37
Career * Mother				0.25	0.09	2.93 **

Table 1. Model statistics

Graphical analyses of the interaction results are presented in Figure 2. As shown, level of mother’s degree has a differential impact depending on the independent variable. If mothers have a lower educational level, then the level of career expectations does not differ in its impact on intent to major in IT. Conversely, when the mother has a higher educational level, the greater the impact of career expectations on intent to major. For interest, results show that interest has a differential impact on intent to major for students from mothers with lower educational levels while there is no significant differential impact of interest on intent for students from mothers with higher education.

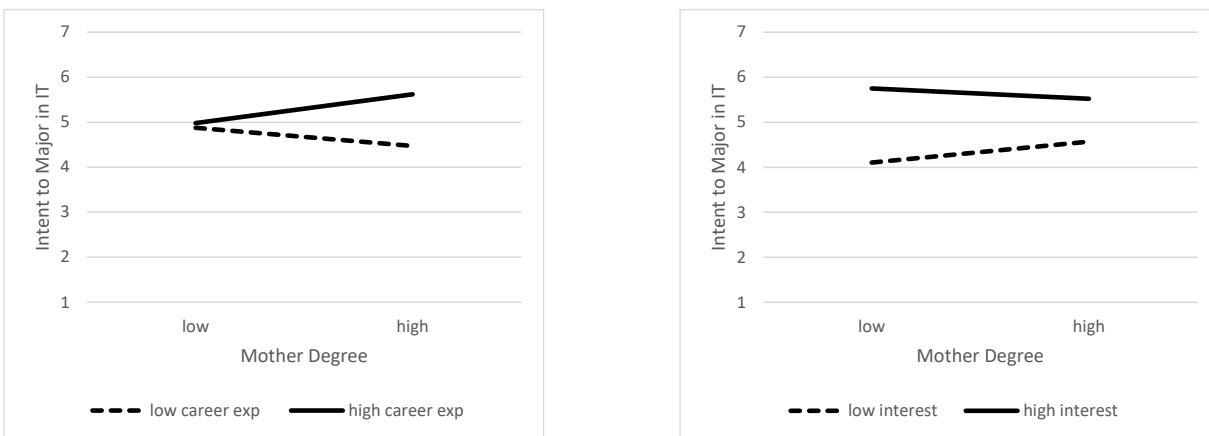


Figure 2. Interaction effects

FINDINGS

As illustrated in Figure 2, the impact of career expectations and interest on students' intentions to pursue a major in IT may vary depending on their mother's education level. In particular, for students whose mothers have a low level of education, interest in IT has a varying impact on their intention to major; however, for students whose mothers have higher levels of education, interest does not have a significant differential impact on intent. Conversely, career expectations impact the intention to major in IT differently depending on the mother's educational level. For students whose mothers have a higher educational level, career expectations have a greater impact on their intention to major in IT than for those whose mothers have a lower educational level. One potential explanation for these findings is that mother's self-esteem tends to be higher if she has been educated, which can positively affect her ability to nourish and prepare her children (Idris, Hussain et al. 2020). Moreover, higher educated mothers may be better at conveying the potential advantages of majoring in IT to their children since they are more aware of the opportunities and benefits associated with IT careers. Conversely, less educated mothers are less interested in their childrens’ education (Idris, Hussain et al. 2020) which may result in children choosing the major based on their own interest and is consistent with our results that students whose mothers have a lower level of education are more likely to choose a major based on their personal interests that maybe be due to the lack of benefit from the knowledge shared by their mothers.

Another possible explanation is that mothers with a higher level of education have greater aspirations for their children's academic and career achievements (Davis-Kean 2005). Since IT professions generally have a high level of financial reward and prestige, these careers may become a particular target for high-educated mothers to encourage their children to pursue.

CONCLUSION

In keeping with previous research (Gratz et al. 2006; Jodl et al. 2001; Marks 2008; Shoffner and Klemmer 1973), on the whole mothers have more influence over their children's education and career expectations than fathers. In this work the mother's educational level had a significant moderating effect on two of the independent variables: interest and career outcomes.

One most heartening finding to those working with science, technology, engineering, and mathematics (STEM) outreach programs is that while it was predicted that parents' educational level would positively affect the impact of interest on major intent and thus push the scale toward selecting IT as a college major (H2), the findings showed a differential impact based upon mother's educational level. If mothers have a higher educational level, their children's interest in IT does not affect their intent to major. However, if a mother has a lower educational level, there is a significant relationship between interest and intent to major, such that higher interest leads to a greater intent to major. This demonstrates that students' interest in the area can drive their selection of the major beyond the mother's experience or guidance. It bodes well for outreach programs that focus on increasing student interest in IT at any early age. Outreach programs can work to increase interest in the IT related areas and thus increase enrollment and production in the computer-related careers pipeline. This implies students can move beyond their mothers' educational level and occupational experience, thus potentially moving past a previous socio-economic status impediment of mother's lower educational level.

Conversely, mothers with higher educational background positively impact the influence of their child's outcome expectations on intent to major (H3), keeping with previous findings (Dubow et al. 2009). Again, this could point to a socio-economic condition where mothers who have higher educational levels have seen the "brighter future" for those who major and have careers in IT-related fields. However, for students who have mothers with a lower educational level, career expectations do not differentially impact intent to major in IT. A takeaway for outreach programmers again points to the base model of increasing understanding of career opportunities based upon early intervention.

Overall, this research points toward the influence of mother's educational background on their child's future major intentions in IT by affecting the impact of interest and career outcome expectations. These findings point towards important opportunities for outreach programs to target those families in order to better market IT as a potential career path for children.

RESEARCH IMPLICATIONS AND LIMITATIONS

Through this study, we examined how parental education level influences children's career choices in IT; however, we did not take into account whether the parents' educational background is actually in the IT field. This could have led to more nuanced conclusions informing policies aimed at increasing interest and engagement in IT careers. In light of our study's findings, future research could investigate how parents with IT-related degrees influence their children's career choices, as compared to parents without IT-related degrees.

Our study suggests that educators and mothers can collaborate to entice more children to consider IT as their future career option. As part of this effort, students should be exposed to IT-related courses and career opportunities at an early age as well as provided with more information about the advantages of pursuing an IT career. To ensure that children with less educated mothers have the resources necessary to succeed in the IT field, educational institutions could provide additional support and resources such as IT outreach programs (Luse and Hammer 2017; Luse et al. 2014) in order to introduce IT as a promising field as their career choice. In addition, aiming to attract more students from diverse backgrounds with different socio-economic statuses to IT careers can help to address the industry's absence of certain groups leading to produce more innovative products and services that are more appropriate for a diverse global population. Furthermore, in this way, it is possible to prevent a decrease in the number of students enrolling in and completing STEM degrees.

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