

The Relationship between Low-Income Middle School Gifted Students' Beliefs about Intelligence and Their Attitudes in School

Mihyeon Kim and Jennifer H. Robins

Abstract—What are the psychological mechanisms that enable middle school gifted students to accomplish their academic goals? Among many models and theories to understand the ways to promote students' academic achievement, implicit theories of intelligence is described as a model that students may hold different implicit belief about the nature of intelligence and have been explored to predict low-income students' academic motivation and achievement. To understand psychological mechanisms that allow low-income gifted students to overcome challenges they face, this study examined beliefs about nature of intelligence and their attitude in school in the context of implicit theories on shaping their attitudes in schools. The results of the study indicated that the multiple regression analysis for predicting attitude in school was found to be statistically significant. The results of this study showed that beliefs about malleable characteristics of intelligence impact their attitudes in school.

Index Terms—Implicit intelligence theory, underachievement, low-income gifted students, school attitudes.

I. INTRODUCTION

Early adolescent years are a critical stage in individuals' development, because many changes happen during this time and the way in which they deal with these changes has major implications for adolescents' academic futures [1]. Educators have highlighted that low-income students often face barriers to overcome from their impoverished background such as a lack of positive educational support and experience from family and school [2]-[6]. Although many low-income students have barriers in their environment that inhibit them from being academically motivated in school, some low-income gifted students experience academic success and have positive attitudes toward school, whereas other low-income gifted students underachieve in school. Many gifted students who showed potential for academic success often fail to perform well in school. Poor achievement in school compare to their demonstrated ability frustrates educators and parents. Researchers have examined factors influencing gifted students' discrepancy between ability and their achievement [7]. Among various factors explored to understand low-income students' academic success, perception about their intelligence have studied under social-cognitive motivation theories.

Educators and psychologists have long debated the definitions of intelligence and how to measurement it. Identification, developmental aspect, and environmental context of intelligence have been explored in terms of external impact and internal coherence among the psychology and education fields to understand the role of intelligence in lifelong learning. The malleability of intelligence has been discussed along with all the questions about intelligence. Whether intelligence is expandable or fixed, researchers believe that students' perception about their intelligence can impact students' achievement and attitude, and Dweck [8] proposed that attributions predict cognitions, affect, and performance as individual face barriers [8], [9].

According to Dweck and her associates [10], students' beliefs about their intelligence influence their performance goals and their responses to obstacles they deal with [9], [11]. Dweck suggested that there are two different beliefs about intelligence. One belief is to view intelligence as a fixed entity, and the other belief is to consider intelligence as a changeable characteristic. Even though students show the same measured intelligence, students may respond to their barriers differently depending on their perception about intelligence. When students face challenges, students with a fixed mindset tend to stop working and put little effort in academics as a way of protecting themselves whereas students who believe in growing characteristics of intelligence work hard to improve their performance in school [12]. Understanding psychological mechanisms enabling low-income gifted students to thrive under challenges and barriers they face help educators to guide and serve their students more effectively.

Robin and Pals [13] demonstrated that the implicit theory model predicts how students respond to the challenges. Students with a fixed entity belief give up easily when they have challenges compared to students who believe in changeable characteristics of intelligence. The purpose of this study was to explore the relationship between perceptions of gifted students from low-income backgrounds about their intelligence and their attitudes in school, because of concern about the educational aspirations and attitudes in school of low-income students. The current study examined the role of beliefs on intelligence of low-income gifted students from in the context of implicit theories on shaping their attitudes in schools.

II. METHODOLOGY

A. Program Description and Participants

Participants for the study were 79 rising seventh- and eighth-grade high-ability students from low-income

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Mihyeon Kim and Jennifer Robins are with the Center for Gifted Education, William and Mary, Williamsburg, VA 23187 USA (e-mail: mxkim3@wm.edu, jhrobins@wm.edu).

backgrounds who participated in a 2-week residential summer enrichment program called Camp Launch, which began in 2012. Camp Launch was developed and implemented specifically to support low-income, high-ability seventh- and eighth-grade students from school districts within 75 miles of the William & Mary campus in Williamsburg, Virginia, in the United States. Only districts with more than 52% of students eligible for free and reduced lunch were considered eligible. Camp Launch staff members contacted gifted coordinators of selected districts and informed them about the purpose of the program, responsibilities of districts, and how to identify students.

Camp Launch has four goals:

- To deliver advanced instruction in academic content such as science, technology, engineering, and mathematics (STEM) fields, writing, academic self-efficacy, and personal development.
- To provide enrichment opportunities in a wide variety of content areas.
- To encourage the development of peer support networks.
- To develop in campers a future orientation that includes a college education, along with preparation that will help them take advantage of enabling opportunities to achieve that goal.

STEM knowledge, skills, and abilities are critical for continuous technological innovations. Although the demand of students' STEM talent has been addressed in education, many different people have raised concerns about STEM education in the United States and voiced a need for more rigorous and integrated STEM curricula with high-quality teachers [14]. Camp Launch is designed to address the need for STEM education, and each course emphasizes the understanding and application of advanced science content and scientific investigation processes through an inquiry-based, problem-centered, and technologically focused approach to learning.

Camp Launch addresses the need for strong writing skills of low-income, high-ability students to be successful and ready for higher education and their future career. For STEM education, the ability for students to communicate their ideas to others in writing is an essential skill for effective scientific investigation. Camp Launch supports students to advance their skills in written expression, including developing advanced vocabulary, learning how to write for different audiences and for different purposes, and learning how to edit. Camp Launch addresses the socio-emotional needs of low-income, high-ability students in addition to addressing their needs for academic support. Studies relating to the psychological and social issues of this population have recognized issues such as negative stereotypes, peer pressure, and identity issues [15]-[18]. Therefore, Camp Launch includes a personal development course as one of the main academic courses to address the need for the development of psychosocial skills of low-income high ability students.

The program consists of 60 hours of direct instruction in academic content (i.e., STEM, academic content, writing, and instruction for personal development), a 5-hour career planning workshop, a STEM-based field trip, and 15 hours of other enrichment educational opportunities, such as drama, art, and so forth, based on students' choices and interests.

Selected school districts were contacted for their participation, and districts were required to provide transportation to and from the campsite for their students, if they were willing to participate. Gifted coordinators who agreed to participate identified rising seventh-grade students based on the following criteria for the participation:

- family income level below \$45,000, and
- standardized test scores at the 90th percentile or better in at least one of the test subscales, or
- recommendation accompanied by evidence of performance.

After the first year, participants were invited back for a second year as rising eighth graders along with a new seventh-grade cohort. Beginning in Year 3 of the program, a select group of rising ninth graders were invited to apply for a Junior Teaching Assistant (TA) position. Eight students were selected to serve as Junior TAs in the science courses. Table I shows the total number of participants in the program between 2012 and 2017.

TABLE I: CAMP LAUNCH PARTICIPANTS

| | Year 1 (2012) | Year 2 (2013) | Year 3 (2014) | Year 4 (2015) | Year 5 (2016) | Year 6 (2017) |
|------------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Rising 7 th | 46 | 36 | 50 | 25 | 46 | 37 |
| Rising 8 th | | 37 | 32 | 37 | 23 | 31 |
| Rising 9 th | | | 8 | 12 | 8 | 8 |
| Total | 46 | 73 | 90 | 73 | 77 | 76 |

In Year 3, out of the 90 students, 79 rising seventh- and eighth-grade participants completed the surveys in full. The rising ninth graders were not included in the data collection.

B. Instruments

Two self-reporting instruments—Implicit Theories of Intelligence Scale [18] and School Attitudes Assessment Survey-Revised—were used in this study to examine the relationship between self-perception about students' intelligence and school attitudes amongst low-income high-ability students. The Implicit Theories of Intelligence Scale contains 4 incremental and 4 entity theory items and assesses general beliefs about the fixedness versus malleability of intelligence. Overall, research indicates the scale displays good internal consistency ($\alpha = .82$ to $.97$) and good construct validity, with scores predicting theoretically meaningful relationships with a range of variables [10]. The School Attitudes Assessment Survey-Revised (SAAS-R) consists of 35 items [19] and measures academic self-perceptions, attitude toward school, motivation, goal valuation, and attitudes toward teachers. McCoach and Siegle [19] reported a range of $.86$ to $.92$ for the internal consistency reliability coefficient on the five factors.

III. RESULTS

Data were analyzed to examine relationship between low-income gifted students' perception about their intelligence and their school attitudes. Correlations amongst factors are presented in Table II, respectively.

TABLE II: CORRELATIONS AMONGST FACTORS (N=79)

| | I ¹ | SAAS_ R ¹ | SAAS_ R ² | SAAS_ R ³ | SAAS_ R ⁴ | SAAS_ R ⁵ |
|-------------------------|----------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| I ¹ | 1 | | | | | |
| SAAS_ R ¹ | -.30* | 1 | | | | |
| SAAS_ R ² | .77* | .63* | 1 | | | |
| SAAS_ R ³ | -.25* | .42* | .66* | 1 | | |
| SAAS_ R ⁴ | -.42* | .66* | .82* | .65* | 1 | |
| SAAS_ R ⁵ | -.07 | .32* | .56* | .66* | .48* | 1 |

I¹: Implicit-Intelligence; SAAS_R¹: Goal Valuation; SAAS_R²: Motivation/Self Regulation; SAAS_R³: Attitude toward Teachers; SAAS_R⁴: Academic Self-perception; SAAS_R⁵: Attitude toward School; * $p < .05$

Regression was conducted to explore relationships between predictors and dependent variables. The overall multiple regression of predicting school attitudes of goal valuation, motivation/self-regulation, attitude toward teachers, and academic self-perception from students' perception about intelligence showed $R = .30$ and $R^2 = .08$, $R = .23$ and $R^2 = .05$, $R = .25$ and $R^2 = .06$, $R = .07$ and $R = .42$, and $R^2 = .18$. That is, when students' perception about intelligence was used as predictors, about 8%, 5%, 6%, 7%, and 18% of the variance in students' school attitude factors of goal valuation, motivation/self-regulation, attitude toward teachers, and academic self-perception could be predicted. The overall regression was statistically significant, $F(1, 77) = 7.44, p < .01$; $F(1, 77) = 4.19, p < .05$; $F(1, 77) = 5.01, p < .05$; and $F(1, 77) = 16.36, p < .001$.

The results show that the factor of perception about their intelligence was significantly predictive of four of school attitude factors of goal valuation, motivation/self-regulation, attitude toward teachers, and academic self-perception factors. Complete results for the multiple regression are presented in Table III.

TABLE III: MULTIPLE REGRESSION INCLUDING SCHOOL ATTITUDE OF DISADVANTAGED STUDENTS RELATED TO PERCEPTION ABOUT THEIR INTELLIGENCE (N=79)

| Variables | Implicit Intelligence | | |
|----------------------------|-----------------------|-------|------|
| | R ² | F | p |
| Goal | .088 | 7.44 | .008 |
| Motivation/self-regulation | .052 | 4.19 | .044 |
| Attitude toward teachers | .061 | 5.01 | .028 |
| Academic self-perception | .175 | 16.36 | .000 |
| Attitude toward school | .005 | .36 | .546 |

IV. DISCUSSION

The focus of this study was to extend the implicit self-theory to a real-world context and examine the impact of

low-income gifted students' perception about intelligence on their attitude in school. Barriers of disadvantaged gifted students and their achievement have often been studied to support them in school; however, there has been a lack of research on students' perception of intelligence and the impact of it on their achievement and attitude in school. The results of this study provide a three-fold contribution toward the understanding of how low-income gifted students overcome their environmental barriers and are academically successful in school. First, the results show a relationship between students' belief about intelligence and their attitude in school. Second, the study extends prior psychological research about low-income gifted students by including a variable of implicit factor. Third, this investigation continues to explore the process of academic success of low-income, high-ability students.

Underachievement of gifted students is associated with development of students' confidence, the way of responding to teachers and school personnel, students' interest in school, and goal valuation impacting students' motivation in academics [19]. The present study supports the need for a greater focus on effort among incremental theorists than among entity theorists. This study demonstrates that believing malleable characteristics of intelligence impact students' goal valuation, academic perceptions, motivation and self-regulation, and their attitudes toward teachers. Intervention and counseling sessions for low-income gifted adolescents to help them understand their capabilities may motivate them to focus on their academics.

This study supports the socioemotional needs of disadvantaged gifted students in addition to addressing their needs for academic support. Studies about the psychological and social aspect of this population have explored negative stereotypes, peer pressure, and identity issues [15]-[17]. However, understanding their capabilities and future possibilities may support their academic success, because through it, the individual strives to meet his or her social and emotional needs, regardless of the systemic and historic environmental stressors and disadvantages [21]-[24].

Researchers and practitioners have become increasingly interested in studying performance of gifted students who encounter difficult situations or pressures [25]. Previous research studied various factors to understand how low-income gifted students overcome their barriers [24], [26]-[30]. The present study demonstrated that perception about intelligence influence their attitudes in schools. As results of the current study showed, students need to have growth mindset to have positive attitudes in school. School counseling programs and educators need to address students' capability and understand the importance of continuous academic commitment regardless their adversity.

V. CONCLUSION

Understanding psychological mechanisms and developing a supportive academic performance system for low-income middle school gifted students are not simple to explore; however, academic success of this population has significant implications for their personal and future career satisfaction throughout their lifespan. Tailored educational services based on the understanding of high-ability students from

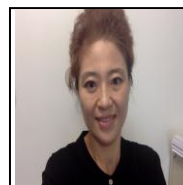
disadvantage backgrounds are known to benefit students. More research about various psychological aspects about gifted students and effective interventions to address underachievement of gifted students will be desirable to provide evidence for what works effectively for low-income gifted student population.

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Mihyeon Kim is the director of precollegiate learner programs at the Center for Gifted Education, William and Mary. She is responsible for designing and implementing academic enrichment services for precollegiate students and has expanded services to international students. She is interested in development of effective enrichment programs and career development of gifted students. In addition, she is staunchly committed to providing educational opportunities to disadvantaged students to offer enrichment programs. She offers a variety of precollegiate programs for various student populations, including Saturday, summer, and residential programs.



Jennifer H. Robins is the director of publications and professional development at the Center for Gifted Education at William and Mary and a clinical assistant professor. She received her doctorate in educational psychology with an emphasis in gifted education from Baylor University. Currently she is managing editor of the *Journal for the Education of the Gifted* and treasurer of The Association for the Gifted, Council for Exceptional Children. Her areas of interest include the history of gifted education and underrepresented populations.