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I am smart, therefore I can: examining the relationship between IQ and self-efficacy across cultures

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Abstract

The purpose of this article is to examine the relationship between intelligence (IQ) and self-efficacy in children and adolescents living in the United States and Nicaragua. The sample consisted of 90 (46 male, 44 female) students (mean age=11.57 years, SD=3.0 years) referred by school administrators and faculty. United States (US) participants (n=27) resided in rural counties in the Northwest. The other group consisted of 63 students from Central America. A comparison between groups revealed that in the US, sample higher grades and IQ scores are typically associated with higher levels of self-efficacy. However in the Nicaraguan sample, both IQ scores and grades were not associated with self-efficacy, although age was correlated with self-efficacy. Results suggest that the construct of self-efficacy might change depending on whether one belongs to an individualistic or collectivistic society. Additionally, the effects of socioeconomic factors might influence perceived ability even more than intellectual abilities.

Keywords: collectivistic; intelligence (IQ); poverty; self-efficacy; socioeconomic status (SES).

Introduction

The American Psychological Association (APA) has stated as part of its vision that the organization aims to serve as a “global partner promoting psychological knowledge and methods to facilitate the resolution of personal, societal, and global challenges” (1). Within this context, one of the many challenges we face today is the issue of children living in

poverty. There are certainly factors outside the individual, such as governmental and economic structures, which influence the outcomes of poor children. However, established psychological factors could also play a key role in predicting their personal, educational, and vocational success.

Research identifies self-efficacy as one of the predictors for eradication of the culture of poverty in the United States (US) (2). Self-efficacy has further been identified as one of the key factors that must be addressed in order for people to accept new practices that improve their well-being (3). However, little is known about how self-efficacy might differ in developing countries.

Nicaragua is one of the poorest countries in the Western hemisphere. Half the population lives beneath the poverty line, 38% report having gone hungry in a 12-month period (4), and 46.5% are under-employed (5). There might be many opportunities for applied psychology to help children break the cycle of poverty in their families. However, more research is needed to understand whether personal factors, such as self-efficacy, are as important for personal outcomes in Nicaragua as they are in the US.

Self-efficacy predicts positive outcomes

Self-efficacy (SE) is defined as “belief in one’s capabilities to organize and execute the courses of action required to produce given attainments” (1). SE is different from self-concept in that it has less to do with “who I am” and more to do with “what I think I can do”. In general, people with high self-efficacy are more likely to persevere in the face of difficulty, expend more effort, and choose higher goals (1, 6). There is substantial evidence that SE influences successful attainment of goals in several domains, including cognitive, health, clinical, and organizational functioning (1). Some have proposed that SE is a better predictor of success than skills or past accomplishments (1, 7). Because of its connection to positive outcomes in the face of difficulty, it has been considered an important facet of resilience and could even serve as a proxy indicator of resilience as an outcome (8).

Self-efficacy, academic achievement, and intelligence

In the academic realm, SE relates positively to mental effort (9), writing performance (10), use of learning strategies (11, 12), mathematics achievement (13), and memory functioning (14), among other things. Academic SE has been linked to academic achievement, including grades and aptitude tests (12, 13, 15–18).

Research on SE, achievement, and intelligence (IQ), however, has had mixed results. Paunonen and Hong (19) found

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that students' SE for specific cognitive domains correlated with subsequent performance on verbal, numerical, and spatial cognitive abilities, but not for mechanical. Smith (12) reported that SE related to grades, but IQ did not. Ayatola and Adedeji (13) showed that mathematics SE was the best predictor of math achievement, but that mental ability did not correlate with math SE, math anxiety, or math achievement. Furthermore, Nuovo and Elastico (16) found that SE predicts verbal IQ and academic success, but IQ did not predict academic success. More research is needed to clarify the connections between ability (IQ), efficacy, and achievement, especially across cultures. There is limited research on intelligence and SE, possibly because of the cost in time and money of established intelligence tests.

Intelligence assessment in Spanish-speaking children and adolescents

In consideration of the implications of cognitive assessment, mental health clinicians have long been concerned about the disproportionate number of minorities represented in the mentally retarded category (20). For this reason, among others, it has become increasingly important to develop cognitive assessments that are culturally appropriate. One example of such tests is the Wechsler Intelligence Scale for Children (WISC), which is the most widely used intelligence measure for children. Based on its popularity and a growing need for administration in other languages, a Spanish version of this test was created in 2005 (21). Owing to the relative newness of the WISC-IV in Spanish, there was a need to validate its utility for Spanish-speaking children. In a sample of 107 Spanish-speaking children of Puerto Rican descent, the WISC-IV was determined to have criterion validity when used to assess brain dysfunction (21). There are certain criteria that should be followed in using assessments with culturally diverse students. Rhodes et al. (22) suggest that when using a culturally specific test, one must be clear about definitions of special education, as well as the demographic, legal, and educational issues experienced by culturally diverse students. The authors consulted with clinicians who specialize in testing Spanish-speaking populations and ensured the reliability of these guidelines.

Cultural differences in self-efficacy

Bandura (23) contends that efficacy beliefs contribute significantly to performance across cultures, based on the basic capacities of common human nature. However, many cross-cultural studies have found that when SE is compared between Western and non-Western groups, non-Western groups tend to have lower SE beliefs that are more predictive of performance (24). In a review of 20 studies, Klassen (24) concluded that although optimistic SE (predictions higher than actual performance) appears to influence outcomes in Western cultures, realistic SE (predictions closer to actual performance) seems more likely and more effective in non-Western cultures.

It has been proposed that the "self" focus of self-efficacy could alter its relevance in collectivistic cultures. Whereas

individualistic cultures, such as the US, tend to emphasize independence, individual initiative, and privacy, more collectivistic cultures, such as Mexico, tend to emphasize a more collective identity, group solidarity, and duty (25). Klassen (24) concludes that SE operates differently in non-Western cultures compared with Western cultures, but that across cultures, SE does tend to be highly predictive of performance. Bandura (23) agrees that culture could influence the diverse ways that SE can influence outcomes, but argues that SE is still relevant across cultural contexts. More research is needed on the relationship between SE and positive outcomes in different collectivistic societies. Much of the present cross-cultural research on SE compares Western countries with Asian or Eastern European societies, but research in collectivistic Latin American countries is limited.

A central idea in social cognitive theory is the reciprocal determinism between behavioral, cognitive, and environmental influences. According to this premise, SE would improve performance, which would in turn improve SE. To test the reciprocal determinism of SE and performance for mathematics, Williams and Williams (26) used structural equation modeling with cross-sectional data from 15-year-old in many countries. The model was a good fit and supportive of reciprocal determinism for 24 of the 33 countries. This suggests that although the relationship between SE and achievement is relevant in many cultures, there is still some cross-cultural variation for these pathways. No Central American countries were included in this analysis.

Further exploration of the relationship between SE and achievement in different cultures is needed, especially in developing countries, where SE could be a tool to help children improve their situations.

Achievement, self-efficacy, and poverty

In the US, a family's socioeconomic status (SES) is defined by the parents' education, occupations, and incomes (27). Research has shown that parents' beliefs and educational successes are particularly influential in predicting children's achievement (28). Based on this information, families from lower SES backgrounds might not have access to the types of resources that are otherwise available for creating a stimulating and warm home environment and might be at higher risk for lower achievement (29).

Another important element in children's achievement levels is parental stress. McLoyd (30) created a model that explained the interaction of low income and child-rearing outcomes. He states that parents who have lower income have higher parental stress levels and lower mental health, which then influences parenting behaviors in the home and results in negative behavioral consequences for children. A study of diverse family dynamics found that Mexican American children had more adjustment problems when they experienced parental conflicts in the home than other ethnicities (31).

In their study including participants from over 30 countries, Williams and Williams (26) found that in all but two countries, SES had a significant, positive effect on math achievement test scores. SES also had a positive effect on SE

for math, but only in 19 of 30 nations. This further suggests that there is variability in the pathways between poverty, SE, and achievement among cultures.

Overview of current research

Research on intelligence, SE, and academic achievement is limited both in low SES residents of the US, as well as in developing countries. The primary purpose of this project was to explore the pathways of SE in a collectivistic, developing nation, and an individualistic, developed nation. Additionally, the authors hoped to gain an understanding of the influence of SES in the development of SE in children and adolescents. To reduce the confounding influence of linguistic differences, the US sample consisted of mainly first- and second-generation Spanish-speaking immigrant children.

Two hypotheses were undertaken to examine the relationship between IQ and SE in the two countries. Based on the idea that as abilities (IQ) lead to mastery experiences, efficacy will increase, we hypothesized that IQ, Grade Point Average (GPA), age, and SE would moderately correlate for the entire sample. This result would corroborate the current understanding of how SE enhances academic achievement (12, 13, 15–18). Secondly, in the Nicaraguan sample, IQ, SE, and achievement would correlate, perhaps more so in a non-Western society, which tends to have more calibration (realistic predictions) between efficacy beliefs and actual achievement.

Methods

Participants

A total of 91 Spanish-speaking participants were randomly selected to participate in this study by school faculty, and psychologists in four different school districts, two in Nicaragua and two in the US. Of these selected participants, one did not qualify because her age was beyond the criteria established by the study. Therefore, 90 participants (46 males and 44 females) completed the intelligence measure, the self-efficacy scale, and a short interview. The study participants ranged in age from 6 to 16 years; the average age was 11.57 years ($SD=3.0$ years). In the US sample ($n=27$), participants resided in the Northwest. These students were enrolled in rural school districts, 90% of these students' parents work agricultural jobs. Their school records indicated that 80% of this sample was first generation (born in Mexico), and 20% was second generation (born in the US, parents born in a different Latin American countries). The majority of the participants' school records (95%) indicated that their socioeconomic status was low (below the poverty level), and (5%) indicated being working class. For the first generation subgroup ($n=18$), length of residence in the US ranged from 5 to 15 years (mean=7.5 years, $SD=3.0$ years). Of this sample, 85% reported speaking Spanish at home.

The subsample from Nicaragua consisted of 63 students from the capital city, Managua. Of this subsample, 53% included students presenting to the school psychologist in a Nicaraguan private institution between January 7, 2008 and January 7, 2010. Computerized school records were used to obtain randomized archival data describing students' use of the school psychology services. Permission to conduct the study was obtained through the University Human Subjects

Research Committee for use of this de-identified data. This subsample was identified as belonging to the upper class as established by the social stratification census of Nicaragua. This group of students received their education at a private school. Of this group, 90% reported speaking a second language, and most of their parents had obtained a master's level education. The remaining 33 participants were enrolled in a rural school district, 98% of these students' parents worked service jobs. The majority of the participants' school records (98%) indicated that their socioeconomic status was low (below the poverty level). All the participants had sufficient oral and visual ability to engage in the assessment. This study followed the ethical guidelines of the APA to protect the confidentiality of participants' records, including de-identification of data. The form used confirmed that consent to participate was voluntary and that participants could discontinue participation in the study at any time without penalty. Only aggregate data would be reported.

The Institutional Review Board of George Fox University approved this research project. The testing session consisted of the WISC-IV in Spanish, the self-efficacy questionnaire for children, school chart review, and a short clinical interview focused on demographic questions such as parent's education, immigration background, and linguistic abilities.

Instruments

Self-efficacy questionnaire for children The 24-item scale was created by Peter Muris (32) to assess a general sense of perceived self-efficacy in order to predict coping with daily hassles as well as adaptation after experiencing all kinds of stressful life events. Scoring: Responses are made on a five-point Likert scale. Time: It requires 10 min on average. The scale provides a total self-efficacy score obtained from adding the three subscales: academic, social, and emotional. The academic self-efficacy subscale provides information about perceived coping skills specific to scholastic activities. The social subscale extracts information related to adaptive social skills, specific to peer relationships and personal boundaries. Lastly, the emotional subscale examines a child's self-regulation and emotional adaptive skills. The scale has moderate psychometric properties in English. It was translated and verified through blind back-translation and then given to a large sample of children and adolescents ($n=90$). Internal reliability was analyzed with Cronbach's α showing a 0.91 coefficient.

Wechsler Intelligence Scale for Children-Spanish, fourth edition (WISC-IV Spanish) The WISC-IV Spanish is an adaptation of the WISC-IV. This measure provides meaningful information about children's intellectual ability. It is the most widely used intelligence measure for children in the US. This individually administered battery provides a comprehensive measure of intellectual ability of Spanish language-dominant children ages six to 16 years. It consists of one full scale (FSIQ) and four index scores: verbal comprehension (VCI), perceptual index (PRI), working memory (WMI), and processing speed (PSI). The VCI measures general verbal skills such as verbal fluency, conceptualization, and knowledge of words. The PRI measures non-verbal knowledge and fluid reasoning. The WMI assesses the ability to memorize, concentrate, manipulate, and retrieve new information. The PSI measures attention, speed, and the ability to discriminate between visual and verbal stimuli. The WISC-IV Spanish has comparable psychometric properties to WISC-IV. The norming sample allows for comparison to other Spanish-speaking children with similar US educational experience, as well as parental education. Additional base rate and critical value scores for composite and discrepancy comparison were developed to strengthen the

utility of the test. Test items have been modified to minimize cultural bias across multiple regions. The examinee earns credit for answers in Spanish and English (33, 34).

Procedure

The school faculty randomly selected participants; both parents and students were informed of the purposes of the study. Snacks were provided to students regardless of whether or not they chose to participate in the study. Participants met in a preselected room inside the school designated by the facility for data collection. If a participant had a significant visual or oral impairment he or she was offered snacks and was asked to be returned to his or her classroom. If the participant met study criteria and gave consent, he or she participated in a short clinical interview and was administered the study instruments.

Following completion, the participant was debriefed using a designated script. School staff then returned the participant to his or her classroom and brought in the next potential participant. The testing session took no more than 90 min. After completing the two instruments and a short clinical interview, the participant had finished his or her participation in the study.

Inter-rater reliability

Two doctoral candidate psychology students with extensive assessment experience conducted the administration and scoring of the instruments. One of the students was both bilingual and bicultural and the other student utilized an interpreter for the assessment administration. The same students conducted data collection in the same room, and 20% of the data collected by the two doctoral students was randomly audited by a licensed psychologist to ensure adequate collection reliability and consistency with a reliability co-efficient of 0.90.

Results

Demographic and descriptive statistics

The primary variables included IQ, SE, GPA, and age from the different groups (Table 1). The total sample consisted of 90 students, of which 46 were male and 44 were female. The two cohorts from Nicaragua were coded as Nica-private school (n=30) and Nica-public school (n=33). The remaining two cohorts were coded as Oregon (n=8) and Washington (n=19). The average age for the sample was 11.57 (Table 1). The minimum full scale IQ score was 47 and the maximum full scale IQ score was 136, with a median of 98. The GPA reflects a range from one to four (Table 1).

Preliminary analysis

First we conducted three one-way analysis of variances (ANOVAs) to examine possible differences between subject variables. There were no significant differences between the groups on SE scores. However, the difference between the groups for FSIQ and GPA scores were significant: FSIQ [$F(4.89)=10.3$, $p=0.000$], GPA [$F(4.89)=16.77$, $p=0.000$]. To examine hypotheses 1 and 2, we combined the groups by country of origin and recoded Group 1 as US (n=27) and Group 2 as Nica (n=63). Then, we conducted three one-way ANOVAs to explore whether the addition of the groups produced a substantial change in the same variables from the report above. Significant differences between the groups FSIQ scores were found [$F(1.89)=4.7771$, $p=0.032$]. However, there were no significant differences between the groups total SE and GPA scores, SE [$F(1.89)=2.679$, $p=0.105$], GPA [$F(1.89)=3.062$, $p=0.084$]. ANOVAs also showed no differences in these factors by gender.

Correlational analyses

Table 2 reports correlations between SE, GPA, and IQ in total sample (n=90). Strong significant positive correlations were found between the pertinent variables, GPA correlated with IQ ($r=0.747$, $p=0.000$); IQ correlated with academic SE ($r=0.207$, $p=0.05$); however, GPA did not correlate with SE. This result indicates that hypothesis 1 is partially confirmed and that, consistent with the literature, IQ and GPA are associated with each other and IQ is associated with SE.

Table 3 reports correlations between SE, GPA, and IQ in the Nicaraguan participants (above the diagonal, n=63) and the US participants (below the diagonal, n=27). In the US sample, the expected correlations did occur between FSIQ and GPA ($r=0.675$, $p=0.000$), between IQ and academic SE ($r=0.486$, $p=0.010$), and between GPA and academic SE ($r=0.383$, $p=0.049$). In the Nicaragua sample, correlations were found between GPA and FSIQ ($r=0.752$, $p=0.000$), contrary to our hypothesis, no statistically significant correlations were found among SE and GPA, or between SE and IQ, except for academic SE and verbal comprehension (VCI, $r=0.253$, $p=0.045$). However, a surprising finding was the correlation between SE and age ($r=0.388$, $p=0.002$). Thus, hypothesis 2 was not confirmed, because the non-Western sample had weaker or non-existent correlations between SE, IQ, and GPA.

Table 1 Descriptive statistics: age, Grade Point Average (GPA), full scale IQ (FSIQ), and total self-efficacy (SE).

Variables	Age			GPA		FSIQ		SE	
	n	M	SD	M	SD	M	SD	M	SD
US public school A	8	13.0	2.13	3.14	0.460	89.30	8.76	80.60	9.86
US public school B	19	10.6	3.28	3.16	0.641	101.40	14.70	74.30	33.3
Nica-private school	30	11.3	3.27	3.32	0.237	100.20	11.60	56.80	39.5
Nica-public school	33	12.0	2.69	2.45	0.807	77.45	21.30	72.84	11.6

M, mean; SD, standard deviation.

Table 2 Summary of intercorrelations, means, and standard deviations for age, grades, intelligence, and self-efficacy for total sample.

	1	2	3	4	5	6	7	8	9	10	11
1. Age	–										
2. GPA	–0.119	–									
3. FSIQ	–0.192	0.747**	–								
4. VCI	–0.103	0.662**	0.895**	–							
5. PRI	–0.150	0.712**	0.953**	0.809**	–						
6. PSI	–0.207*	0.660**	0.900**	0.743**	0.889**	–					
7. WMI	–0.265*	0.674**	0.917**	0.775**	0.863**	0.876**	–				
8. SOCSE	0.342**	0.116	0.234*	0.311**	0.233*	0.265*	0.227*	–			
9. EMOSE	0.268*	0.081	0.202	0.286**	0.190	0.222*	0.195	0.888**	–		
10. ACASE	0.305**	0.084	0.207*	0.334**	0.181	0.194	0.194	0.842**	0.891**	–	
11. TOTALSE	0.326**	0.080	0.194	0.296**	0.184	0.209*	0.184	0.915**	0.931**	0.922**	–
M	11.57	2.95	91.16	89.97	89.36	91.19	89.68	24.14	20.60	24.63	68.51
SD	3.02	0.71	19.44	20.27	19.71	18.36	17.85	10.64	9.30	10.76	29.39

Intercorrelations for total sample (n=90). For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. GPA, Grade Point Average; FSIQ, full scale IQ; VCI, verbal comprehension index; PRI, perceptual reasoning index; PSI, processing speed index; WMI, working memory index; SOCSE, social self-efficacy; EMOSE, emotional self-efficacy; ACASE, academic self-efficacy; TOTALSE, total self-efficacy; M, mean; SD, standard deviation. **Correlation is significant at the 0.01 level (two-tailed). *Correlation is significant at the 0.05 level (two-tailed).

Table 3 Summary of intercorrelations, means, and standard deviations for age, grades, intelligence, and self-efficacy as a function of country.

	1	2	3	4	5	6	7	8	9	10	11	M	SD
1. Age	–												
2. GPA	–0.135	–0.105	–0.166	–0.084	–0.121	–0.220	–0.250*	0.398**	0.361**	0.320*	0.388**	11.67	2.98
3. FSIQ	–0.263	0.675**	0.752**	0.636**	0.726**	0.679**	0.668**	–0.001	–0.045	–0.017	–0.051	2.87	0.74
4. VCI	–0.118	0.686**	0.818**	–	0.968**	0.942**	0.912**	0.142	0.050	0.124	0.067	88.29	20.73
5. PRI	–0.223	0.602**	0.889**	0.541**	0.849**	0.808**	0.775**	0.205	0.150	0.253*	0.169	86.37	20.77
6. PSI	–0.156	0.499**	0.656**	0.340	–	0.916**	0.874**	0.149	0.122	0.116	0.066	85.08	20.49
7. WMI	–0.320	0.643**	0.921**	0.728**	0.793**	0.657**	0.913**	0.198	0.122	0.161	0.124	87.65	19.24
8. SOCSE	0.267	0.362	0.424*	0.500**	0.329	0.327	0.300	0.173	0.094	0.140	0.098	87.33	19.31
9. EMOSE	0.110	0.329	0.578**	0.548**	0.505**	0.396*	0.433*	–	0.879**	0.821**	0.891**	22.83	10.71
10. ACASE	0.293	0.383*	0.486*	0.578**	0.375	0.254	0.369	0.915**	0.916**	0.890**	0.913**	19.56	9.07
11. TOTALSE	0.231	0.369	0.510**	0.559**	0.414*	0.335	0.378	0.969**	0.967**	–	0.909**	24.08	11.21
M	11.33	3.15	97.85	98.37	99.33	99.44	95.15	27.22	23.04	25.93	–	65.22	29.43
SD	3.15	0.58	14.23	16.54	13.43	13.02	12.53	10.01	9.54	9.70	28.37		

Intercorrelations for Nicaragua participants (n=63) are presented above the diagonal, and intercorrelations for US participants are presented below the diagonal. Means and standard deviations for Nicaragua participants are presented in the vertical columns, and means and standard deviations for the US participants are presented in the horizontal rows. For all scales, higher scores are indicative of more extreme responding in the direction of the construct assessed. GPA, Grade Point Average; FSIQ, full scale IQ; VCI, verbal comprehension index; PRI, perceptual reasoning index; PSI, processing speed index; WMI, working memory index; SOCSE, social self-efficacy; EMOSE, emotional self-efficacy; ACASE, academic self-efficacy; TOTALSE, total self-efficacy; M, mean; SD, standard deviation. **Correlation is significant at the 0.01 level (two-tailed). *Correlation is significant at the 0.05 level (two-tailed).

Conclusions

An overview of the research has demonstrated a connection between higher SE and improved performance in tasks attempted. It has also been proven that those with higher SE also have more perseverance in the face of adversity, exert more effort, and seek out higher goals (3, 6). The benefits of increased SE are wide-reaching including improved cognitive, health, clinical, and organizational functioning (3). Although SE has been linked to the aforementioned benefits, the current literature has mixed results in the comparison of SE to achievement and intelligence, and particularly when evaluating these effects in children from diverse backgrounds. It is important to address the lack of research on the connection between IQ and SE.

To evaluate these relatively under-researched comparisons, the current study examined the relationship between IQ, achievement, and SE among primarily Spanish-speaking school-aged children from Western US, as well as students from Managua, Nicaragua. The results show differences among the US and the Nicaragua samples. In the US, a higher IQ and grades are correlated significantly with higher academic SE.

By contrast, the Nicaraguan sample represented a positive correlation between self-efficacy and age but no connection between self-efficacy and grades. These differences were not seen in the US sample. This implicates the differences among a primarily individualistic and collectivistic culture and provides a basis for further research on the cultural experience of SE. Our results also disconfirm our hypothesis that IQ and academic achievement (as measured through grades) would be positively correlated with increased SE.

The significance of these results exists in a few domains, including the aforementioned point that the relationship between IQ and SE, which has been minimally investigated, still remains unclear. In particular, this study is also beneficial in understanding a child's experiences of SE and how they relate to measured intelligence and academic performance.

This study also elucidates cultural implications by including diverse populations from both a Nicaraguan sample and second-generation children of Mexican immigrants to the US. Although there has been a wide variety of research on SE conducted within the Western world, there is a great need to perform this research within developing countries such as Nicaragua. According to Bandura (23), SE influences performance across a wide variety of cultures. However, this effect has not been thoroughly studied in children. This study provides a unique benefit to the research on SE and IQ by bridging these gaps in research for children and for Latin American countries.

Owing to the fact that these results only partially confirmed the initial hypotheses, there are a few potential ways to interpret them. The result that IQ and SE are correlated are supported by previous research, including Williams and Williams (26) whose results suggest that the reciprocal determinism between behavioral, cognitive, and environmental influences are connected in that SE leads to improved performance and in turn increased SE. Basically, this affirms the results that a

child with increased intelligence is likely to have a higher rating of SE because of past academic successes.

Despite the solid evidence connecting SE to intelligence, it still remains puzzling when considering the reciprocal determinism theory, that grades are not related to SE in the Nicaraguan sample. This indicates that outside environmental influences could be impacting these factors.

There are many directions for this research that could provide a better understanding of the outside environmental influences on a student's grades. Within the Nicaraguan public school sample, the classroom environment was not always conducive to optimal academic performance. The class size was often large, consisting of as many as 50 students, with only one teacher to work with this large group. There was also no separation among children with special needs from those within the normative range. This integration of special education students, combined with a large class size, could interfere with the students' learning and in effect their performance as measured by grades.

It is necessary to look at other areas of SE within collectivistic cultures, as evident in the correlation between age and SE in the Nicaraguan sample. It is a possibility that the Nicaraguan culture might have differing views on achievement, including helping one's parent gather the harvest or selling necklaces in the market. In this culture, achievement might not be defined as much by grades as it is in individualistic cultures such as the US.

These challenges could be a possible explanation for students who are not able to achieve at their academic potential. A future direction of this study would be to use an alternative academic performance criterion, such as an achievement test. An assessment such as the Wechsler Individual Achievement Test III might have provided a more accurate representation, because GPA might be influenced by other classroom factors. This assessment might have provided a different explanation of the discrepancy among the relationship of SE to IQ and academic performance. Future research could also reproduce the study with an adult population.

One area to explore further is the possibility that collective efficacy could play a stronger role in achievement than alternative forms of efficacy. As described by VonDras (35), a person's orientation, whether collectivistic or individualistic, impacts the social and behavioral interactions that lead to academic success. Individuals from a collectivistic culture have been shown to struggle in traditional individualistic learning environments (36). For example, those from a collectivistic culture might be less likely to ask questions, show minimal classroom interaction, and overall perform poorer in larger academic settings (36, 37).

It is also important to consider other factors that influence achievement, such as parental involvement. In the case of impoverished families, a lack of parental support could be a stronger factor than SE. When teachers from the Nicaraguan public school were asked what some of their biggest challenges were, many reported that parents do not provide support and encouragement for their children's education.

Another issue is that other motivational factors such as learned helplessness or expectancies for the future might have more of

an effect than efficacy on achievement. In a country such as Nicaragua where 46.5% of the people are underemployed and 48% live below the poverty line (5), students might be able to complete the schoolwork, but the reality of the economic situation provides little incentive to perform and succeed in school.

There are certain limitations that are apparent within this research study. They include a small sample size in certain groups. If the US sample had been larger, certain trends and correlations might have been significant. The study also did not include an equal number of lower and higher SES subjects, making it difficult to compare these two groups. There was also a disproportionate sample among the ages of children, with more of a cluster in the middle school age group, and not an even spread across the age groups of 7–16 years.

In summary, there were some positive implications gained from the current study including the support for a collectivistic vs. individualistic cultural perspective on SE. There are also implications for future research in the lack of a correlation between IQ and grades with SE in the Nicaraguan population, despite the correlation in the US sample. Although there are some inherent limitations to the aforementioned study, such as the uneven sampling of children from higher and lower socioeconomic status, as well as comprehension issues of the SE measure, the study has many possible applications. There are many potential research questions to be explored in the area of SE and IQ among a culturally diverse population. Among these include the effect of poverty on SE, SE and performance within the culturally diverse adult population, as well as additional analysis of SE within children from other developing countries.

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