

## ARTIGO

### **Diversidade da experiência e pensamento crítico: a influencia do comfort com a diferença para o desenvolvimento cognitivo**

Diversity of experience and critical thinking: how comfort with difference influences cognitive development

Diversidad de experiencias y pensamiento crítico: la influencia de la comodidad con la diferencia pur el desarrollo cognitivo

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**Resumo:** Neste artigo realizou-se uma análise longitudinal do banco de dados do Estudo Nacional Wabash de Educação em “Liberal Arts” (WABASH, em inglês) para determinar a extensão com a qual sentir-se confortável com diferenças de experiência durante a graduação leva a um nível elevado de desenvolvimento do pensamento crítico. A conclusão do presente estudo sugere que alunos, que se sentem à vontade com diferenças, desenvolvem maior pensamento crítico quando controles estatísticos se fazem presentes para diferenças individuais e tipo de instituição, mas este ganho desaparece quando há controle para outras experiências dos anos de graduação, como motivação acadêmica e interação com docentes. Esta conclusão sugere que estudantes de graduação tem a capacidade de mudar através de suas experiências como alunos de universidades.

**Palavras-chaves:** Diversidade. Pensamento crítico. Desenvolvimento cognitivo.

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**Abstract:** In this study I analyze longitudinal data from the 17-institution Wabash National Study of Liberal Arts Education (WNSLAE) to determine the extent to which being comfortable with difference during college leads to better-developed critical thinking skills in 4-year-college students. My findings suggest that students who are comfortable with difference gain more critical thinking when controls for individual differences and institution type are in place, but this gain disappears when other college experiences are controlled for, such as academic motivation and interaction with faculty. This suggests that students are able to change through their experiences in college.

**Key-words:** Diversity. Critical Thinking. Cognitive development.

**Resumen:** En este trabajo se llevó a cabo un análisis longitudinal de la base de datos del Estudio Nacional de Educación Wabash en “Artes Liberales” (WABASH, en Inglés), para determinar el grado en el que se pueda sentirse cómodo con las diferencias de experiencia durante la graduación que conduce a un alto nivel de desarrollo del pensamiento crítico. La conclusión de este estudio sugiere que los estudiantes que se sienten cómodos con las diferencias, desarrollan mayor pensamiento crítico cuando los controles estadísticos están presentes para las diferencias individuales y el tipo de institución, pero esta ganancia desaparece cuando se controla para otras experiencias de años de pregrado, como la motivación académica y la interacción con el profesorado. Este resultado sugiere que los estudiantes de postgrado tienen la capacidad de cambiar a través de sus experiencias como estudiantes de universidad.

**Palabras-clave:** Diversidad. Pensamiento crítico. Desarrollo cognitivo.

## Introduction

The empirical literature on the benefits of diversity experience on a range of college outcomes is extensive and convincing (CHANG, ASTIN, KIM, 2004; HU; KUH, 2003; HURTADO, 2001; MILEM, 2003; PASCARELLA, TERENCEZINI, 2005). Research on the development of critical thinking in college, however, is much less advanced, and only now researches are beginning to understand how critical thinking evolves through the years of undergraduate education. In this study, I bring together these two aspects of college life to examine the patterns of

their impacts on the cognitive developments of college students. Based on existing evidence, I anticipate that, net of other influences, openness to diversity experience would be linked to gains in critical thinking skills. Therefore, students who have a certain degree of comfort with difference will graduate from college with deeper levels of cognitive development than those who are not open to having experiences with people who are different from them or who have different perspectives than the ones they have.

### **Literature review**

One of the findings of research in this area is that experience with diversity might promote the development of novel and more elaborated forms of thought, including the ability to think critically. Gurin et al. (2002) point out that higher education stakeholders have argued, for a long time, that affirmative action has justification because it allows for the creation of a diverse student body, which is necessary in order to provide students—white and minority—with the best educational environment that is possible. However, the authors argue the arguments defending the importance of affirmative action on American college campuses is too abstract, lacking in theoretical basing and empirical evidence in order to support the link between diversity and educational outcomes. The authors also argue that, based on previous research and their own, if students take the steps to engage in situations that challenge their current modes of thinking, that is, if they leave their comfort zone and face new situations with some frequency, these students will be at a greater chance to engage in more elaborate forms of thinking. Gurin et al. argue that novel situations can happen not only in the classroom but also elsewhere, such as when students encounter others with whom they are not familiar or when these encounters challenge students to think differently, thus changing their perspectives of the world and the ways in which they process information and act upon it.

Likewise, Gurin (1999) posits that higher education is influential when the social environment is different from the communities where the students grew up, and it exerts even more influence when it is significantly diverse and complex to encourage intellectual experimentation. In a diverse educational environment, students tend to learn more and to think in deeper, more complex ways. Gurin points out that complex thinking happens when students are faced with new, different situations for which they have no frame of reference to follow, or when the environment in which they are requires of them more than their practical or theoretical frameworks can provide. Racial diversity, argues Gurin, is essential for a college or university student body in order to provide the very features that research has determined as necessary to create the type of critical thinking that educators expect from their students. Altogether with race, diversity of social class is especially likely to increase cognitive development in the form of critical thinking. This happens particularly when institutions of higher education are not only welcoming of such diversity but include it in their teaching practices, thus providing an environment in which students from diverse background engage in frequent mutual interactions.

As most students are in transition from late adolescence to early adulthood during their college years, the opportunity to interact with people of a different race, social class, and culture is extremely important in providing them with the tools to become critical thinkers able to read and analyze the world critically and to form opinions of their own. Writing at the end of the 1940s, preeminent psychologist Erik Erikson developed the concept of identity and defended that the periods between the end of adolescence and the beginning of adulthood are crucial times for the formation of personal and social identities. Erikson defended that identity develops best when young people have to confront situations in which diversity and complexity are present. So, according to Erikson, by moving into a college or university community students will have a chance to experiment with ideas, relationships and roles that are new and diverse, enabling them to more fully develop their identity.

A study by Dey (1991) suggests that there is a positive relationship between self-reported growth in critical thinking skills during college and the frequency with which students get involved in discussions of racial-ethnic issues. Dey analyzed multi-institutional, longitudinal data from the 1885-89 Cooperative Institutional Research Program (CIRP). His research identified college experiences that had an impact on self-reported growth in critical thinking ability. After statistically controlling for confounding effects such as SAT verbal scores, secondary school experiences, intellectual self-esteem, self-rated math ability, and institutional characteristics, Dey found a strong correlation between discussions of racial issues and critical thinking development. He concluded that the more students are exposed to racial issues and the more they are encouraged to talk openly about them, the bigger their cognitive development over time.

Consistent with the findings of Gurien et al. (2002) and Dey (1991), Chang et al. (2006), Gurin (1999) and Kim (1996) suggest that there is a significant relationship between encounters with racial and cultural diversity during college and outcomes such as critical thinking, problem solving, and complexity of thinking. One issue with this important initial work was that although student self-reported gains can reveal important outcomes, scholars are concerned about the validity of this process. Surprisingly, however, research that aims to assess the impact of experience with diversity on cognitive development using more objective measures than self-reported gains is very limited, which is surprising given the growth in diversity of college populations across the United States in the last years. In this sense, Pascarella (2001) states that objective standardized instruments that more directly assess critical thinking skills are generally viewed as more psychometrically valid measures than self-reported gains, and are therefore preferred. The first study that attempted to estimate the impact of diversity experiences on critical thinking skills using objective standardized measures was that of Terenzini and colleagues (TERENZINI, SPRINGER, YEAGER, PASCARELLA,

NORA, 1994). For this study, the researchers looked at data from the first year of the National Study of Student Learning (NSSL), a longitudinal study of 23 institutions that was conducted from 1992 to 1995. One of the instruments used to measure cognitive development in college was a test of critical thinking skills called Collegiate Assessment of Academic Proficiency (CAAP), developed by the American College Testing Program (ACT) in 1990. With controls for potentially confounding elements such as student demographics, precollege critical thinking scores, and the characteristics of the institution where the student was enrolled, among others, Terenzini et. al. concluded that students who attended a diversity awareness workshop showed a small but significant correlation with gains in tested critical thinking abilities, and that white students demonstrated less gains in critical thinking than their nonwhite counterparts. Accordingly, Pascarella (2001) affirms that the impact of involvement in diversity experience may be conditional instead of general. In other words, the same benefits may not be equally distributed among all students, but it could differ in proportion for different kinds of people. This is because precollege characteristics that students bring with them to postsecondary education may be central to the formation of cognitive benefits in terms of involvement in diversity activities or other experiences.

## Research Methods

### Sample and Data Collection.

The present study sought to find evidence of critical thinking growth among students who are open to diversity experience in college. To this end, I analyzed data from the Wabash National Study of Liberal Arts Education (WNSLAE), a longitudinal pretest-posttest study of the effects of liberal arts experiences on the cognitive and personal outcomes theoretically associated with a liberal arts education. The WNSLAE data was collected from full-time undergraduate students

at 19 four-year colleges and universities. These students were asked to answer surveys about their educational experience from fall 2006 to spring 2010. The study had 3 main phases of data collection: early fall 2006, when the students entered college (in the study referred to as time 1, or T1); late in spring 2007, when the students were completing their first year of college (time 2, or T2); and late spring 2010, at the end of the fourth year of college, when the students were about to graduate (time 3, or T3). The question that guides my analysis is whether being comfortable with difference (a scaled variable in the study) at T1 led to improvement in critical thinking abilities at T3. In other words, do students who are open to diversity of experience when they started college graduated with better, more advanced critical thinking skills? My hypothesis, thus, is that students who were open to diversity at T1 were much more prone to develop better critical thinking skills by the end of their fourth year of college.

For this paper I analyzed the fourth-year follow-up of the Wabash National Study of Liberal Arts Education (WNSLAE). Data for the Wabash National Study was initially collected from 4,501 students from 19 institutions of higher education. This first step of the data collection included questions on student demographic characteristics, high school experiences, political orientation, and family background. Some of the students were also asked to take a 40-minute critical thinking test of the Collegiate Assessment of Academic Proficiency (CAAP). About half of the students were randomly assigned by institution to take the CAAP test. A follow-up data collection was conducted in the spring 2010, and two types of data were collected: extensive information on students' experience of college and follow-up (posttest), measuring personal and intellectual development. The instrument used to measure intellectual development was the CAAP test, which was also first completed in the initial data collection.

Following Pascarella et al. (2001), the present study employed diversity experience scales, which combined multiple items, and took

into account the nesting or clustering effect. The nesting effect assumes that students who are enrolled in a given institution would tend to have similar characteristics (behavior wise) than students across institutions. Hence, there is a correlation between the error terms for the prediction model, which violates one of the assumptions of Ordinary Least Squares regression and results in underestimated standard errors in regression estimates (ETHINGTON, 1997; RAUNDENBUSH; BIRK, 2001). Because of such correlation, I controlled for the nested nature of the data by using appropriate regression procedures that adjust for this clustering (GROOVES *et. al.*, 2004).

## Variables

*Dependent variable.* The dependent variable was the Critical Thinking Test from the Collegiate Assessment of Academic Proficiency (CAAP). The test, developed by the American College Testing Program (ACT), intended to measure the ability to explain, assess, analyze, develop and provide justification for arguments. The test is divided into four passages that contain different types of questions, such as debates, case studies, statistical cases, etc., and multiple choice questions. Each passage has a variety of arguments that support a general conclusion and a set of multiple-choice test items, asking students to read and analyze texts that are commonly found in higher education classes and assignments. According to Pascarella *et. al.* (1995), the CAAP test has an internal consistency reliability of 0.81 and it correlates at 0.75 with the Watson-Glaser Critical Thinking Appraisal. The Critical Thinking Test was given to the students both in the fall of 2006 and in the spring of 2010. I used the test administered in the spring of 2010 as my dependent variable and the one administered in the fall of 2006 as a control variable.

*Independent Variable.* The main independent variable was the *Comfort with Difference* Subscale of the Miville-Guzman Universality-Diversity Scale (M-GUDS-S). Developed by Marie L. Miville, the



questionnaire is composed of 15 multiple-choice questions that measure the attitudes, cognition, and behavior of students in regards to diversity. The instrument uses a 6-point Likert-type scale to assess awareness and acceptance that students have towards similarities and differences towards people and is organized around four main concepts: culture, race or racial background, ethnicity or ethnic group, and country (FUERTES *et al*, 2000) - not in reference. The M-GUDS-S scale is divided into three subscales: *Diversity of Contact*, *Relativistic Appreciation*, and *Comfort with Difference*. The *Comfort with Difference* subscale, which has an internal consistency reliability of .85, is composed of five items. Items in the subscale include: getting to know someone of another race is generally an uncomfortable experience for me; I am only at ease with people of my race; it's really hard for me to feel close to a person of another race; it is very important that a friend agrees with me on most issues; and I often feel irritated with persons of a different race.

*Control Variables.* In order to build the regression specifications, I followed Pascarella e Terenzini (1991) longitudinal conceptual models for studying the concept of college on students. Pascarella e Terenzini (1991) argue that in order to have a valid estimate of the net impact of any single experience, one needs to take into account at least three sets of influence, in addition to the independent variable: individual characteristics students brought with them before they started college, the context of the institution where the student registered, and other college experiences that could confound the effects of a given college experience. In order to control for student pre-college characteristics, I included the following variables: gender, race, parental education, academic motivation, degree of high school involvement, and pre-college levels of critical thinking skills (fall 2006 CTT score). To account for the context of the institution, a dummy variable was created to indicate whether or not one attended a liberal arts college. Finally, other college experiences included whether a student majored in the arts and humanities, the level of intellectual challenge, good teaching, interaction

with faculty and interaction with peers. Below is a list of all the control variables that are present in the study:

- gender
- race
- parental education
- academic motivation
- degree of hs involvement
- pre-college critical thinking
- major - arts and humanities
- type of institution
- academic challenge
- good teaching
- interaction with faculty
- interaction with peers

### Data Analysis

In keeping with previous analysis of the Wabash National Study of Liberal Arts Education, I used Ordinary Least Squares regression models. The data analysis was carried out in three steps in order to determine which, if any, of the characteristics I controlled for would reduce my independent variable of interest (comfort with difference) to no significance. The first model aimed to determine if there were any significant general net effects of the comfort with diversity scale on end of fourth-year critical thinking gains. I regressed end of fourth-year critical thinking scores on the comfort with difference scales plus the control variables accounting for pre-college characteristics such as critical thinking at time 1, race, gender, levels of academic motivation, high school involvement and whether or not students were the first-generation of their families to go to college. Individuals were the level of analysis, but instead of using Ordinary Least Squares regression, I accounted for the nested nature of the data by employing regression procedures that adjusted standard errors for the nesting or clustering effects. Specifically, I employed the regression option (*vce*) in the Stata software statistical package that accounts for the nesting or clustering effect and calculates stronger standard errors for individual predictors than Ordinary Least Squares.

The second regression model used in the analysis aimed to determine if the net effects of the comfort with diversity scale on critical thinking gains were conditional on the same variables accounting for precollege characteristics used in model one and the two control variables for institution type: whether one attended a liberal arts college or university and whether one majored in the arts and humanities field. Similar to the analysis carried out in model one, I also used regression procedures that accounted for standard errors for the clustering effect.

The third and last regression model sought to determine if – in addition to individual characteristics students brought with them before they started college and the context of the institution where the student registered – other college experiences confounded the effects of a given college experience. In order to accomplish that, I regressed critical thinking on comfort with difference and all the control variables in model one and two, adding to it variables accounting for levels of academic challenge, good teaching practices, student interaction with faculty and student interaction with other peers. Just as in models one and two, in model three I continued to use regression procedures that took into consideration standard errors for the clustering effect. Finally, because race was highly significant in two of my models, I conducted a race interaction for comfort with diversity at time 1 by race to check for significant results, but found the relation to be not significant.

## Results

Table 1 summarizes the regression estimates of the effects of interactional diversity on critical thinking at the end of the fourth-year of college. The results for model 1 (table 1) indicate that, net of all other influences, only comfort with difference at time 1, critical thinking at time 1, and race had a significant, positive estimated effect on fourth-year critical thinking skills. Critical thinking at time 1, particularly, was very significant at  $p < 0.00$ . Gender, academic motivation, high school

involvement and first generation are not significant for gains in critical thinking in face of the independent variable of interest.

**Table 1**

Comfort with difference x critical thinking and individual differences

Critical ThinkingT3	Coef.	Std. Err.	P> t
Comfort with differenceT1	.32	.13	.01*
Critical thinking T1	.68	.02	.00*
Race	.55	.24	.03*
Gender	.04	.21	.82
Academic motivation	-.21	.17	.22
High school involvement	-.08	.17	.63
First generation	.04	.19	.81

The second model (table 2) shows that comfort with difference at time 1 is less significant than it was before controlling for type of institution. Critical thinking at time 1 remains highly significant in model 2 at  $p < 0.00$  and race becomes more significant than it was in model 1, indicating that the type of institution attended might influence the significance of gains in critical thinking skills over four years of college for white students who are comfortable with difference.

**Table 2**

Comfort with difference x critical thinking and institution type

Critical ThinkingT3	Coef.	Std. Err.	P> t
Comfort with differenceT1	.30	.13	.02*
Critical thinkingT1	.67	.02	.00*
Race	.66	.26	.01*
Gender	.04	.20	.84
Academic motivation	-.17	.15	.26
High school involvement	-.13	.18	.46
First generation	.04	.21	.82
Liberal arts	-.34	.39	.38
Arts and humanities	-.03	.20	.86

The third model, however, which controls for experiences in college in addition to individual differences and institution type,

yields results that show that when control is in place for other college experiences, then comfort with difference at time 1 and race become not significant (table 3). But critical thinking at time 1, good teaching practices, interaction with faculty and interaction with peers are all highly correlated. The bottom of table 3 shows results for the interaction term of comfort with diversity by race.

**Table 3**

Comfort with difference x critical thinking and other college experiences			
Critical Thinking T3	Coef.	Std. Err.	P>  t
Comfort difference T1	.24	.13	.07
Critical thinking T1	.64	.02	.00
Race	.51	.26	.05
Gender	.06	.19	.74
Academic motivation	-.03	.14	.79
High school involvement	-.05	.19	.77
First generation	-.01	.20	.95
Liberal arts	-.39	.36	.28
Arts and humanities	-.08	.21	.69
Academic challenge	-.03	.16	.82
Good teaching	.47	.14	.00
Interaction faculty	-1.0	.14	.00
Interaction peers	.72	.15	.00
Diversity x Race	.00	.21	.98

## Summary and Discussion

The findings from models 1 and 2 confirm my hypothesis that a positive attitude towards diversity of experience will positively predict gains in critical thinking skills. The result also supports the argument that Gurin *et al.* (2002) defend, namely, that exposure to experiences involving diversity nourishes the development of cognitive growth and modes of thought that are novel and more complex. Moreover, the findings indicate that, when controlling for individual differences and institution type, the effects of diversity experiences at time 1 on cognitive development at time 3 are maintained during the four years of college, with the possibility

of an increase over time to students who are open to experiences involving diversity. One may thus conclude that comfort with diversity has a positive impact on cognitive development, for students who are comfortable with different people and different ideas before they enter college and who keep such comfort during their college years—graduate with stronger and better developed critical thinking skills.

One of the effects shown models 1 and 2 is worth mentioning: the control variable for race. Altogether with comfort with diversity at time 1 and critical thinking at time 1, race was significant on the effect of comfort with difference over critical thinking gains. As a matter of fact, race became even more significant in model 2 when compared to model 1. Since race is a binary variable in which 0 is nonwhite and 1 is white, the fact that race is significant for models 1 and 2 seem to indicate that white students are the ones who benefit the most from comfort with diversity when it comes to critical thinking gains. This finding supports that of Pascarella et al. (2001), who argue that white students are more prone to gains in critical thinking linked to comfort with diversity during college than their nonwhites counterparts.

The findings from model 3, however, indicate that, net of other outcomes, comfort with difference at the beginning of college loses significance over critical thinking gains once control for college experiences such as academic challenge, good teaching, interaction with faculty and interaction with peers is set in place. In other words, the findings seem to predict that experiences in college are actually more important than individual characteristics or institution type when it comes to gains in critical thinking abilities for students who are comfortable with difference. A hotly debated question in higher education studies is whether or not students are able to change after they go to college. My findings also indicate that, in terms of the impact of comfort with difference over critical thinking gains, people do have the capacity to change due to a series of college experiences.

Interestingly, race was also no longer significant once I controlled for other college experiences, which indicates that race matters when control mechanism are in place for individual differences and for institutional types, but it disappears once control for college experiences are in place.

Overall, comfort with difference does seem to have a strong positive impact on cognitive development. Students open to interacting with people who have different backgrounds and different ideas than their own tend to show more cognitive development. They are also better equipped to think critically about the world than their peers who were not open to diversity experiences. Finally, net of other outcomes, white students seem to gain more critical thinking skills than nonwhite students by being open to diversity experiences in college.

### **Policy implications and further research.**

My findings reinforce the argument that comfort with difference may have important implications for the cognitive development of students during their years in college. In this sense, institutional policies encouraging efforts to promote and exchange diversity of experience among students and faculty may work to enhance the intellectual mission of a college. Such an institutional policy might seem to be justifiable not only by theoretical and rhetorical devices but also by empirical evidence. Having said that, my findings add to a body of literature and research evidence that suggests that white students show a bigger gain in critical thinking skills when comfortable with difference than their nonwhite counterparts. Thus, because race is a significant variable in several of the models used in my study, there may be differences between race groups in critical thinking gains. Although I conducted a time 1 comfort with difference by race interaction term and it didn't yield any significant results, further research is necessary to investigate the possibility of such relationship, that is, to find out and explain the relationships that

might exist between differences in race and cognitive development for students who are comfortable with diversity during their years in college.

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Práxis Educacional	Vitória da Conquista	v. 10, n. 17	p. 219-236	jul./dez. 2014
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