

AN INVESTIGATION OF COLLEGE STUDENTS' LEARNING STYLES IN THE US AND CHINA

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ABSTRACT

This research project explores learning styles of college students in the US and China. The Grasha-Reichmann Student Learning Style Scale, designed to measure how college students view their learning, was used as the main instrument for the current study. A total of 511 college students, 274 from the US and 237 from China, participated in this study. Results indicate that there are significant differences between the Chinese and American students in their reported learning styles, but not necessarily in the direction of conventional prediction. For example, the Chinese participants scored higher on the independent and competitive subscales than the American participants, reflecting a more individualistic tendency by the Chinese students than previously thought. Conversely, the American participants scored higher on the dependent subscale than the Chinese students. Some gender differences are also observed. These results are discussed in the context of traditional cultural orientations as well as current educational systems of the two countries.

INTRODUCTION

Educators have noted repeatedly that different students prefer different ways of learning. This has been verified by everyday teaching and learning experiences in the classroom. Most agree that learning style is a person's preferred way of obtaining and processing knowledge and information (Prichard, 2009). Information on students' learning styles may help instructors design and deliver their courses more efficiently and contribute to students' overall learning experiences.

Increasing numbers of scholars have developed different types of inventory to assess students' learning styles, for example, the Dunn Learning Style Model (Dunn & Dunn, 1993), the Felder-Silverman Learning Style Model (Felder & Silverman, 1988), the Kolb's Model (Kolb, 1984), the Myers-Briggs Type Indicator (Myers & Mc-

Caulley, 1986), and the Grasha-Reichmann Learning Styles Scales (Grasha, 1996). Among these various instruments, Grasha-Reichmann's Learning Style Scales (SLSS) is distinguished by its behavioral approach (Montgomery & Groat, 1998). In other words, SLSS is geared towards assessing students' responses to class activities and their opinions towards teachers and peers rather than assessing their general personality traits, as some of the other measures are designed to do.

Grasha (1996) defined learning styles as "personal qualities that influence a student's ability to acquire information, to interact with peers and the teachers, and otherwise participate in learning experiences" (p. 41). Back in 1974, Reichmann and Grasha developed a new instrument to assess student's learning style called the Grasha-Reichmann Student Learning Style Scales (SLSS). They defined six types of learners: independent,

dependent, collaborative, competitive, participant, and avoidant. Grasha (1996) indicated that some students may very well possess more than one learning style; however, in general most people seem to exhibit a primary pattern of learning behavior or style of learning.

The independent–dependent group measures the degree to which students desire to work independently or rely on their professors and peers. The collaborative–competitive group measures the degrees of competitiveness and collaboration of students when interacting with their professors and peers. The participant–avoidant group measures students’ willingness to be involved in classroom activities, their responses to classroom routine, and their views toward learning. The SLSS overall was designed to help educators identify students’ views toward learning, views of professors and other students, and their attitudes and responses toward classroom activities.

A careful literature review reveals that though there have been many past studies on learning styles, overall the findings are not conclusive. In fact there seem to be more questions than answers. For instance, is there a meaningful relationship between a student’s learning style and her academic performance? What about learning styles and gender? In the following pages, we will briefly present and discuss some of the past findings in the literature regarding college students’ learning styles.

Learning Styles and Gender

Whereas Gray’s (1992) bestselling book *Men are from Mars, Women are from Venus* may have influenced people’s perceptions of gender differences in the popular media, scientific research has also made great progress in brain study in recent decades. It has been reported that men’s brains are approximately 8% larger than women’s for both left and right hemispheres (Eliez et al., 2001). Although it is unclear whether the size difference of the brain affects men and women’s intelligence, it is speculated that the differences of the brain may have an effect on their learning styles (Leamson, 2010). Many studies have shown that the learning styles of male and female college students seem to differ (Alumran, 2008; Keri, 2002; Philbin, Meier, Huffman, & Boverie, 1995; Sim & Sim, 1995). For example, it has been reported that women are more retentive, detail-oriented, and they prefer organizing course mate-

rials and their notes in a neat and orderly fashion; whereas men are more imaginary, innovative, and are good at understanding abstract concepts (Alumran 2008; Liu, 2005). On the other hand, others (Sims & Sims, 1995) argued that there are simply not enough studies on learning styles and gender in higher education to draw a definitive conclusion. Overall, this area remains mostly untapped today and much more empirical research needs to be done before a conclusion can be drawn.

Learning Styles and GPA

Similar to learning styles and gender, there is a paucity of literature focusing on learning style and academic performance as indicated by GPA. Among those who investigated this relationship, there is a lack of consistency in results and therefore no definitive conclusion can be drawn at this time. For example, Aragon, Johnson, and Shaik (2000) found that a combination of increased participation and decreased avoidance is a predictor of higher academic performance. From a different perspective, Reece and Dunn (2008) found that the students with the highest GPAs prefer to study easy materials in the late morning or in the afternoon and difficult materials in the evening; whereas the students with midrange GPAs prefer to study in the daylight, and the students with lowest GPAs prefer to study during the night with music on. Hargrove, Wheatland, Ding, and Brown (2008) reported a significant difference in students’ GPAs with different learning styles among engineering majors. Specifically, students with the highest GPAs are relatively unemotional. They are good at understanding abstract concepts and prefer to work with things than with people. Students with the lowest GPAs are more imaginary, emotional, and good at understanding concrete concepts. They perform better in brainstorming and prefer working with people. Liu (2005) found that Chinese students with independent learning style were more likely to have better grades in Chinese language and literature, but no relationship with grades in other academic subjects. However, other researchers have found no relationship between learning styles and GPA altogether. Veenman, Prins, and Verheij (2003) for example, posited that there is no correlation between students’ learning styles and their GPAs in their investigation. Generally speaking, it seems these mixed results indicate that there is a need for further systematic studies.

Learning Styles and Academic Discipline

Past research indicates that students in different disciplines exhibit different learning styles. Pinto, Geiger, and Boyle (1994) found that nonbusiness majors tend to demonstrate applied learning preferences after spending more time in school. Matthews (1994) found social sciences majors prefer to work with languages and ideas; whereas students majoring in mathematics or sciences tend to be applied learners who welcome and excel in real-life learning situations. Similarly, Yuen and Lee (1994) also found differences in learning styles among students majoring in humanities and social sciences, basic sciences, computer science, medicine, law, business administration, and architecture in Singapore. For example, they reported that humanities and social sciences students enjoy relating to people and coming up with ideas more so than other majors. These students tend to emphasize concrete experiences and think deeply. On the other hand, science and law students tend to be more structured and organized and they prefer to think rather than to act.

Learning Styles and Academic Ranks

Hartnett (1973) argued that lower level students such as freshmen, are more participatory and less independent; whereas upper level students such as seniors are more experienced and tend to have acquired more independent learning styles. Pinto and colleagues (1994) examined the learning styles of 178 college students, and concluded that students tend to change learning styles over their college career. Specifically, first and second year students are more malleable and are more likely to change their learning styles than third and fourth year students. On the other hand, Busato, Prins, Elshout, and Hamaker (1998) concluded, from a longitudinal study to investigate the change of learning styles among students during their stay at the university, that there was no significant change of learning styles over these students' college careers. Again, it seems the findings in this area are anything but conclusive.

Learning Styles and Culture

While much research concerning learning styles has been conducted in the Western countries, especially the US, few empirical studies have been done in the non-Western countries such as China.

In China, it is thought that there has been more focus on learning strategies rather than learning styles (Liu, 2005). As the practice of teaching and learning is steeped in cultural traditions of a particular country or region (Harbon, 2008), we believe a brief review of the main philosophical and ideological principles and thoughts in the West and East might be helpful.

Two very different approaches to teaching and learning seem to emerge. Socrates, whose influence still dominates western thinking in many educational areas, encouraged students to engage in critical thinking and questioning common knowledge (Shiraev & Levy, 2010). Therefore, a teacher's job is akin to a facilitator. On the contrary, the Chinese philosopher and educator Confucius, whose ideology has strongly influenced east Asian cultures, promoted the virtue of acquiring knowledge based on respect toward educators and accepting what is taught without independent thinking or questioning (Shiraev & Levy, 2010). So a teacher's main job is to transmit knowledge and information to students.

As culture shapes our beliefs, views and behavioral patterns, it is expected that these two different traditions in thinking have also influenced the way of teaching and learning. In cross-cultural studies, the cultural dimension of individualism and collectivism has been widely used as a theoretical framework to compare behaviors of people in Western and non-Western countries (Shiraev & Levy, 2010). In general, American culture is identified as largely individualistic, where the ties between individuals are loose, and people are expected to take care of themselves (Hofstede, 1991). Chinese culture on the other hand, is considered largely collectivistic, where people tend to consider themselves as members of a group and are more willing to sacrifice their interests for the group's needs (Morris, Davis, & Allen, 1994).

Within an individualistic framework, students are expected to participate in class activities enthusiastically because it is a good opportunity for them to express their opinions and share their independent thoughts with others. Each individual is encouraged to be unique and teachers are supposed to see each student as an independent entity. Standing out is rewarded and thus positively reinforced, as illustrated in the English proverb "Squeaky wheels get the grease." Uniqueness is encouraged and embraced by the society because

it goes with the free enterprising spirit of the individualistic culture.

In a collectivistic context however, students are encouraged to conform to the norm, and discouraged to be unique. Maintaining group harmony is considered more important than expressing personal uniqueness. Standing out is chastised and thus discouraged, as illustrated in the Chinese and Japanese popular proverb “The nail that sticks out gets hammered down.” People are generally encouraged to go with the flow and not make waves. This behavioral pattern is conducive to the type of traditional learning that is heavily reliant on repetition and rote memorization. A good example of this type of traditional learning is the Imperial Test System to select government officials (known as “mandarins”) that was prevalent during several dynasties in China. Biggs (1991) has labeled the kind of learning that is characterized by pure repetition and rote memorization as surface learning, which does not involve students’ critical thinking or independent judgment.

In general, educators have observed that American students tend to be more actively involved in class activities and more likely to speak up in class than East Asian students (Markus & Kitayama, 1991). Such differences are also reflected in the classroom settings and learning and teaching structures (Cortazzi & Jin, 2001) that encourage or discourage an interactive atmosphere in the classroom.

Current Study

The main purpose of the current study was to investigate possible differences in learning styles between American and Chinese college students. Based on our review of the past research findings and literature on cultural influences on teaching and learning, the following six hypotheses were generated:

1. Different cultures influence students’ learning styles. Specifically, there would be differences on all the categories of learning styles between the American and Chinese participants.
2. American students would be more likely to score higher on independent, competitive and participatory subscales than Chinese students, whereas Chinese

students would be more likely to score higher on dependent, collaborative and avoidant categories.

3. Male and female students would differ in learning styles in both countries. Specifically, men would score higher on independent, competitive and avoidant styles than women who would score higher on dependent, collaborative, and participant learning styles.
4. There would be differences in learning styles for both groups among students with high, medium and low GPAs.
5. There would be differences in learning styles for both groups among students in different academic disciplines.
6. There would be differences in learning styles for both groups among students at different academic ranks. Specifically, first and second year students would tend to be more dependent whereas the juniors and seniors would be more independent in their studies.

METHOD

Participant

A total of 511 college students participated in this study, 274 (54%) from a regional university in the southeastern part of the United States and 237 (46%) from a major comprehensive university from the northeastern part of China. Of the sample, 42% are male and 51% female (7% unknown). The mean age for the US sample is 24 and 20 for the Chinese counterparts. Their academic majors cover a wide range of disciplines. A more detailed description of their demographic characteristics is presented in Table 1.

Instrument

The Grasha-Reichmann Student Learning Style Scale (SLSS) (1996) was used as the main instrument for the current study. Designed to gauge how college students view their learning, the scale has 60 statements, encompassing six identified learning styles: independent, dependent, competitive, collaborative, participant and

	US (n=274)	China (n=237)
<i>Gender</i>		
Male	111	104
Female	138	124
Unknown	25	9
Mean age	24	20
<i>Academic Rank</i>		
Freshmen	2	173
Sophomore	9	43
Junior	214	13
Senior	43	0
Unknown	6	8

Learning styles	Location	m (sd)	t
Independent*	US	3.48 (.51)	-5.6
	China	3.77 (.48)	
Dependent*	US	3.77 (.48)	10.57
	China	3.29 (.49)	
Competitive	US	2.6 (.65)	.648
	China	2.65 (.54)	
Collaborative**	US	3.55 (.72)	-2.29
	China	3.71 (.59)	
Participant*	US	3.74 (.67)	4.11
	China	3.49 (.58)	
Avoidant	US	2.78 (.71)	1.17
	China	2.77 (.59)	

* p<.01 **p<.05

avoidant. Each of these six categories has ten statements. Here are some sample statements for each category: I prefer to work by myself on assignments in my course (independent). I like it whenever teachers state it clearly what is required and expected (dependent). To do well, it is necessary to compete with other students for the teacher's attention (competitive). Working with other students on class activities is something I really enjoy doing (collaborative). I do whatever is asked of me to learn the contents of my classes (participant). I often daydream in my classes (avoidant). The responses were measured on a Likert scale: 1 = strongly disagree to 5 = strongly agree. For the Chinese sample, the questionnaire was translated from English into Chinese using the back translation method, and tested with a small group of Chinese students before being administered for this study.

This scale has been used by other researchers and has shown good reliability and validity. In the current study, the average Cronbach's alphas for the six categories were .70 and .63 respectively for the American group and the Chinese group. A few items on demographic characteristics were also collected: age, sex, self-reported GPA, academic rank, and major of study.

Procedure

Data collection procedure was similar in the United States and China. Convenience samples were utilized at both universities. The researchers distributed the survey questionnaire to students in their classes, and instructed students that they could fill out the survey either in the classroom or do it later at their conveniences. They were told to put completed surveys in envelopes provided outside in the hallway. Most students returned the completed surveys within a day or two. Participation was voluntary and the responses were anonymous as no name or other personally identifiable information was collected.

RESULTS

We examined the results in the order of each of our previously stated hypotheses. The means and standard deviations of each of the six categories of learning styles for both groups are presented in Table 2.

Hypothesis 1 was only partially supported because the American and Chinese students

showed significant differences only in four out of six learning styles: independence, dependence, collaborative and participant, whereas no significant difference was shown on competitive and avoidant learning styles. Hypothesis 2 was also partially supported. It turns out that the Chinese participants scored significantly higher than their US counterparts on independent and collaborative categories whereas the American students scored significantly higher on dependent and participant categories. There are no differences in the other learning styles.

We then examined each sample individually, breaking it down by gender. Results are presented in Table 3 and Table 4.

Hypothesis 3 was partially supported. The gender differences shown in the results are somewhat similar between the two groups. In the US sample, men scored higher on the avoidant category

than the women, but the women scored higher on both dependent and participant styles. In the Chinese sample, the pattern is similar where women also scored higher on dependent and participant styles. These results are consistent with the direction that was predicted in Hypothesis 3. No differences were found on the other categories.

Next we examined possible relationships between our participants' learning styles and their demographic characteristics. Hypothesis 4 was partially supported. Results show that for the US sample, there is a significant correlation between independent learning style and self-reported GPA ($F=3.3, p<.05$), indicating that those American students who report the independent type of learning pattern are more likely to report higher GPAs than students with other types of learning styles. In the Chinese sample, it was found

TABLE 3
MEANS AND STANDARD DEVIATIONS OF THE SLSS FOR US SAMPLE, BY GENDER

Learning styles	Gender	m(sd)	t
Independent	Male	3.56 (.52)	1.51
	Female	3.42 (.48)	
Dependent*	Male	3.68 (.54)	-3.11
	Female	3.84 (.44)	
Competitive	Male	2.62 (.59)	.603
	Female	2.63 (.66)	
Collaborative	Male	3.57 (.71)	-.116
	Female	3.55 (.71)	
Participant**	Male	3.48 (.71)	-4.33
	Female	3.90 (.6)	
Avoidant*	Male	3.05 (.74)	2.64
	Female	2.62 (.64)	

* $p<.05$; ** $p<.01$

TABLE 4
MEANS AND STANDARD DEVIATIONS OF THE SLSS FOR CHINESE SAMPLE, BY GENDER

Learning styles	Gender	m(sd)	t
Independent	Male	3.83 (.47)	.686
	Female	3.74 (.xx)	
Dependent*	Male	3.22 (.51)	-2.19
	Female	3.34 (.46)	
Competitive	Male	2.64 (.56)	-.642
	Female	2.67 (.52)	
Collaborative	Male	3.73 (.61)	-1.05
	Female	3.7 (.58)	
Participant*	Male	3.4 (.61)	-2.57
	Female	3.57 (.53)	
Avoidant	Male	2.82 (.53)	.749
	Female	2.74 (.59)	

* $p<.05$

that there is a positive relationship between self-reported GPA and competitive ($F=3.5$, $p<.05$) and participant ($F=3.05$, $p<.05$) learning styles, suggesting that those Chinese students who are more competitive and more participant tend to report higher GPAs than students with other types of learning styles.

Hypotheses 5 and 6 were not supported as the results show no significant differences between learning styles and academic disciplines or ranks for either group.

DISCUSSION

Examination of the results clearly shows that the findings only partially support our earlier hypotheses; in fact, some findings are in the opposite direction of our prediction. Based on cultural orientation dichotomy of individualism and collectivism, it was predicted that American students would be more likely to have independent, competitive and avoidant learning styles than the Chinese. However, the findings indicate almost the opposite: the Chinese students turned out to be more likely than their American counterparts to report the independent style. At first glance, it seems puzzling due to the collectivistic nature of the Chinese culture: aren't Chinese people supposed to be more interdependent of one another and less individualistic? The answer may not be a simple one and we may need to look closely at the contextual factors of both groups of participants. We believe that students' self-reported learning styles are shaped by the environment factors. For example, past and experiences may have influenced the learning styles of both participant groups.

If we look carefully at the contemporary Chinese society, we can appreciate how competitive its economy has become in the global world, and the tremendous pressure it puts on the educational system to produce young educated people competent enough to contribute to the growth of the country. Another factor is related to the national only-child reality. A majority of the students are from one-child families. Without siblings, they are used to doing things by themselves and may have developed a more independent behavioral pattern as a result (Liu, 2005). Also, being the only child in the family, their parents have invested heavily in their education since they were born hoping their child would succeed in this competitive world. The reality is that this genera-

tion of students grew up in a highly pressurized environment where they were always taught to excel in school in order to have a successful life. They have had to compete for the best kindergarten, elementary, middle and high schools, and then the top universities. The university where the Chinese participants were attending is one of the nationally recognized leading comprehensive higher education institutes that have high admission requirements. These students may very well have internalized the individualistic notion of independence and competitiveness, as least as far as studying is concerned.

This speculation is consistent with Zhang's (2000) position that Chinese people's collectivism is largely confined to the domain of the family, and in general does not extend beyond that. Once outside family, according to Zhang (2000), Chinese people in fact are very independent and competitive. Growing up in a highly competitive environment, it is not surprising if the students exhibit more independent and individualistic characteristics rather than collectivistic tendency, as traditionally thought.

On contrary, the college where the US participants were attending is a regional university that does not have as stringent entrance requirements, and its students haven't had the highly pressurized experience of competing for the top schools their entire life. This may partially account for the findings in the independent/dependent learning style category. It is reasonable to speculate that if the college were a more academically competitive school, the findings on this aspect may very well turn out differently.

Past research has also indicated that Asian students tend to prefer working on their own to solve problems rather than working in groups, whereas non-Asian American students prefer to work in groups (Hall, 2010). Similar findings are reported by Reid (1987) in overseas Chinese students. Liu (2005) also found in her study that Chinese college students of English preferred working individually rather than in a group. This could simply be a preference that by itself is not complex, but if examined a little more deeply, it may be related to culture and experiences.

We are not suggesting that Chinese students are completely individualistic because the findings also show they scored higher on collaborative style than the US students. It may seem contradictory to the finding on independent style; how-

ever, it may not be. Chinese culture has always emphasizes social and group harmony, and it is instilled in children as a virtue in their socialization. So it is not surprising that while being independent in their overall study habits, the Chinese students may also exhibit some collaborative traits in doing their school work in the classroom. It is likely that it all depends on the subject matter, some being more conducive to group work than others. On the other hand, we believe it is also possible that the students simply picked the answers they thought they “should” do in the collaborative category due to social desirability effect.

The findings that American students are more likely to report the dependent learning style than their Chinese counterparts may at first seem surprising, but in fact they are quite consistent with previous research. American teachers in general are encouraged to give clear and explicit instructions on what the goals and expectations are for the class and how to achieve them (Stronge, Tucker, & Hindman, 2004). These instructions are usually stated in the syllabi as well as given orally in class. Students have learned to depend on these clearly stated instructions for successful completion of the course. In colleges, clear cut instructions from the instructors including grading rubrics are deemed necessary and preferable and students expect the professors to do so in the beginning of the course and follow the syllabus throughout the semester. This structure is something students have come to rely on in their learning. From our personal experiences, the syllabus serves a somewhat different purpose in China. A few years ago the first two authors went to teach in a Chinese university for a semester. The first thing we did was to hand out a detailed syllabus in our respective classes as we normally do here in the US. However, the Chinese students were very surprised at how detailed our syllabi were, including plans for each class period, exam dates, assignment due dates, rubrics, among others. It seemed that their regular professors did not ordinarily inform the class of a detailed course plan for the semester. The syllabus was more of a rough timetable for the instructor rather than for students, and in some cases the instructor did not hand out a syllabus at all (personal communication).

The findings that American students are more likely to report the participant styles are also pretty consistent with previous research that ex-

amines US educational practices. Students have been shown to learn more and better when they are actively involved in the learning process (Davis, 1993). Active participation in class has been linked to greater student academic achievement in the class (Langlois, 2001). Educators in the US are strongly encouraged to explore active learning techniques to bring students into the learning process as opposed to the traditional lecturing format in the classroom (Champions of Active Learning, 2004). In light of these findings, the current results on participant style are consistent with the standard educational system the US students are accustomed to, and by the time they reach college, they are well versed in this practice.

In the area of possible gender differences, the current findings show that for both US and Chinese college students in the study, women were more likely to report dependent and participant learning styles than men. These results are in general consistent with the notion that women tend to be more detail oriented and participatory than men. However, a definitive conclusion can't be drawn until more empirical research is done on this topic.

Regarding learning styles and GPA, the current findings show that independent learning style is positively related to higher GPAs for US students, but no relationships are found for other types of styles. For Chinese students, competitive and participant styles both are positively correlated with higher GPAs. We are not able to assess the directionality of these relationships; however, it seems that certain learning styles are more conducive to higher academic grades than others. Again, more empirical research is needed before we can draw any conclusions.

No relationships are found in the current study between learning styles and academic disciplines or ranks. We speculate if our sample size were larger with enough participants in each category of academic disciplines and ranks, the data might have shown some meaningful results.

LIMITATIONS AND CONCLUSION

The current study has several methodological limitations.

First, sample compatibility is less than ideal. The two universities are of different levels of academic vigor, and therefore the intensity of competitive-

ness is very different which may have affected students' self-reported learning styles. As mentioned before, we believe students' learning styles are shaped by the environment as well as their past and current educational experiences. Further, the participants from the Chinese sample are overall younger than the US participants. Age differences of the two groups may have also influenced the findings.

Second, what is the most appropriate measure of learning styles for college students? There is no definitive answer. We chose SLSS because it focuses on the behavioral responses rather than traits. However, whereas the Cronbach's alpha for the US group is acceptable, the internal reliability for the Chinese sample is relatively lower than hoped for. This raises the question of how well the SLSS measurement worked with our Chinese sample.

Third, although it is believed that most students have a primary type of learning style, it would have been interesting to combine primary and secondary styles, and see what kind of influence that would have on the results.

Despite the limitations of the study though, overall, we hope the current findings will add some useful information to the literature on college students' learning styles, both in the US and China. Future cross-cultural studies should choose a larger and more compatible sample and work with multiple measures. Further, the cultural dimensions of learning styles need to be examined more closely.

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