

# Exposure to Chinese Culture-conforming Parenting and Subsequent Executive Function Skills in Chinese International College Students in the United States

“Louise” Peiyue Zhuang, “Lily” Yaxuan Liang, Destany Calma-Birling, Philip David Zelazo  
Institute of Child Development, University of Minnesota



## Abstract

Executive functions (EF) is a collection of top-down mental processes that require a certain level of cognitive capacity, and its importance is rising increasingly. It can affect one's daily functioning, influence academic and social outcomes, and even serve as a protective factor against adversity. In Western cultures, the “authoritarian” parenting style is thought to be harmful to children's development and may leave long-term consequences. However, some studies have shown that children of East Asian descent are, to a certain degree, exempted from that potential harm (e.g., Huang et al., 2017).

Hence in the present study, we wish to explore the EF scores of Chinese international college students raised by Chinese culture-conforming parents, and we hypothesized that they will have a negative correlation.

We recruited 43 Chinese international students who are currently pursuing a Bachelor's Degree in a four-year college in the United States, and have each participant go through a 20-min survey examining their EF scores, their caregiver's parenting behaviors, their own beliefs regarding Chinese culture, and the extent to which they might have experienced risk and resilience factors growing up.

## Introduction

The purpose of this project is to examine the relation between college students' EF skills and whether these students report having been raised by caregivers who conform to traditional Chinese Culture. Not enough work was done on results of EF skills from parenting behaviors, so we wish to fill the gap by recruiting specifically Chinese college students in America.

This study's main hypothesis is that the EF skills (esp. cognitive flexibility) of Chinese students attending college in the U.S. will be negatively related to parenting conforming with Traditional Chinese Culture—which is low on autonomy-granting. Hence, we expect that college students who perform better on EF tasks will report that their primary caregivers were high on autonomy-granting and conform less with Traditional Chinese Culture. A secondary aim of this UROP project is to explore the associations between adverse childhood experiences (ACEs), EF skills, and mental health outcomes. The study is disseminated through the popular Chinese social software Wechat, with the help of the nation-wide non-profit organization, Chinese Psychology Student Association.

## Methodology

We used the Gorilla Experimenter Builder, a cloud-based research platform that allows researchers and students to create and administer behavioral experiments online (Anwyl-Irvine et al., 2020), to assess EF skills. This platform includes templates of the EF tasks we plan to use in our study and has been shown to reliably measure reaction time. Participants completed a battery of questionnaires that assessed caregiver's parenting behaviors, participant's own view on Chinese cultural expectations, along with sociodemographic measures. The \$5 compensations are delivered through Tango Rewards.

## Measurements

(selected)

- Parenting environment & behaviors:

# The Psychological Control and Autonomy Granting Scale (Silk et al., 2003)

# Egna Minnen Beträffande Uppfostran: One's Memories of Upbringing (Li et al., 2012)

- Own view of Chinese culture:

# Asian American Values Scale (Kim et al., 2005)

- Executive function skills:

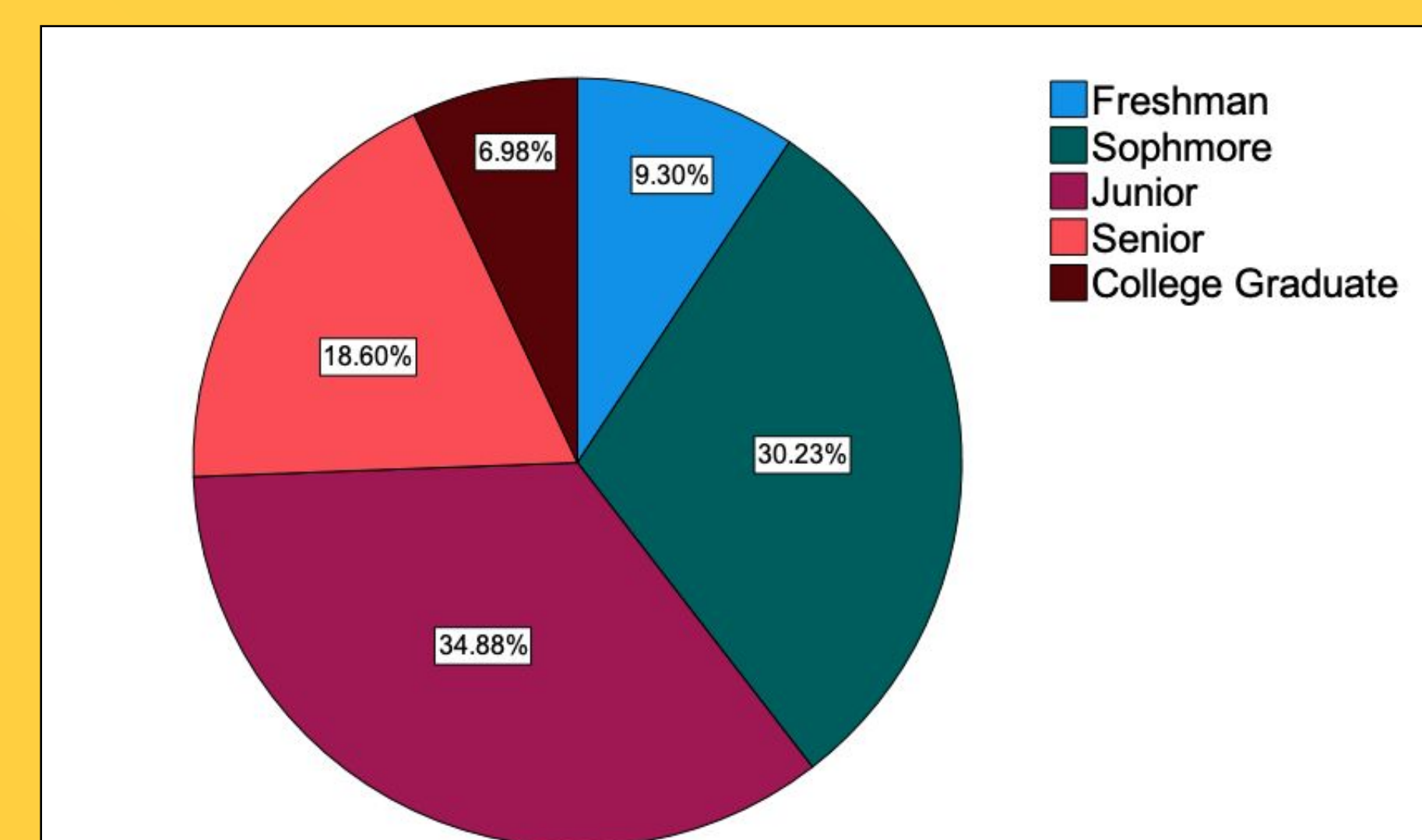
# Cognitive Flexibility: Stroop task

# Inhibitory Control: Flanker task

# Working Memory: Digit Span, Backward Digit Span

## Participants

A total of 63 participants began the study, and among them 43 completed it (N=43). The time frame of recruitment was Mar.4 to Apr. 1st, 2022. The average year of participants who have lived in the United States is 3.21 yrs (SD= 2.157), and the most prevalent major area of study for our participants are Psychology (53.5%) or a related field. In terms of gender identity, 25 participant identify as female and 15 identify as male.



## Results

Table 1. Associations between stroop task performance and both Chinese cultural values and parenting behaviors, controlling for parental education level.

Stroop	Congruent Average Reaction Time	Incongruent Accuracy	Incongruent Average Reaction Time	Cognitive Flexibility
Chinese Cultural Values- Childhood	-.041	-.013	.077	.154
Cultural Values - Adulthood	-.214	.128	-.347*	-.284
Autonomy Granting	-.113	.140	-.070	.014
Psychological Control	-.090	.171	-.071	-.012
Over Protection	.293	.060	.040	-.242
Warmth	.298	.070	.315*	.152
Rejection	.059	-.055	-.026	-.099

Note. \*p < .05

**Finding 1:** The incongruent reaction time is significantly correlated to participants' Chinese cultural values after they came to the U.S. for college and their experience of parental warmth by -.347 and .315, respectively.

Table 2. Associations between performance on the digit span tasks and both Chinese cultural values and parenting behaviors, controlling for parental education level.

Digit Span	Forward Accuracy	Forward Reaction Time	Backward Accuracy	Backward Reaction Time
Chinese Cultural Values- Childhood	.049	.174	-.053	.055
Chinese Cultural Values - Adulthood	.164	.232	.130	-.005
Autonomy Granting	.149	-.113	.163	.069
Psychological Control	.263	-.018	.347*	.127
Over Protection	.062	-.234	-.083	-.261
Warmth	.015	-.299	-.099	-.284
Rejection	-.070	-.178	-.103	-.175

Note. \*p < .05

**Finding 2:** Accuracy of the backward digit span and parenting behaviors that are high on psychological control are positively and significantly correlated by a factor of .347.

Table 3. Associations between flanker task performance and both Chinese cultural values and parenting behaviors, controlling for parental education level.

Flanker	Congruent Accuracy	Congruent Reaction Time	Incongruent Accuracy	Incongruent Reaction Time	Interference Effect: Accuracy	Interference Effect: Reaction Time
Chinese Cultural Values- Childhood	.043	.010	.252	-.135	.254	-.191
Chinese Cultural Values - Adulthood	.274	-.149	.313*	-.149	.218	-.057
Autonomy Granting	.245	.105	.279	-.132	.194	-.278
Psychological Control	.150	-.072	.220	-.208	.172	-.211
Over Protection	-.109	.288	.013	.347*	.062	.191
Warmth	-.290	.241	.088	.255	.223	.111
Rejection	.014	.196	-.071	.229	-.083	.119

Note. \*p < .05

**Finding 3:** A significant correlations were found between “cultural adherence after coming to the U.S.” and accuracy in the incongruent trials by .313.

**Finding 4:** A significant .347 correlation was found between parents' over-protective behaviors and their reaction speed in the incongruent trials' reaction time.

## Discussion

This study's primary hypothesis was that EF skills of Chinese students attending college in the U.S. would be negatively associated with parenting practices that follow traditional Chinese values.

**Finding 1** contradicts our main hypothesis, according to the positive correlation between parental warmth and reaction time for the incongruent trials on the Stroop task. The significant correlation suggests that the more parental warmth one experienced growing up, the more time they needed to answer, which means they are more likely to perform worse in the incongruent stroop trials. This may be partially contributed by the fact that children with parents that are high on warmth require less sensitivity to different social contexts to strive in an interdependent society, and therefore do not need to practice flexibility on a daily basis — hence, growing up in a context-sensitive environment would help one perform better on a cognitive flexibility task (Imada, Carlson & Itakura, 2013).

**Finding 2:** This correlation suggest that participants who have experienced caregiving high on control would actually perform better on this working memory task. — The same trend is observed in **Finding 3**. These two correlations seem to suggest that conformity with Chinese traditional values either by the parent or participants, can actually help one's accuracy performance in working memory and inhibitory control.

**The only significant relationship that supports our general hypothesis** of EF skills being negatively related to parenting practices that aligns with Chinese culture is **Finding 4**, and it suggests that the more parents helicopter over their child, the more likely they will take more time to answer.

There can be multiple explanations for such results, like the fact that over half of participants are already capable college students in a psychology major, so these EF tasks may be too simple for them to see a difference despite a presumably stressful cultural parenting experiences (Yerkes & Dodson, 1908). Additionally, there are ceiling effects observed in task performances, and Junior and Senior students take up over half of participants — so, such high performance may be due to the fact that these young adults are rising to the peak in cognitive ability (Zelazo et al. SRCD Mono), and the same trend may not be observed in a different age group.

## Acknowledgements

Graduate Faculty: Philip D. Zelazo  
Graduate Student: Destany Calma-Birling

Special thanks to the Chinese Psychology Student Association (CPSA), and our pilot study participants:

Yujia Liu Fanwen Kong Jingrou Mai