

# The Links Between Imposter Phenomenon and Implicit Theory of Intelligence Among Chinese Adolescents

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## ABSTRACT

Both imposter phenomenon and implicit theory of intelligence have an impact on adolescents' development, especially affecting their academic progress and mental health. Therefore, these two constructs are well worth investigating, especially in the previously unexplored Chinese adolescent sample. In the present study, the aim was to find out the relationship between imposter phenomenon and Stability of existing ability and Modifiability of ability deficits. In total, Chinese high school students (N=173, Mean age=16.7) completed the Clance Imposter Phenomenon Scale [13] and Implicit Personality theory scale contains two sub-scales measuring Stability and Modifiability belief [19]. Among them, 108 females and 65 males have done the online questionnaire survey. The result suggested there is no significant relationship between imposter Phenomenon and Stability of existing ability and Modifiability of ability deficits in the current sample. Yet a significant difference was identified among the groups with different imposter scores, suggesting a curving effect. Meanwhile, no significant gender differences were noted in the current sample in terms of the three variables. But the results were shown that Chinese high school students had relatively high imposter scores, indicating potential cultural variance. Implications for avoiding imposter phenomenon for Chinese adolescents was discussed, raising awareness in high level of imposter phenomenon among Chinese adolescents.

**Keywords:** *Imposter Phenomenon, Implicit theory of intelligence, Adolescence*

## 1. INTRODUCTION

Imposter Phenomenon (IP) is defined as “an internal experience of intellectual phoniness” [15] and Impostorism is the feeling of being an imposter [6]. Imposters have difficulties in internalising their success [15], which means they believe that their success is due to temporary causes so reject positive feedback about their successful accomplishment of their tasks [8]. In consequence, when they have a different achievement-related task next time, they would expose themselves to self-doubt and anxiety [13]. The study of IP originates from researching high-achieving woman. As the research went further, IP has been identified in people of different genders [5, 35, 54], ethnicities [22] and cultures [9, 14]. Also, studies over the last three decades have shown that IP is prevalent among diverse samples, but the study was not mainly conducted in adolescents' sample. It has been investigated in college students [5, 22, 27, 35 ], physician assistants [42,46] and nursing students [12]. However,

investigations of IP in adolescents are getting more and more attention [7], because of its potential influence on development of adolescents.

Although some research in adolescents has been done, investigations have not extended into Chinese adolescents. Most previous research took place in western cultural backgrounds, but the results could be different in Asia, because of different parenting styles. Previous research shows that IP is positively correlated to high parental control and low level of parental warmth [37, 51], which are the characteristics of the authoritarian parenting style [50, 58]. Some previous studies suggest that native-born Chinese adolescents are more likely to report their parents as authoritarian than foreign-born Chinese adolescents [11]. And Asian-American parents tend to be more authoritarian than European-American [18, 45, 51]. That shows the potential cultural differences in parenting style between western samples and Chinese sample. Besides, authoritarian parenting style shows the highest trait anxiety scores in adolescents among all the parenting styles [59] and trait anxiety has been reported positively correlated

with imposter fears [55]. Other personality traits that correlated to IP such as perfectionism [24] can be predicted by parental authoritarian parenting style [3]. Thus, authoritarian parenting style may have an impact on IP, indicating potential cultural difference in IP between Chinese adolescents and western adolescents because of parenting style. The present study is intended to address this issue.

Another controversial issue in IP is gender difference. Whether gender differences in IP exist or not are still in question. Some studies reported women are more likely to hold imposter beliefs than men [32, 34, 43], while other empirical studies indicated women did not show higher level of IP [4, 7, 17, 53]. This study seeks to contribute to the debate by examining gender difference in current sample (i.e., Chinese adolescents).

Previous research has identified several related variables of IP, such as family background [5, 32, 50, 58] and personality traits [4, 9, 24, 47]. Furthermore, there are also increasingly more studies on the correlation between IP and other constructs, such as self-handicapping [58], self-esteem level and stability [49], self-efficacy [60], as well as entity theory of intelligence [34].

Entity theory of intelligence, otherwise known as fixed mindset, is a construct in Dweck's implicit theory of intelligence (ITI) [20]. People who hold an entity theory believe that their intelligence will not change and cannot be controlled by themselves. While people hold the opposite view—the incremental theory, also called growth mindset, believe that intelligence is malleable [20]. Fixed mindset is viewed as maladaptive and affect the level of efforts people put in pursuing their goal [44]. And growth mindset is seen as adaptive [20]. People view their abilities and intelligence as either stable or malleable [21].

Based on the discussion above, both fixed mindset and IP is highly related to people's achievement behaviour [34]. Specifically, imposters and entity theorists shared an important characteristic, that is, imposters worried that people may discover they are in fact less intelligent than they had been seen, which only matters when people believe their ability are static [34]. As mentioned above, some investigations already show the link between IP and fixed mindset. It has been reported that relationship between IP and fixed mindset existed in female adult [34], but few studies that examined this in an adolescent sample. So the present study seeks to further investigate the relationship with a Chinese adolescent sample.

Ziegler's framework of implicit personality theory is employed in this study [63]. Because this may be a precise specification of Dweck's theory, which gives a better understanding of people's view towards their intelligence. It is based on the model of giftedness [61], indicating people hold the belief of stability of existing ability and belief of modifiability of ability

deficits [62, 63]. Ziegler highlighted that a fixed mindset only leads to negative consequences when an individual show ability deficit [63] and show positive consequences if a person shows high abilities. Ziegler also emphasized on the independent conceptualization, which shows that stability of self can be functional as it can play a critical role in maintaining healthy view of self. That means that it is also meaningful to investigate the relationship between Ziegler's theory and imposter phenomenon.

This study aims to extend the investigation of the relationship between imposter phenomenon, Stability of existing ability and Modifiability of ability deficits to a new sample—Chinese adolescents. It is assumed that the relationship between IP and stability belief will be different from the relationship between IP and fixed mindset. Because stability belief in Ziegler's construct lead to fewer negative consequences than fixed mindset. Therefore, this study aims to explore this relationship.

### ***1.1. Hypothesis***

Based on the literature review above, the following hypotheses were proposed in the present study.

- Boys and girls are different in their scores of Imposter phenomenon, Stability of existing ability and Modifiability of ability deficits.
- Imposter phenomenon is positively correlated with Stability of existing ability.
- Imposter phenomenon is negatively correlated with Modifiability of ability deficits.
- People with different Imposter phenomenon would have different levels of Stability of existing ability and Modifiability of ability deficits.

## **2. METHODOLOGY**

### ***2.1. Research design***

This study adopted survey research in order to examine the above hypotheses. By using this method, it enabled the researcher to assess the three variables in this study, namely, imposter phenomenon, stability of existing ability and modifiability of ability deficits.

### ***2.2. Participants***

Convenient sampling strategy is employed in this study.

Participants in this study were high school students from Chengdu, China. Table 1 shows different types of schools that they currently study in. In total, 183 participants filled in the online survey. Among them, 173 participants (108 females and 65 males, mean

age=16.7, SD=1.27) provided valid data. Participants out of the age limit (13-18 years old) were excluded from the dataset.

### 2.3. Materials

All participants were required to complete two measures as well as 3 questions asking about their demographic information at the end of the questionnaire. Specifically, two existing measures were used in this survey, which were the Chinese version of Implicit Personality Theory of Intelligence scale (IPT) (includes stability belief scale and modifiability belief scale) [19] and Clance’s Imposter Phenomenon Scale (CIPS) [13].

#### 2.3.1. Implicit Personality Theory of Intelligence scale (IPT)

This scale was developed by Ziegler in order to examine stability and modifiability belief, and was further translated into Chinese by Duan [19]. Previous studies have applied this scale in Chinese high school students and showed the same theoretical construct as the original scale. Apart from that, the internal reliability was examined in both scales. The internal consistency reliability of the two sub-scales of the IPT was 0.77 and 0.72, which means the scale also have good reliability from their sample [19].

There were two sub-scales. Six items were found in each scale. Six-point likert scale was used. Participants were asked to rate from “completely disagree (1)” to “completely agree (6)”. An example item is shown:

1: What I learned in school will never be forgotten.

In this study, the reliability was examined. The internal reliability of Stability belief scale was .759 and Modifiability belief scale was .735 after excluding the two reversed items. For the Stability belief scale, item 2 and 3 was excluded because of very low item-rest correlation (item 2:  $r=.208$ ; item 3:  $r=.110$ ). That indicates that these two items may not be suitable for the context of this study. As for Modifiability scale, item 3 and item 6 were not included in analysis, which also had low item-rest correlation (item 3:  $r=.274$ ; item 6:  $r=.138$ ). This may be due to the wording problem. Thus, these two items may be appropriate to exclude as well.

#### 2.3.2. Clance’s Imposter Phenomenon Scale(CIPS)

To the best knowledge of the researcher, there was no existing Chinese version of CIPS. Therefore, the researcher translated it from the original scale. Another researcher back-translated this scale that

ensures the meaning is same as the original scale. Some wordings were adapted for Chinese high school students: in item 14, original “undertaking” was adapted to “duties and responsibility” (职责) in Chinese, and in item 19, “receive promotion” is adapted to “win an award” (获得奖项). Also, the internal consistency of the translated scale was .897 (Cronbach’s alpha).

**Table 1. Frequencies of school type.**

School type	Number of participants
Typical high schools	117
International schools (include juniors and seniors)[1]	49
International department of typical high schools[2]	3
Missing data	4
Total	173

### 2.4. Procedure

The online survey was designed utilizing Wen Juan Xing Platform (<https://www.wjx.cn/>). The link of the questionnaire was distributed in the following ways. URL and mini program (a program on WeChat) of the questionnaire survey were sent out on several social networking platforms, including WeChat and QQ. And the majority of participants voluntarily filled the questionnaire. Specifically, links or mini programs as well as brief instructions for this questionnaire were sent to private chats, group chats, Qzone and Moments. A considerable number of responses were received. Participants clicked the link or the mini program and accessed the questionnaire directly. In particular, by taking advantages of Qzone, quite a few people re-posted the link and spread the questionnaire to more people. Furthermore, with the help of a headmaster in an international school and a few more teachers, more participants who came from international schools took part in this study. So students who came from international schools were involved in this study.

### 2.5. Analysis

Participants’ scores of the scales of imposter phenomenon and implicit personality theory of intelligence were inputted into a software known as Jamovi for quantitative analysis. No missing data were identified. And data of the three variables: IP score, Stability score and Modifiability score all met the assumption of normality. Descriptive data were presented to show the levels of IP, Stability of existing ability and Modifiability belief of ability

deficits of the participants in this study. Independent Sample T-tests were conducted to compare IP, Stability belief and Modifiability belief between boys and girls. Correlation tests were conducted to examine the relationships between IP and Stability beliefs and Modifiability belief. And lastly, ANOVA test was conducted to compare Stability and Modifiability belief in different imposter groups.

**3. RESULTS**

**3.1. Descriptive outcomes**

Descriptive outcomes of score of IP, Stability of existing ability belief and Modifiability of ability deficits are shown in Table 2. In terms of Imposter Phenomenon, participants had relatively high scores (M=65.8, out of 100), which indicates many of them had frequent Imposter Phenomenon. For Modifiability belief (M=19.2, out of 24) and Stability belief (M=12.7, out of 24), participants seemed to hold a belief that their ability can be changed. Because relatively higher score in Modifiability belief and lower scores in Stability belief means they believe that their abilities are malleable.

**3.2. Gender differences in imposter scores, stability and Modifiability belief.**

Independent-samples t-tests were conducted to examine the hypothesis whether gender differences existed in the score of IP, Stability of existing ability and Modifiability of ability deficits. The results showed that there was no significant difference in the scores of IP between boys (M=63.8, SD=12.68) and girls (M=67.1, SD=12.43).  $t(171)=1.668, p=.099$ . Likewise, there was no significant difference in the scores of Stability of existing ability between boys (M=13.0, SD=3.59) and girls (M=12.5, SD=3.75).  $t(171)=-.901, p=.369$ . Also, there was no significant difference in the scores of Modifiability of ability deficits between boys (M=19.1, SD=3.20) and girls (M=19.3, SD=3.13).  $t(171)=.262, p=.793$ . These results suggest that there was no gender difference in the current sample in terms of the variables under investigation.

**3.3. Correlations between variables**

The correlations between IP, Stability of existing ability and Modifiability of ability deficits were under examination. With one-tail hypothesis, results suggests that IP does not have a significant positive correlation with Stability of existing ability,  $r=.114$ , bias corrected and accelerated bootstrap

95% CIs are reported as follows: 95% BCa CI [ 1.000, -.012],  $p=.068$ . IP does not have a significant and negative correlation with Modifiability of ability deficits,  $r=-.0139$ , 95% BCa CI [ .112, - 1.000],  $p=.428$ . Meanwhile, there was a significant and positive correlation between Stability of existing ability and Modifiability of ability deficits,  $r=.292$ , 95% BCa CI [ .423, .149],  $p=.001, r^2=.0853$ . Basically, imposter phenomenon does not significantly correlate with Stability of existing ability or Modifiability of ability deficits. But a weak correlation is demonstrated between Stability of existing ability and Modifiability of ability deficits.

**3.4. Comparison between four imposter groups:**

According to Clance’s IP Test and Scoring standard [13], participants were divided into four subgroups which represent four different severity of imposter phenomenon. Details are presented in Table 3. There was no significant difference between the four groups in terms of scores on Stability belief,  $F(3,9.62)=3.00, p=.084$  (see Table 4 for group descriptives of score on Stability belief).

In contrast, there was a significant difference between the four groups in terms of scores of Modifiability belief,  $F(3,10.5)=5.94, p=.013$ . While the Post hoc comparison shows that the individual comparison between these four groups was not significant, there was a potential curving effect in the 4 groups in terms of Modifiability of ability deficits (see Table 5 for group descriptives of the score of Modifiability of ability deficits).

**Table 2. Descriptive statistics of the scores of Imposter Phenomenon Scale, Stability of existing ability, Modifiability of ability deficits.**

Variables	NO.of participants	M	SD	Mdn
Imposter phenome-non	173	65.8	12.6	66
Stability of existing ability	173	12.7	3.69	12
Modifiability of ability deficits	173	19.2	3.15	20

**Table 3. Classification of groups according to imposter scores.**

Group number	Imposter Scores' range	Severity of imposter phenomenon
1	≤40	Few imposter characteristics
2	41-60	Moderate IP experiences
3	61-80	Frequent IP feelings
4	>80	Intense IP experiences

**Table 4. Group descriptives of the scores of Stability of existing ability.**

	IP group	N	Mean	SD	SE
Stability	1	3	7.33	3.21	1.856
	2	59	12.59	3.69	0.481
	3	87	12.62	3.67	0.394
	4	24	13.63	3.35	0.683

**Table 5. Group descriptives of the scores of Modifiability of ability deficits.**

	IP group	N	Mean	SD	SE
Modifiability	1	3	15.3	1.53	0.882
	2	59	19.5	2.96	0.385
	3	87	19.3	3.18	0.341
	4	24	18.6	3.39	0.691

#### 4. DISCUSSION

This study investigated the relationship between imposter phenomenon, Stability belief and Modifiability belief among Chinese high school students.

The descriptive data of this study showed that Chinese adolescents had a relatively high level of imposter phenomenon (mean=65.8 out of 100). Compared to previous research with western adolescents as sample, Chinese adolescents appear to have a higher level of imposter phenomenon [7, 17, 29]. The cause of cultural differences is that Caselman, Self & Self [7]'s study recruited participants from various ethnicities in the United

States background. While participants in this research are Chinese adolescents. That indicates that IP may be more frequent in Chinese background. As mentioned earlier, authoritarian parenting styles are more common in Chinese culture than western countries [11, 52]. That is evident from less autonomy and over-protection on children from Chinese parents [37, 39, 51]. Instead, they have higher controlling and monitoring behavior than western parents [11, 37, 39, 51, 52]. And a high level of parental control and over-protection is positively correlated with IP [36]. Recent research also indicates that authoritarian parenting style was associated with "parenting criticism. Doubts about abilities and concern over mistakes" [57]. Fear of mistakes and

self-doubt is a typical feature of IP [48]. Therefore, authoritarian parenting style may explain the differences in imposter scores of Chinese and western samples. Considering the characteristics of this study, which is Chinese adolescents recruited from one city, future studies may use a larger and more representative sample to investigate imposter phenomenon in Chinese adolescents.

There is no significant gender difference in imposter phenomenon in Chinese adolescents. In terms of previous research, there is no consistent evidence existing and one of the potential reasons is the differences in the sample. Similar findings were reported in previous studies conducted in adolescents sample [7, 17]. This is because differences between male and female in parenting become less significant because of one-child policy in China, they are more likely to be treated equally in terms of academic demands from parents and teachers [23, 38, 56]. That is explained by the fact that the vast majority of the subjects in this study were from urban areas. The one-child policy has resulted in a child-orientated culture in society, regardless of their gender. Parents of one-child families have equally high expectations between boys and girls on their children's academic success [25, 56]. Then they are more possible to consider their success and achievement similarly. However, significant differences present in samples of college students [32, 34]. The underlying psychological mechanisms can explain the result. The reason is that women are more vulnerable to imposter fears than men [34]. According to Maccoby & Jacklin's study [41], women frequently reported lower performance expectancies and lower self assessments of ability than men. Clance & O'Toole [16] suggest that male has more social support in their academic and work environments, but the female does not have this kind of support. Therefore, women more easily expose themselves to imposter fears. This is also because the IP may be more likely to be related to academic achievement for female than male [32]. Female adolescents spent more time outside of school to study and usually have higher achievement in most of the subjects. That means they may care about academic achievement in adolescent years [40]. Furthermore, it has been suggested that female has more roles than male and they believe their new roles should be done perfectly, which contribute to imposter phenomenon [13, 14, 28]. Future research can further explore whether gender differences exist in different age groups of Chinese samples.

Meanwhile, no significant gender differences exist in terms of Stability of existing ability and Modifiability of ability deficits. Relatively few studies have considered this issue. Similar to the discussion above, boys and girls in China may not be treated significantly different in terms of academic demands [25, 38, 56]. That means there are no significant gender differences in Stability and Modifiability belief among Chinese adolescents. Further research is

needed to provide more empirical evidence for this relationship of this issue.

The results also show that no significant correlation between imposter phenomenon and Stability of existing ability and Modifiability of ability deficits. The results suggested that the relationship between IP and Stability or Modifiability belief is different from the relationship between IP and fixed mindset. In accordance with the different conceptualisation of these constructs, different measures are utilized. Implicit Theory of Intelligence Scale examines whether people believe their ability and intelligence varies while Stability scale tests the extent that they can persevere action repertoire — their possibilities for action an individual is capable of executing [61]. While Modifiability scale measures whether they can expand the action repertoire. Future research may clarify whether stability of existing ability and fixed mindset is differently related to the imposter phenomenon.

Potential problems with the Chinese version of Implicit Personality Theory of Intelligence [19] that can be improved in the future research. There are some differences existed in the English version and Chinese version. For example, item 1 in the English version says: "After I have learned something in school, I don't forget how to apply it." This item is worded as "forget how to apply", which implies whether their existing ability will change in the future. However, it seems that Chinese version emphasizes how the changes in places (e.g. school) rather than their personal beliefs in stability of existing ability. Therefore, this may pose questions to the validity of this measure. This still remains as a problem to be addressed in future studies.

Despite the non-significant linear correlations between imposter phenomenon, Stability and Modifiability in this study, significant differences in Modifiability scores were reported between different imposter groups. It is interesting to note that a potential curving effect is presented in these four groups: the group who has moderate imposter phenomenon has the highest mean score of Modifiability belief (Modifiability score=19.5), followed by the group with frequent imposter phenomenon (Modifiability score= 19.3). According to the Actiotope Model of Giftedness (Ziegler, 2005), increase in Modifiability belief means the expansion of the action repertoire, which may threaten the stability of the Actiotope. Threatening of Stability belief means difficulties and setbacks may impede the learning process and even cause demise in the study process. Then, people may tend to avoid efforts, resulting in self-handicapping [33]. This tendency also disables people to execute actions to deal with prospective situations, which may result in low self-efficacy and anxiety [1, 2]. And low self-efficacy and anxiety goes by IP [54, 58, 60]. Therefore, it is postulated that high level of

Modifiability may relate to the high level imposter phenomenon. Future studies can further investigate the curving effect of Modifiability score shown in this study.

## 5. CONCLUSION

By conducting a survey research of relationship between imposter phenomenon, stability belief of existing ability and Modifiability of ability deficits in Chinese high school students, this study showed that Chinese high school students had relatively higher imposter scores, indicating cultural differences between Chinese and western adolescents in imposter phenomenon. No significant differences between male and female adolescents in imposter phenomenon, Stability belief and Modifiability belief, which are consistent with some research that used adolescents as sample. In addition, results showed that correlations between imposter phenomenon, Stability belief and Modifiability belief were not significant. However, significant differences in Modifiability of ability deficits present in different imposter groups, suggesting a curving effect.

## 6. LIMITATIONS

One of the limitations in this study is sampling strategy. Convenient sampling was used to collect data and the sample size was relatively small. Due to the characteristics of the current sample. The results need to be taken as caution. Future studies may use more representative samples. Moreover, this paper also shows evidence that the Chinese version of Implicit personality theory scale can be refined to present clear wording. Future studies may validate a new translated version of the scale to ensure better construct validity and reliability.

## 7. IMPLICATIONS

This study has extended the investigation of IP to a new sample— Chinese high school students. The results have shown cultural differences with imposter scores, implying Chinese high school students may be more susceptible to imposter phenomenon. Frequent imposter phenomenon has the potential hazard to students. Therefore, this alarming consequences of high imposter phenomenon in current sample should raise awareness of teachers and parents. So, it is needed for teachers and parents help students to acknowledge and celebrate their own achievements, preventing this phenomenon endangering their mental health. Mentor programs and group meetings with only imposters can be helpful to decrease imposter feelings [15, 31]. Students themselves should also be aware of the

imposter phenomenon. Emphasizing the importance of self-worth, seeking families and friends for help and motivate themselves intrinsically are also useful methods.

By understanding the relationship between the imposter phenomenon and implicit theory of intelligence, students can avoid this potential detrimental effects on their development.

## ACKNOWLEDGMENT

Thanks for the support from Dr.Jie.Gao for her advice on the whole research process and academic writing and for her assistance in translating scales.Also,be thankful to my parents for their financial support during this period.

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